PORT OF TILBURY LONDON

PLANNING ACT 2008
INFRASTRUCTURE PLANNING (EXAMINATION PROCEDURE) RULES 2010

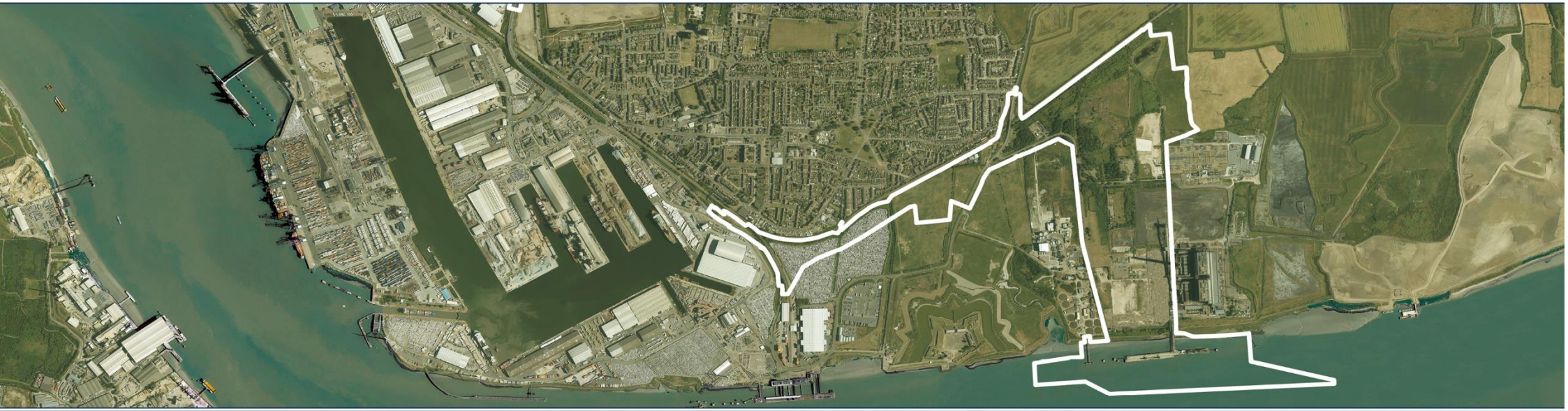
PROPOSED PORT TERMINAL AT FORMER TILBURY POWER STATION

TILBURY2

TRO30003

Written Submission of Case at ISH of 19th April

DOCUMENT REFERENCE: PoTLL/T2/EX/95



TILBURY2

PORT OF TILBURY LONDON LIMITED – TILBURY2 – DEVELOPMENT CONSENT ORDER APPLICATION

SOCIO-ECONOMIC, TECHNICAL AND OTHER ENVIRONMENTAL MATTERS ISSUE SPECIFIC HEARING

19 APRIL 2018

SUMMARY OF APPLICANT'S SUBMISSIONS

1. INTRODUCTION

1.1 This note summarises the submissions made by Port of Tilbury London Limited ("PoTLL") at the Issue Specific Hearing in relation to Socio-Economic, Technical and other Environmental Matters held on 19 April 2018 ("the hearing") in relation to PoTLL's application for development consent for a Proposed Port Terminal at the Former Tilbury Power Station known as "Tilbury2" ("the Scheme").

1.2 Oral submissions by all parties attending the hearing were made pursuant to the agenda published by the Examining Authority ("the ExA") on 11 April 2018 ('the agenda"). In setting out PoTLL's position on the issues raised in the agenda, as submitted orally at the hearing, the format of this note follows that of the agenda. In addition, extra items have been added where interested parties or the ExA raised points not specifically mentioned in the agenda and in relation to which PoTLL made oral submissions. Where the ExA requested a written response to an agenda item, the Applicant has also responded as appropriate in the note below.

PINS' ISH Agenda Item/ Issue	Summary of PoTLL's Oral Submissions made in the Hearing	Relevant document references
Socio-Economic Effects		
17.1 Opportunities/Benefits in Thurrock - Thurrock Council (TC) listed a range of opportunities/benefits in its response to ExA's FWQs Q1.17.3 [REP1-092], which asked TC the socio-economic impact of, and opportunities/benefits arising from, the Proposed Development.		
i. Would the Applicant and TC update the hearing on the current position with their discussions on these matters?	**Steven Taylor** recognised both the 'good employer' role of PoTLL and the positive discussions that have been held between Thurrock Council and PoTLL on the Skills and Employment Strategy. The current focus for Thurrock Council is to extent this 'good neighbour' role to the Port's tenants. **Francis Tyrrell** of Pinsent Masons LLP, on behalf of PoTLL, recognised and echoed Thurrock Council's recognition of the 'good employer' role played by the Port and the good engagement between PoTLL and Thurrock Council. The Port is aware of the Council's desire to extend the 'good neighbour' current initiatives by PoTLL to its customers and tenants. PoTLL is in active discussion with Thurrock Council to take that forward, and has made provision for this within the updated Skills and Employment Strategy submitted at Deadline 3.	Updated Skills Employment Skills Strategy (Appendix 3 to PoTLL/T2/EX/83)
• ***17.2 Employment Skills and Strategy***		
i. TC states that the potential for local socio-economic benefits, to be delivered through the Employment and Skills Strategy, are supported by TC, and that discussions with the Applicant regarding the detailed content of the Strategy are ongoing (re TC's WR [REP1-090]). Would the Applicant and TC update the hearing on the current	The **ExA** recognised that the Skills and Employment Strategy is a 'key plank' in the plans and asked Thurrock Council on their views of it. **Steven Taylor** confirmed that Thurrock Council do support the Skills and Employment Strategy and that discussions to finalise it were ongoing with PoTLL. The Skills and Employment Strategy is a sensible way of capturing what both parties are trying to achieve. **Kieron Hyams,** of Arup, on behalf of PoTLL, gave some further detail on the progress in ongoing discussions between Thurrock Council and PoTLL, thanking the Council for their engagement to date and the strong recognition of the current positive role of PoTLL in this area. The applicant viewed the Skills and Employment Strategy as covering the Thurrock Council area, but in keeping with the current employment catchment, recognised that it also extended beyond this administrative boundary.	Updated Skills Employment Skills Strategy (Appendix 3 to PoTLL/T2/EX/83)

position with regard to the Employment and Skills Strategy?	Discussions between Thurrock Council and PoTLL have focused on how PoTLL's 'good neighbour' relationship can be extended to tenants and customers. The Skills and Employment Strategy addresses these issues and the updates being progressed make this more explicit. PoTLL will be committing to establish a shared forum with Thurrock Council, Gravesham Council and the Essex Employment and Skills Board, and the Port's tenants and customers in order to highlight and drive those issues forward, and this is reflected in the updated Skills and Employment Strategy submitted at Deadline 3. **Wendy Lane** stated that Gravesham Borough Council welcomed that they were included in the proposed shared forum.	
ii. How will it be secured?	The provisions of the Employment and Skills Strategy will be secured through a section 106 agreement with Thurrock Council **Matthew Gallagher** stated his understanding was that the Skills and Employment Strategy would be secured through the Section 106 Agreement, as an appendix to the Agreement. **Francis Tyrrell** confirmed and agreed that the applicant would be seeking to secure the Skills and Employment Strategy through a Development Consent Obligation, more commonly referred to as a Section 106 Agreement, to which the Skills and Employment Strategy would be appended. A draft of this agreement has been submitted at Deadline 3.	Draft section 106 Agreement (PoTLL/T2/EX/83)
• ***17.3 Wider Opportunities - In Section 1.17 of its submission at deadline 1, Essex County Council (ECC) makes a number of points on socio-economic effects [REP1-050]. What is the status of discussions between the Applicant and ECC in relation to ECC's assertions that:***		
i. The employment catchment for Tilbury extends beyond Thurrock and that this should be considered when implementing the Skills and Employment Strategy?	**Kieron Hyams** stated, when thinking about the ports employment catchment, that the applicant has considered both construction and operational employment socio-economic effects. For construction, the Environmental Statement has considered effects across the greater south east (including London, the South East and East of England regions) recognising that this has a broad catchment. More importantly, for operational effects the assessment and the Skills and Employment Strategy recognise that the current port catchment does indeed extend beyond the Thurrock Council administrative boundary.	

ii. Emphasis should be placed on the use of the local supply chain and economy to realise these benefits?	**Kieron Hyams** provided several references within the Skills and Employment Strategy to organisations and programmes that PoTLL collaborate with currently by way of representing the Port's engagement in the labour market beyond the Thurrock Council administrative boundary. These included: the Logistics Academy East of England, South Essex College, Career Ready, the Careers Enterprise Company, the Department for Work and Pensions, JobCentre Plus, the Tilbury on Thames Trust (in connection with a Department for Trade and Industry-led project on employment opportunities for military veterans) and Opportunity South Essex. The appendix at Section 5 of the Skills and Employment Strategy provides a more comprehensive list.	Updated Skills Employment Skills Strategy (Appendix 3 to PoTLL/T2/EX/83)
iii. The strategy should take into account and refer to the Essex Employment and Skills Board and the role that the Board can play in shaping local educations offers to meet employers' requirements?	**Kieron Hyams** provided a summary of discussions to date between Essex County Council and PoTLL in relation to the Skills and Employment Strategy and the role of the Essex Employment and Skills Board. PoTLL has proposed to Essex County Council the creation of the shared forum which would include the Port, Thurrock Council, Gravesham Council and the Essex Employment and Skills Board, and the Port's tenants and customers. This is aimed at addressing the concerns of Essex County Council (as well as other local authorities) to create a way of ensuring skills and employment issues are discussed and managed in a coordinated way and to give a means of the public sector 'getting in front of' port tenants and customers. It would enable a two-way discussion on programmes, projects and initiatives This builds on the mature and in depth relationship that PoTLL already has with wide range of employment related parties. This will enable the Essex Employment and Skills Board to have a defined roll in Port skills and employment discussions.	Updated Skills Employment Skills Strategy (Appendix 3 to PoTLL/T2/EX/83)
iv. ECC would anticipate an increased need for high-level engineering/construction/digital technology skills to support expansion of the port itself, the Lower Thames Crossing, Bradwell B (new nuclear power station), housing/infrastructure development plus the expected	**Francis Tyrrell** stated that the socio-economic impact assessment within the Environmental Statement does set out the expected cumulative impacts at a regional level relating to the proposals and other developments. Table 7.23 outlines a number of development proposals considered in combination with Tilbury. The Lower Thames Crossing was not considered as part of the application cumulative assessment as there is not considered to be sufficient detail on that aspect of the scheme at this stage. He indicated that, as per PoTLL's comments regarding this issue at the Issue Specific Hearing on 18 April, a high level qualitative, proportionate cumulative assessment of possible socio-economic effects with LTC has been undertaken for Deadline 3. That said, this anticipated increased demand for employment has been assessed within the socio-economic impact assessment. In combination, it is anticipated that the overall effect would be to create stimulus and critical mass for providers to offer appropriate courses and training. This would be the case with or without the Lower Thames Crossing project. The increase in demand therefore	Qualitative Cumulative Effects Assessment of Tilbury2 with Tilbury Energy Centre and Lower Thames Crossing (PoTLL/T2/EX/92)

industry/employment migration from London, all of which will impact on available labour force?	supports the provision for upskilling of the community although the skills and employment types and timing of construction periods would vary. The Port would continue to provide opportunities such as industrial placements, apprenticeships and local publishing of posts as set out in the Skills and Employment Strategy. **Kieron Hyams** provided his understanding of Essex County Council's reference to 'an increased need for high-level skills' based on discussions with them to date. This is understood to be a high-level statement about the changing nature of the workforce and recognising the sectors which they imagine will become more prominent in the future in the area. Discussions between PoTLL and Essex County Council have been cognisant that this, like the South East as a whole, is an area of forecast and planned housing and population growth. The applicant believes it is right and proper, and indeed desirable, that there is development which provides employment to accompany that housing and population growth. Reference to these sectors is about reaching a 'critical mass' of demand to the point that education providers will reflect these sectors in their offer.	
Construction/Engineering and Design		
5.1 Piling		
i. Ref the Marine Management Organisation (MMO)'s SoCG (5.3.5), [REP1-021] effects of underwater noise to fish, the MMO is concerned that underwater noise could result in an acoustic barrier and cause temporary behavioural effects on fish, which are therefore unlikely to be negligible. The Applicant has proposed mitigation and intermittent, small scale, temporary piling. Would the MMO and Applicant please update on progress with this?	**Jayne Burns** on behalf of the MMO stated that they are satisfied with the assessment and mitigation measures recently provided by the Applicant on this issue. However, based on a comment made during the ISH (18/04/2018), regarding the submission of updated piling details to Chapter 17 of the ES to Deadline 3, the MMO would like to see this update to ensure that any alterations are in line with what they have assessed and agreed previously. **Francis Tyrrell** welcomed the MMO's confirmation that they are content with the issue of underwater noise and piling, but clarified that the Applicant does not intend to amend any chapters of the ES but will instead issue information at Deadline 3 as to the noise effects arising from the piling details given in the errata Chapter 5.	ES Chapter 5 Errata Version (AS-006) Update to ES Appendix 17.A (underwater noise assessment) (Appendix 1 to Written Summary of Case at Issue Specific Hearing of 18 April (PoTLL/T2/EX/94))

ii. Ref FWQ 1.5.2, the non-piling window is not included in the Construction Environmental Management Plan (CEMP). Does the MMO	**Francis Tyrrell confirmed** that it is not necessary for the non-piling window to be included in the CEMP as it will be imposed through the operation of the DML. **Jayne Burns** on behalf of the MMO indicated that they agree with this position.	
iii. Ref the Port of London (PLA)'s FWQ comments [REP1-082]: There are various piling techniques, and mitigation for specific piling should be clearly identified, including the type of piling and seasonal restrictions. As indicated in the comment on FWQ 1.2.31, the PLA anticipates such necessary mitigation being the subject of conditions on its approval under the protective provisions. Would the MMO, PLA and Applicant update the hearing on progress with this matter?	**Francis Tyrrell** confirmed that PoTLL does not believe this is a point at issue between the parties. It acknowledges the PLA's ability to impose conditions by way of the protective provisions.	
iv. Condition 8 regarding minutes of soft start has been updated in the revised dDCO, although is still incomplete. Would the Applicant confirm that it will include details of no-piling hours and what this detail will be?	**Francis Tyrrell** confirmed that these details will be added to the DML once discussions on these matters with the MMO have reached an agreed position. **Jayne Burns** on behalf of the MMO indicated that they agree with this position.	

18.1 Transport Assessment		
i. Would the Applicant and Thurrock Council (TC) update the hearing on their discussions on the traffic impact of the Proposed Development on the local highway network in Thurrock and mitigation measures; and the infrastructure corridor link road design, junctions and access arrangements (re Section 5.1 of SoCG Applicant-TC Appendix 1 of SoCG Update Report [REP1-021])?	**Phil Hamshaw** of I-transport, traffic consultants for PoTLL, confirmed the view of Thurrock Council expressed at the hearing that matters had taken a positive step forward on the infrastructure corridor link road design, junctions and access arrangements. **Phil Hamshaw** explained the impact on the local highway network is within acceptable limits as set out in the TA and is not disputed by TC as confirmed in the SOCG with TC.	Statement of Common Ground Update Report (PoTLL/T2/EX/93)
ii. Would the Applicant and Essex County Council (ECC) update the hearing on their discussions on the traffic impact on the local highway network re the impact of the A1089/A13 Interchange on the A13 link capacity, and the routing of commercial traffic with respect to the A13 / M25 Junction 30 (re ECC's response to ExA's FWQs Q1.18.6(b) [REP1-050])?	**Phil Hamshaw** confirmed that discussions have been continuing with ECC who have acknowledged that the impact on the wider strategic network including A1089/A13 and M25 Junction 30 is a matter for HE. ECC only wish to be assured that HE are satisfied any impact is within acceptable limits. This will be incorporated in future SoCGs. **Phil Hamshaw** explained the distribution (routing) of commercial (HGV) traffic has been agreed with HE and that this is confirmed by HE in response to ECC FWQ 1.18.6(b) [REP2-003].	
iii. Would the Applicant and Kent County Council (KCC) update the hearing on their	**Phil Hamshaw** explained the Applicant has provided additional information to KCC on the forecast HGVs on their road network. The Applicant has received a subsequent request for	

discussions on the traffic impact on the KCC local highway network including the forecast number of HGVs on the KCC highways network (re SoCG Applicant-KCC Appendix 8 to SoCG Update Report [REP1-021], and KCC's WR [REP1-066])?	clarification from KCC. Discussions are continuing.	
iv. Would the Applicant and HE update the hearing on their discussions on the traffic impact on the strategic road network, including the analysis of traffic generation, trip generation, traffic modelling and its impact, and mitigation measures for the strategic road network (re SoCG Applicant-HE Appendix 6 of SoCG Update Report [REP1-021]; HE's WR [REP1-060]; HE's response to ExA's FWQs Q1.18.5 [REP1-062]; HE's deadline 2 submission [REP2-001])?	**Phil Hamshaw** countered HE's initial view of discussions to date clarifying that dialogue had been continuing since February 2017, the TA was a combination of technical analysis which were provided to HE pre-submission (as noted in the response to Highways England's relevant representation (AS-049). The Applicant has continued an ongoing dialogue responding to HE requests. **Phil Hamshaw** emphasised that the TA demonstrated the impact of the development on the SRN would be within acceptable limits, with the residual impact on the SRN not 'severe'. **Phil Hamshaw** explained good progress has been made on details of the traffic/trip generation, with agreement in relation to Parking and the Walking, Cycling, Horse-Riding Assessment. **Phil Hamshaw** stated that there was ongoing dialogue and he was satisfied outstanding points of clarification could be resolved. **Francis Tyrell** responded to the ExA request to provide 'Rochdale envelope' worst case traffic estimates to HE, by confirming the Applicant had provided worst case traffic generation estimates to HE consistent with the 'Rochdale envelope' approach to assessment. **Francis Tyrell** further clarified that the outstanding request for information from HE was for historical growth at the existing Port which is not relevant to 'Rochdale envelope' assessment. **Peter Ward,** Commercial Director of PoTLL, confirmed that the worst case assumptions which underpin the TA are linked to throughput volumes estimates at Tilbury2, which in turn directly influence the traffic generation estimates. **Peter Ward** and **Phil Hamshaw** noted that the TA had been brought forward on a worst case basis, in particular by assuming all throughput is exported by road whereas a large proportion will be by rail, and some could be transported by barge. The assumptions for road transport also assumed the smallest payload vehicle for aggregates export, therefore generating the largest	Traffic Generation Assumptions for Tilbury2 (PoTLL/T2/EX/84)

	number of potential road vehicles. **Phil Hamshaw** confirmed that the TA assesses an extreme worst case scenario with these assumptions in combination and demonstrates that even on this basis the residual impact is acceptable. **Francis Tyrell** noted that this approach should satisfy the ExA that the assessments satisfy the 'Rochdale envelope' requirements. **Francis Tyrell** and **Phil Hamshaw** confirmed that a summary note of the assumptions underpinning the traffic generation estimates would be submitted by Deadline 3. This has been completed.	
v. What is the position regarding the design of, and mitigation measures for, the Asda roundabout (re TC's WR [REP1-090], TC's LIR [REP1-101], Amazon's WR [REP1-024], ECC's response to FWQs [REP1-050])?	**Francis Tyrrell** confirmed that the Applicant has always proposed a mitigation scheme for the ASDA roundabout. Details of the scheme continued to be discussed with HE and TC. The scheme is designed in accordance with DMRB and any modifications will similarly be designed in accordance with DMRB. In any event any improvements to the junction would require appropriate approval by HE through the protective provisions of the DCO, with similar input from TC as appropriate to the local road network. **Phil Hamshaw** confirmed that the TA has included Amazon as a committed development with associated traffic and is liaising with Amazon's representatives to reach an agreed position. **Phil Hamshaw** stated that discussions with HE were focused on various matters but not the ASDA roundabout and therefore an update on the status of the mitigation measures at ASDA roundabout for Deadline 3 was not expected. **Phil Hamshaw** explained that the Applicant considered the improvements at the ASDA roundabout provide suitable mitigation both in terms of the limited effect on capacity and in terms of safety, particularly for pedestrians. However, as mentioned dialogue was ongoing and, if necessary, modifications to the mitigation measures will be made. Further to the oral submissions at the Hearing, PoTLL has produced a note to demonstrate that the likely alternative proposals at Tilbury2 would fall within the Order limits, or would otherwise fall within the ambit of the wider streets powers included within the draft DCO.	Asda Roundabout: DCO Powers and Potential Scope of Works (PoTLL/T2/EX/85).
vi. Would TC, ECC, KCC and HE update the hearing on whether they regard the Construction Environmental	**Phil Hamshaw** responded to TC's concern about Fort Road bridge closure requiring HGV's to route through sensitive areas and confirmed discussions were ongoing to ensure appropriate management of vehicles during the proposed closure. This has been clarified in the revised	Appendix 1 to the revised CEMP (PoTLL/T2/EX/72)

Management Plan (CEMP) and Construction Traffic Management Plan (CTMP) as satisfactory for transport purposes?	CTMP submitted at Deadline 3. **Phil Hamshaw** confirmed neither ECC nor KCC have commented or raised any concerns in discussion on the CEMP or CTMP.	
18.2 Framework Travel Plan (FTP) - In TC's response to ExA's FWQs Q1.18.6 [REP1-092], TC states that the FTP is for the new site only and suggests that it should extend across the whole of the Port development within the control of the Applicant. TC also proposes a number of other improvements to the FTP including tenant travel plans, annual monitoring of the plan, cycle parking, cyclist and pedestrian and security, and on-site parking.		
i. Would the Applicant and TC state the latest position on their discussions on the FTP? ***ii. Would the Applicant and HE state the latest position on their discussions of the FTP (re SoCG Applicant-HE Appendix 6 to SoCG Update Report [REP1-021])?***	**Phil Hamshaw** confirmed further comments from TC (and HE and ECC) have now been incorporated into a revised draft of the FTP, alongside information clarifying its content, which is under discussion with TC (and HE and ECC) and a revised document would be submitted at Deadline 3. **Phil Hamshaw** explained the Framework Travel Plan (APP-073) has been prepared for Tilbury2 only. However, it is noted that the Framework Travel Plan requires the creation of a Sustainable Travel Group which will include, amongst others, Thurrock Council and Highways England. It will also include PoTLL, who, as noted in paragraph 5.13 of the FTP, are also present on the London Distribution Park Steering Group (which includes Amazon). Therefore PoTLL has a wider role in providing a coordinated approach to travel planning within Tilbury through that existing forum and the Tilbury2 FTP should be focused on the particular requirements of Tilbury2 albeit in the context of wider Tilbury travel planning matters. A revised version of the document has been submitted at Deadline 3 with all principle matters agreed, with just some discussion of detailed wording still to be undertaken.	Revised Framework Travel Plan (PoTLL/T2/EX/67)
iii. What is the position re ECC's call for clarity on how the proposed measures to promote public transport will enable the workforce at Tilbury 2 to effectively use the public transport to travel to and from work, the approach to	**Phil Hamshaw** explained the Applicants understanding of ECC's position was their concern of the ability of staff to travel to Tilbury2 by public transport, in particular shift workers by bus. This matter has been clarified in the revised FTP which demonstrates that the majority of shift workers would be able to travel by bus with a new bus stop at the entrance to Tilbury2. **Francis Tyrell** responded to the ExA question to confirm the FTP would be secured by a requirement within the DCO (Schedule 2)	Revised Framework Travel Plan (PoTLL/T2/EX/67)

promoting sustainable travel modes by PoTLL with the new workforce to encourage a modal travel shift, and the additional staff facilities to be provided on site for pedestrians and cyclists (re ECC's response to ExA's FWQs Q1.18.6(c) at deadline 1 [REP1-050])?		
18.3 Sustainable Development Plan (SDP) - In TC's response to ExA's FWQs Q1.18.6 [REP1-092], TC states that the SDP could be merged with the FTP, to manage all aspects of sustainable travel and transport under one umbrella, and makes proposals on moving other freight arriving at the port by rail rather than road, and on monitoring of the plan for effectiveness. TC is also concerned that there may be insufficient capacity on the rail network beyond the London-Tilbury-Southend railway line, and there may be insufficient freight parking for HGVs.		
i. Would the Applicant and TC state the latest position in relation to the SDP? ***ii. Would the Applicant and HE do likewise (re SoCG Applicant-HE Appendix 6 to SoCG Update Report [REP1-021])?***	**Phil Hamshaw** explained that the production of an SDP was requested by TC at the Scoping stage as required by policy PMD11 of Thurrocks Core Strategy. The FTP and SDP are essentially companion documents but perform two separate but complementary roles. FTP is to do with people movement, SDP is to do with freight movement. Discussion will continue with TC, however at this stage the Applicant intends to retain both documents unless agreed otherwise. **Francis Tyrell** confirmed updated versions of the FTP and SDP would be submitted at Deadline 3 subject to receipt of responses from the authorities. Following discussion with those TC and HE, a revised version has been submitted at Deadline 3.	Revised Sustainable Distribution Plan (PoTLL/T2/EX/69)
18.4 Roles and Responsibilities re the Strategic Road Network (SRN)		
i. Would the Applicant and HE update the hearing on their discussions with respect to the roles, responsibilities and powers that would apply on the SRN when the proposed	**Francis Tyrrell** explained that PoTLL and Highways England are maintaining a productive dialogue. The Applicant is satisfied that the protective provisions submitted as part of the dDCO enable Highways England to impose conditions before works which interfere with highways operations are begun. This is, in our view, the appropriate mechanism to ensure that the SRN is safeguarded. HE is currently reserving its position on whether it considers the application of the	

Works were being undertaken on or near it (re HE's WR [REP1-061])?	protective provisions sufficient protection.	
ii. What assurances would HE require to ensure that it was not prevented from discharging its statutory duties?	**Francis Tyrrell** set out that PoTLL does not believe that the proposals in the dDCO are an unwarranted interference with HE's ability to carry out its statutory powers. PoTLL acknowledges that during the time that the works are constructed there will be interference. HE may, however, impose conditions on the exercise of the powers, pursuant to their protective provisions within the DCO, so that appropriate traffic management measures are put in place both during construction and the 12 month maintenance period; or that HE could access the site to inspect works.	Note on Highways England Protective Provisions in the DCO (PoTLL/T2/EX/87)
18.5 Road-Rail Freight Matters		
i. The assumption for freight movements appears to be that 50% of the freight produced at Tilbury2 will be moved by rail and 50% by road (re Section 5.69 of the ES [APP-031], and a worst-case road assumption is used in the ES, whereby 100% of all freight is assumed to be moved by road. Would the Applicant say what the worst-case rail assumption is?	**Phil Hamshaw** clarified that the 50% of movements by rail only refers to the CMAT throughput with the remainder by road along with up to 150,000 tonnes by barge. All the RoRo is assumed by road. A sensitivity assessment in the TA assumes all Tilbury 2 throughput by road. **Phil Hamshaw** explained that the ES provides the assumptions for rail based on the restrictions of 5 movements per day which is the maximum movements that could be achieved given that the loading times are around 4 hours and allowing for timetabling for a slot between the passenger traffic on the mainline. Thus, 5 movements from the whole site is the 'worst case' as it is practically the maximum amount of movements that could be undertaken from the site. As such even if there were more movements from the either the CMAT or the RoRo, this would still be within the maximum of 5 movements. A total of 5 movements per day is already assessed in the ES.	
ii. Is there a reasonable scenario in which more than 50% of the freight would be moved by rail?	**Phil Hamshaw** explained that there is a reasonable scenario where more than 50% of freight could be moved by rail and this will be determined by the customer, however they would still be constrained by the 5 journeys a day from the site. All major CMAT customers utilise large amounts of rail freight with aggregates being the largest bulk freight movement on UK rail freight networks. However that would still be constrained by the maximum movements in a day and so a customer would need to be aware that its movements would be constrained by that movement capacity.	

