



Thurrock Flexible Generation Plant

Environmental Statement Volume 5
Chapter 32: Summary of Cumulative Effects

Date: March-June 2021

Environmental Impact Assessment

Environmental Statement

Volume 5

Chapter 32

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Summary

This document summarises the cumulative effects identified in the Environmental Statement (ES). Full details of the cumulative assessment can be found in Volume 4, Chapters 19 to 30 of this ES.

Qualifications

This document has been prepared by Clare Russell, an Associate and EIA Practitioner with over 18 years’ experience in environmental consultancy focusing on environmental impact assessment and management of construction impacts.

It has been checked by Dan Smyth BSc, MSc, a Senior Director who has 25 years’ experience of environmental impact assessment, and Tom Dearing, a Chartered Environmentalist and full Member of the Institute of Environmental Management and Assessment, who has ~~eight~~11 years’ experience.

1. Introduction

1.1 Purpose of this chapter

- 1.1.1 This chapter of the Environmental Statement (ES) presents the summary of cumulative effects for the Environmental Impact Assessment (EIA) of the Thurrock Flexible Generation Plant.
- 1.1.2 Each development considered has been assigned a tier, based on PINS guidance. Tier 1 developments are those with submitted applications, consents, or that are already under construction. Tier 2 developments are those at scoping stage for EIA. Tier 3 developments are those otherwise indicated as a possibility, e.g. through pre-application discussion with PINS or a local planning authority or those identified in relevant local development plans. Tier 3 projects are less likely to come forwards than Tier 2 projects, which are themselves not certain to be developed.
- 1.1.3 Table 1.1 summarises the overall cumulative effect and includes the identified cumulative impacts, cumulative developments and assigned development tier. Full details of the cumulative effects assessment can be found in Volume 4, Chapters 19 to 30 of this ES.

1.2 Conclusions

- 1.2.1 As summarised in Table 1.1, overleaf, for each of the identified impacts either no significant effects are concluded, or the impact to various receptors as a result of Thurrock Flexible Generation Plant is negligible and would not change the significance of the cumulative effect.
- 1.2.2 Therefore, it is concluded that no further mitigation or monitoring measures are considered necessary, beyond those which have been adopted as part of each proposed development, or were outlined in the topic chapters in Volume 3, Chapters 6 to 17.

