East Anglia
Offshore Wind

VATTENFALL

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East Anglia THREE

Chapter 20

Air Quality

Environmental Statement
Volume 1
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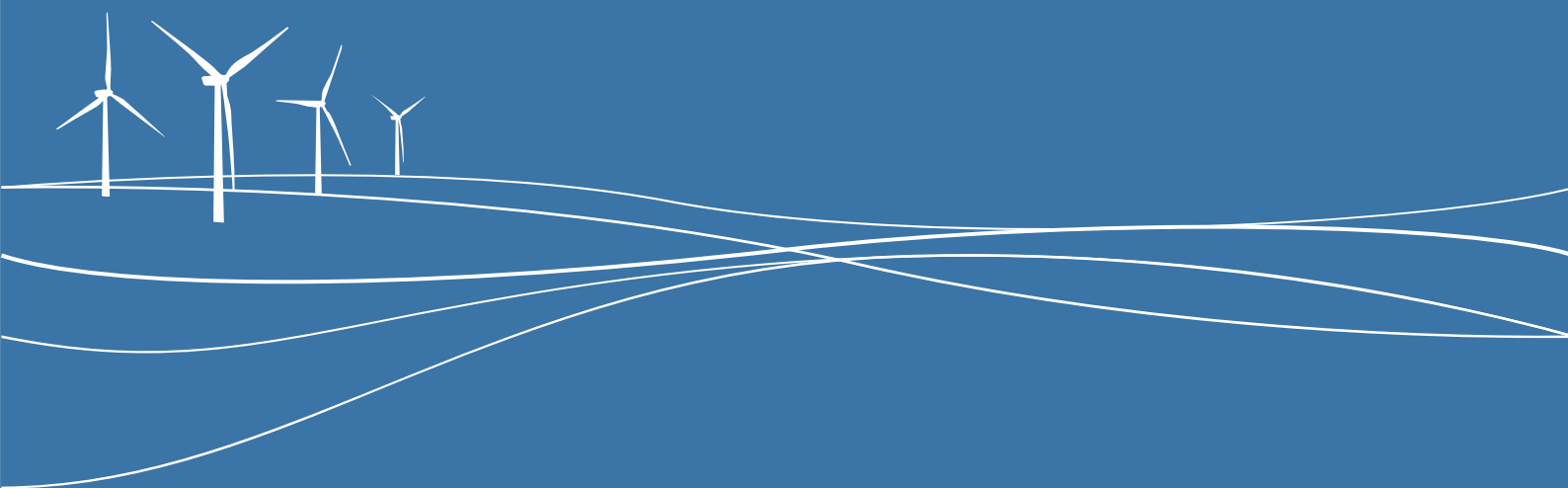

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20 AIR QUALITY

20.1 Introduction

1. This chapter of the Environmental Statement (ES) assesses the potential air quality impacts of the proposed East Anglia THREE project as a result of the onshore electrical transmission works, including impacts associated with the use of temporary access routes and Construction Consolidation Sites (CCS).

2. The potential air quality impacts arising from the construction, operation and decommissioning of the offshore elements of the proposed East Anglia THREE project are considered to be of negligible significance and have been scoped out of this assessment. As a result they are not considered further within this chapter.

3. Figures which complement the text in this chapter are provided in *Volume 2 Figures 20.1, 20.2* and *20.3.*

4. This chapter has cross references with Chapter 27 Traffic and Transport and Chapter 23 Terrestrial Ecology.

20.2 Consultation

5. Consultation undertaken to date is detailed in *Table 20.1.* Scoping opinion was sought from the Planning Inspectorate as part of the Environmental Impact Assessment (EIA) process. The scoping phase concluded that, in terms of onshore impacts, the operation of the proposed East Anglia THREE project would not result in any significant change in vehicle flows to and from the site or introduce new emission sources. The Secretary of State noted that numbers of vehicle movements were not included in the Scoping Report and there were no details of maintenance activities, however it was accepted that the conclusion in respect of potential air quality effects was valid given the nature of the development. The Secretary of State therefore agreed that onshore operational phase air quality impacts could be scoped out from further consideration (Planning Inspectorate 2012).

6. With regard to offshore impacts, it was concluded that the number of construction vessel movements and associated atmospheric emissions would be extremely small in comparison to the total shipping in the southern North Sea. The Planning Inspectorate therefore agreed that offshore construction impacts were not considered to be significant and could be scoped out (Planning Inspectorate 2012).

7. A Preliminary Environmental Information Report (PEIR) was issued to consultees in May 2014. There were no consultation responses received with regard to air quality.

A further round of consultation was held in summer 2015 using a Phase III Consultation Report. One response was received relating to air quality.

8. A list of consultation responses is shown in *Table 20.1.*

Table 20.1 Consultation Responses

Consultee	Date /Document	Comment	Response / where addressed in the ES
Planning Inspectorate	December 2012, Scoping Opinion	Onshore operational impacts and offshore construction and operational impacts could be scoped out for air quality. Only onshore construction phase impacts require assessment	Section 20.6
Ipswich Borough Council (IBC)	March 2014, Response via email	Assessment methodology acceptable for construction phase impacts	Section 20.4
Residents from Henley	June 2014, PEIR Response	Residents from Henley informed EATL that they had been misnaming Mill Road, and it should be "Newbourne Road".	Chapter 27 Traffic and Transport
IBC, Suffolk County Council (SCC), Suffolk Coastal District Council (SCDC)	July 2014, PEIR Response	The OCoCP should provide adequate mitigation for impacts on air quality associated with construction activities, chiefly dust emissions.	Section 20.6.1.1
IBC, SCC, SCDC	July 2014, PEIR Response	With regard to air quality impacts associated with construction traffic, the use of the most recent version of the IAQM Guidance is welcomed and the methodologies used are acceptable. The location of the nearest Air Quality Management Areas (AQMAs) is correct. There has been no further progress in extending the AQMAs in Ipswich to date. The assessment of impact on the current AQMAs concludes that there would no significant deterioration in air quality.	Section 20.4.3.2 Section 20.6.1.2
IBC, SCC, SCDC	July 2014, PEIR Response	As for noise, the accuracy of the air quality assessment with respect to construction traffic and HGV movements is dependent	Chapter 27 Traffic and Transport

Consultee	Date /Document	Comment	Response / where addressed in the ES
		on the accuracy of the traffic assignment. Until all of the queries on that topic have been resolved, it is not possible to determine whether the air quality assessment is acceptable.	
IBC	August 2015, Traffic consultation meeting	The Environmental Health Officer requested additional information on the air quality impacts associated with routing traffic through the Norwich Road / Valley Road air quality management area (AQMA)	Information on the details of the assessment was provided to Ipswich Borough Council, and they have confirmed they are happy with the approach to the assessment. See section 20.4 for the impact assessment methodology.