iii. London Gateway Port Limited (LGPL) expresses concern that the wider rail freight network needs to be considered by Network Rail in terms of potential capacity constraints in the future, and that it is in the interests of both ports to work together to ensure that there is sufficient capacity on the network beyond the Tilbury 2 development (re SoCG Applicant-LGPL Appendix 11 to SoCG Update Report [REP1-021]). Would the Applicant, LGPL and Network Rail (NR) state how they see this matter being taken forward?	**Francis Tyrrell** highlighted that Network Rail has confirmed that there is existing capacity on the network to facilitate the rail movements for Tilbury 2 (Appendix 1 to Response to Relevant Representations (AS-049)). The Applicant has undertaken within the SoCG with LGPL to work together in regard to capacity issues.	Statement of Common Ground Update Report (PoTLL/T2/EX/93)
iv. Kent County Council (KCC) questions the capacity on the Essex Thameside rail corridor and beyond across London to accommodate additional rail freight movement from Tilbury2. Would the Applicant and NR state their views on this matter (re SoCG Applicant-KCC Appendix 8 to the SoCG Update Report [REP1-021]; KCC's WR [REP1-066])?	**Francis Tyrrell** highlighted that PoTLL has confirmed its position to this issue in its response to D1 in its response to FWQ 1.18.7, and has a letter of support from Network Rail confirming the capacity for Tilbury 2 both on the Thameside corridor and across London (Appendix 1 to the Response to Relevant Representations). As such there is capacity for Tilbury2 rail movements.	Response to First Written Questions (REP1-016) Response to Relevant Representations (AS-049)

18.6 Local Residents		
i. Mr Mick Lewis notes that the proposals are "happening just over my back fence". He makes various points regarding the proposed link road and suggests that it should be re-assessed (re [REP1-072])? What is the Applicant's response to these points?	**Martin Friend,** the Port's planning consultant responded by stating that :- • During two rounds of public consultation (non statutory followed by statutory), PoTLL listened carefully to the comments of residents, including those concerned about the routing of the link road. • The justification for the routing of the infrastructure corridor is set out in the Masterplanning Statement (APP-034] • The Environmental Impact Assessment process has undertaken a thorough assessment of all environmental effects from the link road and embedded mitigation to avoid or minimise the effects of the development both in the physical works (such as noise barriers and landscape proposals) and construction and operational management plans, compliance with which will be secured through the DCO. • The Applicant also responded to Mr Lewis' representations in its Deadline 2 submissions noting that Mr Lewis' highlighted in particular that Mr Lewis' representation made the point that the assessment of T2 fails to take into account the possible link to the LTC. As PoTLL has made clear, although they are prepared to undertake a high level qualitative assessment of the cumulative impact of T2 with LTC, there is no traffic data on which to base any quantitative assessment. HE has confirmed that Tilbury2 is a cumulative project that will be assessed when that scheme comes forward. Any additional mitigation, should it be required, will fall to LTC to provide.	
ii. Mr Chris Henderson states that "We are particularly concerned about the construction phase when lorries will be redirected through our streets, some of which have restrictions for heavy vehicles" (re [REP1-041]). What assurances can the Applicant give to Mr Henderson in this regard?	**Francis Tyrrell** commented that HGV routes will be controlled via the imposition of the CTMP (which will be approved by Thurrock Council, pursuant to the CEMP, which is itself secured by the CEMP). As noted in the draft CTMP HGV's would be routed only via appropriate routes. The residential areas throughout Tilbury are subject to a weight restriction which prohibits through movements by HGV's – the HGV routing during construction would adhere to these restrictions.	

iii. Mr Colin Elliott cites a meeting with PoTLL and raises a number of points, including his concerns about the impact in terms of noise and pollution of the proposed link road into Tilbury from the proposed Lower Thames Crossing, and also diversion routes in the event of incidents on the proposed routes (re [REP1-042]). What assurances can the Applicant give to Mr Elliott on these matters?	**Martin Friend** the Port's planning consultant, commented that: • PoTLL understands and appreciates the concerns of local residents such as Mr Elliot with regard to the three potential NSIP projects in the vicinity of Tilbury, and have engaged specifically with Mr Elliott in relation to his concerns. • Mr Elliot has been reassured that all three will be scrutinised in detail with regard to the impacts of noise and pollution. • As set out in its submissions at the Issue Specific Hearing on 18 April 2018, PoTLL will submit a CEA of Tilbury2 with LTC and CEA at Deadline 3, but this will be high level, proportionate and qualitative. As PoTLL have made clear, although they are prepared to undertake a high level, proportionate and qualitative assessment of the cumulative impact of T2 with LTC, there is no traffic data on which to base any quantitative assessment. HE has confirmed that Tilbury2 is a cumulative project that will be assessed when that scheme comes forward. Any additional mitigation, should it be required, will fall to LTC to provide • The proposed link road will connect with Fort Road which will remain open to traffic. Fort Road would in an emergency provide an alternative route should the link road become impassable. During an incident as with existing roads the Police would manage traffic and as at present would liaise with Port Authority Police to minimise disruption. • As the Applicant highlighted in its responses to Deadline 1 submissions to Mr Henderson, Chapter 17 of the Environmental Statement provides an assessment for the rail link and road link to Tilbury2 and concludes that the noise impacts from the rail link and road link will not be significant.	
18.7 London Resort Holdings Limited (LRHL)		
i. The Applicant and LRHL cite a memorandum of understanding (MOU) between them for how the two parties will work together to utilise the river and PoTLL's port facilities (SoCG Applicant-	**Peter Ward** confirmed that PoTLL and LRHL have agreed an MOU to provide construction support to the LRHL development utilising construction consolidation and river transport. LRHL are committed to using the river both for construction and ongoing support to the theme park when constructed. Although a commercially confidential document, **Peter Ward** was able to confirm that the MOU in relation to the Port provides for: *the use of the Port and its facilities or parts thereof as the main location for transhipment,*	

LRHL Appendix 13 to SoCG Update Report [REP1-021]; LRHL's WR [REP1-070]). Would the Applicant and LRHL state what is agreed between them in the MOU?	*discharge, loading, storage, barge operations and other services in connection with the development and construction of the Project.* **Francis Tyrrell** highlighted a press release from LRHL which promoted this initiative. This is enclosed at **Appendix 5** to this Summary.	
ii. Would the LRHL state what use LRHL expects to make of Tilbury 2, and would the Applicant state whether this use has been addressed in the ES for the Proposed Development?	**Peter Ward** confirmed that LRHL will utilise the existing Port of Tilbury facilities in support of the project. It has not therefore been assessed within the ES. The ES however does take account of aggregate movement from the CMAT by river (150,000 tonnes) and it is possible this may be delivered to LRHL from Tilbury 2.	
18.8 National Grid Electricity Transmission (NGET) - NGET expresses concern that the Proposed Development, and in particular the impact that the construction of the new road and amendments to the existing road network in conjunction with the routing of the new infrastructure corridor under the existing Fort Road, will have on NGET's access to its assets (NGET's WR [REP1-076]). Where transport is concerned, NGET requires access to its substations and other apparatus including access for Abnormal Indivisible Loads, which need to be transported on trailers that have requirements for their turning circles, total weight and load height. Furthermore, access is required throughout the construction period as well as during the operation of the Tilbury2 port.		
i. Would the Applicant and NGET update the hearing on these matters?	**Francis Tyrell** explained that following a meeting with NGET on the 11th April 2018 several options for NGET Abnormal Indivisible Loads in to Tilbury2 are being reviewed. It is agreed that a Girder Frame trailer will be able to access Tilbury2 from the highway network. What remains to be resolved is access for a Flat Top Trailer and other vehicles with regards head room under Fort Road bridge. The impact of lowering the road to achieve the required 6m head-room in that scenario is being investigated but is considered to fall within the parameters of the assessment. **Francis Tyrell** confirmed that PoTLL is also working on a set of protective provisions with NGET.	
Contaminated Land and Waste		
6.1 Waste - Is Thurrock Council content with the revised impact assessment for forecast waste produced by	**Richard Hatter** confirmed that Thurrock are content with the revised assessment. PoTLL had no comment to make in response to this.	

the Proposed Development set out in Appendix E of the Applicant's Response to Written Representations, Local Impact Reports, etc at Deadline 2 [REP2-007]?		
Health/Safety		
12.1 Active Travel Study – Health Impact - In Thurrock Council (TC)'s written representation [REP1-090], under the health section, TC states that further discussion of the detailed content of the Active Travel Study is required to maximise mitigation measures.		
i. Would the Applicant and TC state the status of their discussions and the resultant mitigation measures?	**Matthew Ford (Thurrock Council)** explained that a meeting had been held to discuss the Active Travel Study and that PoTLL had updated the proposals to reflect the positive discussions at the meeting. TC would be responding to the updated Active Travel Study before deadline 3 and the position would be captured in the SoCG to be submitted at Deadline 3. **Martin Friend,** the Port's planning consultant, thanked Mr Ford for his positive comments and confirmed that the Applicant had indeed had what it considers to be positive discussions with the Council regarding the Active Travel Study in order to maximise its contribution to mitigation. **Matthew Fox**, of Pinsent Masons LLP, on behalf of PoTLL, suggested to the Panel that there may be some value in PoTLL explaining in a little more detail as to the role and content of the Active Travel Study and its proposed measures and invited **Martin Friend** to assist in this regard. **Martin Friend** explained that the Active Travel Study provides a package of measures to encourage cycling and walking in the area of the Tilbury2 scheme, including access to the Tilbury Fort, the riverside and the existing port. The ATS has a number of roles: • Encouraging sustainable transport – including to access the Tilbury 2 scheme by walking and cycling • Health – encouraging activity among the local population	Updated Travel Plan (Appendix 3 to draft section 106 agreement (PoTLL/T2/EX/83))

	• Access to Tilbury Fort as a heritage asset. He went on say that physical works comprise works within the Order Limits, which form part of the actual scheme, and works outside the Order Limits that will be provided for within the proposed section 106 Agreement. Works include: • provision of cycling and walking facilities within the Infrastructure Corridor along the proposed highway; a crossing point allowing people travelling by train to cross the road and travel down to the Cruise Terminal; and along the river front. • upgrade of a number of footpaths within the vicinity of Tilbury Fort, helping to provide linkages from the Infrastructure Corridor down to the riverfront, • other upgrades include re-surfacing, crossing points on Fort Road, stile upgrades, and footpath improvements. a comprehensive scheme of way-finding markers. For example, located outside the railway station there will be information boards indicating routes to the various destinations within the area, particularly to the riverside and Tilbury Fort. The purpose of the scheme is to encourage legibility of the area for pedestrians, cyclists, employees, and visitors, and ensure users understand timing and distances and are confident in accessing the various routes to important local destinations. • cycle route upgrades will link in with Thurrock Council's own aspirations in relation to the national cycle network. The Council is already undertaking works within Tilbury to facilitate improved cycling facilities as part of the NCN13 route. **Martin Friend** went on to confirm that PoTLL has been working with the Council to make sure the ATS links in with the wider strategy for the borough, and that the scheme maximises the benefits of the proposals, and encourages people to use the upgrading routes. A positive meeting in this regard took place with the Council on 14 March 2018. All this information is captured on a plan, which has been submitted at Deadline 3 and is secured through the draft section 106 agreement.	
12.2 Traffic		
i. Ref ES 8.136 [APP-031], the Land Side Transport chapter	**Helen Horrocks** from Thurrock Council Public Health set out her concerns that the effects would	

identifies that most of the roads within the study area will experience an increase in total traffic flow of less than 10% against 2020 baseline flows. Fort Road (south of the site) will experience a 25% increase in traffic flow, which includes a 29.6% increase in the percentage of HGV. These impacts on traffic flow could influence health in the local population by discouraging active travel, physical activity, and the use of open space. The health effect has been assessed as Direct, Negative, Temporary, Minor/Moderate. Would TC state its response to the Applicant's points above concerning the impact on health from the anticipated traffic increases on Fort Road?	need to be mitigated through the Active Travel Study. **Matthew Fox** highlighted that as well as the Active Travel Study, sustainable transport measures are set out in the Framework Travel Plan (APP-073) and the Sustainable Distribution Plan (APP-074) during the operational phases, all of which aim to try and ensure the least amount of traffic impact.	
ii. Ref FWQ 1.12.2, Highways England (HE)'s Deadline 2 response to the Applicant's response to FWQ [REP2-001]: It would be helpful to have clarification as to why the Road Drainage and the Water Environment topic has not been included?	**Matthew Fox** noted the following: • Road Drainage and the Water Environment were scoped out of the health assessment, as the conclusions of the assessments (and the mitigation measures set out within them and secured through the DCO) for those topics resulted in no significant effects or negligible effects. As such, no health impacts would arise. • Specifically, it is noted in respect of Road Drainage that the Drainage Strategy (Document Reference APP-090) concludes that "*The conceptual drainage system has been designed in accordance with relevant standards and planning legislation, and maximises the usage of SuDS, improves water quality and controls pollution, as much a reasonably practical*." (Section 8.1).	

	• In respect of the Water Environment, the Level 2 Flood Risk Assessment (APP-086) concludes that "*In compliance with the requirements of NPPF and the NPS, and subject to the mitigation measures proposed, the development can proceed without being subject to significant flood risk.*" (Section 6). The ExA asked Highways England if that answered the questions they raised. Highways England, confirmed that the applicant's response answered the question raised.	
12.3 Health Impact Assessment		
i. TC's Local Impact Report dated 20/03/2018 [REP1-101] notes TC Public Health Team's request for the submission of a Health Impact Assessment to accompany the DCO application. Acknowledging the Applicant's submission of Appendix A: Explanatory Information - Health Assessment (Applicant's response to WRs, LIRs etc.), what is the position of TC, Public Health England and the Applicant on the various health issues associated with the proposed development?	**Helen Horrocks,** Public Health Officer for Thurrock Council, noted that they had identified some further areas for clarification and discussion with the Applicant, which includes the Active Travel Strategy discussions and the residual health effects identified from operational noise and neighbourhood amenity and quality in relation to visual amenity. However, overall, she confirmed that Thurrock Council are sufficiently satisfied that the Health Chapter of the ES and the additional Appendix A provided adequately for the identification of health impacts **Matthew Fox** confirmed that the PoTLL will continue these discussions with TC and re-stated the points made by PoTLL at the Hearing on 18 April that PoTLL will submit a high-level, proportionate and qualitative cumulative assessment that takes into account our project, alongside the LTC and the TEC based on the high-level information that is available to us at the moment.	Qualitative Cumulative Effects Assessment of Tilbury2 with Tilbury Energy Centre and Lower Thames Crossing (PoTLL/T2/EX/92)
ii. Do the parties think a Health Impact Assessment is required?	All parties agreed at the hearing that no separate health assessment is required.	

Air Quality		
1.1 Air Quality Common Ground		
i. Would TC and GBC confirm that the study area, baseline, methodology, assessment of effects (all the modelled results fall either below or well below the relevant air quality objectives for NO_2, PM_{10}, and $PM_{2.5}$) and mitigation measures (through the CEMP and OMP) are all agreed between the Applicant TC and GBC (re SOCG Update Report [REP1-021], Appendices 1 and 2)? Matt Fox Sarah Horrocks to support/be introduced	**Matthew Fox** confirmed that the Applicant has been in contact with GBC throughout the consultation process. **Sarah Horrocks** provided an outline of the Applicant's approach to assessment. **Sarah Horrocks** noted there were many points raised by GBC in their Oral response, and began by confirming that: • The review of baseline conditions for the air quality assessment in the ES reviewed data from all local authorities (data presented in Appendix 18.A-E of the ES including Gravesham (reviewed at ES paragraph 18.161, 18.173-18.175); • The location of AQMAs relative to the proposals and the affected road network was taken into consideration in preparing the ES (Figure 18.3). **Sarah Horrocks** explained, in response to the ExA's comment that the assessment findings (below or well below objectives) were counter-intuitive, that: • Historic trends in data were analysed and show concentrations are decreasing (ES Appendix 18.B.3); • Concentrations will be lower in the opening year of the proposals, due to improvements in emission control and because the latest vehicle emissions are now closer to expectations; • Some AQMAs remain in place even when monitoring data consistently shows concentrations are below the objective (a point subsequently confirmed at the Hearing by TC with regard to Calcutta Road, Tilbury) **Sarah Horrocks** explained, in response to the ExA comment that Defra's "bold statements" regarding a cleaner vehicle fleet have not come to light, and that a robust assessment using a realistic worst case scenario for a Rochdale Envelope approach accounts for any uncertainty (paragraph 18.8 of the ES and Table 18.2). This approach included: • combining maximum HGV movements by road with maximum rail movements • assessing the earliest year of operation (with highest vehicle emissions) combined with	

	maximum operational capacity (highest vehicle flow) • estimating concentrations at sensitive receptors closest to the road-rail network (concentrations will decline rapidly with increasing distance from source). Further to the Oral response at the hearing, the Applicant responds as follows: • To calculate vehicle emission rates for the ES, the Applicant used an alternative (CURED v2A) to the Defra emissions factor toolkit (EfT v7), to ensure full account was made of higher than anticipated emissions from certain diesel vehicles • The fleet projections incorporated into the Defra EfT (from DfT 2015) do not account for the most recent policy and market conditions which have come to light in the past year and thus are likely to be conservative • The baseline and dispersion model outputs were verified against real-world monitoring data and uplifted where appropriate, which also accounts for any differences between model inputs and actual emissions. These points are explained in more detail below. The Applicant chose not use Defra's EfT v7 for the assessment for the ES, as it was known not to incorporate the recent update to the European database, COPERT5. An alternative, CURED v2A ("Calculator Using Realistic Emissions for Diesels" developed by AQC) was applied, which uplifts certain of the NOx emission factors to bring them more in line with evidence from real-world monitoring data. • Following ES publication, EfT v8 was released in November 2017, and the Applicant repeated the assessment using this dataset to verify the ES findings. • The full sensitivity test report is provided in **Appendix 2** to this Summary. • The relevant air quality officers at both TC and GBC reviewed the sensitivity test report and agreed with the findings presented, i.e. that the ES was robust. A further update to CURED (v3A) has recently been published by AQC (2018b). It differs to the Defra EfT v8 in that improvements from Euro 6d LDVs are assumed to be ineffective and thus the tailpipe emissions no different to those of Euro 6c. • There is no change to HDV emission functions compared to EfT v8, and since the main vehicle movements generated by Tilbury2 are those of HDVs, the impact of this refinement for Euro 6d LDVs on the findings presented in the sensitivity test report is	

	immaterial. • There is very little difference between the emissions generated by CURED v2A, v3A and Defra EfT v8 for the Tilbury2 assessment year of 2020. Beyond this date, all three models show varying rates of decline in emissions. The fleet projections in the Defra EfT (and CURED) are based on the DfT national traffic model (NTM), which is based on extant policy at the time of publishing. The basis for the emissions calculations used in the ES and subsequent sensitivity test was the DfT NTM 2015. • Paragraph 3.56 of DfT (2015) states "These forecasts represent what would happen if no further emission reducing policies were introduced beyond current announced policy and expectations, and should not be interpreted as a statement of policy". Take up of electric vehicles is as set out in the WebTAG Data Book, which uses a figure of 0.94% of petrol cars and 0.23% of diesel cars in 2020 with no electric OGVs and PSVs (Figure 1 in **Appendix 1** to this Summary). Since these projections were developed: • At the beginning of 2017 the Society for Motor Manufacturers (SMMT) announced that sales of diesel vehicles have fallen quicker than anticipated and that sales of alternative fuelled vehicles have increased. • In July 2017, the UK Government announced a ban on the sale of all new conventional petrol and diesel cars and vans by 2040. • The European Automobile Manufacturer's Association (EAMA) has more recently (April 2018) announced a drop in new car registrations. These policies and trends are not included in NTM 2015 (and thus not in EfT v7, EfT v8 or CURED) and hence the future year projections that were used in the assessment for the ES are likely to have overestimated the proportion of conventional vehicles in the fleet. This position is supported by the AQC report (January 2018) describing the latest update to CURED emissions model (v3A): • The proportion of diesel cars in EfT v8 in Outer London (provided as an example) is noted to change very little between 2016 and 2030 while the projected uptake of fully-electric cars by 2030 in the EfT v8 (based on DfT 2015 projections) is small. • There is good reason to believe that the basic vehicle fleet projections contained in EfT	

	v8 may be over-precautionary with respect to NOx emissions in the future. It is also noted that the ES emission calculations for Tilbury2 used the "England (not London)" fleet type and therefore any influence of the London LEZ/ULEZ on vehicles using the network around Tilbury will not have been accounted for. The Defra background maps that were used in the assessment of land-side transport emissions were verified against actual measurement data and adjusted accordingly, in an approach agreed with TC (the local authority area through which the highest volumes of Tilbury2 traffic will pass). • This adjustment process is described in Appendix 18.C.6 (APP-095). • The approach to establishing a future baseline for assessment purposes was also summarised by the Applicant in the Response to PLA's Response to FWQ 1.9.15 (REP2-007). Defra guidance LAQM.TG(16) requires verification of modelled data against real world monitoring. Verification and subsequent adjustment is designed to deal with inevitable discrepancies between the estimated vehicle emission factors, fleet composition and engine type which are issued at regular intervals by Defra and DfT. • This process is set out in Appendix 18.D (APP-095). By uplifting the model output by a multiplication factor, the agreement between modelled and measured data is improved. The same factor is then applied to estimates of future year concentrations. • This was also summarised in REP2-007 in the Applicant's Response to PLA's Response to FWQ 1.9.15 including an additional comparison to a background monitoring site in central Tilbury. **Matthew Fox** explained, in response to the points raised by GBC regarding shipping emissions, that the Scoping Opinion from the SoS (para 3.36) was that this source could be scoped out, as explained at ES paragraphs 18.147 to 18.150 of the ES. **Sarah Horrocks** explained that the approach for scoping these emissions followed Defra Technical Guidance LAQM.TG(16). In response to the SoS request to keep the position under review, additional qualitative assessment was provided in ES (paragraphs 18.325 to 18.331). • The Defra Technical Guidance LAQM.TG(16) requires further assessment if screening criteria regarding the number of shipping movements and distance to sensitive receptors are exceeded (a study area of 1km for vessel movements and 250m for manoeuvring). Further, quantitative assessment was not required because the relevant thresholds were	

	not exceeded – The source magnitude in terms of the number of movements with the new port relative to existing, and the size and type of shipping vessel is defined at paragraphs 18.326 to 18.329 of the ES – Identification of sensitive receptors in the GBC area, is explained at paragraph 18.328 which specifically identified the Canal Basin area – The effectiveness of the pathway was established in terms of distance from source, and receptor orientation, noting the probability of winds of the required speed and direction to carry pollution towards receptors (ES paragraph 18.329) – Consideration of the existing baseline relative to air quality standards, noting the absence any evidence of issues near the existing port (ES paragraph 18.330) – Consideration of existing emission controls, legislation and policy (ES Table 18.3, paragraph 18.42 and paragraph 18.212) The Applicant acknowledges GBC's comment that the assessment of shipping in the ES Chapter 18 did not explicitly cover the very fine particulate fraction ($PM_{2.5}$) emitted from vessels. **Sarah Horrocks** noted that the main pollutant of concern for shipping emissions, because of potential exceedances of air quality standards and because it is the main emission from the combustion of fuel in the engines, is NO_2, whereas existing baseline concentrations of PM_{10} (and by association, $PM_{2.5}$) are low relative to their respective standards. • <u>Correction</u> regarding $PM_{2.5}$ as a subset of PM_{10} : – Based on monitoring in TC presented in Table 18.17, ambient concentrations are two thirds not one third of PM_{10} as stated during the hearing. – This is supported by the AQEG (2012) report on $PM_{2.5}$ in the UK looked at the relationship between $PM_{2.5}$ and PM_{10}, noting that the ratio is variable depending on source. Ambient ratios are typically around 0.6 to 0.7 i.e. $PM_{2.5}$ is two thirds the concentration of PM_{10}. Further to the Oral response at the hearing, the Applicant responds as follows: • Defra Technical Guidance LAQM.TG(16) Box 5.1 lists the pollutants to be considered for	

	"other transport sources". Under item B.3 - Ports (shipping), only SO_2 is listed. The National Policy Statement (NPS) for Ports also highlights SO_2 as a key pollutant (paragraph 5.7.1). • In paragraph 7.21 of the Defra Technical Guidance LAQM.TG(16), NO_2, PM_{10} and SO_2 are noted for potential exceedances of short term objectives due to shipping emissions, if certain criteria are exceeded. While PM_{10} was mentioned at paragraph 18.148 of the ES the Applicant notes it could also have been considered again at paragraph 18.330. • The AQEG report on shipping (2017) notes that "*Projections that take account of current legislation on shipping emissions and growth in shipping activity indicate increased emissions of NOx from shipping in 2020 but substantial decreases in SO_2 emissions and moderate decreases in PM_{10} emissions*." • It also gives the contribution of shipping to primary $PM_{2.5}$ as 0.1 µg/m^3 as a population weighted average though clearly that value will be higher near to ports. The contribution to secondary $PM_{2.5}$ (derived from NO_x and SO_2 emissions forming aerosols) is closer to 0.5 µg/m^3. • Based on existing measurement data, there would need to be a doubling in ambient concentrations of PM_{10} and $PM_{2.5}$ in GBC for the respective AQS objectives to be exceeded as a result of shipping emissions. This is an implausible scenario for a 10% increase in existing shipping movements expected with Tilbury2 (ES Chapter 14, paragraph 14.36) in light of the relatively small contributions from shipping emissions to total PM concentrations. To assist the ExA and GBC further, the Applicant has obtained the PLA's emission inventory, which was collated in 2017, and undertaken a detailed dispersion modelling study of shipping emissions from Tilbury2. The study is presented in **Appendix 3** to this submission. • The PLA emission inventory demonstrates that the main emission from shipping is NO_x. Inventory ID 4020 (grid square TQ6275 at Port of Tilbury, shown in Appendix 1 Figure 2) • $PM_{2.5}$ emissions (which make up the majority of PM for this combustion source) are 3 to 5% of NO_x. • The modelled ground-level concentrations of both NO_2 and $PM_{2.5}$ at worst case receptor locations for Tilbury2 shipping emissions in both TC and GBC, are just a fraction of a percent of the respective AQS long-term objectives.	