Table 1.1 Summary of Cumulative Effects

Development Phase	Cumulative Impact	Cumulative Development	Development Tier	Cumulative Effect
Landscape and Visual Resources				
Construction	Adverse impact to designated landscapes (Kent Downs area of outstanding natural beauty)	Tilbury2 port expansion Lower Thames Crossing Other shortlisted cumulative developments	Tier 1 Tier 2 Various	Tilbury2 is under construction and due to become operational in 2020 so no cumulative construction effects with Thurrock Flexible Generation Plant are predicted. The negligible impact (minor adverse effect) of Thurrock Flexible Generation Plant would make no significant contribution to cumulative effects on the Kent Downs AONB. The Lower Thames Crossing is considered to have the potential to have significant effects on the AONB in its own right, not materially increased by the effect of Thurrock Flexible Generation Plant.
	Adverse impacts to non-designated landscapes (NCA 81: Greater Thames Estuary, LCA C5: Tilbury Marshes, LCA D7: West Tilbury Urban Fringe)	Tilbury2 port expansion Lower Thames Crossing Other shortlisted cumulative developments	Tier 1 Tier 2 Various	Effects of Tilbury2 on LCA5 Tilbury Marshes are predicted to be significant and this significance would not be increased by the cumulative effect with Thurrock Flexible Generation Plant and the Lower Thames Crossing. Significant cumulative effects on other non-designated landscapes and with other non-NSIP developments in the study area are not predicted.
	Adverse impact to views from residential, public right of way and access land, tourist and other sensitive viewpoints	Tilbury2 port expansion Lower Thames Crossing Other shortlisted cumulative developments	Tier 1 Tier 2 Various	The significance of effect of Tilbury2 is not considered to be increased by the cumulative impact of Thurrock Flexible Generation Plant and the Lower Thames Crossing where significant adverse effects from the developments alone were predicted, and no new significant cumulative effects with these and other non-NSIP developments in the study area are predicted.
Operation and maintenance	Adverse impact to designated landscapes (Kent Downs area of outstanding natural beauty)	Tilbury2 port expansion Lower Thames Crossing Other shortlisted cumulative developments	Tier 1 Tier 2 Various	The negligible impact (minor adverse effect) of Thurrock Flexible Generation Plant would make no significant contribution to cumulative effects on the Kent Downs AONB. The Lower Thames Crossing has the potential to have significant effects on the AONB in its own right, not materially increased by the effect of Thurrock Flexible Generation Plant.
	Adverse impacts to non-designated landscapes (NCA 81: Greater Thames Estuary, LCA C5: Tilbury Marshes, LCA D7: West Tilbury Urban Fringe)	Tilbury2 port expansion Lower Thames Crossing Other shortlisted cumulative developments	Tier 1 Tier 2 Various	Effects of Tilbury2 on LCA5 Tilbury Marshes are predicted to be significant and this significance would not be increased by the cumulative effect with Thurrock Flexible Generation Plant and the Lower Thames Crossing. Significant cumulative effects on other non-designated landscapes and with other non-NSIP developments in the study area are not predicted.
	Adverse impact to views from residential, public right of way and access land, tourist and other sensitive viewpoints	Tilbury2 port expansion Lower Thames Crossing Other shortlisted cumulative developments	Tier 1 Tier 2 Various	The significance of effect of Tilbury2 is not considered to be increased by the cumulative impact of Thurrock Flexible Generation Plant, Tilbury2 and the Lower Thames Crossing where significant adverse effects from the developments alone were predicted, and no new significant cumulative effects with these and other non-NSIP developments in the study area are predicted.
Decommissioning	Adverse impact to designated landscapes (Kent Downs area of outstanding natural beauty)	Tilbury2 port expansion Lower Thames Crossing Other shortlisted cumulative developments	Tier 1 Tier 2 Various	Thurrock Flexible Generation Plant decommissioning activity would have no greater impact than assessed for the construction phase, and less likelihood of overlapping with other shortlisted cumulative development effects, so no significant cumulative effect is predicted.
	Adverse impacts to non-designated landscapes (NCA 81: Greater Thames Estuary, LCA C5: Tilbury Marshes, LCA D7: West Tilbury Urban Fringe)	Tilbury2 port expansion Lower Thames Crossing Other shortlisted cumulative developments	Tier 1 Tier 2 Various	