20.2.1 Statement of Common Ground (East Anglia ONE)

9. The proposed East Anglia THREE project utilises the same onshore cable route and substation location as East Anglia ONE. A Statement of Common Ground (SoCG) specific to the proposed East Anglia THREE project is to be developed in advance of the Development Consent Order (DCO) Examination. Until this point in time, the East Anglia ONE SoCG will be used as a basis for the East Anglia THREE SoCG, and is used as a reference point for the assessment.

10. The SoCG produced for East Anglia ONE for Air Quality was agreed in July 2013. Consultees included Suffolk County Council (SCC), Mid-Suffolk District Council (MSDC), and Suffolk Coastal District Council (SCDC). There were no disagreed matters which relate to this chapter.

11. Agreed matters relating to air quality are detailed in *Table 20.2*.

Table 20.2. Agreed Matters Relating to Air Quality

Section ID	Issue Agreed by SCC, MSDC and SCDC
8.2.1	The parties agree with the results of the assessment of impacts on Air Quality on East Anglia ONE.
8.2.2	It has been agreed that requirement 27 of the Development Consent Order gives the District Councils sufficient control over design to avoid significant

Section ID	Issue Agreed by SCC, MSDC and SCDC
	impacts on Air Quality from East Anglia ONE
8.2.3	It is agreed that there are no other outstanding matters that have not been agreed with respect to Air Quality in relation to the Project Application

20.3 Scope

20.3.1 Study Area

12. As agreed by the Planning Inspectorate, the direct impact study area is limited to the boundary of onshore construction impacts only.

13. Potential impacts associated with the proposed East Anglia THREE project are as follows:

- Construction phase dust emissions; and
- Construction vehicle exhaust emissions.

14. Potential construction phase dust impacts were considered at existing sensitive receptor locations within 350m of the onshore cable route and substation(s) location, and within 50m of the edge of access roads that would be used by construction vehicles, up to 500m from the boundary of the works, in accordance with Institute of Air Quality Management (IAQM) guidance (IAQM 2014).

15. Impacts from construction vehicle exhaust emissions were considered at sensitive receptor locations along site access routes, as detailed within Chapter 27 Traffic and Transport. The study area covers the towns of Wickham Market, Woodbridge, Ipswich, Bramford, Claydon and Needham Market. The primary, main and secondary routes that were considered in the assessment are detailed in *Table 20.3;* these are shown in *Figure 27.2*.

Table20.3 Road Links Considered in the Construction Vehicle Exhaust Emission Assessment

Link ID	Link Description	Link ID	Link Description
1	A14 between the J51 and J52	17	A12 north from the A1152
2	A14 between the J52 and J53	18	B1078 west from the A12
3	A1156 south from J53	19	B1079 between the Stoney Road and A12
4	A14 between the J53 and J55	20	Ipswich Road
5	A12 south from J55	21	B1077 between the B1078 and A1156
6	Paper Mill Lane	22	A1214 west from the A12
7	B1113	23	B1078 between the A140 and B1077

Link ID	Link Description	Link ID	Link Description
9	A14 between the J55 and J56	24	A140 north east of J51
10	A14 between the J56 and J58	25	A14 north of J51
11	A14 south from J58	26	A1152
12	Trimley Road	27	B1083
13	Newbourne Road/Ipswich Road	28	B1438
14	A14 between J58 and Top Street	29	Woodbridge Road/The Street
15	Top Street	30	School Lane/Waldringfield Road
16	A12 between Top Street and the A1152		

20.3.2 Worst Case

16. There are two approaches for the construction of the proposed East Anglia THREE project:

- Single Phase - a single phase (up to 1200MW installed in a single construction period); or
- Two Phased - two phases of up to 600MW each, with the start date of each phase of works separated by no more than 18 months).

17. Ducts (including all horizontal directional drilling (HDD) operations) for the onshore cables for the proposed East Anglia THREE project will be installed during the construction of East Anglia ONE.

18. Therefore, under the Single Phase approach, for construction of the proposed East Anglia THREE project the following works would be required:

- If the short duct method if used at the landfall, a ramp would be required to access the beach;
- Creation of one transition bay compound near to the landfall location;
- Installation of one transition bay compound to connect the offshore shore export cables and the onshore export cables;
- Installation of up to two jointing bays (assuming up to two cables are jointed in each bay) at up to 62 locations along the cable route;
- Creation of one jointing bay construction compound at up to 62 locations along the onshore cable route, each with a hardstanding area of 775m^2 within a compound of 3,740m^2.

- CCS – seven sites covering an aggregated area of up to 1.32ha;
- Access via existing roads and tracks and therefore haul road is required only where joints are placed in remote areas. A maximum of 18.05km of 5.5m width haul road is required. Temporary track matting may be required if ground conditions are very poor;
- Transport to site, cable pulling and jointing at up to 124 (each with 2 cables so 248 joints) jointing bays;
- Installation of up to 248 kiosks for cable maintenance; and
- Up to 300m of open trenching for cables from the end of pre-installed ducts to the substation(s);
- One substation within a 3.04ha compound;
- Up to 235m of open trenching for cables from the substation(s) to ducts pre-installed by National Grid; and
- Reinstatement of land.