	• The study confirms that the screening out of shipping as a potential significant source of pollution was appropriate and robust. To assist in the understanding of the difference between PM_{10} and $PM_{2.5}$, AQEG (2005) explains that airborne particulate matter is made up of a collection of solid and/or liquid materials of various sizes that range from a few nanometres in diameter to around 100 micrometres (100 µm, the thickness of a human hair). It consists of both primary components, which are released directly from the source into the atmosphere, and secondary components, which are formed in the atmosphere by chemical reactions. Particulate matter comes from both human-made and natural sources. It contains a range of chemical compounds. • Dust, which can cause loss of amenity, is defined by IAQM (2014) as solid particles that are suspended in air, or have settled out onto a surface after having been suspended in air. • Particulate matter generated by construction and materials handling is typically in the coarse PM_{10} fraction whereas that emitted by fuel combustion is in the fine $PM_{2.5}$ fraction (WHO 2006): – PM with a diameter between 2.5 and 10 µm, (i.e. the coarse fraction of PM_{10}) usually contains crustal materials and fugitive dust from roads and industry, which are more easily deposited and typically travel up to 10 km from source. – PM with a diameter between 0.1 µm and 1 µm, typically formed through combustion of coal, oil, gasoline, diesel fuel, and atmospheric transformation) can stay in the atmosphere for days or weeks and can be transported over longer distances (up to thousands of kilometres). • The contribution of different sources of $PM_{2.5}$ to total emissions was also reviewed in the AQEG (2012) report. The data in Table 4.1 of that report (repeated in Figure 4a of **Appendix 1**) show the contribution from “other transport” (rail, national navigation and aviation) as 1.6 ktonnes in 2015, a small fraction compared to road transport (exhaust and non-exhaust) at 10.8 ktonnes. AQEG (2012) notes there is a more significant contribution of secondary PM (i.e. non combustion related particulate matter) in the south-east, with this secondary PM being more significant in the $PM_{2.5}$ fraction. • Over the distances under consideration in the ES (1 km between source and receptor, regardless of pollutant) there is no material difference between the range of transport of	

	$PM_{2.5}$ and PM_{10}, both of which can travel several kilometres as a result of their small diameter. • The Northfleet Industrial Area AQMA, which is to the south of the existing Port of Tilbury has shown no exceedances of the PM_{10} short or long- term objectives; this CMS is a similar distance to shipping movements at the existing Port of Tilbury, as Gravesend town centre will be to Tilbury2. Although industrial activities at Northfleet have lessened over time, there remain several jetties along the Gravesham shoreline which receive aggregate materials (**Appendix 1** Figure 3: PLA Terminal Locations Map). • Short-term measurements at Tilbury CMS (TK4) demonstrate the lack of any exceedances of the SO_2 and NO_2 standards in recent years. As this CMS site is downwind of the existing Port of Tilbury in relation to the prevailing SW wind, any notable emissions of these pollutants from shipping using the existing Port of Tilbury would be expected to have been recorded. • The Applicant has not identified any evidence from the NO_2 monitoring undertaken by GBC along the northern shore of the Thames, and recent reports published by GBC including a review of AQMAs, that there is a cause for concern for emissions from shipping. The only potential new AQMAs discussed in the GBC 2017 review of AMQAs is related to road vehicle emissions. • This supports the Sustainable Distribution Plan for Tilbury2 (APP-074), which seeks to promote alternatives to road freight (the emissions from which are much closer to sensitive receptors than shipping). The promotion of shipping as a means of transport is consistent with the Gravesham Local Plan Core Strategy, which seeks a modal shift away from car based transport (ES paragraph 18.39) and the NPS for Ports (paragraph 3.4.14 and 5.7.11). The Air Quality Strategy that has been developed by PLA together with the future provision for Tilbury2 to be shore-power ready, the introduction of more stringent engine emission standards and other emission reduction and management techniques which are secured in the OMP, will assist PLA, TC and GBC in continuing to work towards a reduction in PM across the study area. The transportation of freight by ship, as a substitute for inland freight transport (especially by road haulage) reduces emissions of pollutants per tonne-mile, and furthermore the emissions are released at a greater distance from receptors compared to those along the strategic road network.	

	The COMEAP statement (2015) on $PM_{2.5}$ states that, despite the increased number of studies now available, the general conclusion remains that "*there are many components contributing to the health effects of $PM_{2.5}$, but not sufficient evidence to differentiate those constituents (or sources) that are more closely related to specific health outcomes*." They also note the Boston Health Effects Institute's conclusion that a "*better understanding of exposure and health effects is needed before it can be concluded that regulations targeting specific sources or components of $PM_{2.5}$ will protect public health more effectively than continuing to follow the current practice of targeting $PM_{2.5}$ mass as a whole*". The Applicant notes GBC's concern regarding the fact that the Applicant did not undertake any specific baseline monitoring within their local authority area. **Sarah Horrocks** explained that: • In determining the need for additional monitoring ahead of undertaking the air quality assessment for the ES, the Applicant reviewed the availability of data from various CMS and diffusion tubes in the study area. • There are two CMS in GBC and three in TC (Figure 8.3 of the ES) which measure PM_{10}. The available particulate monitoring data were deemed adequate and representative such that further monitoring by the Applicant was not warranted. • Both PM_{10} and $PM_{2.5}$ annual mean concentrations have been approximately half the respective objectives (40 µg/m^3 and 25 µg/m^3) consistently so over the last few years, in TC, GBC and Havering (ES paragraph 18.265, Tables 18.17, 18.21 and 18.23 in Appendix 18.B). Further to the Oral response at the hearing, the Applicant responds as follows: • There is a clear lack of spatial variation in PM_{10} annual mean concentrations (Table 18.18 and Table 18.23 of Appendix 18.B), which is to be expected given good dispersion of the light particulate fraction and because the main sources contributing to ambient PM concentrations in the South East of England are secondary (Appendix 1 Figure 4b). – The AQEG (2012) report on $PM_{2.5}$ in the UK notes that "*The high level of spatial homogeneity is consistent with $PM_{2.5}$ being dominated by regional sources, including secondary PM, with local sources being less important.*" • Monitoring of $PM_{2.5}$ is challenging, as recognised by AQEG (2012) which noted "*current measurements fall below the requirements of the Air Quality Directive*" due to issues with data capture and uncertainty. It was not deemed proportionate or necessary to undertake	

	$PM_{2.5}$ monitoring in GBC or any other area to establish the ES baseline. • The site-specific study of NO_2 concentrations, using the practical method of diffusion tubes to measure NO_2, was undertaken in agreement with TC. – This focussed on areas of concern along the Infrastructure Corridor, filling gaps where TC data were not available, focusing on locations where traffic associated with the proposals would pass close to receptors. – The nine-month dataset was used to reaffirm the findings of the model verification process in a sensitivity test (see **Appendix 4** to this Summary). • The PLA's recently published air quality strategy sets out objectives for increasing the amount of ambient air quality monitoring along the Thames corridor. Supporting references and figures can be found in **Appendix 1.**	
ii. Are the parties content with the provisions for the management of dust during construction via the CEMP, and during operation through the OMP?	TC confirmed that the measures and procedures are sufficient to provide suitable mitigation during construction and operation. The Applicant notes that TC expressed at the hearing that it was satisfied that the CEMP and OMP measures are enforceable. **Matthew Fox** stated in response to the ExA's concern regarding the application of OMP measures "on the ground", that the monitoring regime will be agreed with TC and that the OMP will be secured through the DCO. **Sarah Horrocks** explained that: • The dust control measures in the OMP for Tilbury2 are based on the outcome of an assessment using IAQM minerals planning guidance (2016). • There will be Environmental Permits in place for eventual CMAT processing facilities. • Requirements for regular visible observations and dust deposition monitoring will be secured through the OMP. • There will be a complaints mechanism in place and a requirement to take action to address any unacceptable dust emissions, as secured through the Operational Community Engagement Plan (APP-030) Further to the Oral response at the hearing, the Applicant responds as follows • The assessment which followed IAQM minerals planning guidance (2016) is based on a	

	source-pathway-receptor approach taking into consideration the potential for loss of amenity as well as health effects from fine particulates, based on the likelihood of material reaching sensitive receptors. It considered: – A realistic worst-case for the activities within the CMAT to define source magnitude, e.g. the maximum number of processing facilities and material throughput – Effectiveness of the pathway in terms of distance from source, (further from source the greater the effect of dilution and dispersion) – A conservative distance to sensitive receptors, e.g. activities being undertaken up to the CMAT boundary – Effectiveness of the pathway in terms of receptor orientation relative to the port, and – The probability of winds of the required speed and direction to carry PM towards receptors (ES paragraph 18.285) • The IAQM guidance focuses on PM_{10} as the health indicator of airborne particles. This is in line with national Planning Practice Guidance for mineral sites (Paragraph: 030 Reference ID: 27-030-20140306, Revision date: 06 03 2014). – In Section 1.2 of the IAQM guidance it is explained that, for quarries, most suspended dust (as opposed to the "disamenity" dust deposited nearer to the source) will be in the coarse sub-fraction ($PM_{2.5-10}$), rather than the fine ($PM_{2.5}$) fraction. • Visible dust comprises the heavier, larger particle size fraction and is unlikely to travel beyond the site boundary whereas empirical evidence also shows the finer PM_{10} fraction drops off rapidly with distance – The minerals PPG states that "*Additional measures to control fine particulates (PM_{10}) to address any impacts of dust might be necessary if, within a site, the actual source of emission (eg the haul roads, crushers, stockpiles etc) is in close proximity to any residential property or other sensitive use*." Close proximity is not defined however the screening distance of 1 km is conservative. – The IAQM (2016) guidance notes that recently published data from construction sites, suggests that PM_{10} concentrations (from construction sites) "*decline*	

	exponentially with distance, and reduced to half their initial concentrations within a few hundred metres downwind". The graph in Table A2-6 of the IAQM guidance (referred to at ES paragraph 18.306 and presented in Appendix 18.B of the ES) illustrates this rapid rate of decline in PM_{10} concentrations with distance. – The distance of 1 km is based on evidence from opencast coal mines, an activity with a much higher dust generation potential than minerals handling, according to the IAQM guidance (Section 2.3). There is no equivalent graph available for $PM_{2.5}$, as it is a much less common particle size fraction from mineral operations compared to, for instance, fuel combustion (WHO 2006). – Given the distance of over 800m to sensitive receptors in GBC and the infrequent nature of winds that could carry PM towards the area of concern in Gravesham (Graph 18.3 and paragraph 18.285), no further assessment was deemed necessary to develop the OMP (REP1-008). – The Northfleet AQMA, which has not recorded any exceedances of the AQS objectives for PM_{10} in the last ten years, is a similar distance from (1.5km) and orientation relative to (SW of) the current dust handling/storage operations at the existing Port of Tilbury as will the Tilbury 2 CMAT be to Gravesend Town Centre. – The OMP measures are designed to control impacts on receptors in much greater proximity to the proposals, including adjacent footpath users and those residents closest to the CMAT in Tilbury. • The Applicant has previously noted (in REP2-007) that actions similar to those set out in GBC's action plan for the Northfleet Cement Works are incorporated into the OMP • Emission controls, legislation and policy (ES Table 18.3, paragraph 18.271 to 18.281) together with the OMP are appropriate means to control and manage risks – Appendix 1 to the IAQM guidance, notes the 2015 Bradley decision (APP/X1355/A/11/2150277): "*Following the approach in national guidance, although there would be communities within 1km of the site, the technical evidence to the inquiry shows clearly that PM_{10} levels would remain well below the relevant air quality limits. In such circumstances, PPG recommends that good practice measures should be used. This could be ensured by appropriately worded conditions*." The Tilbury2 proposals are in line with national policies aimed at reducing emissions from a wide	

<table>
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<td>range of sectors, from industry, shipping and road vehicles, local/regional strategies such as the PLA air quality strategy and the application of best practice for managing fugitive sources of dust through the OMP.

Processing facilities that may operate within the CMAT will be covered by the relevant pollution control system. The Applicant notes paragraph 4.11.3 of the NPS, which states that, "the decision-maker should focus on whether the development itself is an acceptable use of the land and on the impacts of that use, rather than the control of processes, emissions or discharges themselves. The decision-maker should work on the assumption that the relevant pollution control regime […] will be properly applied and enforced by the relevant regulator. It should act to complement but not seek to duplicate it."

Supporting references and figures can be found in Appendix 1.</td>
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<td>iii. Do any parties have outstanding issues over air quality?</td>
<td>Discussions are ongoing with GBC and an updated SoCG is being prepared.

The Applicant has been in regular contact with the air quality officer at GBC since January in order to agree the SoCG and supplied the following information to GBC to assist.

<table>
<tr><th>GBC PEIR comment</th><th>POTLL action</th><th>Further info</th></tr>
<tr><td>Highlighted that an AQMA has been declared in Gravesend town centre.</td><td>The location of the Gravesham AQMA relative to the proposals and the affected road network is taken into consideration in the ES.</td><td>Gravesham policy is reviewed at paragraph 18.34, 18.39 – 18.40. Gravesham air quality data is reviewed at paragraph 18.161, 18.173-18.175.</td></tr>
<tr><td>The ES will need to have regard to the strategic allocation of the Canal Basin key site rather than just existing identified sensitive receptors.</td><td>The Canal Basin area has been considered in the assessment.</td><td>The existing and proposed receptors are described in paragraph 18.181.</td></tr>
<tr><td>Consideration should be given to the impact on users of a riverside walk.</td><td>Relevant locations of exposure to short term pollutant concentrations have been considered in the assessment, including in terms of</td><td>The footpaths along the north bank of the Thames and therefore nearest to the site are assessed within the operational dust assessment, see Table</td></tr>
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		potential loss of amenity.	18.19 and preceding paragraphs 18.291 and 18.294. Any footpaths in Gravesham would have an even lower risk outcome. Concentrations of NO_2 in the vicinity are well below 60 µg/m^3 thus no short-term exceedances are expected (see Table 18.47) during construction or operation.		
	There are a range of potential sources of air pollution and many do not appear to be mentioned and therefore satisfactorily considered in the PEIR. Their cumulative effects also need to be considered.	All potential emission sources are considered within this ES chapter where they could give rise to significant impacts. Where appropriate the in-combination impact has been calculated, for instance the infrastructure corridor emissions from road and rail. The cumulative effect with other committed and planned developments has been considered.	The pollutants considered and their effects are listed in Table 18.1. The potential impacts considered are described in paragraph 18.44. Paragraphs 18.121 to 18.146 describe how the dispersion model for operational emissions includes road and rail emissions in combination. The in-combination effects of pollutants on respiratory health are considered in Chapter 8 Health. (see paragraph 8.94 to 8.105). Chapter 20 Cumulative and Synergistic Impacts, describes synergistic impacts on health in more		

			detail, considering effects for both the construction and operational stages.		
	The recommended use of diffusion tube monitoring is only suitable for NO_2 annual mean and not for other pollutants like dust or particulate matter (PM_{10} and $PM_{2.5}$).	Emissions of NO_2 from the infrastructure corridor and wider affected road network are the main potential impact associated with the proposals. Monitoring of dust and particulate matter will be undertaken as part of the CEMP (Document 6.9) and OMP (Document 6.10), focusing on locations at highest risk of impacts within the relevant study areas.	The baseline survey focussed on NO_2 as the main potential impact. AQS objectives for PM_{10}, $PM_{2.5}$ and SO_2 are likely to be achieved within the study area, thus a baseline survey for particulate matter was deemed not to be required. As noted in paragraph 18.265, at both the CMS in Gravesham, 2016 annual mean PM10 concentrations were less than 20 µg/m^3 . Dust monitoring plans are mentioned at paragraph 18.334 and 18.346.		
	Unregulated emissions of dust, PM_{10}, $PM_{2.5}$, NO_2 shouldn't be permitted and there needs to be a requirement for sources to be designed out e.g. it should be feasible to use fixed shore side electrical power to replace ships generators when they are in port or to be adequately mitigated.	The regulatory regimes that apply to the proposals are described in the ES chapter. The Tilbury2 site will be covered by the Environmental Permitting Regulations 2016, Environmental Protection Act 1990, Clean Air Act 1993 and byelaws made under the Port of London Act 1968. The London	Paragraphs 18.325 to 18.331 consider shipping emissions. Paragraph 18.213 refers to the point raised about electrical power. "*The proposals will not preclude this in the future but vessels using Tilbury2 will not be equipped to use this facility and currently, the power requirements are*		

		Port Health Authority or Environment Agency will be responsible for enforcing suitable emission controls depending on the specific type of emission.	*not available. At this stage therefore, the use of shore/electrical power for docked ships is not deemed to be feasible*." The Carbon and Energy Report (Document 6.7) and the Sustainability Statement (Document 6.8) explain how the proposals have sought to reduce emissions and maximise best use of resources.		
	Concern regarding SO_2 emissions, more clarification is required including a detailed breakdown of existing vessel movements and the impact of Tilbury2 in combination.	Further information is included in this ES chapter regarding vessel movements.	In paragraphs 18.325 to 18.331 additional detail on future shipping movements and location of Gravesham receptors is presented.		
	Consideration needs to be given to existing and proposed riverside residential developments to the south of Tilbury2.	These developments have been considered where relevant to the assessment study areas.	Receptors in Gravesham are not relevant to the assessment of PM_{10} during operation of the CMAT for the reasons set out in paragraph 18.57. This further examined in paragraph 18.265. Receptors in Gravesham are noted in paragraph 18.181 to be over 1 km from the CMAT element of the Tilbury2 proposals and not in the prevailing wind direction and thus not		

			relevant to consideration of dust or PM_{10} during operation. Receptors in Gravesham are not relevant to the odour assessment for the reasons set out in paragraph 18.65. Receptors in Gravesham are not relevant to the traffic assessment for the reasons set out in paragraph 18.131. Receptors in Gravesham are considered within the assessment of shipping emissions, as noted in paragraph 18.150 and in paragraphs 18.325 to 18.331.		
	Consideration must be given to the asphalt plant and possible odorous impacts on visitors to Tilbury Fort.	Odour is covered by the environmental permitting regime for roadstone coating plant and thus the proposed facility will need to operate in line with the relevant process guidance issued by the regulatory authority. Residual odour emissions from the proposals once operational have been considered.	Operational dust was also considered for Tilbury Fort, see paragraph 18.290 and Table 18.19.		

1.2 Use of Short Power of Powering Moored Vessels		
i. The Applicant responds to Interested Parties' calls for shore power to be considered for moored vessels, and states that there are constraints due to ships' ability to take shore power, and due to electrical capacity being extremely limited due to the National Grid infrastructure locally (re Applicant's response to ExA's FWQs Q1.1.1 and Q1.1.3 [REP1-016]). The Applicant also states that it will provide the infrastructure to ensure that shore power can be accommodated at the Tilbury2 site in the future should the vessel profile change. Would the Applicant state what infrastructure it will provide so that shore power can be accommodated, and what provisions will be made to ensure sufficient electrical capacity?	**Francis Tyrrell** confirmed that the Applicant will provide the cable connections to ensure shore power can be facilitated in the future. The port has secured the remaining additional capacity of the existing UKPN substation and this will provide sufficient power for the CMAT and RoRo operations. Both UKPN and NGET will need to provide additional capacity in the local area before shore power can be facilitated not withstanding the other existing constraints due to ships inability to receive shore power **Matthew Fox** indicated that such provision was secured through section 7.4 of the Operational Management Plan (REP1-008).	
ii. Would NGET comment on the sufficiency of electrical capacity?	NGET were not in attendance at the hearing, but PoTLL can confirm that NGET confirmed to PoTLL that it bought the last of the capacity in the local area.	
iii. Would TC and GBC comment on this matter?	**Wendy Lane** from Gravesham Borough Council, indicated her concerns in respect of this and considered that PoTLL could be doing more in this regard. **Peter Ward**, of PoTLL pointed to the PLA's Comments on Responses to FWQs, ES and	

	Deadline 1 material (submitted at Deadline 2) which confirmed that despite international advances, the technology is not there yet for shore power to able to be delivered. **Alison Gorlov,** on behalf of the PoTLL, set out that whilst the PLA is undertaking a number of measures to promote the use of shore power, it was not yet in widespread use. **Wendy Lane** suggested that some form of 'trigger' should be placed on the DCO to 'require' PoTLL to utilise shore power. **Francis Tyrrell** indicated that this was not justified, necessary or proportionate. If shore power was to be utilised, the demand would come from ships utilising such power requesting it from PoTLL.	
Water Quality, Flood Risk and Water Framework Directive		
19.1 Flood Risk - Is the Environment Agency (EA) content that the Flood Risk Assessment (FRA) Addendum submitted at Deadline 1 [REP1-014] satisfactorily covers the issues of:		
potential increase in the flood depths in two fields, one to the east of Fort Road and one to the north west of Tilbury Fort;	**Pat Abbott**, on behalf of the EA, stated that they have assessed the FRA addendum and have had a follow up telephone conference call with PoTLL's consultants to discuss the findings. **Pat Abbott** confirmed that in terms of the potential increase in flood depths, they have received enough information to assess the impact and are satisfied with the work carried out. The EAs technical comments will be submitted at Deadline 3. Pat Abbott confirmed that there are no concerns from the EA's point of view in respect of the Addendum.	
proposed new and replacement culverts are included within the breach modelling; and	**Pat Abbott,** on behalf of the EA, confirmed that the new breach modelling does include the proposed new and replacement culverting. He went on to state that the design of the culverts is still under discussion with PoTLL as although diagrams of the culverts are included in the FRA addendum the EA feel that the largest possible culverts haven't been used in all instances and in relation to culvert 5b the Applicant proposes to use three small culverts when one large one would be a better option (as 3 could trap debris and increase flooding). **Pat Abbott** stated that this has been discussed with the Applicant who is happy to consider these concerns although detailed design of culverts could be agreed pursuant to the DCO protective provisions.	

breach modelling climate change allowances meet the requirements of the NPS.	**Pat Abbott,** on behalf of the EA, stated that the FRA addendum confirms that no safety critical elements form part of the development and as such the EA are happy with what has been carried out in the FRA. Pat Abbott went on to confirm that they are happy with all of the concerns previously raised and will give technical comments when they put in their Deadline 3 submission. **Paul Hudson** from the ExA asked if the Applicant endorsed this response. **Matthew Fox,** on behalf of the Applicant, responded to state that the Applicant was grateful to the EA confirming they were happy with the documents. Matthew Fox also confirmed the earlier statement by the EA that the detailed design of the culverts will be processed with the EA through the operation of their protective provisions. Matthew Fox asked if now would be a good time to respond to the query English Heritage raised yesterday as to whether their moats were included in the flood breach models. **Paul Hudson** agreed that now would be an appropriate time. **Matthew Fox** stated that the Applicant could confirm that the moats are included in the breach model in the Level 3 FRA using LiDAR data and that owing to the volume of water that would inundate the area during a tidal breach event it is unlikely that increasing the capacity in the moats through dredging, which has its own problems, would not have any marked impact on the flood levels. In terms of the Level 2 FRA it can be confirmed that the moat and the fort was included in the Level 2 FRA, as they form part of the EA flood map for the Tilbury area (Appendix A to the Level 2 FRA [APP-087]). Further to the Oral response at the hearing, the Applicant responds as follows: Although the Tilbury area benefits from flood defences, there is still a very low chance of tidal flooding affecting the area should the defence walls fail creating a breach for flood water to get through. This is known as the residual risk of tidal flooding. The residual risk from tidal flooding already exists for the Tilbury area and the Tilbury2 project will not alter the chance of this being experienced now or in the future. As discussed above, the results of the assessment, as set out in the FRA Level 3 addendum demonstrate that there is a small part of land that falls within the Tilbury Fort site within the moats	

	to which there would be a change in the depth of flooding if there was a breach in the flood defences. In the event of a flood defence breach prior to 2030, flood depths could potentially increase by up to 0.34m as a result of the existence of Tilbury2. Post 2030, flood depths could potentially increase by up to 0.11m as a result of the existence of Tilbury2. Any increase in capacity, through dredging for example, is unlikely to alter the standing water level (head) within the moat as this is governed by local hydrology and the water table. It is therefore likely that any 'dredged' volume would be 'filled up' by local water (e.g. pluvial or ground water). As such dredging of the moats is unlikely to provide any additional storage capacity during tidal breach inundation and could have other potential detrimental ecological effects.	
19.2 What modifications does the Applicant propose to building design in response to the FRA Addendum [REP1-014], i.e. finished floor levels of all buildings should be a minimum of 300mm above the proposed ground level?	**Paul Hudson** stated that in terms of design recommendations in the FRA, there are specific ones (as quoted in the Agenda item). Does the applicant propose to actually respond to recommendations directly in design considerations and the way it's expressed in the Order. **Matthew Fox** on behalf of the Applicant responded to state that the FRAs are secured through the requirements of Schedule 2 of the DCO which states that we must comply with these documents and therefore the recommendation within it. **Matthew Fox** introduced Sarah Rouse from Atkins who is leading on engineering of the project on behalf of the Applicant to explain how this would work in practice. **Sarah Rouse** confirmed that the actual design of the buildings will be developed further at the detailed design stage. Within the FRA recommendations we have the principals set out for the mitigation. The Panel has already highlighted the option of raising floor levels by 300mm. The proposed modifications will be determined on a building by building basis based on location within the site and also the use of the building. For example, the Workshop buildings will need to have vehicular access but this can be achieved by providing ramps up to raised floor levels. These types of buildings would also likely have concrete floors and brick finishing. Such materials offer their own water resilient properties. Welfare units, more temporary structures, are likely to be modular buildings and could be raised above ground level for example by using stilts. This will all be confirmed as part of the detailed design which will be undertaken following the recommendations of the FRA. **Paul Hudson** stated that the main point he was trying to get at was that the Applicant is	•

	accepting the recommendations within the FRA. **Sarah Rouse** confirmed this was correct.	
19.3 Would the Applicant state the position concerning the condition of the East Tilbury Dock Sewer and its potential capacity, referred to in the EA WR [REP1-044]?	**Matthew Fox** responded to this question on behalf of PoTLL and indicated that ultimately, the interaction of the scheme with East Dock Sewer will be work captured by the protective provision in the DCO. The starting point is that the existing wall is in poor condition which may or may not be exacerbated as part of the scheme but we will not know this until the detailed design has been completed. Any measure that the applicant may or may not need to undertake to mitigate the impact will be agreed with the Environment Agency through the protective provision. **Sarah Rouse** on behalf of the Applicant stated that, at present, the drainage strategy proposes that a small proportion of the western end of the proposed infrastructure corridor will drain to the East Dock Sewer. It is proposed to discharge unrestricted flows to this sewer as a portion of the existing Ferry Rd, which is proposed to be removed as part of the scheme, already performs this function. The overall catchment drained to this sewer will therefore not increase and therefore will not impact on the existing capacity. This will be subject to detailed design and discussion with the EA through their protective provisions. **Matthew Fox** confirmed that if PoTLL are causing an issue with the sewer as a result of the infrastructure corridor works they may be required to deal with this but ultimately this will be dealt with through the PPs.	Drainage Strategy (APP-090)
19.4 Although the situation is described in rather different terms in its WR, EA states in FWQ 1.19.2 [REP1-046] that the flood defences bordering the River Thames in the Tilbury 2 site are currently considered to be in very poor condition, have ceased to function effectively, and require significant remedial works or replacement within 3	**Matthew Fox** confirmed that there is a direct interaction between the Tilbury proposals and the flood defence with the linkspan, as shown on the errata engineering drawings (AS-010) He also highlighted that the L3 FRA deals with what would happen should the flood defences fail and the recommendations to mitigate should a breach occur. The applicant has to comply with this under the DCO. **Sarah Rouse,** of Atkins, on behalf of PoTLL, stated that it had been agreed with the Environment Agency that no permanent structures were to be constructed within 16m with the exception of the RoRo approach bridge, but that temporary structure such as fences could be built within such a distance. This would allow the Environment Agency to access land to maintain the flood defences if required.	Interaction of Tilbury2 and River Thames Flood Defences (PoTLL/T2/EX/89)

years to which the Applicant is expected to contribute. Would the Applicant and EA update the hearing on the current position concerning improvement works to these flood defences?	She and **Francis Tyrrell** confirmed that the Applicant has put considerable thought into the design of the scheme and the works being carried out taking into account as-built drawings for the flood defence which were provided by the EA. Further to oral submissions at the Hearing, PoTLL can confirm that where the existing defences are being replaced as part of the scheme proposals, the level of these defences will be raised to take into account future climate change predictions. Further details regarding the interaction between the Tilbury2 proposals and the flood defence have been submitted at Deadline 3, demonstrating that Tilbury2 will provide improvement to the flood defences it directly impacts. Any other improvements to flood defences would be dealt with through the interaction of the Environment Agency and PoTLL as riparian land owner rather than developer of Tilbury2.	
19.5 Is the EA content that detailed design of box culverts to meet flood protection requirements is secured through protective provisions rather than during the Examination?	**Paul Hudson** stated that he believes that this is already covered and that detailed design of the culverts would be agreed through PPs rather than a specific element in the Order. **Pat Abbott** confirmed that this was correct.	
19.6 Water Framework Directive (WFD) - Is the Applicant proposing to update the WFD assessment during the Examination to include priority and priority hazardous substances	**Matthew Fox** stated that the Applicant's starting position is that it would not update the WFD assessment to include these substances. **Felipe Steigler,** marine ecologist from Atkins, on behalf of the Applicant, explained why an assessment of these substances was not originally anticipated: • This assessment is designed for schemes with a sewerage or industrial outfall, which Tilbury2 does not have. • The EA [REP1-046] recognised the difficulty to assess transfer from individual chemical substances from sediments into the water column during dredging. • The Applicant has already committed to a series of bespoke mitigation measures following analysis of sediments for some of the priority and priority hazardous substances during the EIA. **Matthew Fox** stated that any measures considered necessary by the EA to protect water quality can be suggested as part of the consultation on the dredging method statement which the	

	Applicant must undertake before its submission to the MMO, under the terms of the DML. He confirmed that, notwithstanding this initial position, the Applicant is aware of the EA's concerns and is in discussions with them on this issue. From these discussions the Applicant understands that the EA would find an assessment based on existing data satisfactory, but the methodology for this assessment would need to be agreed with the EA, which in turn will determine if such an assessment can be submitted during the Examination. For the reasons stated above, this assessment is not deemed absolutely necessary, but the Applicant will continue to discuss this with the EA. The ExA enquired if the circumstances for an outfall discharging chemicals would arise, if this discharge would be controlled under the EA environmental permitting regime. **Francis Tyrrell** confirmed that an outfall discharging hazardous substances would indeed require such an environmental permit, but clarified that Tilbury2 will only discharge surface drainage water.	