Development Phase	Cumulative Impact	Cumulative Development	Development Tier	Cumulative Effect
	Adverse impact to views from residential, public right of way and access land, tourist and other sensitive viewpoints	Tilbury2 port expansion Lower Thames Crossing Other shortlisted cumulative developments	Tier 1 Tier 2 Various	Thurrock Flexible Generation Plant decommissioning activity would have no greater impact than assessed for the construction phase, and less likelihood of overlapping with other shortlisted cumulative development effects, so no significant cumulative effect is predicted.
Historic Environment				
Construction	Adverse impact to below ground archaeology	Tilbury2 port expansion Lower Thames Crossing Demolition of Tilbury B power station Residential and mixed-use developments expanding Linford and East Tilbury	Tier 1 Tier 2 Tier 1 Tier 1	There is a requirement for other developments to appropriately investigate, assess and remediate any impacts to the known and potential buried archaeological resource through offsetting works. A Written Scheme of Investigation for Archaeological Mitigation was submitted as part of Tilbury2 and investigative work is ongoing for the Lower Thames Crossing. Both schemes will have significant adverse effects on buried archaeological remains, where such are present, and these would be mitigated via a scheme of archaeological investigation and offset through design measures or preservation by record. These effects occur at different places. The potential cumulative effect is therefore not expected to exceed the level of significance as reported in Volume 3, Chapter 7. The Thurrock Flexible Generation Plant does not increase the significance of effect.
	Adverse impacts to settings of heritage assets and on the historic landscape	Tilbury2 port expansion Lower Thames Crossing Demolition of Tilbury power station Residential and mixed-use developments expanding Linford and East Tilbury	Tier 1 Tier 2 Tier 1	If the construction phase of Thurrock Flexible Generation Plant were to overlap with Tilbury2 and Lower Thames Crossing (and any further demolition of Tilbury Power Station), which is unlikely, the contribution of Thurrock Flexible Generation Plant would not be material and the significance of effect reported in Volume 3, Chapter 7 would remain unchanged. The significance of effect of Tilbury2 is not considered to be increased by the cumulative impact of Thurrock Flexible Generation Plant and the Lower Thames Crossing where significant adverse effects from the developments alone were predicted, and no new significant cumulative effects with these and other non-NSIP developments in the study area are predicted.
Operation and maintenance		Tilbury2 port expansion Lower Thames Crossing Residential and mixed-use developments expanding Linford and East Tilbury	Tier 1 Tier 2 Tier 1	Potential adverse cumulative impacts causing significant effects may occur; however, the contribution of Thurrock Flexible Generation Plant would not materially increase the significance of effect.
Land Use, Agriculture and Socio-Economics				
Construction	Adverse impacts on agricultural land	Lower Thames Crossing Residential and mixed-use developments expanding Linford and East Tilbury	Tier 2 Tier 1	The permanent loss of land associated with Thurrock Flexible Generation Plant affects lower quality grade 3b land. The other developments would have likely significant effects on higher quality "best and most versatile" Grade 2 and Grade 3a land (i.e. best and most versatile land). Thurrock Flexible Generation Plant would make no material contribution to the cumulative loss of best and most versatile land and the significance of effect reported in Volume 3, Chapter 8 would therefore remain the same.
	Adverse impacts on farm holdings	Lower Thames Crossing Residential and mixed-use developments expanding Linford and East Tilbury	Tier 2 Tier 1	The effect on the two large farm holdings associated with Thurrock Flexible Generation Plant is negligible. It is considered that it would be unlikely for significant effects on farm holdings to arise from the development of residential and mixed-use sites. However, the the Lower Thames Crossing PEIR identified the potential for significant adverse effects on farm assets to occur as a result of land take and severance. Thurrock Flexible Generation Plant would make no material contribution to potential cumulative effects with the Lower Thames Crossing and the significance of effect reported in Volume 3, Chapter 8 would therefore remain unchanged.
	Adverse impact to Common Land (access land)	Lower Thames Crossing	Tier 2	The loss of common land as a result of the Lower Thames Crossing will require exchange land to be provided under Section 16 of the Commons Act 2006, therefore no net loss of common land is likely to occur. On this basis, no adverse cumulative effects on this resource are anticipated to occur.