19. Under a Two Phased approach the following works would be required:

- If the short duct method if used at the landfall, a ramp would be required to access the beach;
- Creation of two transition bay compounds (one during each Phase) near to the landfall location;
- Installation up to two transition bay compounds (one during each Phase) each to house up to two joints between the offshore export cables and the onshore export cables;
- Creation of two jointing bay construction compounds (one during each Phase) at up to 62 locations along the onshore cable route;
- Installation of up to two jointing bays (assuming two cables are jointed in each bay in each in Phase 1 and two jointed in each bay in Phase 2) at up to 62 locations along the cable route, each with a hardstanding area of 775m^2 within a compound of 3400m^2;
- CCS – seven sites covering an aggregated area of up to 1.32ha;

- Access via existing roads and tracks and therefore haul road is required only where joints are placed in remote areas. A maximum of 18.05km (of 5.5m width) haul road is required. Temporary track matting may be required if ground conditions are very poor. As a worst case scenario, it is assumed that all haul road will be removed and the ground reinstated on completion of Phase 1 and will be replaced and then removed again during Phase 2;
- Transport to site, cable pulling and jointing at up to 124 (62 during Phase 1 and 62 during Phase 2) (each with 2 cables so 248 joints) jointing bays;
- Installation of up to 248 kiosks for cable maintenance; and
- Up to 300m of open trenching for cables from the end of pre-installed ducts to the substation(s);
- Up to two substation(s) within a 3.04ha compound;
- Up to 235m of open trenching for cables from the substation(s) to ducts pre-installed by National Grid; and
- Reinstatement of land.

20. Full details of the Single Phase and Two Phased approaches are provided within Chapter 5 Description of the Development.

21. For each impact, the assessment utilises a worst case approach for both the Single Phase and Two Phased approach to construction described above. The design parameters that constitute worst case vary depending on the potential impact under consideration. *Table 20.4* below details the assumptions used.

22. The final routeing of cables connecting into the substation is not known at the current time. Therefore the pre-installed ducts will end just beyond the western boundary of the screening trees and bunding installed by East Anglia ONE to the east of the East Anglia THREE substation. Therefore the final stretch of cables will be open trenched from the end of the ducts to the substation. This will be a maximum distance of 300m. Likewise, National Grid will install ducts to connect into the existing Bramford substation but these will end at the boundary of the National Grid land, therefore EATL will need to open trench up to the end of these ducts, a distance of up to 235m. In both cases the cables would be laid directly into trenches.

23. As discussed in Chapter 5 Description of the Development (section 5.6.6.2.2) EATL will investigate opportunities to leave haul road in place between projects and/or phases to further minimise impacts, this would be dependent upon the agreement

of individual landowners and the approval of the local authorities. EATL consider that for air quality it would be more disruptive for all receptors to install and remove haul road twice under the Two Phased approach due to the increased vehicle movements necessary, disturbance to the ground and associated noise and dust, than to leave it in situ. In addition, given that locations where haul road would be left in place is dependent upon individual landowner decisions and local authority approval, at this stage it is not possible to determine where this may occur and which receptors would be affected. Therefore, this potential case is not assessed independently as it is considered that the impacts of leaving the haul road in situ between phases falls within the magnitude of effects assessed under the two construction approaches presented.

24. Only those design parameters with the potential to influence the level of impact are identified here. Therefore, if the design parameter is not described in the table below, it is not considered to have a material bearing on the outcome of the assessment.

25. The worst case scenarios identified here are also applied to the cumulative impact assessment (CIA). When the worst case scenarios for the project in isolation do not result in the worst case for cumulative impacts, this is addressed within the cumulative section of this chapter (see section 23.7).

Table 20.4 Worst Case Assumptions

Impact	Key design parameters forming worst case scenario	Rationale
Construction		
Construction Phase Dust Emissions	*Single Phase* • Footprint = area of haul road, maximum 62 x jointing bay construction compounds, 1 x transition bay compound, substation compound and 7 CCS = 37.85ha • Depth of pits to house jointing bays = 2.5m • Permanent area loss at substation(s) compound = 3.04ha • Total spoil = 121,241m^3 from pits to house jointing bays. • Total residual spoil for removal offsite = 4,404m^3 • Material to be stored onsite = 72,480m^3 • Onshore cable route - duration of works = 29 weeks • Haul road – 18.05km	Values provided within Chapter 5 Description of the Development.

Impact	Key design parameters forming worst case scenario	Rationale
	• Substation(s) - duration of works 55 weeks *Two Phased* • Footprint = area of haul road (laid twice), maximum 124 x jointing bay construction compounds, 2 x transition bay compounds, substation(s) compound and 7 CCS = 67.05ha • Depth of pits to house jointing bays = 2.5m • Permanent area loss at substation(s) compound = 3.04ha • Total spoil = 215,586m^3 from pits to house jointing bays • Total residual spoil for removal offsite = 4,404m^3 • Material to be stored onsite = 83,547m^3 • Onshore cable route - duration of works = 29 weeks, a gap of up to 49 weeks then further 29 weeks • Haul road – 18.05km × 2 = 35.6km (assuming removal of haul road after Phase 1 has been completed) • Substation(s) - duration of works 55 weeks, a gap of up to 24 weeks then further 45 weeks	
Construction Vehicle Exhaust Emissions	*Both approaches* • The 24 hour Annual Average Daily Traffic (AADT) flows used in the air quality assessment for 'with development' scenarios	Values provided from Chapter 27 Traffic and Transport, and are detailed within *Appendix 20.2*.
Operation		
Operational phase impacts were scoped out of the assessment		
Decommissioning		
All impacts	*Both approaches* • Buried cables remain in-situ • Dismantling and removal of above ground electrical equipment; • Removal of any building services equipment; • Demolition of the buildings and removal of security fences; • Removal of hard standing; • Removal of kiosks;	Values provided within Chapter 5 Description of the Development.

Impact	Key design parameters forming worst case scenario	Rationale
	• Presence of plant and vehicles (see Chapter 27 Traffic and Transport); and • Landscaping and reinstatement of the site.	

26. Worst-case assumptions regarding the number of construction vehicle movements on site access routes are detailed in Chapter 27 Traffic and Transport.