PORT OF TILBURY LONDON

PLANNING ACT 2008
INFRASTRUCTURE PLANNING (EXAMINATION PROCEDURE) RULES 2010

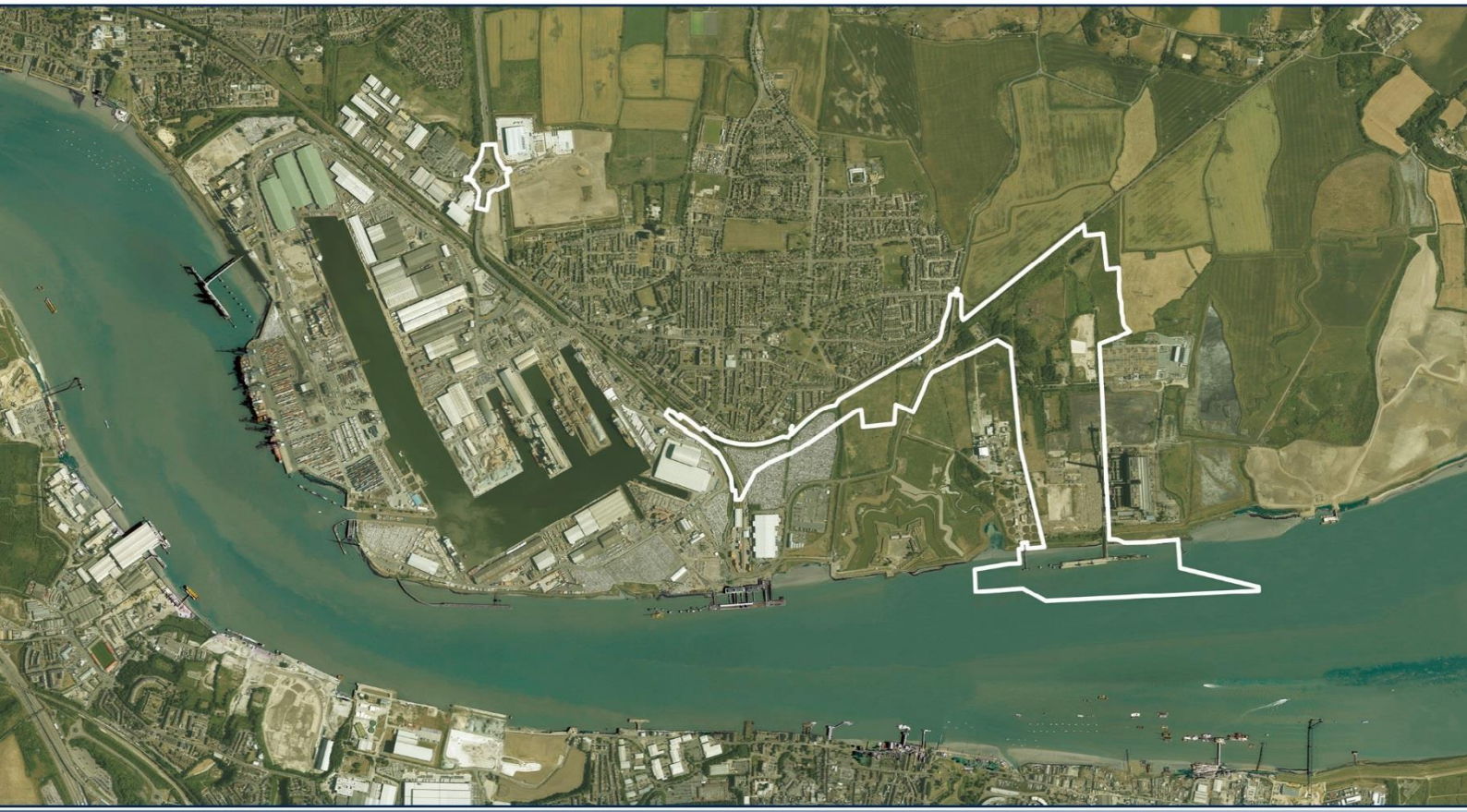
PROPOSED PORT TERMINAL AT FORMER TILBURY POWER STATION

TILBURY2

TR030003

APPENDIX 1: AIR QUALITY REFERENCES AND FIGURES

TILBURY2 DOCUMENT REF: PoTLL/T2/EX/95



References

AQEG (2012) Fine Particulate Matter ($PM_{2.5}$) in the United Kingdom.

https://uk-air.defra.gov.uk/assets/documents/reports/cat11/1212141150_AQEG_Fine_Particulate_Matter_in_the_UK.pdf

AQEG (2013) Mitigation of United Kingdom $PM_{2.5}$ Concentrations

https://uk-air.defra.gov.uk/assets/documents/reports/cat11/1508060903_DEF-PB14161_Mitigation_of_UK_PM25.pdf

COMEAP (2015) The evidence for differential health effects of particulate matter according to source or components
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/411762/COMEAP_The_evidence_for_differential_health_effects_of_particulate_matter_according_to_source_or_components.pdf

AQEG (2017) Impacts of Shipping on UK Air Quality

https://uk-air.defra.gov.uk/assets/documents/reports/cat11/1708081025_170807_Shipping_Report.pdf

DfT (2015) Road Traffic Forecasts 2015
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/411471/road-traffic-forecasts-2015.pdf

IAQM (2016) Guidance on the Assessment of Mineral Dust Impacts for Planning

http://www.iaqm.co.uk/text/guidance/mineralsguidance_2016.pdf

Ministry of Housing, Communities and Local Government (2014) Minerals Planning Guidance

https://www.gov.uk/guidance/minerals#Dust-emissions

Air Quality Consultants (2018a), Nitrogen Dioxide and Nitrogen Oxide Trends in the UK 2005 to 2016

http://www.aqconsultants.co.uk/AQC/media/Reports/NO2-NOx-Trend-Report.pdf

Air Quality Consultants (2018b), Development of the CURED v3A Emissions Model
http://www.aqconsultants.co.uk/AQC/media/Reports/Development-of-CURED-V3A-110117.pdf

Department for Transport (2017), WebTAG Data Book

https://www.gov.uk/government/publications/webtag-tag-data-book-july-2017

Gravesham BC (2017a), Air Quality Management Area Review
http://www.kentair.org.uk/Pagesfiles/Gravesham%20Air%20Quality%20Management%20Area%20Review%20-%20Detailed%20Assessment%20August%202017.pdf

Gravesham BC (2017b), LAQM Annual Status Report 2017

http://www.kentair.org.uk/Pagesfiles/Gravesham%20Annual%20Status%20Report%20ASR%202017.pdf

National Policy Statement for Ports

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/3931/national-policy-statement-ports.pdf

World Health Organisation (2006), Health risks of particulate matter from long range transboundary air pollution

http://www.euro.who.int/__data/assets/pdf_file/0006/78657/E88189.pdf

Press Releases

https://www.gov.uk/government/news/plan-for-roadside-no2-concentrations-published

https://www.smmt.co.uk/2017/02/uk-new-car-market-kick-starts-2017-with-milestone-for-alternatively-fuelled-vehicles/

http://www.acea.be/press-releases/article/passenger-car-registrations-0.7-first-quarter-of-2018-5.3-in-march

http://www.bbc.com/news/business-38880019

Department for Transport

WebTAG Table A 1.3.9

Proportions of vehicle kilometres by fuel type

This version:
October 2017 release v1.8.2
Oct-17

Links:
Contents
WebTAG Unit 3.5.6
WebTAG Unit A 1.3

Parameters:

Source year: 2010

Sheet Navigation:

Notes

Source: DfT,Environmental Analysis

Notes:
(1) Values are assumed to be constant post 2035
(2) These data are in line with the assumptions made for the road emissions component of BEIS's Energy and Emissions Projections, last updated 15/03/2017. Link to EEP publication
(3) They represent the current Government policy reference scenario, meaning that they reflect all agreed policies where decisions on policy design are sufficiently advanced to allow robust estimates of impact (i.e. including "planned" policies)
(4) Forecasts of vehicle-kilometre proportions for diesel and petrol vehicles based on DfT 2010 fleet models for both cars and LGVs.
(5) At present, it is assumed there are no OGVs or PSVs using electricity. These columns are for possible future use.
(6) For the years 2005 - 2029, values for years not shown in bold are calculated by linear interpolation between the two closest years.
(7) Values for 2036 onwards are assumed to be constant at the 2035 level.
(8) OGV 1 comprises rigids up to 26 tonnes, whereas OGV 2 comprises rigids over 26 tonnes, and artics. Rigids and artics are as defined in the DfT Traffic Statistics. Link to traffic stats definitions

Databook Source worksheets: VoC Mileage %. This table feeds into Tables A 1.3.12, A 1.3.13 and A 1.3.15.
WebTAG 1: Unit 3.5.6 (Table 12)

Table A 1.3.9:	Proportion of cars, LGV & other vehicle kilometres using petrol, diesel or electricity											
	Cars			LGV			OGV1		OGV2		PSV	
Year	Petrol	Diesel	Electric	Petrol	Diesel	Electric	Diesel	Electric	Diesel	Electric	Diesel	Electric
2004	**73.10%**	**26.90%**	**0.00%**	**8.50%**	**91.50%**	**0.00%**	**100.00%**	**0.00%**	**100.00%**	**0.00%**	**100.00%**	**0.00%**
2005	70.69%	29.31%	0.00%	7.08%	92.92%	0.00%	100.00%	0.00%	100.00%	0.00%	100.00%	0.00%
2006	68.45%	31.55%	0.00%	5.86%	94.14%	0.00%	100.00%	0.00%	100.00%	0.00%	100.00%	0.00%
2007	66.17%	33.83%	0.00%	4.99%	95.01%	0.00%	100.00%	0.00%	100.00%	0.00%	100.00%	0.00%
2008	64.46%	35.54%	0.00%	4.41%	95.59%	0.00%	100.00%	0.00%	100.00%	0.00%	100.00%	0.00%
2009	62.32%	37.68%	0.00%	4.07%	95.93%	0.00%	100.00%	0.00%	100.00%	0.00%	100.00%	0.00%
2010	**60.00%**	**40.00%**	**0.00%**	**3.68%**	**96.32%**	**0.00%**	**100.00%**	**0.00%**	**100.00%**	**0.00%**	**100.00%**	**0.00%**
2011	57.74%	42.25%	0.00%	3.27%	96.73%	0.00%	100.00%	0.00%	100.00%	0.00%	100.00%	0.00%
2012	55.58%	44.41%	0.01%	2.96%	97.04%	0.02%	100.00%	0.00%	100.00%	0.00%	100.00%	0.00%
2013	53.37%	46.61%	0.03%	2.60%	97.37%	0.03%	100.00%	0.00%	100.00%	0.00%	100.00%	0.00%
2014	51.40%	48.54%	0.07%	2.34%	97.59%	0.07%	100.00%	0.00%	100.00%	0.00%	100.00%	0.00%
2015	**49.72%**	**50.13%**	**0.15%**	**2.16%**	**97.74%**	**0.10%**	**100.00%**	**0.00%**	**100.00%**	**0.00%**	**100.00%**	**0.00%**
2016	47.82%	51.83%	0.34%	1.91%	97.92%	0.17%	100.00%	0.00%	100.00%	0.00%	100.00%	0.00%
2017	46.38%	53.18%	0.44%	1.71%	98.02%	0.27%	100.00%	0.00%	100.00%	0.00%	100.00%	0.00%
2018	45.48%	53.95%	0.57%	1.56%	98.21%	0.23%	100.00%	0.00%	100.00%	0.00%	100.00%	0.00%
2019	45.00%	54.25%	0.75%	1.43%	98.35%	0.22%	100.00%	0.00%	100.00%	0.00%	100.00%	0.00%
2020	**44.88%**	**54.18%**	**0.94%**	**1.34%**	**98.43%**	**0.23%**	**100.00%**	**0.00%**	**100.00%**	**0.00%**	**100.00%**	**0.00%**
2021	44.78%	53.99%	1.22%	1.27%	98.46%	0.28%	100.00%	0.00%	100.00%	0.00%	100.00%	0.00%
2022	44.69%	53.69%	1.62%	1.22%	98.37%	0.41%	100.00%	0.00%	100.00%	0.00%	100.00%	0.00%
2023	44.62%	53.30%	2.08%	1.17%	98.18%	0.65%	100.00%	0.00%	100.00%	0.00%	100.00%	0.00%
2024	44.59%	52.76%	2.66%	1.13%	97.81%	1.06%	100.00%	0.00%	100.00%	0.00%	100.00%	0.00%
2025	**44.51%**	**51.99%**	**3.50%**	**1.09%**	**97.16%**	**1.75%**	**100.00%**	**0.00%**	**100.00%**	**0.00%**	**100.00%**	**0.00%**
2026	44.46%	51.14%	4.40%	1.06%	96.54%	2.40%	100.00%	0.00%	100.00%	0.00%	100.00%	0.00%
2027	44.41%	50.27%	5.32%	0.84%	96.01%	3.15%	100.00%	0.00%	100.00%	0.00%	100.00%	0.00%
2028	44.34%	49.41%	6.26%	0.84%	95.22%	3.94%	100.00%	0.00%	100.00%	0.00%	100.00%	0.00%
2029	44.21%	48.57%	7.22%	0.83%	94.33%	4.84%	100.00%	0.00%	100.00%	0.00%	100.00%	0.00%
2030	**44.04%**	**47.78%**	**8.17%**	**0.82%**	**93.32%**	**5.86%**	**100.00%**	**0.00%**	**100.00%**	**0.00%**	**100.00%**	**0.00%**
2031	43.83%	47.02%	9.15%	0.81%	92.33%	6.86%	100.00%	0.00%	100.00%	0.00%	100.00%	0.00%
2032	43.58%	46.29%	10.13%	0.79%	91.34%	7.87%	100.00%	0.00%	100.00%	0.00%	100.00%	0.00%
2033	43.30%	45.58%	11.12%	0.78%	90.34%	8.88%	100.00%	0.00%	100.00%	0.00%	100.00%	0.00%
2034	42.99%	44.90%	12.11%	0.77%	89.32%	9.91%	100.00%	0.00%	100.00%	0.00%	100.00%	0.00%
2035	42.65%	44.23%	13.11%	0.76%	88.30%	10.94%	100.00%	0.00%	100.00%	0.00%	100.00%	0.00%

Figure 1 – DfT WebTAG Data book (2017) - Vehicle fleet composition

Figure 2 – PLA emission inventory data (2016) for grid square TQ6275

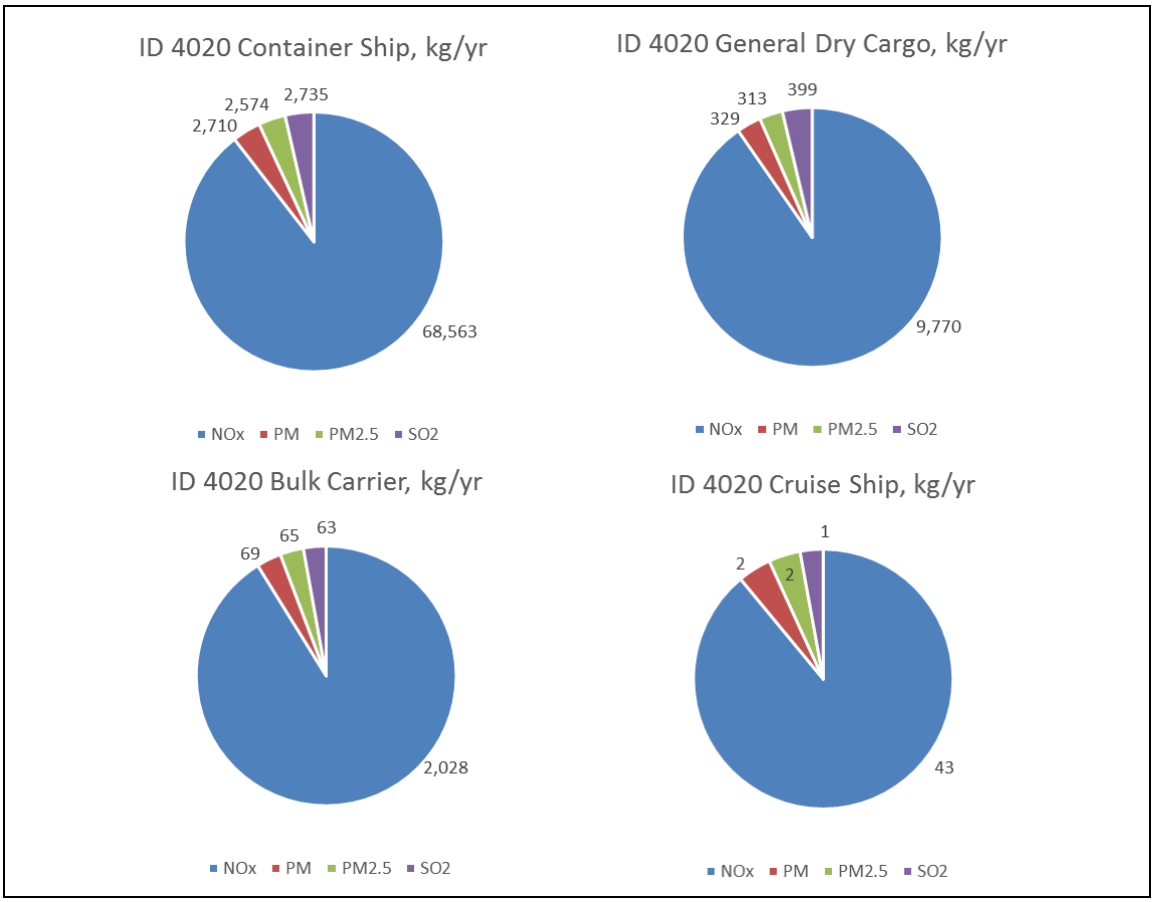
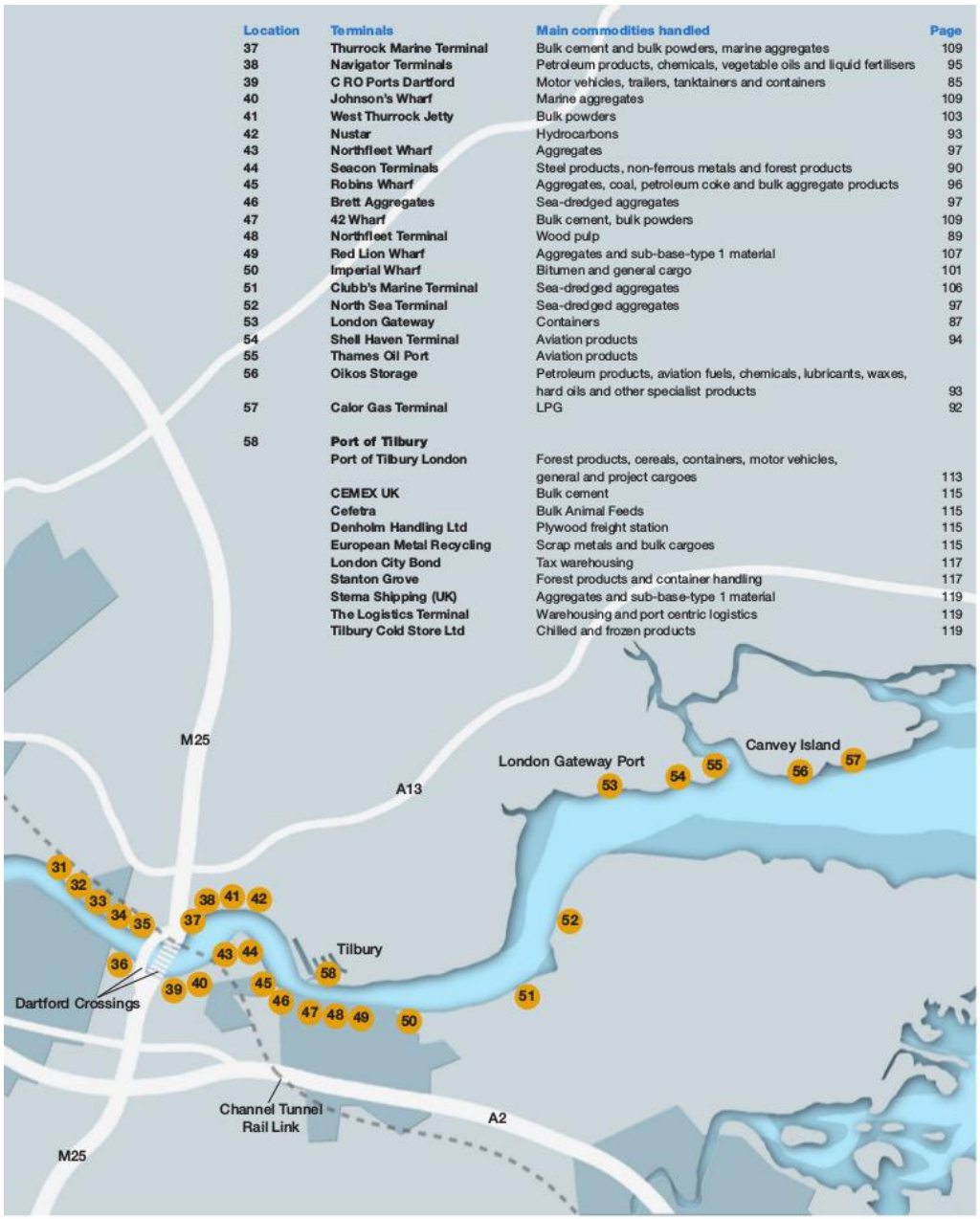
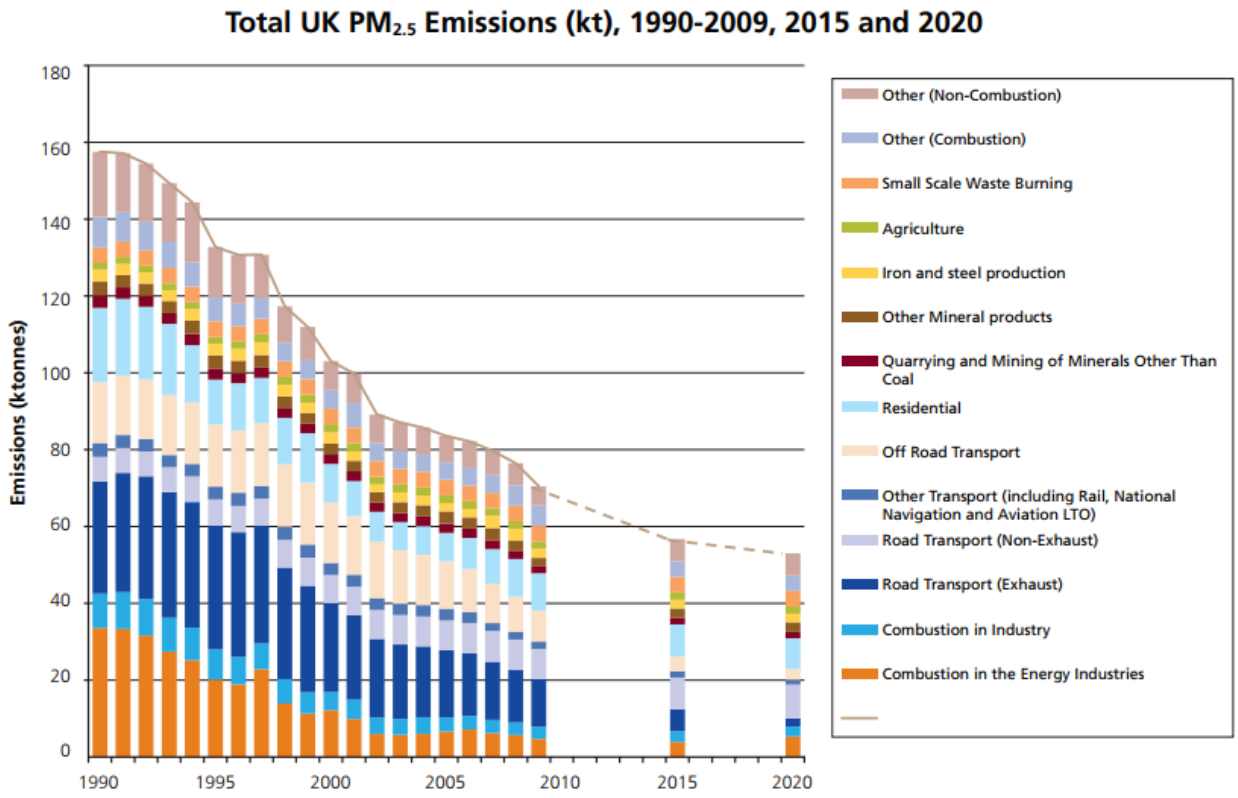


Figure 3 - PLA Terminal Locations Map



Location	Terminals	Main commodities handled	Page
37	Thurrock Marine Terminal	Bulk cement and bulk powders, marine aggregates	109
38	Navigator Terminals	Petroleum products, chemicals, vegetable oils and liquid fertilisers	95
39	C RO Ports Dartford	Motor vehicles, trailers, tanktainers and containers	85
40	Johnson's Wharf	Marine aggregates	109
41	West Thurrock Jetty	Bulk powders	103
42	Nustar	Hydrocarbons	93
43	Northfleet Wharf	Aggregates	97
44	Seacon Terminals	Steel products, non-ferrous metals and forest products	90
45	Robins Wharf	Aggregates, coal, petroleum coke and bulk aggregate products	96
46	Brett Aggregates	Sea-dredged aggregates	97
47	42 Wharf	Bulk cement, bulk powders	109
48	Northfleet Terminal	Wood pulp	89
49	Red Lion Wharf	Aggregates and sub-base-type 1 material	107
50	Imperial Wharf	Bitumen and general cargo	101
51	Clubb's Marine Terminal	Sea-dredged aggregates	106
52	North Sea Terminal	Sea-dredged aggregates	97
53	London Gateway	Containers	87
54	Shell Haven Terminal	Aviation products	94
55	Thames Oil Port	Aviation products	
56	Oikos Storage	Petroleum products, aviation fuels, chemicals, lubricants, waxes, hard oils and other specialist products	93
57	Calor Gas Terminal	LPG	92
58	**Port of Tilbury**		
	Port of Tilbury London	Forest products, cereals, containers, motor vehicles, general and project cargoes	113
	CEMEX UK	Bulk cement	115
	Cefetra	Bulk Animal Feeds	115
	Denholm Handling Ltd	Plywood freight station	115
	European Metal Recycling	Scrap metals and bulk cargoes	115
	London City Bond	Tax warehousing	117
	Stanton Grove	Forest products and container handling	117
	Stena Shipping (UK)	Aggregates and sub-base-type 1 material	119
	The Logistics Terminal	Warehousing and port centric logistics	119
	Tilbury Cold Store Ltd	Chilled and frozen products	119

Figure 4a - Source contribution to UK emissions of primary $PM_{2.5}$, 1990 to 2020 (from AQEG 2012)



	UK $PM_{2.5}$ emissions (ktonnes)						
Emission source	**1990**	**1995**	**2000**	**2005**	**2009**	**2015**	**2020**
combustion in the energy industries	33.6	20.2	12.2	6.6	4.8	3.9	5.4
combustion in industry	8.9	7.8	4.7	3.7	3.1	2.8	2.6
road transport (exhaust)	29.2	32.3	23.1	17.4	12.4	5.7	2.0
road transport (non-exhaust)	6.4	6.7	7.3	7.8	7.8	8.2	8.8
other transport (including rail, national navigation and aviation landing and take-off)	3.6	3.4	3.2	3.1	2.0	1.6	1.3
off-road transport	15.9	16.2	15.7	12.3	8.0	3.9	2.9
residential	19.3	11.7	10.0	7.4	9.8	8.3	7.9
quarrying and mining of minerals other than coal	3.3	2.9	2.5	2.4	1.9	1.7	1.7
other mineral products	3.6	3.4	2.8	3.2	2.1	2.5	2.5
iron and steel production	3.1	3.1	3.0	2.2	2.5	2.2	2.2
agriculture	1.7	1.8	2.1	2.0	1.9	1.9	1.9
small-scale waste burning	4.1	4.1	4.1	4.1	4.1	4.1	4.1
other (combustion)	7.9	6.1	4.8	4.6	5.3	4.0	4.0
other (non-combustion)	17.0	13.2	7.6	6.8	5.0	5.8	5.8
TOTAL	**157.6**	**132.8**	**103.1**	**83.6**	**70.5**	**56.8**	**53.0**

Figure 4b – Source attribution for annual average $PM_{2.5}$ (from AQEG 2013)

Component	Contribution to total $PM_{2.5}$	Estimated % contribution to total $PM_{2.5}$				
		UK	Non-UK	Shipping	Natural	Other
Primary PM	23%[3]-25%[2*]	19%[3]	4%[3]			
Secondary inorganic aerosol	32%[3]-44%[2]	13%[3] 20%[1,2]	14%[3] 24%[1,2]	6%[3]		
– sulphate	8%[3]	2%[3]	5%[3]	2%[3]		
– nitrate	16%[3]	8%[3]	6%[3]	3%[3]		
– chloride						
– ammonium	7%[3]	3%[3]	3%[3]	1%[3]		
Secondary Organic Aerosol	14%[2]-17%[3]	14%[4,3] 12%[4,2]	3%[4,3] 2%[4,2]			
Mineral dust/soil	7%[2]-10%[3]				7%-10%	
Traffic non-exhaust	4%[3] (<13%[2])	4%				
Sea salt	5%[3]-7%[2]				5%-7%	
Other	3%[2]-9%[3]					
Total (PCM)†		50%	21%	6%	15%	9%
Total (Yin *et al.* (2010); Nemitz *et al.* (2014))		55%	30%	–	14%	3%

* Incorporates "Industry/commercial/domestic", "Off-road/smoking engines" and "Traffic" in Yin *et al.* (2010), and so includes non-exhaust traffic emissions;

(1) Nemitz *et al.* (2013) for 2007, gives a contribution of non-UK sources to UK SIA of about 55% of the spatial average UK value from EMEP4UK;

(2) Yin *et al.* (2010), Birmingham estimates for 2007-08 from CMB model and measurements, annual mean $PM_{2.5}$ = 11.63 μg m^{-3};

(3) PCM model, Ricardo-AEA, population-weighted UK mean (see Figure 4.12 in AQEG, 2012);

(4) Redington and Derwent (2013) NAME model, average over Harwell, Auchencorth, Birmingham and London Bloomsbury used in conjunction with PCM, result for Birmingham used in conjunction with Yin *et al.* (2010), with NAME UK/non-UK split used to scale PCM and Yin *et al.* (2010) contribution to total $PM_{2.5}$; authors calculate on average 83% of UK and 71% of non-UK SOA is biogenic. This does not necessarily mean that the biogenic SOA is uncontrollable as it will include some contribution from cooking;

† Based on PCM figures, 9% of total $PM_{2.5}$ is unaccounted for, 'Other' in the table.