Development Phase	Cumulative Impact	Cumulative Development	Development Tier	Cumulative Effect
Construction	Adverse impacts on Public Rights of Way and other linear recreational routes	Lower Thames Crossing	Tier 2	<p>The development boundary and temporary areas required during the construction of the Lower Thames Crossing also impact on PRow and cycle routes (i.e. Thames Estuary Path, National Cycle Route 13 and Tilbury Green common land). <u>Firstly. The PRow and cycle routes impacted by LTC are different to those impacted by Thurrock Flexible Generation Plant.</u> However<u>Furthermore</u>, with the implementation of measures in the LTC PEIR, it is anticipated that the significance of any cumulative effect due to the contribution of Thurrock Flexible Generation plant would be no greater than reported in Volume 3, Chapter 8.</p> <p>The restoration of land at Ash Fields includes the indicative route of the new PRow on land adjacent to Thurrock Flexible Generation Plant. There is potential for a cumulative impact as pedestrians would have to access areas of Access Land and the wider public rights of way network by a longer route including walking alongside Fort Road. However, in the context of the recreational routes in the area, the new Common Land and accessibility, this is not considered to be a significant cumulative effect.</p>
	Adverse impacts on construction employment	NSIP schemes	Tier 1 and 2	<p>Construction labour demand for Thurrock Flexible Generation Plant is likely to be lower than the other NSIP schemes. In the cases where construction timeframes overlap, the relatively lower construction demands, the pool of local and regional construction labour and the mobility of the construction workforce are such that the cumulative effect on availability of labour due to the contribution of Thurrock Flexible Generation Plant would be negligible.</p>
Ecology				
Construction	Adverse impact to Lytag Brownfield Local Wildlife Site (LWS)	Tilbury2 port expansion Lower Thames Crossing	Tier 1 Tier 2	<p>Construction of Tilbury2 resulted in the loss of the majority of the LWS, which in the absence of mitigation is a significant effect on this designated site and the invertebrate assemblage it supports. Mitigation proposed for Tilbury2 primarily comprises provision of offsite habitat.</p> <p>The Lower Thames Crossing PEIR identified the potential for construction effects from habitat loss on terrestrial invertebrates, but in the absence of information on the mitigation measures proposed for the LTC in the PEIR it is not known whether these effects would be significant for this project.</p> <p>Although Thurrock Flexible Generation Plant would not contribute to the direct cumulative effect on the habitats within the LWS, there is potential for a cumulative effect from Thurrock Flexible Generation Plant on habitats outside the LWS which also contribute to support of the invertebrate assemblage and the populations of reptiles and breeding birds. However, with the mitigation provided, the cumulative effect is unlikely to exceed the level of significance reported in Volume 3, Chapter 9.</p>
	Adverse impact to Thames Estuary and Marshes Special Protection Area / Ramsar	Tilbury2 port expansion Lower Thames Crossing Residential and mixed-use developments expanding Linford and East Tilbury	Tier 1 Tier 2 Tier 1	<p>No significant effects on integrity of the Thames Estuary and Marshes SPA/Ramsar from Tilbury2 were identified either alone or in combination by the HRA carried out for that project. Construction of Tilbury2 will not overlap with construction of Thurrock Flexible Generation Plant.</p> <p>The Lower Thames Crossing PEIR identified the potential for construction effects from loss of or disturbance to functionally linked land associated with the Thames Estuary & Marshes SPA / Ramsar during construction, but in the absence of information on the mitigation measures proposed for the LTC in the PEIR it is not known whether these effects would be significant for this project.</p> <p>There is potential for greater disturbance and displacement effects on wintering birds on the foreshore if the construction phases of Thurrock Flexible Generation Plant overlap with the Lower Thames Crossing, or for these effects to last for a greater duration if the construction programmes are sequential.</p> <p>However, given the sporadic to occasional use of SPA species in the intertidal area of Zone G in the vicinity of the proposed causeway, any sequential effect arising from the construction phases of the two schemes is not considered to have an adverse effect on integrity or the SPA/Ramsar.</p>