20.3.3 Embedded Mitigation

27. Mitigation measures which are embedded into the project design and which are relevant to air quality are listed in *Table 20.5*. General mitigation measures are provided first, and apply to all parts of the onshore electrical transmission works. Specific mitigation measures, which apply to the landfall, onshore cable route or substation, are described separately thereafter. An Outline Code of Construction Practice (OCoCP) has been submitted alongside the DCO application. As noted in section 20.2.1 of this chapter, this assessment is based upon the East Anglia ONE assessment and SoCG and as such the embedded mitigation measures below have been utilised, which were taken from the 2006 Greater London Authority and London Councils guidance document. The IAQM released new guidance on the assessment of construction dust impacts in 2014 (IAQM 2014), which was utilised in the assessment of construction dust impacts as a result of the proposed East Anglia THREE project. Mitigation measures specified in the IAQM document have therefore also been recommended, in addition to the embedded mitigation measures in place from East Anglia ONE.

Table 20.5 Embedded Mitigation in relation to Air Quality

Parameter	Mitigation measures embedded into the project design
General	
Construction	Construction and decommission works would be undertaken in accordance with the Greater London Authority and London Councils best practice guidance document (Greater London Authority and London Councils 2006) on controlling emissions from construction sites. Control measures which would be included within final Code of Construction Practice would include: • Effective barriers would be erected around dusty activities or the site boundary; • No bonfires would be allowed on site; • Machinery and dust-generating activities would be located away from sensitive receptors; • No vehicles would be allowed to idle on site; • Vehicles leaving site would be washed if necessary;

Parameter	Mitigation measures embedded into the project design
General	
	• All loads entering and leaving site would be covered; • Runoff of mud and water would be prevented; • All non-road mobile machinery would use ultra-low sulphur diesel where available; • Water would be used as a dust suppressant as appropriate; • Temporarily cover or re-vegetate earthworks if possible; • Skips would be covered and drop heights minimised; • Cutting equipment would have water suppression or suitable local exhaust ventilation systems; • Dust-generating activities would be minimised; and • Stockpiles would be kept in place for the shortest possible time.
Construction	The methods for controlling air quality impacts would be discussed and agreed with the relevant local authorities and pertinent stakeholders through the development of an Air Quality Management Plan (AQMP). Agreement on the scope of an AQMP (as part of the Code of Construction Practice) would be reached to ensure that the potential for adverse environmental effects on local receptors is reduced to an absolute minimum. The AQMP would include measures for controlling dust and general pollution from construction operations, and include details of any monitoring scheme, if appropriate. Controls would be applied throughout the construction period to ensure that emissions are mitigated.
Construction	Agreed methods would be formalised within a Code of Construction Practice, outlining the level of mitigation that would be employed based on the potential risk at any given stage and with regard to receptor sensitivity.
Construction	Public relations would be co-ordinated on site by a designated member of the construction management team. A proactive public relations campaign would maintained, keeping local residents informed of the type and timing of works involved, paying particular attention to potential evening and night time works and activities which may occur in close proximity to receptors. A combination of communication mechanisms such as posters and parish meetings would be employed to keep local residents informed.
Construction	Any dust complaints would be monitored and appropriate mitigation measures implemented, where appropriate.
Landfall	
No embedded mitigation further to the General measures listed above	
Onshore cable route	
No embedded mitigation further to the General measures listed above	
Substation	
No embedded mitigation further to the General measures listed above	

20.5 Assessment Methodology

20.5.1 Legislation, Policy and Guidance

20.5.1.1 Air Quality Legislation

20.5.1.1.1 European Union Directives

28. Air pollution can have adverse effects on the health of humans and ecosystems. European Union legislation forms the basis for UK air quality policy. The European Union Air Quality Framework Directive 96/62/EC on Ambient Air Quality Assessment and Management entered into force in 1996 (European Parliament 1996). Directive 96/62/EC and the first three Daughter Directives were combined to form the new European Union Directive 2008/50/EC (European Parliament 2008) on Ambient Air Quality and Cleaner Air for Europe, which came into force in June 2008.

20.5.1.1.2 United Kingdom Air Quality Strategy

29. The 1995 Environment Act required the preparation of a national Air Quality Strategy which sets air quality standards for specified pollutants. The Act also outlined measures to be taken by local planning authorities in relation to meeting these standards and Objectives, which became the Local Air Quality Management (LAQM) system.

30. The UK Air Quality Strategy was originally adopted in 1997 (Department of Environment 1997) and has been reviewed and updated to take account of the evolving European Union legislation, technical and policy developments and the latest information on health effects of air pollution. The strategy was revised and reissued in 2000 as the Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Department of the Environment, Transport and the Regions 2000). This was subsequently amended in 2003 (DETR 2003) and was last updated in July 2007 (Defra 2007).

20.5.1.1.3 Local Air Quality Management

31. The standards and Objectives relevant to the LAQM framework have been prescribed through the Air Quality (England) Regulations (2000) (HMSO 2000), and the Air Quality (England) (Amendment) Regulations (2002) (HMSO 2002). The European Union Limit Values have been implemented via the Air Quality Standards Regulations (2010), which set out the combined Daughter Directive limit values and interim targets for Member State compliance (HMSO 2010).

32. The current air quality standards and Objectives are presented in *Table 20.6*. Pollutant standards relate to ambient pollutant concentrations in air, set on the basis of medical and scientific evidence of how each pollutant affects human health.

Pollutant Objectives, however, incorporate target dates and averaging periods which take into account economic considerations, practicability and technical feasibility.

33. Where an air quality Objective is unlikely to be met by the relevant deadline, local planning authorities must designate those areas as Air Quality Management Areas (AQMAs) and take action to work towards meeting the Objectives. Following the designation of an AQMA, local planning authorities are required to develop an Air Quality Action Plan (AQAP) to work towards meeting the Objectives and to improve air quality locally.

34. Possible exceedances of air quality Objectives are usually assessed in relation to those locations where members of the public are likely to be regularly present and are likely to be exposed for a period of time appropriate to the averaging period of the objective.