PORT OF TILBURY LONDON

PLANNING ACT 2008
INFRASTRUCTURE PLANNING (EXAMINATION PROCEDURE) RULES 2010

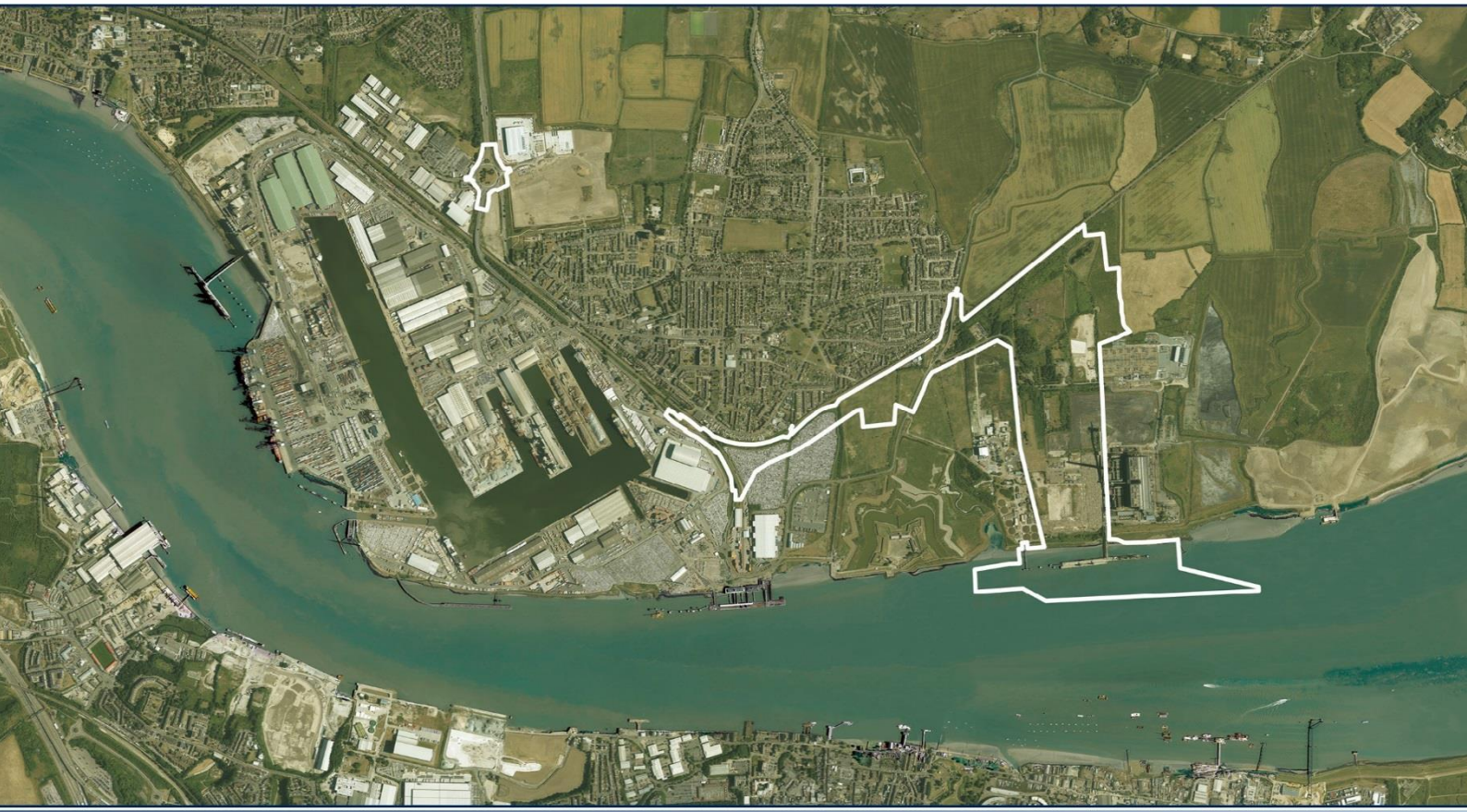
PROPOSED PORT TERMINAL AT FORMER TILBURY POWER STATION

TILBURY2

TR030003

APPENDIX 2: SUMMARY OF TRAFFIC AND EFT UPDATE

TILBURY2 DOCUMENT REF: PoTLL/T2/EX/95



TILBURY2

Memo

To:	Thurrock and Gravesham EHO		
From:	Sarah Horrocks	**Email:**	sarah.horrocks@atkinsglobal.com
Phone:	01372 756032	**Date:**	29 Jan 2018
Ref:	Tilbury2 DCO	**cc:**	Martin Ward, Matthew Fox
Subject:	Operational traffic emissions - sensitivity tests		

1. Approach to Assessment

1.1. Introduction

This note looks at the sensitivity of the results presented in the Environmental Statement (ES) for Tilbury 2 to recent changes. Revised traffic model data have been issued as a result of updated national growth factors released by Department for Transport (DfT). Forecasts of traffic growth are obtained from the Trip End Model Presentation Programme (TEMPro) software which provides forecasts of increases in traffic flow based on population, household and employment data contained within the national trip end model (NTEM) dataset[1]. The original forecasts presented in the ES used version 7.0 of the NTEM dataset as incorporated into the TEMPro software. This note uses the latest version 7.2 of the NTEM dataset as incorporated into the TEMPro software.

In addition, in November 2017 the Department for Environment, Food and Rural Affairs (Defra) released an updated suite of Local Air Quality Management (LAQM) tools, including the following which were used in the assessment of air quality reported in the ES:

- Revised Emissions Factor Toolkit (EfT) v8.0[2];
- Revised Background Maps (2015 base year)[3];
- Revised Sector Removal Tool v6.1[4]; and
- Revised NOx to NO_2 calculator v6.1[5].

The impact of these changes on the findings reported in the ES is assessed in two scenarios:

1. **Impact of revised traffic data** – Re-modelling the future year Do Nothing and Do Something scenarios for the assessment presented in the ES, accounting for revised traffic growth factors only, as everything else is consistent with the ES (there being no requirement to change the baseline (2016) as the new traffic model data creates no changes to those traffic estimates; as such the model verification stands); and
2. **Impact of updated emissions factors** - Re modelling base and future year scenarios, accounting for revised traffic growth factors and using the latest release of Defra emission factors, background maps and other tools (in this case, re-verification of the 2016 baseline model is required).

Both assessments of operational traffic emissions have been undertaken using the dispersion modelling software ADMS-Roads (version 4.0), consistent with the ES. The model uses information on traffic flows, speeds and composition, vehicle emission rates, road alignment and width, and local meteorological data to estimate the road traffic contribution to local air pollutant concentrations at identified receptor locations. The focus is on operational traffic flows only as the construction impact will not materially change.

[1] DfT, 2017, TEMPro downloads: https://www.gov.uk/government/publications/tempro-downloads
[2] Defra, 2017. Emissions Factors Toolkit: https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html
[3] https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2015
[4] Defra, 2017. NO_2 Adjustment for NO_x Sector Removal Tool: https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html
[5] Defra, 2017. NO_x to NO_2 Calculator: https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html

1.2. Traffic Data

Revised national traffic growth rates based on version 7.2 of the NTEM dataset mean that baseline traffic flows in the future year scenarios have increased relative to the assessment undertaken for the ES. Traffic generated by the development and during construction associated with Tilbury 2 remains as per the ES.

The updated traffic data used in this sensitivity test is presented in Table 1. A comparison showing the difference in traffic data due to changes in growth rates is shown in Table 2. Both scenarios are affected in the same way as flows associated with Tilbury 2 are unchanged.

Table 1. Summary of Revised Traffic Data used in the Updated Assessments

ID	Name	Base 2016			DM 2020			DS 2020		
		AADT	HGV %	Speed (kph)	AADT	HGV %	Speed (kph)	AADT	HGV %	Speed (kph)
1	A13 East of A1089	85,354	8.9	109	93,854	9.6	109	94,506	10.0	109
2	A13 West of A1089	90,417	9.6	102	99,399	10.4	102	101,047	11.7	102
3	A13 Westbound Off-Slip	4,707	7.0	113	5,897	7.7	113	6,223	11.3	113
4	A13 Westbound On-Slip	6,521	32.6	113	8,606	35.9	113	9,430	40.6	113
5	A13 Eastbound Off-Slip	8,010	28.9	113	10,201	32.3	113	11,025	36.6	113
6	A13 Eastbound On-Slip	4,862	17.3	113	6,063	16.5	113	6,389	19.6	113
7	A1089 North of A126 Slips	25,224	23.8	100	31,966	25.9	100	34,256	29.9	100
8	A1089 North of ASDA Rbt	29,076	23.8	98	37,366	24.7	98	39,788	28.2	98
9	A1089 St Andrews Rd North of Gate 1	13,447	46.3	64	14,550	46.8	64	16,972	51.8	64
10	A1089 Ferry Road - North of Proposed Link Road	5,263	26.4	61	5,926	30.0	61	8,327	44.8	61
11	A1089 Ferry Road - South of Proposed Link Road	5,263	26.4	61	5,926	30.0	61	4,323	28.9	61
12	Fort Road - South of Site Access	1,413	8.2	55	1,802	29.4	55			
13	Fort Road - North of Brennan Road	1,906	13.2	54	2,042	13.2	54	2,042	13.2	54
14	Site Access	230	6.3	38	518	58.4	38	3,216	70.1	38
15	Proposed Link Road							4,401	56.4	61
16	A13 East of M25 Jct 30	110,537	11.6	80	121,659	12.6	80	123,307	13.7	80
17	A13 West of M25 Jct 30	89,481	10.6	90	96,878	10.8	90	97,442	11.2	90
18	M25 North of Jct 30	128,855	20.5	102	139,706	20.8	102	140,422	21.2	102
19	M25 South of Jct 30	115,324	19.1	88	124,966	19.4	88	125,308	19.6	88
20	Dock Road	12,924	0.8	43	14,810	0.7	43	14,810	0.7	43
21	Calcutta Road	10,118	0.5	43	11,803	0.4	43	11,829	0.4	43
22	A13 East of A126 Interchange to A1012	83,034	12.3	80	92,195	13.6	80	93,843	15.0	80
23	Arterial Rd North Stifford from B186 to Long Ln roundabout	29,691	5.8	64	31,808	5.8	64	31,808	5.8	64
24	A1013 Stanford Rd from Daneholes roundabout to A1014	11,868	6.9	81	12,714	6.9	81	12,714	6.9	81
25	Fort Road - Between Brennan Road and the Site Access	1,906	13.2	54	2,042	13.2	54	2,141	12.6	54

Table 2. Summary of Difference in Traffic Data due to Revised Traffic Growth Estimates

ID	Name	Base 2016			DM 2020			DS 2020		
		AADT	HGV%	Speed (kph)	AADT	HGV%	Speed (kph)	AADT	HGV%	Speed (kph)
1	A13 East of A1089	-	-	-	1,605	0.0	-	1,605	0.0	-
2	A13 West of A1089	-	-	-	1,700	0.0	-	1,700	0.0	-
3	A13 Westbound Off-Slip	-	-	-	89	0.0	-	89	-0.1	-
4	A13 Westbound On-Slip	-	-	-	123	0.0	-	123	-0.1	-
5	A13 Eastbound Off-Slip	-	-	-	151	-0.1	-	151	-0.1	-
6	A13 Eastbound On-Slip	-	-	-	91	0.0	-	91	0.0	-
7	A1089 North of A126 Slips	-	-	-	474	0.0	-	474	-0.1	-
8	A1089 North of ASDA Rbt	-	-	-	547	0.0	-	547	-0.1	-
9	A1089 St Andrews Rd North of Gate 1	-	-	-	253	0.0	-	253	-0.1	-
10	A1089 Ferry Road - North of Proposed Link Road	-	-	-	99	-0.1	-	99	-0.2	-
11	A1089 Ferry Road - South of Proposed Link Road	-	-	-	99	-0.1	-	72	0.0	-
12	Fort Road - South of Site Access	-	-	-	27	-0.2	-	-	-	-
13	Fort Road - North of Brennan Road	-	-	-	36	0.0	-	36	0.0	-
14	Site Access	-	-	-	-	-	-	-	-	-
15	Proposed Link Road	-	-	-	-	-	-	27	-0.2	-
16	A13 East of M25 Jct 30	-	-	-	2,079	0.0	-	2,079	0.0	-
17	A13 West of M25 Jct 30	-	-	-	1,683	0.0	-	1,683	0.0	-
18	M25 North of Jct 30	-	-	-	2,435	0.0	-	2,435	0.0	-
19	M25 South of Jct 30	-	-	-	2,180	0.0	-	2,180	0.0	-
20	Dock Road	-	-	-	243	0.0	-	243	0.0	-
21	Calcutta Road	-	-	-	190	0.0	-	190	0.0	-
22	A13 East of A126 Interchange to A1012	-	-	-	1,562	0.0	-	1,562	0.0	-
23	Arterial Rd North Stifford from B186 to Long Ln roundabout	-	-	-	558	0.0	-	558	0.0	-
24	A1013 Stanford Rd from Daneholes roundabout to A1014	-	-	-	223	-	-	223	-	-
25	Fort Road - Between Brennan Road and the Site Access	-	-	-	36	0.0	-	36	0.0	-

1.3. Emission Calculations

Pollutant emission rates for each modelled road link have been recalculated using the revised traffic data. The emission rates of NO_x, PM_{10} and $PM_{2.5}$ for the two scenarios have been updated using the following emission calculation tools:

- Scenario 1 - Updated traffic data scenario:
  - Air Quality Consultants (AQC) Calculator Using Realistic Emissions for Diesels (CURED) V2A[6] for NO_x
  - Defra EfT v7.0[7] for PM_{10} and $PM_{2.5}$
- Scenario 2 - Updated EfT v8 scenario:
  - Defra EfT v8.0 for NO_x, PM_{10} and $PM_{2.5}$.

As described in the ES, Appendix 18.C section 18.C.2, the CURED V2A tool is an alternative, more conservative approach to estimating NO_x emissions. The results from CURED V2A are likely to over-predict emissions from vehicles in the future and thus provide a reasonable worst-case upper-bound to the assessment. The use of the CURED V2A tool to calculate NO_X emission rates was decided during the ES assessment stage, while an updated Defra EfT was awaited. This approach was agreed with the local authority, Thurrock. CURED V2A is based on the findings of real world emissions tests on modern diesel vehicles and therefore, for diesel vehicles, provides more conservative NO_X emissions estimates than EfT v7.0.

The EfT v8.0 includes updated NO_x and PM speed emission coefficient equations, taken from the European Environment Agency (EEA) COPERT 5 emission calculation tool (first released September 2016)[8], including Euro 6 subcategories. In most cases, CURED V2A is expected to give similar results to the EfT v8.0, although there may be some road conditions (traffic flow, composition and speed) in future years that could give rise to higher emissions with the EfT v8.0. The sensitivity tests described in the analysis for Scenario 2 seek to confirm that the ES assessment findings are robust.

1.4. Other Model Inputs and Assumptions

Assumptions regarding road type, speed, fleet composition remain as described in the ES for both scenarios (the detail of which is provided in ES Appendix 18.C).
All other model inputs and assumptions also remain the same as described in the ES:

- Meteorology;
- Road Geometry;
- Time-varying Emission Factors; and
- Location of Sensitive Receptors.

1.5. Background Concentrations

Estimates of background concentrations are required in order to calculate total pollutant concentrations from the modelled increments. The methodology for processing background concentrations remains unchanged from the ES for both scenarios.

The background map concentrations for Scenario 1 (revised traffic data using CURED V2A for NO_x and EfT v7.0 for PM_{10} and $PM_{2.5}$) are unchanged from the approach used for the ES (i.e. it uses the Defra 2013-based background maps, which are still available on the Defra UK-AIR website[9]).

As part of the November 2017 update, Defra released new background maps (based on a 2015 base year). These background concentrations have been used in Scenario 2, which looks at the impact of the EfT v8;

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[6] Air Quality Consultants, 2017. http://www.aqconsultants.co.uk/AQC/media/Reports/Relationship-between-CURED-V2A-and-COPERT-V5_0-July-2017.pdf
[7] Defra, 2017. Emissions Factors Toolkit: https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html
[8] COPERT Version 5, Accessed 2017 http://emisia.com/products/copert/copert-5

[9] https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2013

this is necessary to be consistent with all other revised Defra LAQM tools. The background values have been processed using the same methodology described in the ES.

Processing of Defra background maps requires the removal of certain source sectors, to avoid double counting of major roads included in the air dispersion model. The Defra background maps "Sector Removal Tool" was applied, consistent with the approach described in the ES (Appendix 18.C, section 18.C.6). The tools used for the two scenarios were

- Sector Removal Tool v5.1 (used with 2013 based background maps and CURED v2A/EfT v7)
- Sector Removal Tool v6.1 (used with 2015 based background maps and EfT v8).

A comparison of the Defra background maps with monitoring data was undertaken prior to sector removal (both for the ES and this sensitivity analysis). The background comparison undertaken for the ES showed that the 2013-based background maps underestimated 2016 NO_2 concentrations when compared to measured 2016 annual mean concentrations measured at the Thurrock urban background continuous monitoring station (CMS) (TK1). The 2013-based background mapped NO_2 concentrations were uplifted by a factor of 1.66 to bring them in line with real-world conditions (Appendix 18.C, Table 18.35).

This comparison has been repeated for Scenario 2, using the revised Defra mapped concentrations (2015 base year). Table 3 presents the comparison of the TK1 CMS with the Defra mapped concentration for the grid square in which the CMS located. This shows the 2015-based maps are underestimating to a slightly greater extent compared to the 2013-based maps, for the year 2016, by a factor of 1.76.

Table 3. Comparison of CMS Measured vs Defra Mapped NO_2 Concentration (µg/m^3)

Base year	CMS X, Y	Grid Square X, Y	2016 Mapped Background	2016 Measured Background	% Difference	Factor
2013	561066, 177894	561500, 177500	16.9	28.0	-40%	1.66
2015	561066, 177894	561500, 177500	15.9	28.0	-43%	1.76

1.6. Results Processing

The modelled output from ADMS roads is the road only increment for long-term average (annual mean) concentrations of NO_x, PM_{10} and $PM_{2.5}$.

Total NO_2 has been derived from modelled road NO_x concentrations using the method in Defra's Technical Guidance LAQM TG(16)[10], as described in the ES. Total annual mean concentrations are calculated from modelled road NO_x and background NO_2 concentrations using the NO_x to NO_2 Calculator Spreadsheet. Total PM_{10} and $PM_{2.5}$ concentrations have, as described in the ES, been calculated by adding the road PM contribution to the background PM concentration.

The impact of Tilbury2 in relation to NO_2 and PM is determined by the change in concentration at individual receptors. The significance of this change is calculated using Institute of Air Quality Management (IAQM) Planning Guidance[11] which is consistent with the ES.

1.6.1. Scenario 1

As traffic flows for the base year 2016 remain unchanged, the same base year dispersion model as prepared for the ES can be used. Therefore, there is no need to update the associated model verification.

The modelled road NO_x for the revised models for the future years have therefore been adjusted in line with the factors presented in the ES. Total NO_2 has been estimated using the 2013 based background NO_2 maps

[10] Defra, 2016. Local Air Quality Management: Technical Guidance (TG16). April 2016. Available at: http://laqm.defra.gov.uk/documents/LAQM-TG16-April-16-v1.pdf

[11] EPUK / IAQM (2017). Land-Use Planning & Development Control: Planning For Air Quality, January 2017: http://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf

(adjusted as described in the ES) and NO_x to NO_2 Calculator v5.1. The results for this scenario are presented in Section **Error! Reference source not found.** of this note.

1.6.2. Scenario 2

The 2016 base year model is changed for this scenario, as emissions estimates have been generated using the EfT v8. It thus requires reverification, using the update to the Defra background maps and suite of associated LAQM tools (including the NO_x to NO_2 Calculator v6.1). This process is described in Section 3.2.

The processing of modelled road NO_x into annual mean NO_2 is the same as that described in the ES, other than using the updated suite of Defra LAQM tools. The results for these models are presented in Section 0.

2. Scenario 1 – Revised Traffic Growth

2.1. Introduction

As discussed in Section **Error! Reference source not found.**, only the Do Minimum and Do Something (2020) scenarios are affected by the changes in DfT growth factors. Therefore, these are the only models which have been revised in this scenario.

2.2. Scenario 1 Results

The annual mean NO_2, PM_{10} and $PM_{2.5}$ results for Scenario 1 (S1) using the revised traffic data (all other inputs remaining unchanged) are presented in Table 4, Table 5 and Table 6 respectively. These results can be compared directly with the equivalent tables in the ES Appendix 18.E (Tables 18.44 to 18.46), to understand the impact of the updated traffic growth estimates.