Development Phase	Cumulative Impact	Cumulative Development	Development Tier	Cumulative Effect
	Adverse impact to grassland and ditch habitat	Tilbury2 port expansion Lower Thames Crossing Residential and mixed-use developments expanding Linford and East Tilbury	Tier 1 Tier 2 Tier 1	Given that the mitigation proposals for Thurrock Flexible Generation Plant include creation of grassland and ditch habitat that more than equals permanent losses from construction within the main development site, it is not considered that there is potential for cumulative effects on these habitat types.
	Adverse impact to reptiles, water voles, invertebrates and breeding birds	Tilbury2 port expansion Lower Thames Crossing Residential and mixed-use developments expanding Linford and East Tilbury	Tier 1 Tier 2 Tier 1	The Lower Thames Crossing PEIR identified the potential for construction effects from habitat loss and mortality on a range of species but in the absence of information on the mitigation measures proposed for the LTC in the PEIR it is not known whether these effects would be significant for this project. However, given that the mitigation proposals for Thurrock Flexible Generation Plant include creation of grassland and ditch habitat that more than equals permanent losses from construction within the main development site of habitats that support reptiles, water voles, invertebrates and breeding birds, it is not considered that there is potential for cumulative effects on these species.
	Adverse impact of cumulative projects resulting in greater fragmentation of populations of protected species	Lower Thames Crossing	Tier 2	The Lower Thames Crossing PEIR identified the potential for construction effects from fragmentation on a range of species but in the absence of information on the mitigation measures proposed for the LTC in the PEIR it is not known whether these effects would be significant for this project. Thurrock Flexible Generation Plant would not contribute additional fragmentation effects over and above those due to the presence of the Lower Thames Crossing.
Construction	Adverse impact to arable land functionally linked by bird species with the Thames Estuary and Marshes SPA/Ramsar	Tilbury2 port expansion Lower Thames Crossing	Tier 1 Tier 2	There is no potential for cumulative effects on birds associated with the SPA due to construction and use of the Thurrock Flexible Generation Plant, as they do not occur in significant numbers within the zone of influence of the onsite construction site.
Operation	Adverse impact of cumulative projects resulting in greater fragmentation of populations of protected species			The Lower Thames Crossing PEIR identified the potential for operational effects from fragmentation on a range of species but in the absence of information on the mitigation measures proposed for the LTC in the PEIR it is not known whether these effects would be significant for this project. Thurrock Flexible Generation Plant would not contribute additional fragmentation effects over and above those due to the presence of the Lower Thames Crossing.
Decommissioning	Adverse impact to species through additional disturbance	Tilbury2 port expansion Lower Thames Crossing	Tier 1 Tier 2	It is not considered that this would give rise to effects of a magnitude or significance greater than that assessed for Thurrock Flexible Generation Plant alone, i.e. not significant.
Traffic and Transport				
Construction	Adverse impact to driver delay, severance of routes, pedestrian delay or accidents and road safety	Tilbury2 port expansion Lower Thames Crossing Other cumulative developments	Tier 1 Tier 2 various	The cumulative development schemes' ESs did not predict any significant effects resulting from cumulative traffic flows during the future years for construction of Thurrock Flexible Generation Plant. The contribution of Thurrock Flexible Generation Plant construction traffic to cumulative traffic flows from developments including Tilbury2 is predicted to be negligible and no significant cumulative effects on the assessed road links due to Thurrock Flexible Generation Plant are predicted.