Table 20.6 Air Quality Strategy Objectives (England) for the Purposes of LAQM

Pollutant	Air Quality Objective Concentration	Measured as*	To be Achieved By
Benzene	5 µg.m^{-3}	Annual mean	31/12/2010
1,3 Butadiene	2.25 µg.m^{-3}	Running annual mean	31/12/2003
Carbon Monoxide (CO)	10 mg.m^{-3}	Maximum daily running 8-hour mean	31/12/2003
Lead	0.25 µg.m^{-3}	Annual Mean	31/12/2008
Nitrogen Dioxide (NO_2)	200 µg.m^{-3}	1 hour mean not to be exceeded more than 18 times per year	31/12/2005
	40 µg.m^{-3}	Annual mean	31/12/2005
Particles (PM_{10})	50 µg.m^{-3}	24-hour mean not to be exceeded more than 35 times per year	31/12/2004
	40 µg.m^{-3}	Annual mean	31/12/2004
Particles ($PM_{2.5}$)	25 µg.m^{-3}	Annual mean (target)	2020
	15% cut in annual mean (urban background exposure)	2010 - 2020	
Sulphur Dioxide (SO_2)	350 µg.m^{-3}	1-hour mean not to be exceeded more than 24 times a year	31/12/2004
	125 µg.m^{-3}	24-hour mean not to	31/12/2004

Pollutant	Air Quality Objective Concentration	Measured as*	To be Achieved By
		be exceeded more than 3 times a year	
	266 µg.m^{-3}	15-minute mean not to be exceeded more than 35 times a year	31/12/2005

*The way the Objectives are to be measured is set out in the UK Air Quality (England) Regulations

20.5.1.2 Policy

20.5.1.2.1 National Policy Statements

35. The assessment of potential impacts upon air quality receptors has been made with specific reference to the relevant National Policy Statements (NPS). These are the principal decision making documents for Nationally Significant Infrastructure Projects (NSIP). Those relevant to the proposed East Anglia THREE project are:

- Overarching NPS for Energy (EN-1) (DECC 2011a);
- NPS for Renewable Energy Infrastructure (EN-3) (DECC 2011b); and
- NPS for Electricity Networks Infrastructure (EN-5) (DECC 2011c).

36. The specific assessment requirements for air quality, as detailed in the NPS, are summarised in *Table 20.7* together with an indication of the section of this chapter where each is addressed. Where any part of the NPS has not been followed within the assessment an explanation as to why the requirement was not deemed relevant, or has been met in another manner, is provided.

Table 20.7 NPS Assessment Requirements

NPS Requirements	NPS Reference	ES Reference
Any ES on air emissions will include an assessment of CO_2 emissions, but the policies set out in Section 2 [of EN-1], including the EU ETS, apply to these emissions. The IPC (now Planning Inspectorate) does not, therefore need to assess individual applications in terms of carbon emissions against carbon budgets.	EN-1 paragraph 5.2.2	Not Applicable to Assessment
The ES should describe: • any significant air emissions, their mitigation and any residual effects distinguishing between the project stages and taking account of any significant emissions from any road traffic generated by the project; • the predicted absolute emission levels of the proposed project, after mitigation methods have been applied;	EN-1 paragraph 5.2.7	Section 20.6.

NPS Requirements	NPS Reference	ES Reference
• existing air quality levels and the relative change in air quality from existing levels; • any potential eutrophication impacts.		

37. EN-3 and EN-5 do not specifically include details on the assessment of air quality.

20.5.1.2.2 Local Planning Policy

38. EN-1 states in paragraph 4.1.5 that:

"*Other matters that the IPC may consider important and relevant to its decision-making may include Development Plan Documents or other documents in the Local Development Framework. In the event of a conflict between these or any other documents and an NPS, the NPS prevails for the purposes of IPC decision making given the national significance of the infrastructure*."

39. The East Anglia THREE landfall location, onshore cable route and proposed substation fall within the following Local Authorities' areas of jurisdiction:

- SCDC; and
- MSDC.

40. Additionally, construction vehicle access routes would pass through the following Local Authority boundaries:

- Babergh District Council (BDC); and
- IBC.

41. The current planning policy documents and policies relevant to air quality are detailed in *Table 20.8*.

Table 20.8 Relevant Local Planning Policies

Document	Policy/Guidance	Policy/Guidance Purpose
Suffolk Coastal District Local Plan (2013)	DM23	On residential amenity, the Council will have regard to the following: […] (f) light spillage, air quality and other forms of pollution […] Development will be acceptable where it would not cause an unacceptable loss of amenity to adjoining or future occupiers of the development.
MSDC Core Strategy (2008)	CS4	Pollution: To protect people and the environment from unsafe or unhealthy pollutants. Development that harms the quality of soil or air and/or causes noise, dust, odour or light pollution will be avoided

Document	Policy/Guidance	Policy/Guidance Purpose
		wherever possible. Development proposals will have no adverse effect on water quality.
BDC Core Strategy and Policies (2014)	CS15	Proposals for development must respect the local context and character of the different parts of the district, and where relevant should demonstrate how the proposal addresses the key issues and contributes to meeting the objectives of the this Local Plan. All new development within the district, will be required to demonstrate the principles of sustainable development and will be assessed against the presumption in favour of sustainable development – as interpreted as applied locally to the Babergh context (through the policies and proposals of this Local Plan), and in particular, and where appropriate to the scale and nature of the proposal, should: […] Protect air quality and ensure the implementation of the Cross Street (Sudbury) Air Quality Action Plan is not compromised
IBC Core Strategy and Policies Development Plan Document (2011)	DM26	Development which could lead to significant adverse effects on the amenity or environment of neighbouring uses will not be permitted

20.5.2 Data sources

42. A summary of data sources utilised in the assessment is presented in *Table 20.9.*

Table 20.9 Data Sources Features

Data	Year	Coverage	Confidence	Notes
SCDC Progress Report	2013	SCDC boundary	High	Local monitoring data and baseline information
BDC and MSDC Progress Report	2011	MSDC boundary and BDC boundary	High	Local monitoring data and baseline information
IBC Progress Report	2014	IBC boundary	High	Local monitoring data and baseline information
Department for Environment Food and Rural Affairs (Defra) Local Air Quality Management Technical Guidance	2009	UK	High	Assessment methodology
Defra's LAQM Support Portal	2010	Study area	High	1 x 1km grid pollutant background maps

Data	Year	Coverage	Confidence	Notes
IAQM and Environmental Protection UK	2015	UK	High	Assessment methodology
IAQM	2014	UK	High	Guidance on the assessment of impacts from construction dust

20.5.3 Impact Assessment Methodology

20.5.3.1 Construction Phase Dust Emissions

43. Since the production of the East Anglia ONE ES, new guidance on the assessment of construction dust impacts was issued by the IAQM. Assessment of potential impacts associated with the construction phase was therefore undertaken in accordance with the latest IAQM guidance (IAQM 2014). The terminology differs from the generic impact assessment terminology presented within Chapter 6 Environmental Impact Assessment Methodology.