Table 4. S1 Revised Annual Mean NO_2 Results (µg/m³) for Human Receptors

Receptor ID	Background 2016	Background 2020	2016 Base	2020 DM	2020 DS	2020 Change	Impact magnitude	Change from ES
R1	28.3	24.8	37.5	31.1	31.2	0.1	Negligible	No
R2	24.0	21.1	33.4	27.7	27.7	0.0	Negligible	No
R3	23.0	20.2	32.7	28.1	28.4	0.3	Negligible	No
R4	24.1	21.2	30.6	26.5	27.0	0.5	Negligible	No
R5	23.9	21.0	37.0	32.1	32.3	0.2	Negligible	No
R6	23.3	20.5	31.0	26.9	27.0	0.1	Negligible	No
R7	24.6	21.6	31.9	27.4	28.1	0.7	Negligible	No
R8	24.3	21.5	32.9	28.2	29.0	0.8	Negligible	No
R9	25.3	22.5	39.2	34.8	36.8	2.0	Slight	No
R10	24.8	22.1	30.8	26.2	30.7	4.5	Moderate	No
R11	25.8	23.0	28.6	25.0	26.6	1.6	Negligible	No
R12	25.8	23.0	27.8	24.5	26.1	1.6	Negligible	No
R13	24.9	22.3	26.2	23.4	26.5	3.1	Slight	No
R14	24.6	22.1	25.8	23.0	26.9	3.9	Slight	No
R15	23.1	20.7	26.2	23.0	23.7	0.7	Negligible	No
R16	25.8	23.0	27.1	24.0	25.8	1.8	Negligible	No
R17	25.8	23.0	27.2	24.1	26.3	2.2	Slight	Yes
R18	23.5	20.6	27.6	24.0	24.1	0.1	Negligible	No
R19	26.0	23.2	34.1	30.8	31.7	0.9	Slight	No
R20	23.6	20.7	27.1	23.5	23.6	0.1	Negligible	No
R21	26.3	23.1	40.9	34.5	35.0	0.5	Negligible	No
R22	25.8	22.6	28.8	24.8	24.9	0.1	Negligible	No
R23	31.7	28.4	39.2	34.1	34.2	0.1	Negligible	No
R24	21.6	19.0	35.3	28.6	28.7	0.1	Negligible	No
R25	23.3	20.5	38.9	33.9	34.0	0.1	Negligible	No
R26	21.8	19.1	26.9	22.6	22.7	0.1	Negligible	No
R27	24.8	21.8	27.9	24.2	24.5	0.3	Negligible	No

Table 5. Revised Annual Mean PM_{10} Results (µg/m³) for Human Receptors

Receptor ID	Background 2016	Background 2020	2016 Base	2020 DM	2020 DS	2020 Change	Impact magnitude	Change from ES
R1	19.3	18.7	20.0	19.4	19.4	0.0	Negligible	No
R2	18.9	17.7	19.6	18.4	18.4	0.0	Negligible	No
R3	19.2	17.9	20.0	18.6	18.7	0.1	Negligible	No
R4	19.2	18.0	19.7	18.5	18.6	0.1	Negligible	No
R5	18.9	17.3	20.0	18.3	18.3	0.0	Negligible	No
R6	18.2	16.9	18.9	17.6	17.6	0.0	Negligible	No
R7	17.3	16.2	17.9	16.8	16.9	0.1	Negligible	No
R8	17.2	16.4	17.4	16.6	16.7	0.1	Negligible	No
R9	17.0	15.8	17.6	16.5	16.5	0.0	Negligible	No
R10	15.8	15.1	15.9	15.3	15.4	0.1	Negligible	No
R11	15.6	15.0	15.7	15.1	15.1	0.0	Negligible	No
R12	15.6	15.0	15.6	15.1	15.1	0.0	Negligible	No
R13	15.8	15.2	15.8	15.3	15.4	0.1	Negligible	No
R14	15.5	14.9	15.5	14.9	15.1	0.2	Negligible	No
R15	15.9	15.2	16.0	15.3	15.4	0.1	Negligible	No
R16	15.6	15.0	15.6	15.0	15.1	0.1	Negligible	No
R17	15.6	15.0	15.6	15.0	15.1	0.1	Negligible	No
R18	18.6	17.8	18.9	18.1	18.1	0.0	Negligible	No
R19	16.4	15.5	16.8	15.9	16.0	0.1	Negligible	No
R20	18.2	17.4	18.5	17.7	17.7	0.0	Negligible	No
R21	19.5	17.6	20.9	19.0	19.0	0.0	Negligible	No
R22	19.5	18.8	19.8	19.0	19.0	0.0	Negligible	No
R23	18.7	17.5	19.4	18.1	18.1	0.0	Negligible	No
R24	19.1	17.6	20.2	18.6	18.6	0.0	Negligible	No
R25	18.7	16.7	20.0	17.9	17.9	0.0	Negligible	No
R26	18.1	17.2	18.5	17.5	17.5	0.0	Negligible	No
R27	17.5	16.7	17.7	17.0	17.0	0.0	Negligible	No

Table 6. Revised Annual Mean $PM_{2.5}$ Results (µg/m³) for Human Receptors

Receptor ID	Background 2016	Background 2020	2016 Base	2020 DM	2020 DS	2020 Change	Impact magnitude	Change from ES
R1	13.4	12.9	13.9	13.3	13.3	0.0	Negligible	No
R2	12.7	12.2	13.1	12.6	12.6	0.0	Negligible	No
R3	12.6	12.2	13.2	12.7	12.7	0.0	Negligible	No
R4	12.9	12.3	13.3	12.7	12.7	0.0	Negligible	No
R5	12.5	11.9	13.2	12.6	12.6	0.0	Negligible	No
R6	12.3	11.7	12.7	12.1	12.1	0.0	Negligible	No
R7	11.9	11.4	12.3	11.8	11.8	0.0	Negligible	No
R8	12.0	11.6	12.1	11.7	11.7	0.0	Negligible	No
R9	11.7	11.2	12.0	11.5	11.6	0.1	Negligible	No
R10	11.3	10.8	11.4	10.9	11.0	0.1	Negligible	No
R11	11.3	10.8	11.3	10.8	10.8	0.0	Negligible	No
R12	11.3	10.8	11.3	10.8	10.8	0.0	Negligible	No
R13	11.4	10.9	11.4	10.9	11.0	0.1	Negligible	No
R14	11.2	10.7	11.2	10.7	10.8	0.1	Negligible	No
R15	11.3	10.9	11.4	10.9	10.9	0.0	Negligible	No
R16	11.3	10.8	11.3	10.8	10.8	0.0	Negligible	No
R17	11.3	10.8	11.3	10.8	10.8	0.0	Negligible	No
R18	12.6	12.2	12.8	12.4	12.4	0.0	Negligible	No
R19	11.6	11.1	11.8	11.3	11.3	0.0	Negligible	No
R20	12.4	12.0	12.6	12.2	12.2	0.0	Negligible	No
R21	12.7	12.2	13.6	13.0	13.1	0.1	Negligible	No
R22	13.3	12.8	13.5	13.0	13.0	0.0	Negligible	No
R23	12.6	12.1	13.1	12.5	12.5	0.0	Negligible	No
R24	12.3	11.9	13.0	12.5	12.5	0.0	Negligible	No
R25	12.2	11.6	13.1	12.4	12.4	0.0	Negligible	No
R26	12.2	11.7	12.4	12.0	12.0	0.0	Negligible	No
R27	12.1	11.7	12.3	11.8	11.8	0.0	Negligible	No

2.3. Discussion

2.3.1. NO_2

The results for NO_2 show that the changes to traffic have had no material impact on the annual mean concentrations estimated at human receptors within the study area (as defined in the ES, paragraph 18.58 and illustrated in Figure 18.2). Traffic flow projections have increased on all modelled road links as a result of the revised DfT growth factors, hence there are no decreases in concentrations of NO_2 at modelled receptors in either scenario compared with the ES results (Appendix 18.E, Table 18.44).

The maximum impact of the revised traffic data on NO_2 concentrations at any receptor, either with or without the Project, is an increase of 0.2 µg/m³ at R9, which increases from 36.6 µg/m³ (ES) to 36.8 µg/m³ (S1) in the 2020 DS scenario. This receptor also reports the highest modelled concentration for any receptor. The change with Tilbuy2 (DS-DM) increases from 1.9 µg/m³ (ES) to 2 µg/m³ (S1); however, there is no change in the impact magnitude which remains as "slight" (i.e. a change equivalent to 5% of the Air Quality Assessment Level (AQAL) of 40 µg/m³).

The greatest change due to Tilbury2 (DS-DM) in annual mean NO_2 is modelled to occur at R10, with an increase of 4.5 µg/m³ (S1), compared to 4.4 µg/m³ (ES). There is no change in the impact magnitude which stays as "moderate", as the total concentration is just 30.7 µg/m³.

The impact magnitude of the change between the DM and DS scenarios in 2020 with the revised traffic data has remained the same at all but one receptor compared to the ES. This change, at R17, goes from being described as "negligible" (ES) to "slight" (S1) and arises due to a 0.1 µg/m³ higher change in NO_2 with Tilbury2 . This change, from 2.1 to 2.2 µg/m³ causes a jump in the percentage change (rounded to the nearest whole number) relative to the AQAL from 5% to 6%. The total annual mean NO_2 concentration at this receptor is still well below the AQAL, at less than 30 µg/m³ and thus is not considered to be material.

2.3.2. PM_{10}

The results for annual mean PM_{10} show that the changes to traffic growth have had no material impact on the assessment findings. The maximum difference in the total PM_{10} concentration at any receptor in either scenario between the revised models and those presented in the ES is an increase of 0.1 µg/m³. The impact magnitude of the change between the DM and DS scenarios remains the same at all modelled receptors (i.e. negligible). Therefore, results for PM_{10} are not described in further detail.

There would be no associated change in the number of exceedences of the daily mean PM_{10} standard.

2.3.3. $PM_{2.5}$

The results for annual mean $PM_{2.5}$ show that the changes to traffic growth have had no material impact on the assessment findings. The maximum difference in the total $PM_{2.5}$ concentration at any receptor in either scenario between the revised models and those presented in the ES is an increase of 0.1 µg/m³. The impact magnitude of the change between the DM and DS scenarios remains the same at all modelled receptors (i.e. negligible). Therefore, results for $PM_{2.5}$ are not described in further detail.

3. Scenario 2 – Revised Defra Tools

3.1. Introduction

This scenario 2 (S2) investigates the difference between results obtained using CURED v2A/EfT v7 emission estimates and those using Defra EfT v8 (and their respective associated tools). This scenario uses the revised traffic growth data so the findings are directly comparable to Scenario 1 rather than the ES.

3.2. Model Verification

Model verification is the process of determining the local area performance of the base year model in comparison with measured data. The verification step involves comparison of modelled pollutant concentrations at suitable monitoring sites with monitored values that are representative of the base model period (in this case 2016). Verification has been undertaken in accordance with Defra's Technical Guidance LAQM.TG(16) and is as described in the ES.

Although traffic flows remained unchanged in the base year 2016, the updates to Defra background maps and processing tools mean that the base model verification must be redone for Scenario 2. An initial screening of the revised 2016 modelled concentrations against measured concentrations showed that the broad assumptions made during the verification process for the ES were valid. This included grouping by geographical location, as the dispersion model performs differently in different environments.

Table 7 shows the monitoring sites included in the model and the verification group it has been assigned to.

Table 7. Summary of Modelled Diffusion Tube Groups

ID	Group
TILD	Central Tilbury
TL	Central Tilbury
TILA	Central Tilbury
TILB	Central Tilbury
TILC	Central Tilbury
TILE	Central Tilbury
TSR	*Central Tilbury*
TK4	Central Tilbury
PKSL	Outskirts / A13
LYD	Outskirts / A13
NAS2	*Outskirts / A13*
WES	*Outskirts / A13*
KCNO	Outskirts / M25
GDSO	Outskirts / M25
IBIS	*Outskirts / M25*

Some sites were deemed unsuitable for verification (shown in Italics in the table) for the following reasons:

- TSR – this site is a background monitoring site and ~130m from the nearest modelled road and therefore not suitable for use in the verification exercise which focuses on roadside receptors;
- NAS2 – this site is located adjacent to a link which was modelled using DfT traffic data and ~170m from the A13, the main road of interest;
- WES – this site is ~100m from the nearest modelled road, and therefore not suitable for use in verification of roadside model performance;
- IBIS – this site is located ~70m from the nearest modelled road and is adjacent to a junction which cannot accurately represented within the model due to lack of traffic data.

3.2.1. Comparison of Modelled with Measured NO_2

A comparison of modelled and measured total NO_2 concentrations at the selected verification sites is presented in Table 8 for the Scenario 2 base model.

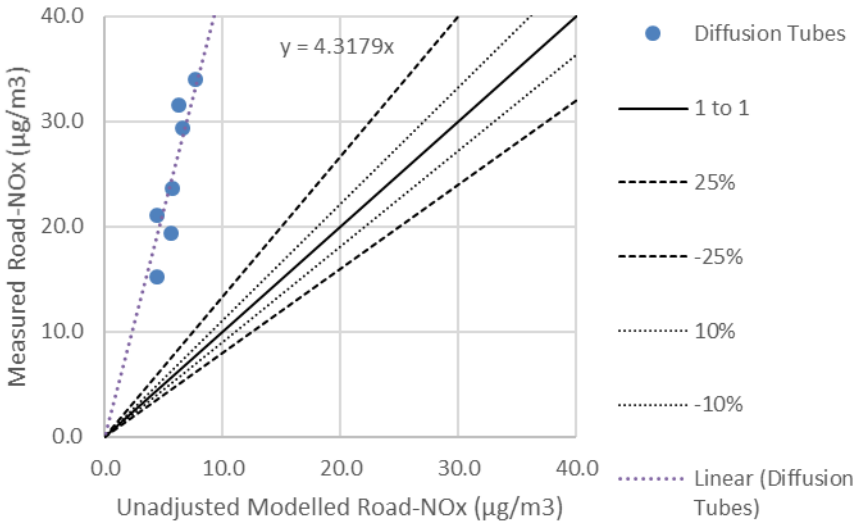
Table 8. Unadjusted Modelled NO_2 vs Monitored NO_2, S2

ID	Modelled NO_2 (un-adjusted)	Measured NO_2	Modelled - Measured	Modelled / Measured	Difference, %	Background NO_2
TILD	28.4	36.9	-8.4	0.8	-23%	25.5
TL	27.7	35.7	-7.9	0.8	-22%	25.5
TILA	28.6	40.8	-12.1	0.7	-30%	24.8
TILB	27.9	39.7	-11.8	0.7	-30%	24.8
TILC	28.2	39.0	-10.8	0.7	-28%	24.8
TILE	28.4	34.9	-6.6	0.8	-19%	25.5
TK4	27.7	33.0	-5.3	0.8	-16%	25.5
PKSL	33.2	29.0	4.2	1.1	15%	23.8*
LYD	37.2	30.8	6.4	1.2	21%	24.7*
KCNO	30.4	32.8	-2.5	0.9	-7%	20.6
GDSO	30.1	28.9	1.2	1.0	4%	23.2
* Additional A-road In-Square Component removed as included within the model adjacent to this receptor						

The revised model continues to underestimate at the majority of monitoring locations, with the biggest underestimates within the Central Tilbury urban area (see Figure 1). The A13 group consistently overestimates whereas the M25 group both over and underestimates, although the values are much closer to measured concentrations than the Central Tilbury locations.

The raw measured vs modelled NO_x in Central Tilbury shows a tight agreement but a clear bias.

Figure 1 – Modelled vs. Measured road NO_x before Adjustment – S2, Centre of Tilbury



3.2.2. Derivation of Adjustment Factors

A comparison of the modelled road NO_x concentrations and calculated road NO_x at the monitoring sites allows a model adjustment factor to be derived. The adjustment factors derived for each geographical group of monitoring locations using the revised Scenario 2, 2016 baseline model are presented in Table 9 alongside those reported in the ES.

Table 9. Summary of Model Adjustment Factors

Model Group	ES	S2
Tilbury Factor	3.77	4.32
Outskirts / A13 Factor	0.38 (1.00)	0.49 (1.12)
Outskirts / M25 Factor	0.71 (1.00)	1.12 (1.12)

The adjustment factors for the revised 2016 based model are higher than those for the ES base model.

For the ES, it was not considered appropriate to reduce modelled concentrations of receptors located within the A13 and M25 verification areas, and thus an adjustment factor of 1.0 was applied to modelled results in these areas. Similarly, for the revised model, an adjustment factor of 1.12 was conservatively applied.

The total NO_2 concentration was re-calculated having applied these adjustment factors, for comparison with measured concentrations and re-verification.

3.2.3. Adjusted Base Model Performance

Table 10. EfT Adjusted Modelled NO_2 vs Measured NO_2

ID	Adjusted Modelled Total NO_2	Measured Total NO_2	Modelled - Monitored	% Difference
TILD	37.4	36.9	0.5	1.5%
TL	34.7	35.7	-0.9	-2.6%
TILA	40.3	40.8	-0.5	-1.1%
TILB	37.7	39.7	-2.0	-5.1%
TILC	38.7	39.0	-0.4	-0.9%
TILE	37.2	34.9	2.3	6.6%
TK4	34.7	33.0	1.7	5.1%
PKSL	33.2	29.0	4.2	14.6%
LYD	37.2	30.8	6.4	20.7%
KCNO	31.5	32.8	-1.4	-4.1%
GDSO	30.9	28.9	2.0	6.8%

Having adjusted the modelled NO_x, model performance (indicated by % difference in the final column) improves considerably at locations within the centre of Tilbury, with modelled results at each tube within ±6.6%. The performance also slightly improves at the M25 and A13 locations.

3.2.4. Comparison of Model Performance

A comparison of adjusted results for the ES against Scenario 2 (using updated Defra Tools) is presented in Table 11.

Table 11. Adjusted Model Results Summary for ES vs S2

ID	Measured NO_2	Adjusted Modelled NO_2		% Difference	
		ES	S2	ES	S2
TILD	36.9	36.1	37.4	-2.0%	1.5%
TL	35.7	34.3	34.7	-4.0%	-2.6%
TILA	40.8	39.3	40.3	-3.6%	-1.1%
TILB	39.7	37.4	37.7	-5.8%	-5.1%
TILC	39.0	41.8	38.7	7.1%	-0.9%
TILE	34.9	36.2	37.2	3.6%	6.6%

ID	Measured NO_2	Adjusted Modelled NO_2		% Difference	
		ES	S2	ES	S2
TK4	33.0	34.1	34.7	3.4%	5.1%
PKSL	29.0	34.3	33.2	18.4%	14.6%
LYD	30.8	40.7	37.2	32.4%	20.7%
KCNO	32.8	35.2	31.5	7.2%	-4.1%
GDSO	28.9	33.6	30.9	16.2%	6.8%

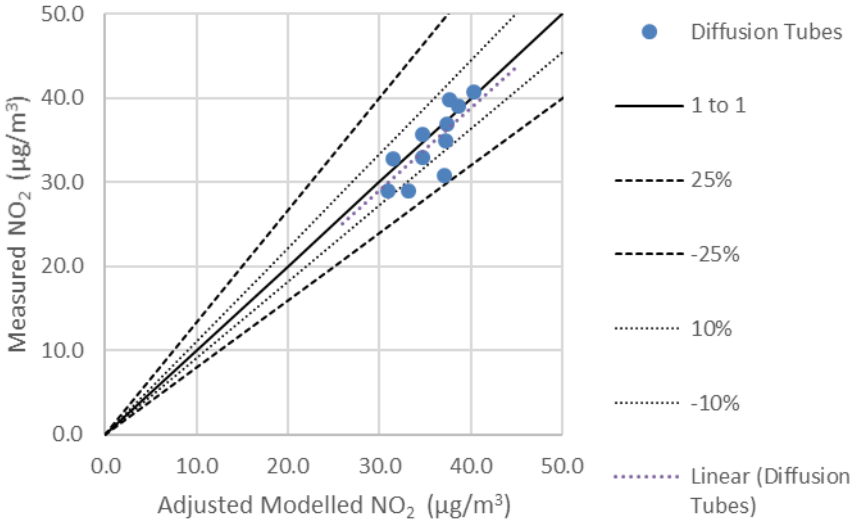
A comparison of the percentage difference shows that the revised base model performs reasonably well (see Figure 2, which shows that all diffusion tubes are within the accepted ±25% of measured values post road-NO_x adjustment), and slightly better than the ES model at many locations.

Table 12 shows that, overall, the revised S2 base model slightly overpredicts compared to real-world conditions, but performs better than the ES model post-adjustment. This is shown by a correlation coefficient closer to a value of 1 and a smaller RMSE value. The revised S2 base model also has less a slightly lower fractional bias than the ES.

Table 12. Summary of Model Statistics

Statistic	ES	S2
Arithmetic mean (modelled)	36.6	35.8
Arithmetic mean (monitored)	34.7	34.7
Difference (modelled minus monitored)	2.0	1.1
Ratio (average)	1.07	1.04
Regression line forced through zero, y =	0.9454x	0.9704x
Correlation Coefficient	0.513	0.795
Root Mean Square Error (RMSE)	4.00	2.67
Fractional Bias	-0.06	-0.03

Figure 2 – Modelled vs. Measured NO_2 road contribution – S2, after adjustment (all diffusion tubes)



3.3. Scenario 2 Results

The annual mean NO_2, PM_{10} and $PM_{2.5}$ results for the revised models using updated traffic growth, the EfT v8 and associated tools are presented in Table 13, Table 14 and Table 15 respectively. These results can be directly compared with Scenario 1, Table 4, Table 5 and Table 6 respectively, which use the revised traffic data. Tables 18.44 to 18.46 in the ES Appendix 18.E are not directly comparable for that reason.

Table 13. Revised EfT v8 Annual Mean NO_2 Results (µg/m³) for Discrete Receptors

Receptor ID	Background 2016	Background 2020	2016 Base	2020 DM	2020 DS	2020 Change	Impact magnitude	Change from S1
R1	28.0	24.4	35.2	29.4	29.4	0.0	Negligible	No
R2	23.2	20.5	30.7	25.8	25.8	0.0	Negligible	No
R3	22.3	19.7	31.6	27.2	27.3	0.1	Negligible	No
R4	23.7	21.0	29.1	25.2	25.5	0.3	Negligible	No
R5	23.5	20.8	36.4	31.4	31.5	0.1	Negligible	No
R6	23.2	20.5	30.8	26.7	26.8	0.1	Negligible	No
R7	24.7	21.8	30.3	26.2	26.5	0.3	Negligible	No
R8	23.6	20.9	30.2	26.1	26.4	0.3	Negligible	No
R9	24.8	21.9	39.8	34.9	36.3	1.4	Slight	No
R10	24.0	21.3	28.9	24.7	28.3	3.6	Slight	Yes
R11	24.7	22.0	27.0	23.6	24.8	1.2	Negligible	No
R12	24.7	22.0	26.4	23.2	24.4	1.2	Negligible	No
R13	24.3	21.7	25.5	22.6	25.3	2.7	Slight	No
R14	23.7	21.3	24.8	22.2	25.1	2.9	Slight	No
R15	22.4	20.2	25.4	22.3	22.9	0.6	Negligible	No
R16	24.7	22.0	25.9	22.9	24.2	1.3	Negligible	No
R17	24.7	22.0	26.0	22.9	24.5	1.6	Negligible	Yes
R18	23.0	20.3	26.9	23.4	23.4	0.0	Negligible	No
R19	25.5	22.6	34.6	30.8	31.4	0.6	Negligible	Yes
R20	23.1	20.4	26.3	22.8	22.9	0.1	Negligible	No
R21	26.1	22.9	39.1	32.9	33.1	0.2	Negligible	No
R22	25.7	22.4	28.3	24.4	24.4	0.0	Negligible	No
R23	30.4	27.0	37.2	32.2	32.3	0.1	Negligible	No
R24	20.6	18.4	31.6	26.1	26.2	0.1	Negligible	No
R25	23.2	20.7	38.9	33.6	33.7	0.1	Negligible	No
R26	20.7	18.4	24.7	21.2	21.2	0.0	Negligible	No
R27	25.4	22.3	27.7	24.2	24.3	0.1	Negligible	No

Table 14. Revised EfT v8 Annual Mean PM_{10} Results (µg/m³) for Discrete Receptors

Receptor ID	Background 2016	Background 2020	2016 Base	2020 DM	2020 DS	2020 Change	Impact magnitude	Change from ES
R1	17.6	17.1	18.3	17.8	17.8	0.0	Negligible	No
R2	17.3	16.1	18.1	16.8	16.8	0.0	Negligible	No
R3	17.8	16.5	18.7	17.3	17.3	0.0	Negligible	No
R4	17.5	16.6	18.0	17.1	17.2	0.1	Negligible	No
R5	17.4	15.9	18.5	16.9	17.0	0.1	Negligible	No

Receptor ID	Background 2016	Background 2020	2016 Base	2020 DM	2020 DS	2020 Change	Impact magnitude	Change from ES
R6	16.9	15.7	17.6	16.4	16.4	0.0	Negligible	No
R7	16.0	15.0	16.6	15.6	15.7	0.1	Negligible	No
R8	16.1	15.5	16.3	15.7	15.7	0.0	Negligible	No
R9	15.5	14.5	16.1	15.1	15.1	0.0	Negligible	No
R10	14.4	13.8	14.5	13.9	14.0	0.1	Negligible	No
R11	14.2	13.7	14.3	13.7	13.8	0.1	Negligible	No
R12	14.2	13.7	14.2	13.7	13.8	0.1	Negligible	No
R13	14.4	13.9	14.4	14.0	14.1	0.1	Negligible	No
R14	14.0	13.6	14.0	13.6	13.7	0.1	Negligible	No
R15	14.5	13.9	14.6	14.0	14.0	0.0	Negligible	No
R16	14.1	13.7	14.1	13.7	13.7	0.0	Negligible	No
R17	14.1	13.7	14.1	13.7	13.8	0.1	Negligible	No
R18	17.2	16.4	17.6	16.8	16.8	0.0	Negligible	No
R19	15.0	14.2	15.4	14.6	14.6	0.0	Negligible	No
R20	16.7	16.0	17.0	16.3	16.3	0.0	Negligible	No
R21	18.3	16.5	19.7	17.9	17.9	0.0	Negligible	No
R22	17.9	17.2	18.2	17.4	17.4	0.0	Negligible	No
R23	17.0	15.9	17.7	16.5	16.5	0.0	Negligible	No
R24	17.9	16.5	19.0	17.5	17.5	0.0	Negligible	No
R25	17.2	15.4	18.6	16.6	16.6	0.0	Negligible	No
R26	16.6	15.8	17.0	16.2	16.2	0.0	Negligible	No
R27	16.2	15.5	16.4	15.8	15.8	0.0	Negligible	No

Table 15. Revised EfT v8 Annual Mean $PM_{2.5}$ Results (µg/m³) for Discrete Receptors

Receptor ID	Background 2016	Background 2020	2016 Base	2020 DM	2020 DS	2020 Change	Impact magnitude	Change from ES
R1	11.6	11.1	12.1	11.6	11.6	0.0	Negligible	No
R2	10.8	10.4	11.4	10.9	10.9	0.0	Negligible	No
R3	11.0	10.6	11.6	11.1	11.1	0.0	Negligible	No
R4	11.2	10.8	11.5	11.1	11.1	0.0	Negligible	No
R5	10.8	10.4	11.6	11.0	11.0	0.0	Negligible	No
R6	10.7	10.3	11.2	10.7	10.7	0.0	Negligible	No
R7	10.4	9.9	10.8	10.3	10.4	0.1	Negligible	No
R8	10.8	10.4	10.9	10.5	10.5	0.0	Negligible	No
R9	10.1	9.7	10.5	10.0	10.1	0.1	Negligible	No
R10	9.7	9.3	9.8	9.4	9.5	0.1	Negligible	No
R11	9.7	9.3	9.7	9.3	9.3	0.0	Negligible	No
R12	9.7	9.3	9.7	9.3	9.3	0.0	Negligible	No
R13	9.8	9.4	9.9	9.4	9.5	0.1	Negligible	No
R14	9.6	9.2	9.7	9.2	9.3	0.1	Negligible	No
R15	9.8	9.4	9.9	9.5	9.5	0.0	Negligible	No
R16	9.7	9.3	9.7	9.3	9.3	0.0	Negligible	No

Receptor ID	Background 2016	Background 2020	2016 Base	2020 DM	2020 DS	2020 Change	Impact magnitude	Change from ES
R17	9.7	9.3	9.7	9.3	9.3	0.0	Negligible	No
R18	11.0	10.6	11.2	10.8	10.8	0.0	Negligible	No
R19	10.0	9.5	10.2	9.8	9.8	0.0	Negligible	No
R20	10.8	10.4	11.0	10.6	10.6	0.0	Negligible	No
R21	11.2	10.8	12.2	11.6	11.7	0.1	Negligible	No
R22	11.6	11.1	11.7	11.3	11.3	0.0	Negligible	No
R23	10.8	10.4	11.3	10.8	10.8	0.0	Negligible	No
R24	10.7	10.3	11.4	10.9	10.9	0.0	Negligible	No
R25	10.6	10.2	11.6	11.0	11.0	0.0	Negligible	No
R26	10.4	10.1	10.7	10.3	10.3	0.0	Negligible	No
R27	10.7	10.2	10.8	10.4	10.4	0.0	Negligible	No

3.4. Discussion

3.4.1. NO_2

The NO_2 background concentrations at the majority of receptors are lower in 2016 and 2020 compared to those for Scenario 1 (and those reported in the ES). The maximum differences in 2016 and 2020 respectively compared to Scenario 1 in 2016 are -1.3 µg/m³ and -1.4 µg/m³ and compared to the ES are -1.4 µg/m³ and -1.5 µg/m³. The backgrounds at a limited number of receptors have increased relative to the ES, the maximum increase is 0.6 µg/m³ compared to Scenario 1 at R27.

Total annual mean NO_2 concentrations are lower at the majority of receptors for the revised model compared with Scenario 1 results. The maximum reduction between the revised model results and Scenario 1 is -3.7 µg/m³ at R24 (adjacent to the M25) in 2016 and -2.5 µg/m³ in 2020. Scenario 2 annual mean NO_2 concentrations in 2016 are higher at two receptors, R9 and R19, which increase by 0.6 µg/m³ and 0.5 µg/m³ respectively relative to Scenario 1. These receptors are in the centre of Tilbury adjacent to Dock Road (note that the vehicles emissions on this link when calculated using EfT v8 are higher than if using CURED v2A).

The maximum difference is a reduction in the change in NO_2 of 1.0 at R14. Concentrations are well below the AQAL i.e. below 30 µg/m³ in both scenarios therefore this is not a material change and the impact magnitude remains “slight”.

The greatest increase at a receptor with the Project (R10) reduces from 4.5 µg/m³ in Scenario 1 to 3.8 µg/m³ in Scenario 2. The impact magnitude at this receptor is therefore a “slight increase” in Scenario 2 compared with a “moderate increase” in Scenario 1 and the ES.