Development Phase	Cumulative Impact	Cumulative Development	Development Tier	Cumulative Effect
Noise and Vibration				
Construction	Adverse impact of construction noise to sensitive receptors	Tilbury2 port expansion	Tier 1	Tilbury2 port expansion ES concludes that construction activities have the potential to give rise to temporary direct, adverse effects at receptors in Tilbury overlooking the proposed road and rail links, such as Byron Gardens and other receptors in the vicinity, but which were not considered significant due to high baseline ambient levels. Tilbury2 construction and Thurrock Flexible Generation Plant construction phases in combination therefore have the potential to cause adverse effects at medium sensitivity receptors in the vicinity of Byron Gardens, however Thurrock Flexible Generation Plant would not make a material contribution to this effect and this effect is not considered significant.
		Lower Thames Crossing	Tier 2	The impact due to the construction or operation of the Lower Thames Crossing is anticipated to be at least moderate to major at the most affected receptors, which would give rise to a significant effect. The Lower Thames Crossing in combination with the construction of Thurrock Flexible Generation Plant is anticipated to also be moderate or major at the most affected receptors, however Thurrock Flexible Generation Plant would not make a material contribution to this significant effect.
		Smaller cumulative schemes	Various	There are a number of other smaller proposed schemes that share zones of impact with Thurrock Flexible Generation Plant, including two adjacent to the application boundary. The only receptors which are predicted to be impacted by all schemes are those in the vicinity of Havers lodge. There is insufficient information available to quantitatively assess the magnitude of cumulative noise, however, should any significant cumulative impact occur, Thurrock Flexible Generation Plant is unlikely to make a material contribution to this effect.
Operation and maintenance	Adverse impact of operational noise to sensitive receptors	Tilbury2 port expansion	Tier 1	Tilbury2 port expansion ES concludes that construction activities have the potential to give rise to temporary direct, adverse effects at receptors in Tilbury overlooking the proposed road and rail links, such as Byron Gardens and other receptors in the vicinity but which were not considered significant due to high baseline ambient levels. Tilbury2 construction phase and Thurrock Flexible Generation Plant operational phase in combination have the potential to cause adverse impact at medium sensitivity receptors in the vicinity of Byron Gardens giving rise to an adverse effect, however Thurrock Flexible Generation Plant would not make a material contribution to this effect. Tilbury2 port expansion ES also reports a number of significant adverse effects during the operation of the scheme. Tilbury2 and Thurrock Flexible Generation Plant operational phases in combination also have the potential to cause adverse impact at medium sensitivity receptors in the vicinity of Byron Gardens giving rise to a significant adverse effect, however Thurrock Flexible Generation Plant would not make a material contribution to this effect.
		Lower Thames Crossing	Tier 2	The impact due to the construction or operation of the Lower Thames Crossing is anticipated to be at least moderate to major at the most affected receptors, which would give rise to a significant effect. If the construction phase of the Lower Thames Crossing were to overlap with the operational phase of Thurrock Flexible Generation Plant, it is considered likely that significant impacts would occur. Significant adverse impacts are also predicted to occur during the overlap of the operational phases. However, the Lower Thames Crossing is expected to dominate the future sound environment and the contribution of Thurrock Flexible Generation Plant is not predicted to cause or materially increase the significance of effect.
		Smaller cumulative schemes	Various	The only receptors which are predicted to be impacted cumulatively by smaller schemes are those in the vicinity of Havers lodge. There is insufficient information available to quantitatively assess the magnitude of cumulative noise, however, should any significant cumulative impact occur, Thurrock Flexible Generation Plant is unlikely to make a material contribution to this effect.

Development Phase	Cumulative Impact	Cumulative Development	Development Tier	Cumulative Effect
Decommissioning	Adverse impact of decommissioning noise to sensitive receptors	Tilbury2 port expansion	Tier 1	Decommissioning effects are considered to be similar to those predicted during construction. As such, it is considered that the decommissioning is unlikely to result in significant cumulative noise effects at affected noise sensitive receptors.
		Lower Thames Crossing	Tier 2	Decommissioning effects are considered to be similar to those predicted during construction.
Air Quality				
Construction	Adverse impact of dust	Tilbury2 port expansion Lower Thames Crossing Residential and mixed-use developments expanding Linford and East Tilbury	Tier 1 Tier 2 Tier 1	No significant cumulative effect with implementation of good practice dust management measures.
Operation and maintenance	Adverse impact of NO ₂ concentrations long-term	Tilbury2 port expansion Lower Thames Crossing Other cumulative developments	Tier 1 Tier 2 various	The cumulative annual mean nitrogen dioxide concentrations at human-health receptors are predicted to remain within the relevant air quality objectives except at West Street in Gravesend, where the air quality objective would be exceeded with or without the effect of Thurrock Flexible Generation Plant in the opening year. This is in large part due to existing baseline concentration. On that basis the cumulative effect is likely to be potentially significant with or without the Thurrock FGP. Appendix 12.6 shows that by 2030, based on conservative assumptions, the cumulative NO ₂ concentrations at West Street in Gravesham are expected to be below the air quality objective. It is considered unlikely that the cumulative effect of all development would delay compliance with the air quality objective at this location. The cumulative hourly-mean NO ₂ concentrations at human-health receptors are predicted to remain within the relevant air quality objective at all receptors. On that basis the cumulative effects are not considered to be significant.
	Adverse impact of NO ₂ concentrations short-term			
	Adverse impact of NO _x concentrations, nutrient nitrogen deposition rates and acid deposition rates			In line with Natural England guidance (as set out in Chapter 25), the following cumulative effects were not included in the cumulative assessment as they may result in potentially significant effects in isolation. <ul style="list-style-type: none">• Lower Thames Crossing and Tilbury 2 – All designated sites.• Tilbury Green Power – Thames Estuary and Marshes SPA, Hangmans Woodland and Deneholes SSSI, Mucking Flats and Marshes SSSI, West Thurrock Lagoon and Marshes SSSI.• Tilbury Peak Reserve – Thames Estuary and Marshes SPA, Mucking Flats and Marshes SSSI.• Gateway Energy Centre – Thames Estuary and Marshes SPA, Canvey Wick SSSI, Holehaven Creek SSSI, Mucking Flats and Marshes SSSI, Pitsea Marsh SSSI, South Thames Estuary and Marshes SSSI, Vange and Fobbing Marshes SSSI. When considering the cumulative effects of the Thurrock FGP with other cumulative developments (except those listed above), no significant cumulative air quality effects on designated habitat sites are expected to arise.
Decommissioning	Adverse impact of dust	Tilbury2 port expansion Lower Thames Crossing Residential and mixed-use developments expanding Linford and East Tilbury	Tier 1 Tier 2 Tier 1	No significant cumulative effect with implementation of good practice dust management measures.