44. A summary of the assessment process is provided below:

- Construction phase assessment steps:

    1) Screen the need for a more detailed assessment;

    2) Separately for demolition, earthworks, construction and trackout:

        A. Determine potential dust emission magnitude;

        B. Determine sensitivity of the area; and

        C. Establish the risk of dust impacts.

    3) Determine site specific mitigation; and

    4) Examine the residual effects to determine whether or not additional mitigation is required.

45. It should be noted that trackout is defined as the transport of dust and dirt from the construction site onto the public road network. Full details of the assessment methodology are provided in *Appendix 20.1.*

20.5.3.1.1 Sensitivity

46. Definitions of the different sensitivity levels for human and ecological receptors to dust are given in *Table 20.10*. Sensitivity levels are taken from IAQM guidance (IAQM 2014).

Table 20.10 Definitions of the Different Sensitivity Levels for Receptors to Construction Dust

Sensitivity	Sensitivity of People to Dust Soiling	Sensitivity of People to the Health Effects of PM_{10}	Sensitivity of Ecological Receptors
High	Dwellings, museums and other culturally important collections, medium and long-term car parks and car showrooms	Residential properties, hospitals, schools and residential care homes	International or national designation and features affected by dust soiling or locations with dust-sensitive species
Medium	Parks, places of work	Office and shop workers not occupationally exposed to PM_{10}	Locations with important plant species or national designation with features affected by dust soiling
Low	Playing fields, farmland, footpaths, short-term car parks and roads	Public footpaths, playing fields, parks and shopping streets	Local designation where features may be affected by dust deposition

20.5.3.1.2 Magnitude

47. The magnitude of construction phase dust emissions should be defined for each type of activity. These are broken down into four categories: demolition, earthworks, construction and trackout. The dust emission magnitudes can either be small, medium or large and are dependent on the methods of work undertaken and the scale of the activity. It was anticipated that there would be no demolition required as part of the proposed East Anglia THREE project; therefore this was not considered as part of the assessment.

48. The worst case dust emission magnitude and subsequent impacts on human and ecological receptors as a result of the onshore electrical transmission works were defined for each phasing approach as detailed in *Table 20.11*.

Table 20.11 Worst Case Scenario for Construction for Human Receptors and Sensitive Ecological Sites for the Onshore Electrical Transmission Works

Receptor Type	Worst Case Construction Scenario
Human Receptors	The worst case scenario for the maximum cumulative dust emission magnitude as a result of the proposed East Anglia THREE project was identified where a jointing bay is located within a Primary Construction Consolidation Site (PCCS), and where there are 10 – 100 receptors within 50m of a PCCS.
Ecological Receptors	The worst case scenario was identified where a jointing bay is located within 50m of a designated ecological site, such as the Deben Estuary Special Protection Area (SPA), Site of Special Scientific Interest (SSSI) and Ramsar.

49. The worst case scenarios in the construction phase dust emissions assessment were identified from indicative locations for the jointing bays and Primary Construction

Consolidation Site (PCCS), and were used to provide a conservative assessment with regard to dust emission magnitudes and subsequent impacts on human and sensitive ecological sites.

50. The dust emission magnitudes for each activity are detailed in *Table 20.12*.

Table 20.12 Definitions of the Different Magnitudes of Construction Phase Dust Emission

Activity	Criteria used to Determine Dust Emission Magnitude		
	Small	Medium	Large
Earthworks	Total site area <2,500m^2.	Total site area 2,500 – 10,000m^2.	Total site area >10,000m^2.
Construction	Total building volume <25,000m^3.	Total building volume 25,000 – 100,000m^3.	Total building volume >100,000m^3.
Trackout	<10 outward Heavy Goods Vehicle (HGV) trips in any one day. Unpaved road length <50m.	10-50 outward HGV trips in any one day. Unpaved road length 50-100m.	>50 outward HGV trips in any one day. Unpaved road length >100m.

51. As detailed in *Table 20.12,* the IAQM guidance provides broad ranges of the area of a site, the total building volume and the number of outward vehicle trips which are used to determine the dust emission magnitude. The construction activities are similar in terms of volume of material moved, building volume and vehicle movements for the Single Phase and Two Phased approaches of the proposed East Anglia THREE project. Therefore, dust emission magnitudes derived for each scenario were equal.

20.5.3.1.3 Significance

52. The dust emission magnitude should be combined with the sensitivity of the area to determine the risk of impacts prior to mitigation. This is shown in more detail in *Appendix 20.1.* Once appropriate mitigation measures have been identified, the significance of construction phase impacts can be determined. The aim is to prevent significant effects at receptors due to the implementation of effective mitigation.

53. A matrix is not provided in the guidance to determine significance as it is considered that, with the implementation of effective mitigation measures, the residual impacts can be considered to be 'not significant' in accordance with guidance provided by the IAQM.

20.5.3.2 Construction Vehicle Exhaust Emissions

54. Assessment of construction vehicle exhaust emissions was not undertaken for the East Anglia ONE DCO Application, as it was concluded that vehicle movements along construction access routes would not constitute a significant increase in traffic flows.

Review of traffic data provided for the proposed East Anglia THREE project identified road links which would experience a greater increase in traffic flows as a result of construction vehicles. Assessment of construction vehicle exhaust emissions was therefore required.

55. The potential impact of exhaust emissions from construction vehicles accessing the onshore electrical transmission works including access was assessed using the Atmospheric Dispersion Modelling System for Roads (ADMS-Roads) v3.4.2. Emission factors were obtained from the Emission Factor Toolkit v6.0.1 provided by Defra (Defra 2014). The main pollutants of concern for human health as a result of vehicle emissions are annual mean concentrations of NO_2 and PM_{10}. Concentrations of these pollutants were therefore the focus of the ADMS-Roads assessment.