There are no increases in impact magnitude at any receptor when compared to Scenario 1 or the ES. The impact magnitude has remained the same for the majority of receptors when compared to those in Scenario 1 or the ES. The exceptions are R10, as noted above, and R17 and R19, both of which reduce to a “negligible” impact compared with a “slight” impact in Scenario 1. Although not directly comparable, the ES reported a “negligible” impact at R17 and “slight” impact at R19.

These changes in magnitude are a result of a combination of lower annual mean NO_2 concentrations in the DM and DS scenarios as well as lower change between the two. None of these changes are considered to be material as the total concentrations with the Project all remain comfortably below the AQAL.

The receptor with the highest total NO_2 in 2020 DS Scenario 2 is R9 with a concentration of 36.3 µg/m³. This receptor was also modelled with the highest DS concentration in Scenario 1 (36.8 µg/m³) and the ES (36.6 µg/m³). The difference is expected to be due mainly to lower emissions estimates with the EfT v8 and associated background maps and tools, compared to CURED v2A. However, this has not resulted in a difference in the magnitude of the change as it remains as a “slight increase” when compared to Scenario 1 and the ES.

3.4.2. PM_{10}

The key difference between Scenarios 1 and 2 is the PM_{10} background concentrations, which have reduced consistently in the latest 2016 and 2020 background maps. The majority of receptors are not modelled to have a different change due to the Project compared to Scenario 1 and the ES. Any differences are 0.1 µg/m³ or less. There is no change in impact magnitude at any receptor, all of which remain negligible.

3.4.3. $PM_{2.5}$

The key difference between Scenarios 1 and 2 is the $PM_{2.5}$ background concentrations, which have reduced consistently in the latest 2016 and 2020 background maps. The majority of receptors are not modelled to have a different change due to the Project compared to Scenario 1 and the ES. Any differences are 0.1 µg/m³ or less. There is no change in impact magnitude at any receptor, all of which remain negligible.

4. Summary

There have been changes to the modelling inputs and results processing tools following the publication of the Tilbury2 ES and these have been examined in sensitivity tests. The key elements used in each assessment i.e. for the ES, Scenario 1 and Scenario 2 are listed in Table 16.

Table 16. Differences in Modelling Approaches for the ES vs Revised Scenarios

Work Element	ES	Scenario 1	Scenario 2
Traffic Data and Emissions			
Time Period Modelled	AADT	AADT	AADT
Diurnal Profiles	As provided by iTransport	As provided by iTransport	As provided by iTransport
Traffic Growth Factors	Tempro 7.0	Tempro 7.2	Tempro 7.2
Traffic Model Network	As defined in the ES	As defined in the ES	As defined in the ES
Emissions Estimation	CURED V2A / EfT v7	CURED V2A / EfT v7	EfT v8
Traffic Mix	As defined in the ES	As defined in the ES	As defined in the ES
Speed Estimates	As defined in the ES	As defined in the ES	As defined in the ES
Model Set-up			
Model used	ADMS Roads v4.0	ADMS Roads v4.0	ADMS Roads v4.0
Model Parameters (e.g. fac file, meteorology, receptors, outputs)	As defined in the ES	As defined in the ES	As defined in the ES
Results Processing			
Background Concentrations	Defra 2013 base year with CURED factoring for future years	Defra 2013 base year with CURED factoring for future years	Defra 2015 base year
Background map adjustment factor	1.66	1.66	1.76
Sectors Removed from Background Concentrations	As defined in the ES	As defined in the ES	As defined in the ES
Sector Removal Tool	Defra NO_2 Adjustment for NO_x Sector Removal Tool v5.1	Defra NO_2 Adjustment for NO_x Sector Removal Tool v5.1	Defra NO_2 Adjustment for NO_x Sector Removal Tool v6.1
Post-processing and assumptions	Defra NO_x to NO_2 Calculator v5.1 Specific borough chosen and mix of “All other urban” and “All non-urban” traffic mix	Defra NO_x to NO_2 Calculator v5.1 Specific borough chosen and mix of “All other urban” and “All non-urban” traffic mix	Defra NO_x to NO_2 Calculator v6.1 Specific borough chosen and mix of “All other urban” and “All non-urban” traffic mix

Work Element	ES	Scenario 1	Scenario 2
Verification and Adjustment Factors	Tilbury Factor – 3.77 A13 Factor – 1.00 M25 Factor – 1.00	Tilbury Factor – 3.77 A13 Factor – 1.00 M25 Factor – 1.00	Tilbury Factor – 4.32 A13 Factor – 1.12 M25 Factor – 1.12

The results from the revised operational scenarios 1 and 2 show that the modelled results do not differ significantly between the revised scenarios and those reported in the ES. A summary of the changes in NO_2 concentrations and "magnitude of impact" descriptor at selected key receptors and the total number of receptors within each "magnitude of impact" category is presented in Table 17 and Table 18 respectively.

Table 17. NO_2 Concentrations and Magnitude of Change* at Key Human Receptors, 2020

Receptor ID	ES				S1				S2			
	DM	DS	Change	Mag	DM	DS	Change	Mag	DM	DS	Change	Mag
R9	34.7	36.6	1.9	S	34.8	36.8	2.0	S	34.9	36.3	1.4	S
R10	26.2	30.6	4.4	M	26.2	30.7	4.5	M	24.7	28.3	3.6	S
R17	24.1	26.2	2.1	N	24.1	26.3	2.2	S	22.9	24.5	1.6	N
R19	30.7	31.6	0.9	S	30.8	31.7	0.9	S	30.8	31.4	0.6	N

*N = Negligible, S = Slight, M = Moderate

Table 18. Differences in Modelled Impact at Human Receptors

Impact Magnitude	NO_2			PM_{10}			$PM_{2.5}$		
	ES	S1	S2	ES	S1	S2	ES	S1	S2
Substantial increase	0	0	0	0	0	0	0	0	0
Moderate increase	1	1	0	0	0	0	0	0	0
Slight increase	4	5	4	0	0	0	0	0	0
Negligible	22	21	23	27	27	27	27	27	27
Slight decrease	0	0	0	0	0	0	0	0	0
Moderate decrease	0	0	0	0	0	0	0	0	0
Substantial decrease	0	0	0	0	0	0	0	0	0

Following a review of the annual mean concentrations in Scenario 1, it can be concluded that there is no material impact of the Project on concentrations of NO_2, PM_{10} and $PM_{2.5}$, even with an increase in the traffic growth rate. All concentrations remain below the relevant air quality objectives and there is no increase in the number of moderate impacts (and just one increase from negligible to slight due to rounding).

Furthermore, the analysis has demonstrated that results for the ES and Scenario 1, using emission factors derived from CURED V2A, are conservative in relation to Scenario 2 (EfT v8 and associated updated tools). Scenario 2 reports the highest number of negligible increases in NO_2 annual mean and no moderate increases (compared to one each in the ES and Scenario 1).

The use of EfT v8 and associated tools gave a slightly improved model performance, bringing modelled results more in line with measured results.

Overall the findings as described in the ES are considered to be robust and not materially affected by recent changes to input data and assessment methods.

PORT OF TILBURY LONDON

PLANNING ACT 2008
INFRASTRUCTURE PLANNING (EXAMINATION PROCEDURE) RULES 2010

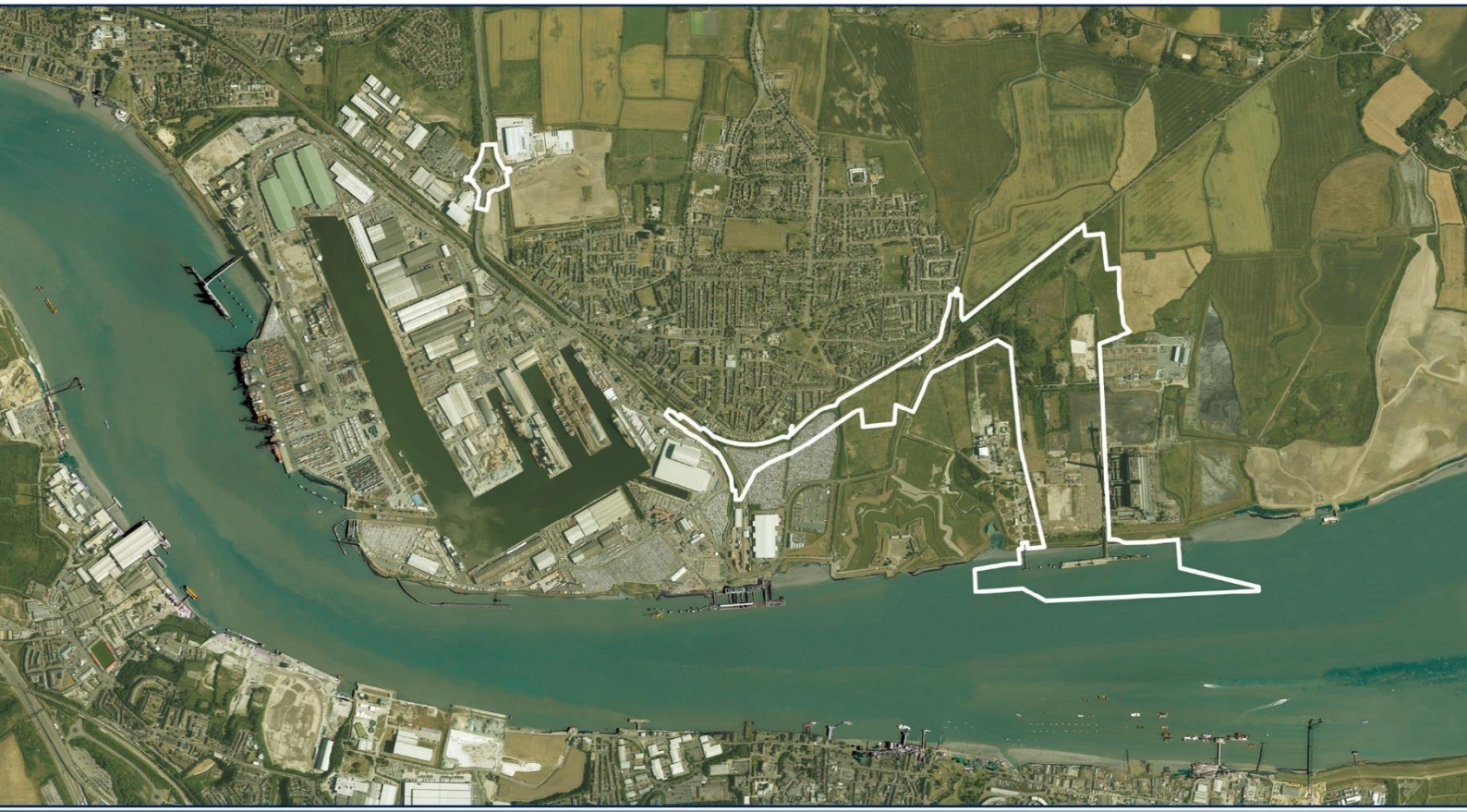
PROPOSED PORT TERMINAL AT FORMER TILBURY POWER STATION

TILBURY2

TR030003

APPENDIX 3: SHIPPING EMISSIONS FROM TILBURY2

TILBURY2 DOCUMENT REF: PoTLL/T2/EX/95



Air Quality CONSULTANTS

Note:
Shipping Emissions from Tilbury2

April 2018

Experts in air quality management & assessment

Document Control

Client	Port of Tilbury London Ltd	**Principal Contact**	Peter Ward

Job Number	J2900

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Report No.	Date	Status	Reviewed by
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Air Quality

Introduction

1 The Final Rule 6 letter published by the Planning Inspectorate on 22 January 2018 included in Annex B, which set out an Initial Assessment of Principal Issues, the following under the heading Air Quality:

- *Whether the assessments sufficiently consider all long term effects upon air quality including those from ships, dredgers and tugs manoeuvring in the river as well as when they are stationary at the port, unloading or loading;*
- *The extent to which the proposed development would impact on air quality and health in the vicinity of the Proposed Development; and*
- *Suitability of proposed monitoring and compensation measures given the permanent nature of the Proposed Development.*

2 This Note addresses the first bullet point above, namely the effect on long-term air quality of shipping emissions in the area around the actual terminal. [The impacts of Tilbury2 shipping downstream of the port are addressed in Appendix 6 to ES Appendix 10:O: Habitat Regulations Assessment (HRA) Report (APP-060).].

3 During the Issue Specific Hearings on 19 April 2018, Gravesham Borough Council raised the issue of the impacts of shipping emissions on $PM_{2.5}$ concentrations within Gravesend. This Note therefore covers the contribution of Tilbury2 shipping to both nitrogen dioxide (NO_2) and particulate matter ($PM_{2.5}$) concentrations.

4 The background to this note is the Scoping Report (Ref TR030003-0000147) and Scoping Opinion (Ref TR30003-000005). The Scoping Report makes clear that shipping emissions can be scoped out of assessment and the Secretary of State's Scoping Opinion accepts this, although welcomes that it will be kept under review (para 3.36). The ES (Ref TR030003-000213-6.1) contained an update on shipping emissions, with the information largely set out in paragraphs 18.325 to 18.331. This confirms that *"the potential impact on local air quality from vessels either in transit or at berth, is considered not to be significant."* (para 18.331) on the basis of information regarding the distance to sensitive receptors, the evidence from existing monitoring data and the number of additional shipping movements with Tilbury2.

5 To supplement the Scoping Report and the discussion in paragraphs 18.147 to 18.150 and 18.325 to 18.331 of Chapter 18 of the ES, modelling has been carried out to provide an indication of the contributions to both NO_2 and $PM_{2.5}$ concentrations that shipping emissions associated with Tilbury2 might give rise to at the nearest relevant receptors in Tilbury and Gravesend.

Assessment of Impacts

6 The emissions for the existing Port of Tilbury docks have been used to estimate the emissions from Tilbury2. The emissions from the existing docks have been taken from the results of the recent emission inventory for the Port of London[1], which have been purchased from the Port of London Authority (PLA) by PoTLL. The inventory covers the vessels within the existing Tilbury docks and adjacent sections of the Thames, including emissions from ships at berth, while manoeuvring and passing along the Thames. The emissions for 2016 have been used, with the nitrogen oxides (NOx) emissions presented in Figure 1, and the particulate matter ($PM_{2.5}$) emissions in Figure 2. The total NOx emissions for the grid squares that cover the existing Tilbury docks and the adjacent section of the River Thames is 776 te/yr, which equates to an overall average emission rate for NOx of around 25 g/s. The total $PM_{2.5}$ emissions for the grid squares that cover the existing Tilbury docks and the adjacent section of the River Thames (as shown in Figure 2) is 27.1 te/yr, which equates to an overall average emission rate for $PM_{2.5}$ of around 0.86 g/s. These emissions will be worst case, as they include an element of shipping using the Thames that is unrelated to Tilbury docks, including that using jetties within Gravesham.

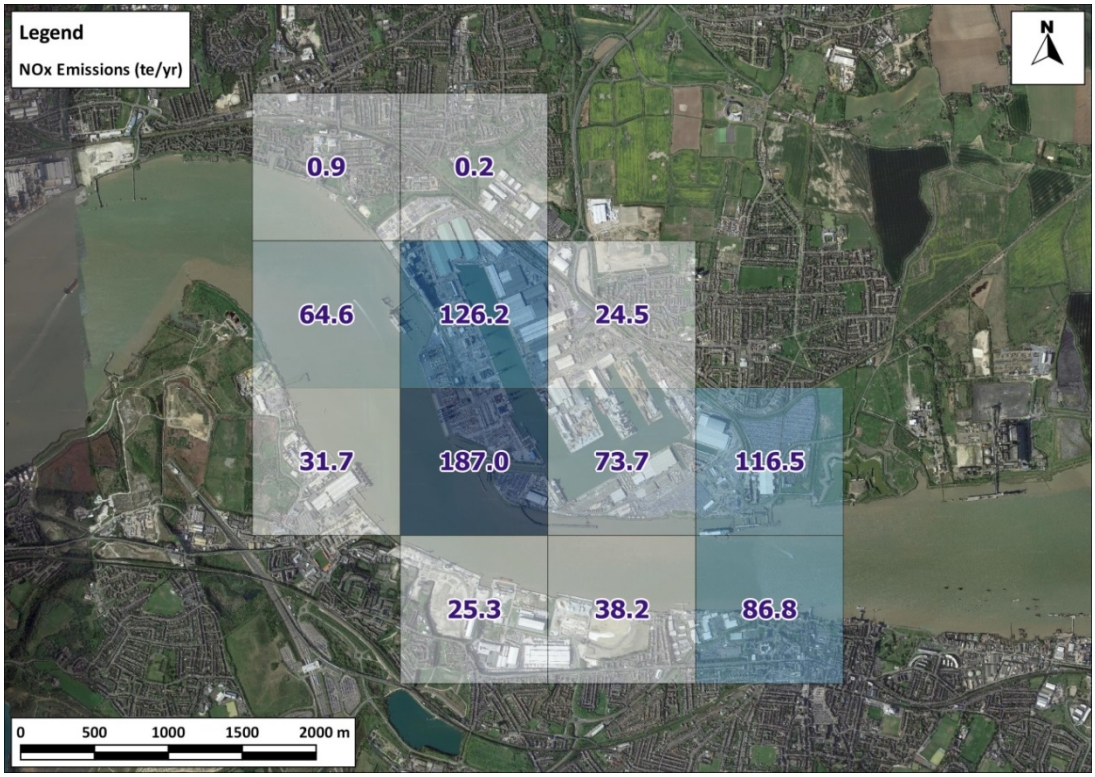

Figure 1: NOx Emissions from Shipping at Existing Tilbury Docks (te/yr per 1x1km grid square)

Imagery ©2018 Google.

[1] Port of London Emission Inventory 2016, November 2017, available at: https://www.pla.co.uk/assets/finalplaportwideinventoryoutputsreportv10.2publication.pdf

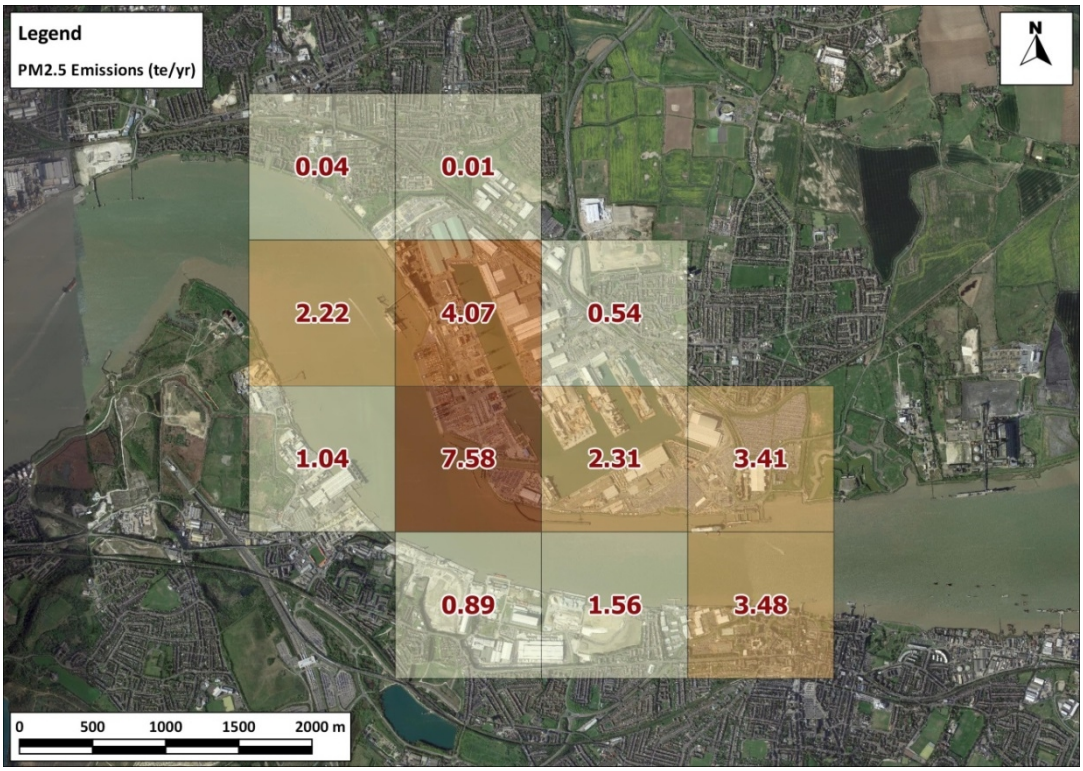

Figure 2: $PM_{2.5}$ Emissions from Shipping at Existing Tilbury Docks (te/yr per 1x1km grid square)

Imagery ©2018 Google.

7 The Navigation chapter of the ES (TR030003-000213-6.1), states that the Tilbury2 shipping movements will represent a 10% increase on those for the existing Tilbury operations[2]. Given the general nature of Tilbury2 operations will be similar (CMAT and RoRo terminal) it is reasonable to assume that the emissions from Tilbury2 will be 10% of those from the existing Port of Tilbury, namely 7.8 te/annum for NOx and 0.086 te/annum for $PM_{2.5}$.

8 These emissions have been input into the ADMS 5 dispersion model to determine concentrations at worst-case receptor locations in Tilbury and in Gravesend. The approach has been to treat the shipping emissions as coming from an elevated area source covering the area shown in Figure 3[3], with the elevation being 40 m, to represent the height of the top of the chimney on the majority of the ships[4]. The locations of the two worst-case receptors are also shown in Figure 3[5]. The

[2] See paragraph 14.25 of Chapter 14 of the ES, which says "The total number of additional vessel movements to/from the proposed Tilbury2 facilities equates to 1,792 per annum. This represents approximately a 10% increase in vessel movements on the existing baseline conditions".

[3] Which covers 461,450 m^2, with the northern boundary running along where the ships will be at berth

[4] The source height has been determined from vessel technical drawings.

[5] These were identified following an initial model run with a receptor grid

temperature of the emissions was assumed to be 280°C, with an efflux velocity of 30 m/s[6], from a stack of 1 m diameter, which equates to a vertical velocity for emissions from the area source of 0.000051 m/s. The latter is a necessary approximation to ensure the model applies the correct amount of heat buoyancy to the emissions. It will slightly reduce plume rise and hence increase local concentrations, thus being a worst-case approach. Hourly sequential meteorological data for Gravesend for 2016 have been used. The 1-hour mean concentrations have been used to derive an annual mean concentration of NO_x and $PM_{2.5}$ at the worst-case receptors. The NO_2 concentrations have been derived by assuming that the annual mean NO_2 represents 70% of the annual mean NOx concentration. This is a conservative approach consistent with that used in industrial permitting applications to the Environment Agency.

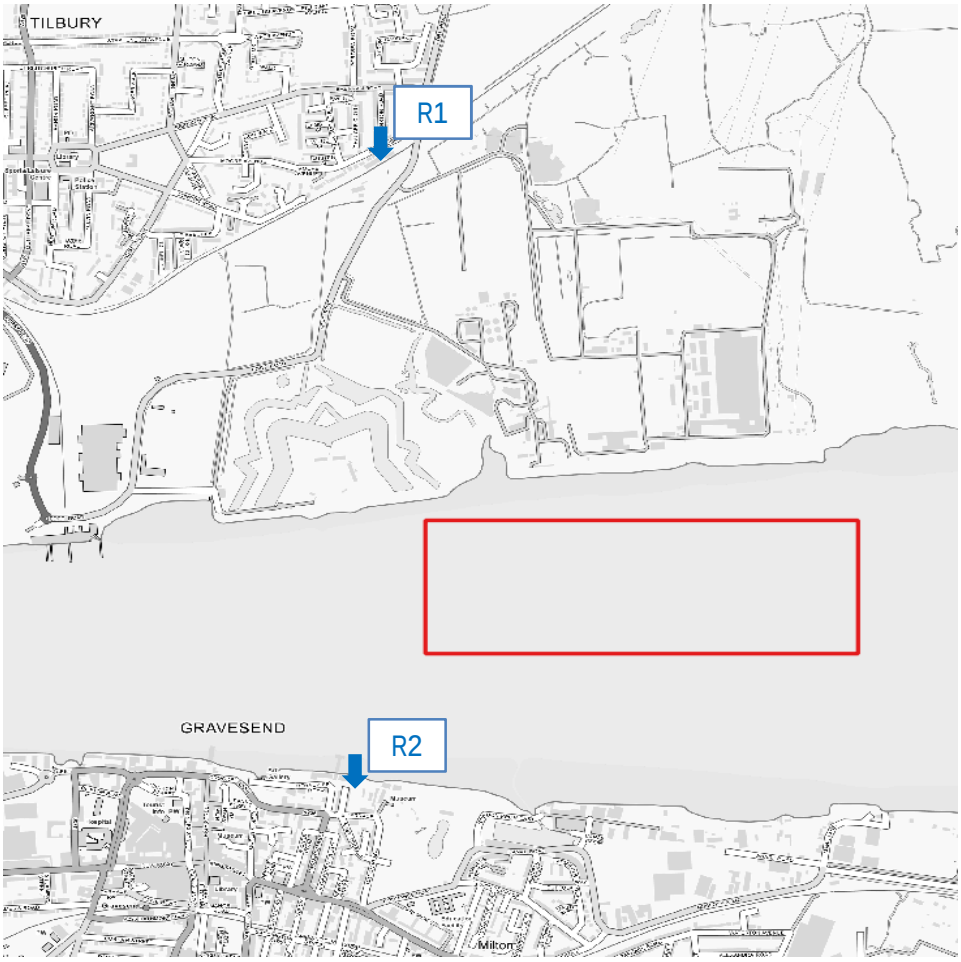

Figure 3: Location of the Area Source of Shipping Emissions from Tilbury2 (box in the Thames) and the Worst-Case Receptors in Tilbury [R1] and Gravesend [R2].

[6] Exhaust temperature and efflux velocity have been taken from a report by CONservation of Clean Air and Water in Europe (CONCAWE, 1994).

9 The results of the modelling for the two worst-case receptors in Tilbury and Gravesend are set out in Table 1.

Table 1: Contributions of Tilbury2 Emissions to Annual Mean Concentrations of NOx, NO_2 and $PM_{2.5}$ at Worst-Case Receptors in Tilbury [R1] and Gravesend [R2]

Location	Grid Ref X	Grid Ref Y	NOx Concentration ($\mu g/m^3$)	NO_2 Concentration ($\mu g/m^3$)	$PM_{2.5}$ Concentration ($\mu g/m^3$)
Tilbury	565237	176285	0.11	0.08	0.004
Gravesend	565157	174385	0.29	0.20	0.010

10 The highest contributions to annual mean NO_2 concentrations from Tilbury2 shipping emissions are estimated to be 0.08 $\mu g/m^3$ at the worst-case receptor in Tilbury (R1), and 0.20 $\mu g/m^3$ at the worst-case receptor in Gravesend (R2). These NO_2 contributions are a small fraction (0.2% and 0.5%) of the 40 $\mu g/m^3$ objective. The highest $PM_{2.5}$ contributions from Tilbury2 shipping emissions are estimated to be 0.004 $\mu g/m^3$ at the worst-case receptor in Tilbury (R1) and 0.010 $\mu g/m^3$ at the worst-case receptor in Gravesend (R2). These $PM_{2.5}$ contributions are a small fraction (0.016% and 0.04%) of the 25 $\mu g/m^3$ objective.