Development Phase	Cumulative Impact	Cumulative Development	Development Tier	Cumulative Effect
Human Health				
Construction	Adverse impact to human health via changes in environmental pathways	Tilbury2 port expansion Lower Thames Crossing Residential and mixed-use developments expanding Linford and East Tilbury	Tier 1 Tier 2 Tier 1	The Tilbury2 health section of the ES provides qualitative terms for the severity of effects but does not specify whether such effects are considered to be significant or not. As a result, it is assumed that a moderate effect in the Tilbury2 ES is significant. During construction, moderate adverse effects on health are predicted due to noise of the road/rail infrastructure corridor and on open space and active travel. During operation, moderate adverse effects on health are predicted due to noise on the wider highway network and operation of the Tilbury2 site. No significant contribution to the cumulative effect with Tilbury2 by Thurrock Flexible Generation Plant is predicted for traffic and noise changes, and new exceedances of air quality standards set to be protective of health would not be caused. No significant adverse cumulative impact on health due to Thurrock Flexible Generation Plant is therefore predicted. No detailed health impact information is available for the Lower Thames Crossing or proposed residential/mixed use developments. As such, on the same basis, it is anticipated that there would be no significant contribution to the cumulative effect with the Lower Thames Crossing or proposed residential/mixed-use developments. In addition, it is unlikely that the increase in number and proximity of the local population, resulting from proposed residential and mixed-use developments expanding Linford and East Tilbury, would be sufficient to quantify any change in local community health outcomes (due to a greater number of people exposed to environmental changes).
Operation and maintenance				
Decommissioning				
Construction	Adverse or beneficial impact to human health via socio-economic pathways	Tilbury2 port expansion Lower Thames Crossing Residential and mixed-use developments expanding Linford and East Tilbury	Tier 1 Tier 2 Tier 1	During construction of Tilbury2, moderate beneficial effects on health are predicted due to employment opportunities. No significant cumulative effect on the basis that construction employment would only provide population and health benefits on an individual level rather than on a community level. No detailed information on health impacts is available for the Lower Thames Crossing or proposed residential/mixed use developments. As such, on the same basis, it is anticipated that there would be no significant contribution to the cumulative effect with the Lower Thames Crossing or proposed residential/mixed-use developments.
Operation and maintenance				During operation of Tilbury2, moderate beneficial effects on health are predicted due to employment opportunities. No significant cumulative effect as Thurrock Flexible Generation Plant employment generation would be minimal and mainly remote-based. No detailed information on health impacts is available for the Lower Thames Crossing or proposed residential/mixed use developments. However, minimal direct employment opportunities would be provided as part of the operation of these developments. As such, it is anticipated that there would be no significant contribution to the cumulative effect with the Lower Thames Crossing or proposed residential/mixed-use developments.
Decommissioning				No significant cumulative effect as overlap in decommissioning timescales is unlikely.
Climate Change				
All developments which emit greenhouse gasses (GHGs) have the potential to impact the atmospheric mass of GHGs as a receptor, and so may have a cumulative impact on climate change. Consequently, cumulative effects due to other specific local development projects are not individually predicted but are taken into account when considering the impact of the proposed development by defining the atmospheric mass of GHGs as a high sensitivity receptor in Section 4 of Volume 3, Chapter 14: Climate Change. The net beneficial effect of the assessment of the proposed development takes account of cumulative changes in greenhouse gas emissions from other energy generation sources.				
Hydrology and Flood Risk				
Construction	Adverse impact on flood risk	Tilbury2 port expansion Lower Thames Crossing Other cumulative developments	Tier 1 Tier 2 Various	No significant cumulative effect on hydrology and flood risk is predicted as all developments are required to provide appropriate flood risk mitigation and safe storage of any potentially-polluting materials.