56. The earliest the proposed East Anglia THREE project would be constructed onshore is 2020. The assessment has therefore considered the following:

- Verification / Base year (2013);
- Year of Construction (2020) 'without proposed East Anglia THREE project';
- Year of Construction (2020) 'with Single Phase';
- Year of Construction (2020) 'with Two Phased – Phase 1';
- Year of Construction (2023) 'without proposed East Anglia THREE project'; and,
- Year of Construction (2023) 'with Two Phased – Phase 2'.

57. 24 hour Annual Average Daily Traffic (AADT) flows and HGV percentages were provided by Royal HaskoningDHV, the transport consultants for the proposed East Anglia THREE project. The traffic data used in the assessment is detailed in *Appendix 20.2*.

58. Traffic speeds were included in the air dispersion modelling as follows:

- Queues were modelled at junctions where traffic lights were present and on the entry to roundabouts and were modelled at 5kph; and
- Speed data for free-flowing traffic conditions were provided by Royal HaskoningDHV's transport consultants see Chapter 27 Traffic and Transport.

59. The IAQM and Environmental Protection UK (EPUK) (IAQM and EPUK 2015) guidance document states that only road links that experience an increase of greater than 500 vehicles per day (100 within an AQMA) or 100 HGVs per day (25 within an AQMA)

require assessment. As such, sensitive receptor locations were identified on the affected links only. Road links which experience increases in vehicle numbers and HGVs in exceedance of the criteria are detailed in *Table 20.17* for each approach.

Table 20.17 Affected road links

Link ID	2020 With Single Phase		2020 With Two Phased – Phase 1		2023 With Two Phased – Phase 2	
	No. of vehicles generated by development		No. of vehicles generated by development		No. of vehicles generated by development	
	Total Vehicles	HGVs	Total Vehicles	HGVs	Total Vehicles	HGVs
1	-	216	-	202	-	202
2	-	355	-	336	-	335
3	146	82	128	82	128	82
4	-	331	-	312	-	310
5	547	432	-	404	-	403
6	-	309	-	288	-	286
7	-	206	-	56	-	-
9	-	417	-	387	-	387
10	-	417	-	387	-	387
11	-	124	-	119	-	119
14	630	463	551	425	551	425
15	716	430	619	400	619	400
16	-	154	-	180	-	180
19	-	110	-	136	-	136
25	-	211	-	197	-	196
30	-	112	-		-	-

60. 2013 meteorological data from the Wattisham recording station was used in the ADMS-Roads model. This is the closest, most representative recording station to the development site.

61. Model verification is the process of adjusting model outputs to improve the consistency of modelling results with respect to available monitored data. In this assessment, model uncertainty was minimised following Defra (Defra 2009) and EPUK (EPUK 2010) guidance. There was one NO_2 diffusion tube located on the considered road network with available data for 2013. This diffusion tube is location 16, operated by Ipswich Borough Council, situated within the Norwich Road / Valley Road AQMA. This diffusion tube was therefore used in the derivation of the adjustment factor utilised in the assessment. Details of the model verification process are provided in *Table 20.18*.

Table 20.18 Model Verification

Model Verification	NO_2 Diffusion Tube Monitoring Location - 16
2013 Monitored Total NO_2 ($\mu g.m^{-3}$)	35.7
2013 Background NO_2 ($\mu g.m^{-3}$)	19.37
Monitored Road Contribution NOx (total - background) ($\mu g.m^{-3}$)	35.92
Modelled Road Contribution NOx (excludes background) ($\mu g.m^{-3}$)	25.59
Ratio of Monitored Road Contribution NOx / Modelled Road Contribution NOx	1.40
Adjustment Factor for Modelled Road Contribution	**1.40**
Adjusted Modelled Road Contribution NOx ($\mu g.m^{-3}$)	35.92
Modelled Total NO_2 (based on empirical NOx / NO_2 relationship) ($\mu g.m^{-3}$)	35.7
Monitored Total NO_2 ($\mu g.m^{-3}$)	35.7
% Difference [(modelled - monitored) / monitored] x 100	0.00

62. Oxides of nitrogen (NO_x) concentrations were predicted using the ADMS-Roads model. The modelled road contribution of NO_x at the identified receptor locations was then converted to NO_2 using the NO_x to NO_2 calculator (v4.1) (Defra 2014), in accordance with Defra guidance (Defra 2009).

63. The ADMS-Roads assessment requires the derivation of background pollutant concentration data that are factored to the year of assessment, to which contributions from the assessed roads are added. Background NO_2 and PM_{10} concentrations were therefore obtained for the 1km x 1km grid squares covering the proposed East Anglia THREE project onshore cable route and substation area and receptor locations for 2013, 2020 and 2023.

64. Defra guidance sets out the method for the calculation of the number of days in which the PM_{10} 24 hour Objective is exceeded, based on a relationship with the predicted PM_{10} annual mean concentration. The calculation utilised in the prediction of short-term PM_{10} concentrations was:

$$\textit{No. 24-hour mean exceedances} = -18.5 + 0.00145 \times \textit{annual mean}^3 + (206/\textit{annual mean})$$

65. Research projects completed on behalf of Defra and the Devolved Administrations (Laxen and Marner 2003) (AEAT 2008) concluded that the hourly mean NO_2 Objective is unlikely to be exceeded if annual mean concentrations are predicted to be less than $60\mu g.m^{-3}$. This value was therefore used as an annual mean equivalent threshold to evaluate likely exceedance of the hourly mean NO_2 Objective.

20.5.3.2.1 Sensitivity

66. The sensitivity of a receptor is not considered in the assessment of air quality impacts; the air quality Objectives in *Table 20.6*, which are health-based, only apply at locations where there is relevant public exposure as detailed in *Table 20.19.*

Table 20.19 Examples of where the air quality Objectives should/should not apply

Averaging Period	Objectives Should Apply At:	Objectives Should Generally Not Apply At:
Annual Mean	All locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, care homes etc	Building facades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
24-Hour Mean and 8-Hour Mean	All locations where the annual mean Objective would apply. Kerbside sites (for example, pavements of busy shopping streets)	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
1-Hour Mean	All locations where the annual mean and 24 and 8-hour mean Objectives apply. Kerbside sites (for example, pavements of busy shopping streets). Those parts of car parks, bus stations and railway stations etc which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more. Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer.	Kerbside sites where the public would not be expected to have regular access.