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PLANNING ACT 2008
INFRASTRUCTURE PLANNING (EXAMINATION PROCEDURE) RULES 2010

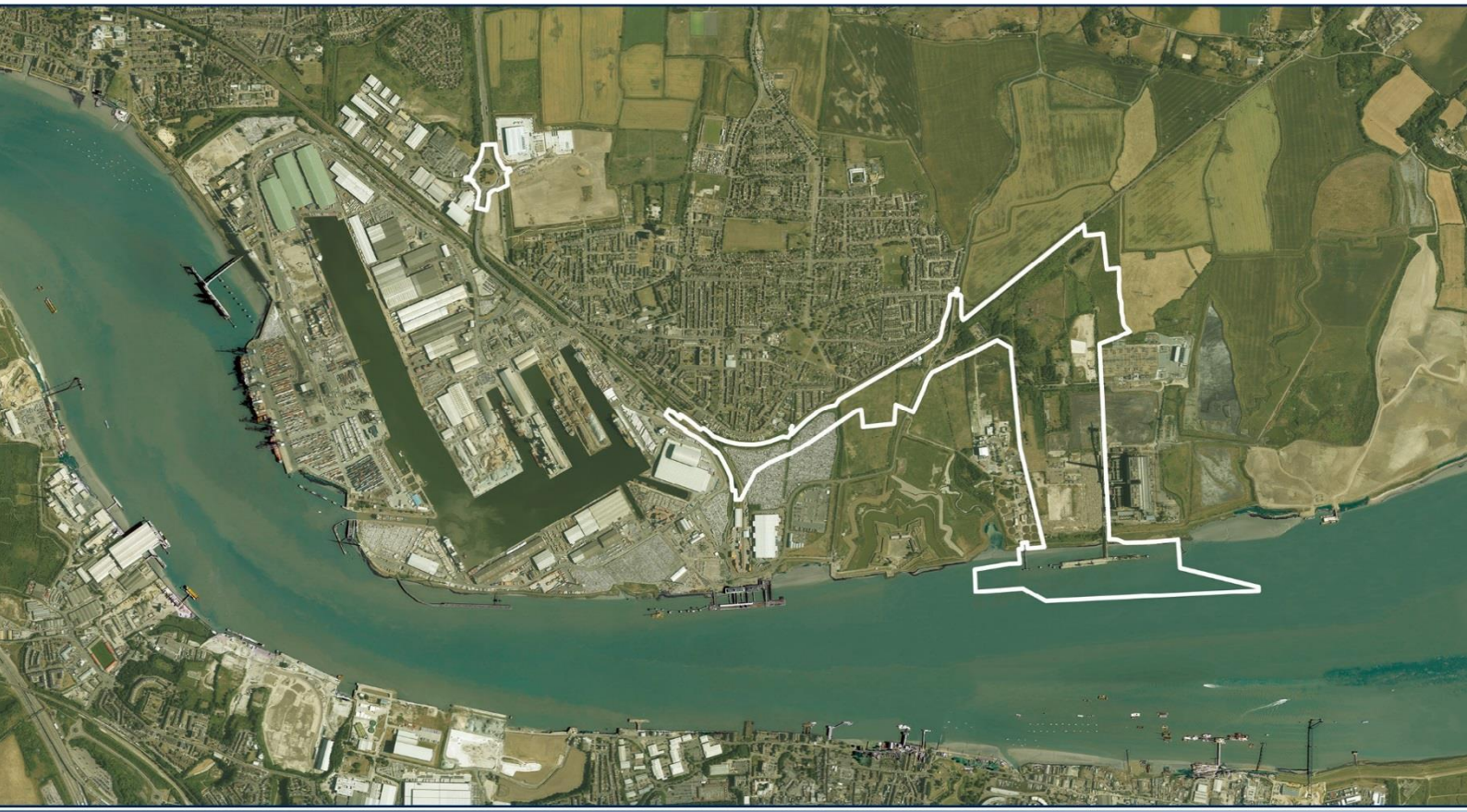
PROPOSED PORT TERMINAL AT FORMER TILBURY POWER STATION

TILBURY2

TR030003

APPENDIX 4: MONITORING DATA AND EFFECT ON VERIFICATION

TILBURY2 DOCUMENT REF: PoTLL/T2/EX/95



TILBURY2

Memo

To:	Thurrock and Gravesham EHO		
From:	Sarah Horrocks	**Email:**	sarah.horrocks@atkinsglobal.com
Phone:	01372 756032	**Date:**	14 Feb 2018
Ref:	Tilbury2 DCO	**cc:**	Martin Ward, Matthew Fox
Subject:	Site specific monitoring survey - model verification		

1. Approach to Assessment

1.1. Introduction

This note looks at the sensitivity of the conclusions of the air quality assessment for Tilbury 2 presented in the Environmental Statement (ES) (Document Reference 6.1) and the subsequent note on "Operational traffic emissions - sensitivity tests" (issued to Thurrock and Gravesham, 29 Jan 2018) to the latest results from the site-specific air quality monitoring survey.

The purpose of this note is twofold:

1. Confirmation of the robustness of the baseline conditions presented in the ES
2. Confirmation of the robustness of the model verification presented in the ES and sensitivity note

The approach to the monitoring survey is described in Chapter 8 of the ES, at paragraph 18.70 to 18.76. The aim of the survey was to provide information about the baseline air quality conditions at receptors along the affected road network, focusing particularly on gaps in local authority data coverage.

The diffusion tube survey for nitrogen dioxide commenced in April 2017 and will end in April 2018. At the time of publication of the ES, only six months' data were available, which was considered sufficient to interpret baseline conditions. Having now gathered nine months' worth of data to the end of 2017, it is opportune to review the data and test the robustness of the dispersion model verification process.

This note is divided into two sections:

1. **Annualisation and bias adjustment of data** – Re-calculation of the annualised and bias corrected data for a base year of 2016 and comparison to that presented in the ES; and
2. **Sensitivity of the dispersion model verification to this data** – Re-verification of the base year scenario, including monitoring data from the local authority surveys and the site specific survey, and comparison of model adjustment factors so derived.

Both the annualisation and bias adjustment of the latest monitoring data and the dispersion model verification were performed using the same approach described in the ES, i.e. in line with Department for Environment, Food and Rural Affairs (Defra) Local Air Quality Management Technical Guidance, 2016 (LAQM.TG16).

1.2. Monitoring Data

The nine-month dataset for the site specific survey, annualised and bias adjusted, is presented in Table 1. The difference in concentrations between the updated estimates of 2016 annual mean concentrations and those presented in the ES is shown in Table 2. The difference between the results presented in the ES (Appendix 18.B, Table 18.25) is small (less than 2 µg/m^3) and in all but one case, the updated estimates of 2016 annual mean concentrations are lower. The one increase, at DT8, is negligible (+0.1 µg/m^3). The results for locations nearest to the A13 and A1089 (Transect 1/1a) are over 1 µg/m^3 lower based on the nine month dataset.

On this basis, the conclusions drawn regarding baseline conditions in the ES were robust, tending towards conservative.

Table 1. Summary of Updated Site Specific Diffusion Tube Monitoring Data

ID	Exposure Period	Period Mean (2017)	Data capture (over 9 months)	Annualisation Factor	Bias Adjustment Factor*	Annual Mean (2016)
		µg/m³	%			µg/m³
DT1	Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec	30.8	100	1.10	0.92	31.3
DT2	Apr, Jun, Jul, Aug, Sep, Oct, Nov, Dec	32.1	89	1.09	0.92	32.4
DT3	Apr	-	-	-	-	
DT4	Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec	32.3	100	1.10	0.92	32.8
DT5	Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec	36.9	100	1.10	0.92	37.5
DT6	Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec	34.2	100	1.10	0.92	34.7
DT7	Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec	33.4	100	1.10	0.92	33.9
DT8	Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec	26.5	100	1.10	0.92	26.8
DT9	Apr, May	-	-	-	-	
DT10	Jul, Aug, Sep, Oct, Nov, Dec	26.6	67	1.07	0.92	26.1
DT11	Jul, Aug, Sep, Oct, Nov, Dec	24.0	67	1.07	0.92	23.6
* No change, taken from the Defra national bias adjustment spreadsheet (09/17) for Gradko, tube preparation method 20% TEA in water, for the year 2016						

Table 2. Comparison of ES Data with Updated Diffusion Tube Annualised Nitrogen Dioxide (2016)

ID	Location	Annual mean ES	Annual mean - updated	Difference
DT1	A1089 Transect 1 (33 m east)	32.9	31.3	-1.6
DT2	A1089 Transect 2 (64 m east)	33.4	32.4	-1.0
DT4	Heath Cottages, Farm Road, Orsett Heath	33.7	32.8	-0.9
DT5	A13 Transect 1 (28 m north)	38.6	37.5	-1.1
DT6	A13 Transect 2 (66 m north)	35.2	34.7	-0.5
DT7	A13 Transect 3 (97 m north)	34.9	33.9	-1.0
DT8	The Stables, Sandhurst Road, Tilbury	26.7	26.8	+0.1
DT10	A1089 Transect 1a (30 m west)	27.4	26.1	-1.3
DT11	138 London Road, Tilbury	24.7	23.6	-1.1

Memo

2. Updated Model Verification

2.1. Introduction

Model verification is the process of determining the local area performance of the base year model in comparison with measured data. The verification step involves comparison of modelled pollutant concentrations at suitable monitoring sites with monitored values that are representative of the base model period (in this case 2016). Verification has been repeated for both the ES (which used emission rates derived from CURED v2A) and the second sensitivity test reported in the memo (29 Jan 2018) which used Defra EfT v8 (and associated tools) combined with the latest traffic growth data estimates.

The 2016 baseline model verification has been revisited to determine whether the inclusion of site-specific monitoring data in the verification process materially influences the adjustment factors so derived. Verification has been undertaken in accordance with Defra's Technical Guidance LAQM.TG(16) as described in the ES (Appendix 18.D).

The following site specific survey monitoring sites were deemed appropriate for inclusion in the model verification: DT1, DT2, DT4, DT5, DT6, DT7. Other sites were excluded on the basis of:

- low data capture (<75%) (DT3, DT9, DT10)
- too far (over 100 m) from modelled roads (DT8, DT11).

An initial screening of modelled against measured concentrations including the additional sites showed that the broad assumptions made during the verification process for the ES are still valid. This included grouping by geographical location, as the dispersion model performs differently in different environments.

Table 3 shows the monitoring sites included in the model and the verification group assigned (site specific survey sites shown in bold, prefixed **DT**). All survey sites fall into the Tilbury outskirts/A13 category, as this is where the gaps in local authority survey were identified (the two sites in Central Tilbury were excluded for reasons given above; they had been included for the purposes of establishing baseline rather than with model verification in mind).

Table 3. Summary of Modelled Diffusion Tube Groups

ID	Group
TILD	Central Tilbury
TL	Central Tilbury
TILA	Central Tilbury
TILB	Central Tilbury
TILC	Central Tilbury
TILE	Central Tilbury
TK4	Central Tilbury
PKSL	Outskirts / A13
LYD	Outskirts / A13
DT1	**Outskirts / A13**
DT2	**Outskirts / A13**
DT4	**Outskirts / A13**
DT5	**Outskirts / A13**
DT6	**Outskirts / A13**
DT7	**Outskirts / A13**
KCNO	Outskirts / M25
GDSO	Outskirts / M25

2.2. ES Model Verification

2.2.1. Comparison of Modelled with Measured NO_2

A comparison of unadjusted modelled and measured total NO_2 concentrations at the selected verification sites is presented in Table 4 for the ES base model with additional sites (ESa).

Table 4. Unadjusted Modelled NO_2 vs Monitored NO_2, ESa

ID	Modelled NO_2 (un-adjusted)	Measured NO_2	Modelled - Measured	Modelled / Measured	Difference	Background NO_2
TILD	28.8	36.9	-8.0	0.78	-22%	26.0
TL	28.3	35.7	-7.4	0.79	-21%	26.0
TILA	29.2	40.8	-11.6	0.72	-28%	25.3
TILB	28.7	39.7	-11.1	0.72	-28%	25.3
TILC	29.9	39.0	-9.1	0.77	-23%	25.3
TILE	28.8	34.9	-6.1	0.83	-17%	26.0
TK4	28.3	33.0	-4.8	0.86	-14%	26.0
PKSL	34.3	29.0	5.3	1.18	18%	23.9
LYD	40.7	30.8	10.0	1.32	32%	25.1
DT1	29.9	29.0	-1.4	0.96	-4%	24.8
DT2	28.2	30.8	-4.2	0.87	-13%	24.8
DT4	31.9	31.3	-0.8	0.97	-3%	24.6
DT5	37.4	32.4	-0.1	1.00	0%	25.1
DT6	32.7	32.8	-2.0	0.94	-6%	25.1
DT7	31.0	37.5	-2.9	0.92	-8%	25.1
KCNO	35.2	32.8	2.4	1.07	7%	21.6
GDSO	33.6	28.9	4.7	1.16	16%	24.0

The model continues to underestimate at the majority of monitoring locations, with the biggest underestimates within the Central Tilbury urban area (no change as site specific tubes not relevant to this area). The A13 local authority tubes overestimate whereas the site-specific survey tubes perform better with a tendency to underestimate but to a lesser degree than Central Tilbury locations.

2.2.2. Derivation of Adjustment Factors

A comparison of the modelled road NO_x concentrations and calculated road NO_x at the monitoring sites allows a model adjustment factor to be derived. The adjustment factors derived for each geographical group of monitoring locations using the updated 2016 verification "ESa" are presented in Table 5 alongside those factors reported in the ES.

Table 5. Summary of Model Adjustment Factors

Model Group	ES	ESa	Used
Tilbury Factor	3.77	3.77	3.77
Outskirts / A13 Factor	0.38	0.76	1.00
Outskirts / M25 Factor	0.71	0.71	1.00

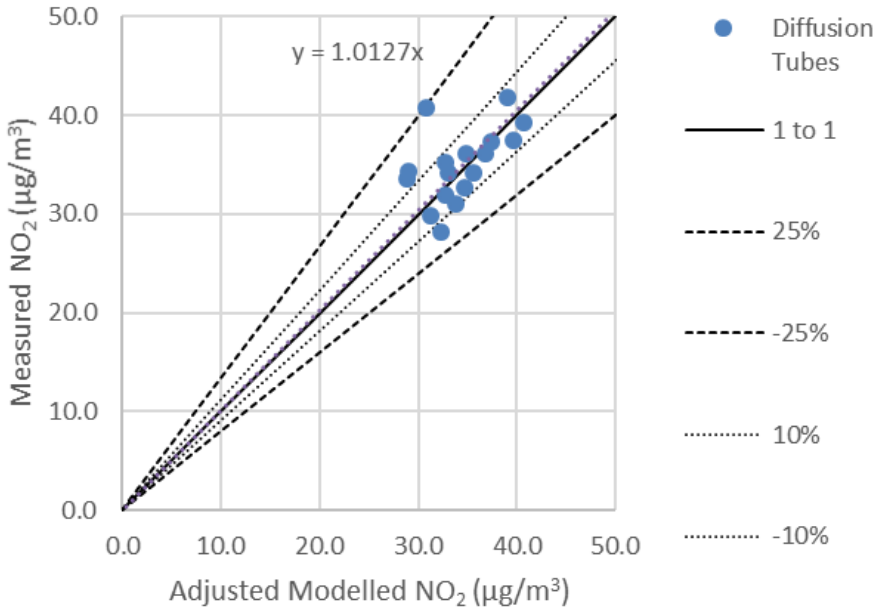
The adjustment factor for the "ESa" 2016 base model for the A13 area is higher, i.e. closer to 1.0 than that for the ES base model.

Memo

At ES stage, it was considered conservative not to reduce modelled concentrations of receptors located within the A13 and M25 verification areas, and thus an adjustment factor of 1.0 was applied to modelled results in these two areas. The inclusion of site specific survey data shows that this approach was robust, and that a factor of 1.0 for the A13/M25 area is still conservative. Were the LYD diffusion tube result to be excluded (because it is located where a dispersion model would not be expected to perform well i.e. a vegetated area immediately behind a barrier at the top of an embankment), the A13 factor is exactly 1.0.

On this basis, there would be no change to the total NO_2 concentrations as reported in the ES.

Figure 1 – Modelled vs. Measured NO_2 – ESa, after adjustment (all diffusion tubes)



2.3. Scenario 2 Model Verification

2.3.1. Comparison of Modelled with Measured NO_2

A comparison of modelled and measured total NO_2 concentrations is presented in Table 6 for the sensitivity test base model (EfT v8, additional traffic growth) with additional verification sites (S2a).

Table 6. Unadjusted Modelled NO_2 vs Monitored NO_2, S2a

ID	Modelled NO_2 (un-adjusted)	Measured NO_2	Modelled - Measured	Modelled / Measured	Difference	Background NO_2
TILD	28.4	36.9	-8.4	0.77	-23%	26.0
TL	27.7	35.7	-7.9	0.78	-22%	26.0
TILA	28.6	40.8	-12.1	0.70	-30%	25.3
TILB	27.9	39.7	-11.8	0.70	-30%	25.3
TILC	28.2	39.0	-10.8	0.72	-28%	25.3
TILE	28.4	34.9	-6.6	0.81	-19%	26.0
TK4	27.7	33.0	-5.3	0.84	-16%	26.0
PKSL	33.2	29.0	4.2	1.15	15%	23.9
LYD	37.2	30.8	6.4	1.21	21%	25.1
DT1	28.2	29.0	-3.1	0.90	-10%	24.8
DT2	27.1	30.8	-5.3	0.84	-16%	24.8
DT4	29.7	31.3	-3.1	0.91	-9%	24.6
DT5	34.4	32.4	-3.0	0.92	-8%	25.1
DT6	30.7	32.8	-4.0	0.88	-12%	25.1
DT7	29.4	37.5	-4.5	0.87	-13%	25.1
KCNO	30.4	32.8	-2.5	0.93	-7%	21.6
GDSO	30.1	28.9	1.2	1.04	4%	24.0

The model continues to underestimate at the majority of monitoring locations, with the biggest underestimates within the Central Tilbury urban area (no change as site specific tubes not relevant to this area). The A13 local authority tubes overestimate whereas the site-specific survey tubes perform better with a tendency to underestimate but to a lesser degree than Central Tilbury locations.

2.3.2. Derivation of Adjustment Factors

A comparison of the modelled road NO_x concentrations and calculated road NO_x at the monitoring sites allows a model adjustment factor to be derived. The adjustment factors derived for each geographical group of monitoring locations using the updated verification "S2a" are presented in Table 7 alongside those factors reported in the sensitivity test S2.

Table 7. Summary of Model Adjustment Factors, S2a

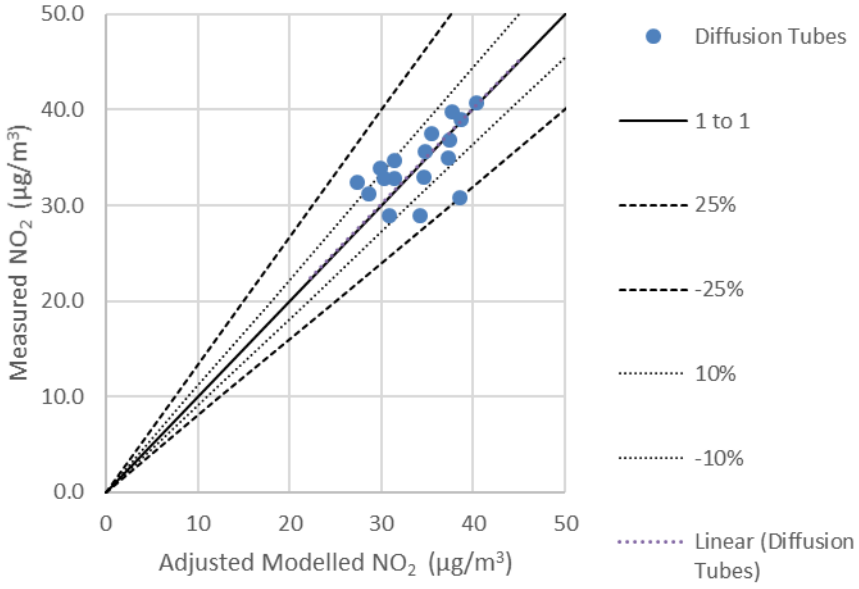
Model Group	S2	S2a	Used
Tilbury Factor	4.32	4.32	4.32
Outskirts / A13 Factor	0.49	0.97	1.12
Outskirts / M25 Factor	1.12	1.12	1.12

The adjustment factor for the "S2a" 2016 base model for the A13 area is higher, i.e. closer to 1.0 than that for the S2 base model.

For the Sensitivity Test it was considered conservative not to reduce modelled concentrations of receptors located within the A13 verification area, and thus an adjustment factor of 1.12 was applied to modelled results in that area based on the M25 factor. The inclusion of site specific survey data shows that this approach was robust, and that a factor of 1.12 for the A13 area is still conservative. Were the LYD diffusion tube result to be excluded (because it is located where a dispersion model would not be expected to perform well i.e. a vegetated area immediately behind a barrier at the top of an embankment), the A13 factor is very slightly higher at 1.25.

On this basis, there would be no material change to the conclusions of the Sensitivity Test note, which found that total NO_2 concentrations were slightly lower under S2.

Figure 2 – Modelled vs. Measured NO_2 – S2a, after adjustment (all diffusion tubes)



2.4. Summary

A summary of the model statistics for each of the cases discussed is presented in Table 8. It can be seen that S2a, which uses the latest emission factors, traffic growth rates and site specific survey data, provides the best model performance in terms of regression line (ratio of modelled to monitored concentrations) and fractional bias.

Table 8. Summary of Model Statistics

Statistic	ES	ESa	S2	S2a
Arithmetic mean (modelled)	36.6	34.9	35.8	34.1
Arithmetic mean (monitored)	34.7	34.3	34.7	34.3
Difference (modelled minus monitored)	2.0	0.6	1.1	-0.3
Ratio (average)	1.07	1.02	1.04	0.99
Regression line forced through zero, y =	0.9454x	0.9778x	0.9704x	1.0030x
Correlation Coefficient	0.513	0.520	0.795	0.613
Root Mean Square Error (RMSE)	4.00	3.50	2.67	3.23
Fractional Bias	-0.06	-0.02	-0.03	0.01

3. Summary

Annual mean concentrations have been derived from a site-specific survey carried out to support the Tilbury2 DCO process. All concentrations remain below the relevant air quality objectives. The updated estimates of 2016 annual mean concentrations are slightly lower than those presented in the ES and do not affect conclusions regarding baseline concentrations of NO_2 in the study area.

Furthermore, the analysis has demonstrated that inclusion of site specific monitoring data does not affect the model verification process used for the ES and sensitivity testing, using emission factors derived from CURED V2A and EfT v8 respectively. The inclusion of the site-specific monitoring data gave a slightly improved model performance in both cases, bringing modelled results more in line with measured results.

Overall the findings as described in the ES are concluded to be robust and not materially affected by the updated estimates of 2016 annual mean concentrations from the site-specific survey.

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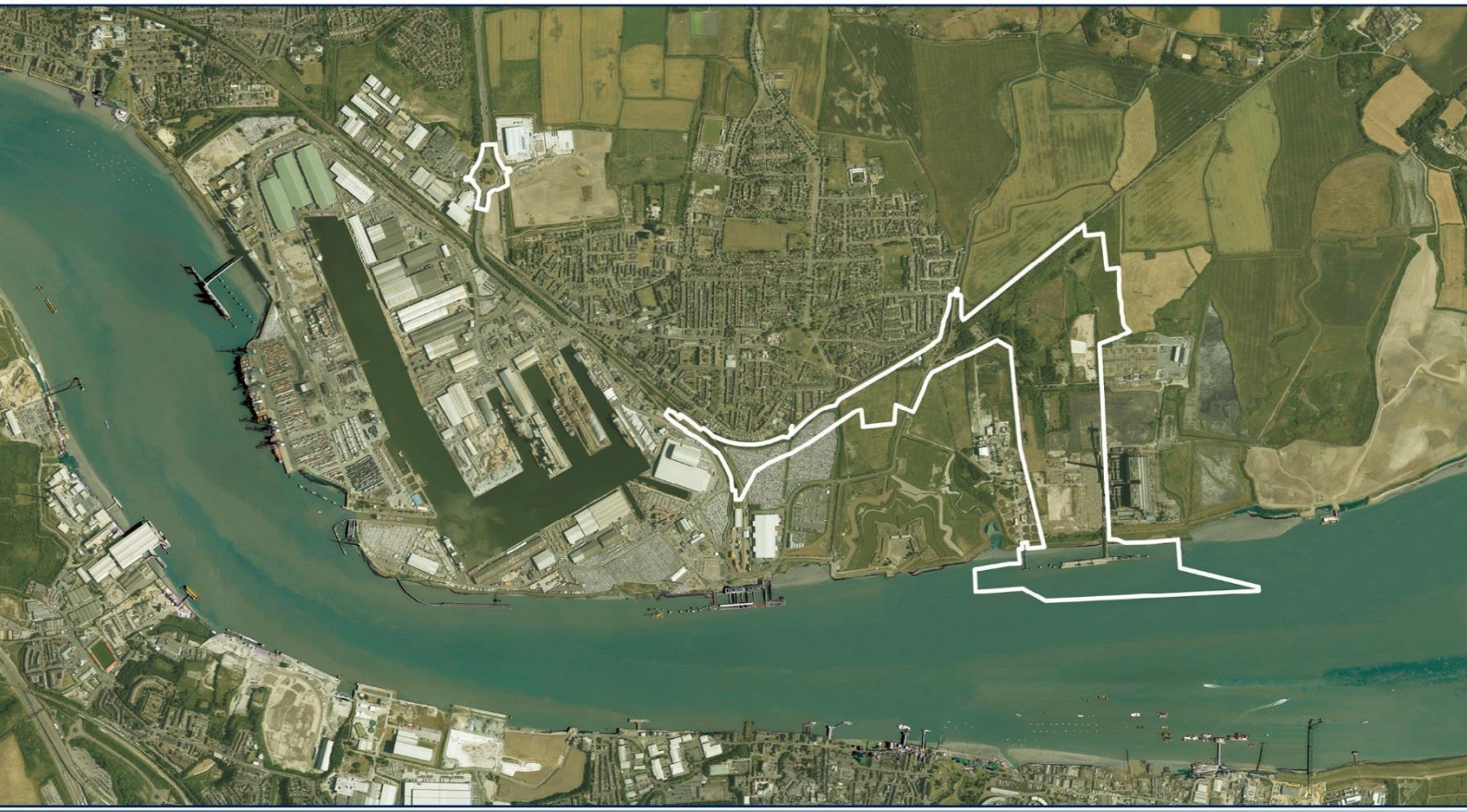

LONDON RESORT COMPANY HOLDINGS SET TO PARTNER WITH PORT OF TILBURY TO HELP BUILD GLOBAL ENTERTAINMENT RESORT IN NORTH KENT

05/07/2017

PRESS RELEASES (/NEWS-DOWNLOADS/PRESS-RELEASES/) DOWNLOADS (/NEWS-DOWNLOADS/DOWNLOADS/)

*London Resort Company Holdings ("**LRCH**") today announced that the company has reached a Memorandum of Understanding with Port of Tilbury London Limited ("POTL") to use the Port and its facilities as the main location for storage, loading, discharge, barge operations and other services in connection with the development and construction of the planned Entertainment Resort in North Kent.*

British company LRCH is the developer behind the planned Entertainment Resort on the Swanscombe Peninsula in North Kent. The Port of Tilbury, located a short distance from the peninsula on the northern bank of the Thames, is London's major port, providing fast, modern distribution services for the benefit of the south east of England and beyond. Serving the UK's market, the port offers customers excellent transport links to and from the capital and across the South East.

The latest plans for the Entertainment Resort, of which the Memorandum of Understanding form a part, will go on public display in autumn this year, before a Development Consent Order is submitted to the Secretary of State.

Humphrey Percy, CEO of LRCH, said:

"We have always spoken of our commitment to make use of the Thames both during construction and operation. Reaching a Memorandum of Understanding with Port of Tilbury underlines this commitment and is a further step in delivering a truly global destination."

Charles Hammond, Group Chief Executive from Forth Ports (owners of the Port of Tilbury) said:

"The Port of Tilbury is ideally located as a hub for LRCH's proposed major construction project in Kent. At Tilbury we are committed to encouraging the increased use of the River Thames for major construction projects. By using the River Thames, there is not only a reduction in the road miles impact but it also helps to reduce congestion on the road network. At Tilbury, LRCH will benefit from our expertise in warehouse consolidation, handling services as well as water-borne transportation."

ENDS