Development Phase	Cumulative Impact	Cumulative Development	Development Tier	Cumulative Effect
	Adverse impact on water quality	Tilbury2 port expansion Lower Thames Crossing Other cumulative developments	Tier 1 Tier 2 Various	
Operation and maintenance	Adverse impact on flood risk	Tilbury2 port expansion Lower Thames Crossing Other cumulative developments	Tier 1 Tier 2 Various	
Operation and maintenance	Adverse impact on water quality	Tilbury2 port expansion Lower Thames Crossing Other cumulative developments	Tier 1 Tier 2 Various	
Geology, Hydrogeology and Ground Conditions				
Construction	Adverse impact on earthworks in mobilising unexpected ground contamination or creating preferential pathways to groundwater	Tilbury2 port expansion Lower Thames Crossing Demolition of Tilbury B power station Other cumulative developments	Tier 1 Tier 2 Tier 1 Various	No significant cumulative effect on geology, hydrogeology or ground contamination is predicted as construction areas would not overlap and Thurrock Flexible Generation Plant is not considered to represent a significant risk in terms of contaminated soil and/or groundwater.
	Adverse impact of construction activity on soil and groundwater contamination	Tilbury2 port expansion Lower Thames Crossing Demolition of Tilbury B power station Other cumulative developments	Tier 1 Tier 2 Tier 1 Various	
Operation and maintenance	Adverse impact from pollution of soils and/or controlled waters	Tilbury2 port expansion Lower Thames Crossing Urban expansion of Linford and East Tilbury	Tier 1 Tier 2 Tier 2	
Marine Environment				
Construction	Cumulative temporary habitat loss/disturbance may have effects on marine ecology receptors	Tilbury2 port expansion Lower Thames Crossing	Tier 1 Tier 2	No significant cumulative effects of temporary habitat loss/disturbance are predicted due to the relatively small proportion of habitat affected and the high recovery potential for sediments and associated communities. No details of marine infrastructure (e.g. potential new jetty) associated with the Lower Thames Crossing are currently available and therefore it was not possible to undertake a cumulative assessment including this project.
	Cumulative increases in SSC and associated deposition during dredging activities with potential effects on water quality and marine ecology receptors	Tilbury2 port expansion Lower Thames Crossing	Tier 1 Tier 2	No significant cumulative effects of increases in suspended sediments and associated deposition during dredging. Capital dredging for Tilbury2 will have been completed well in advance of dredging activities for the Project. No details of marine infrastructure (e.g. potential new jetty) associated with the Lower Thames Crossing are currently available and therefore it was not possible to undertake a cumulative assessment including this project.

Development Phase	Cumulative Impact	Cumulative Development	Development Tier	Cumulative Effect
	Cumulative impacts on local hydrodynamics and sediment transport	Tilbury2 port expansion Lower Thames Crossing	Tier 1 Tier 2	No significant cumulative effects of changes to hydrodynamic regime and sediment transport are predicted due to the causeway, including the RoRo barge during the construction phase, cumulatively with the Tilbury2 new jerry arrangement. Any cumulative change in flows would not affect sedimentary patterns in the area. No details of marine infrastructure (e.g. potential new jetty) associated with the Lower Thames Crossing are currently available and therefore it was not possible to undertake a cumulative assessment including this project.