67. Sensitive receptor locations that experience pollutant concentrations close to, or in exceedance of the Objectives experience a larger impact magnitude with a smaller change in pollutant concentrations, as detailed below.

20.5.3.2.2 Magnitude and Significance

68. Guidance is provided by the IAQM and EPUK (IAQM and EPUK 2015) on determining the significance of a project's impact on local air quality. The guidance was

developed specifically for use in planning and assessing air quality impacts associated with mixed-use and residential developments. However, the criteria detailed below were utilised in the assessment to provide consideration of the impacts associated with the proposed East Anglia THREE Project.

69. *Table 20.20* details the impact descriptors that take account of the magnitude of changes in pollutant concentrations, and the concentration in relation to the air quality Objectives. The guidance recommends that the assessment of significance of effect will need to take into account the following factors:

- The existing and future air quality in the absence of the project;
- The extent of current population exposure to the impacts; and
- The influence and validity of any assumptions adopted when undertaking the prediction of impacts.

70. The guidance also states that a judgement of the significance should be made by a competent professional who is suitably qualified. This air quality assessment and determination of the significance of the proposed East Anglia THREE project on local air quality was undertaken by members of the IAQM.

Table 20.20 Impact descriptors for individual receptors

Long term average concentration at receptor in assessment year	% Change in Concentration Relative to the Air Quality Objective			
	1	2 - 5	6 - 10	>10
75% or less of Objective	Negligible	Negligible	Slight	Moderate
76 - 94% of Objective	Negligible	Slight	Moderate	Moderate
95 - 102% of Objective	Slight	Moderate	Moderate	Substantial
103 - 109 of Objective	Moderate	Moderate	Substantial	Substantial
110% or more of Objective	Moderate	Substantial	Substantial	Substantial

Note: Figures are to be rounded up to the nearest round number. Any value less than 1% after rounding (effectively less than 0.5%) will be described as "Negligible".

20.5.3.3 Critical Loads for Ecological Habitats

71. Critical loads (CLs) for habitat sites in the UK are published on the Air Pollution Information System (APIS) website (Centre for Ecology and Hydrology 2015). These are the maximum levels of nutrient nitrogen that can be tolerated without harm to the most sensitive features of these habitat sites.

72. The project ecologists were consulted on the likely habitats present in the vicinity of affected roads, where nutrient nitrogen deposition may impact upon designated features. The most relevant habitat to the Stour and Orwell Estuaries Special Protection Area (SPA) and Orwell Estuary Site of Special Scientific Interest (SSSI) is littoral sediment (pioneer, low to mid and mid to upper saltmarshes), which is the habitat of the black-tailed godwit, avocet, European golden plover, Eurasian curlew, great-crested grebe, dark-bellied brent goose, Eurasian wigeon and pied avocet. These features are all sensitive to nutrient nitrogen deposition on their broad habitat. The CL for nutrient nitrogen deposition on littoral sediment is 20 to 30kgNha^{-1}yr^{-1}.

20.5.4 Cumulative Impact Assessment

73. For a general introduction to the methodology used for the cumulative impact assessment, please refer to Chapter 6 Environmental Impact Assessment Methodology. This chapter focuses on those cumulative impacts that are specific to air quality.

74. For further details of the methods used for the cumulative impact assessment for air quality, see section 20.7.

20.5.5 Transboundary Impact Assessment

75. There are no transboundary implications with regard to local air quality.

20.6 Existing Environment

20.6.1 Local Air Quality Management

20.6.1.1 MSDC

76. A review of MSDC's latest review and assessment report (MSDC and BDC 2011) has identified that there are no AQMAs currently designated within the district. This is likely due to the fact that land-use in the district is predominately rural.

20.6.1.2 SCDC

77. A review of SCDC's latest review and assessment report (SCDC 2013) has identified that two AQMAs have been declared for elevated NO_2 levels. The closest AQMA to the onshore cable route is at Lime Kiln Quay Road and St John's Street in Woodbridge, which is situated approximately 1.8km north-east of the onshore cable route.

20.6.1.3 BDC

78. A review of the latest review and assessment report for BDC (MSDC and BDC 2011) showed that there is currently one AQMA designated for exceedances of the annual

mean NO_2 Objective in Sudbury. The AQMA is located approximately 26km west of the onshore cable route and is not situated along a construction access route.

20.6.1.4 IBC

79. A review of IBC's latest review and assessment report (IBC 2014) showed that there are currently four AQMAs within the borough, all within Ipswich town centre, that have been declared for exceedances of the annual mean Objective for NO_2. It is anticipated that all four AQMAs will be merged to form one large town centre-wide AQMA in the near future due to monitored exceedances of the Objective outside the existing designations. The closest AQMA to the onshore cable route is at the Norwich Road/Valley Road junction in Ipswich, which is situated approximately 3.7km south of the onshore cable route. The proposed site access routes pass through the Norwich Road/Valley Road AQMA, along the A1156 and A1214.

20.6.2 Air Quality Monitoring

80. NO_2 diffusion tube monitoring is undertaken by IBC across the borough. There is one diffusion tube, tube 16, located on Valley Road which is within an AQMA and is along one of the site access routes. Recent monitoring results from tube 16 are detailed in *Table 20.21*.

Table 20.21 Relevant NO_2 diffusion tube results from IBC

Tube ID	Location	X	Y	Monitored NO_2 Concentration ($\mu g.m^{-3}$)				
				2009	2010	2011	2012	2013
16	Valley Road/Norwich Road	615361	245436	40.0	41.9	38.7	35.2	35.7

81. As shown in *Table 20.21*, NO_2 concentrations exceeded the annual mean Objective of $40\mu g.m^{-3}$ in 2009 and 2010. This is consistent with the AQMA designation, although more recent measurements indicate concentrations below the Objective.

20.6.3 Background Concentrations

20.6.3.1 Human Receptor Locations

82. Background concentrations of NO_2 and PM_{10} were obtained from the air pollutant concentration maps provided by Defra (Defra, 2015a) for the grid squares covering the onshore electrical transmission works and sensitive receptor locations. The background concentrations for 2013, 2020 and 2023 for identified sensitive receptor locations are detailed in *Table 20.22*.

Table 20.22 Background Pollutant Concentrations (µg.m^{-3}) Obtained for 1km x 1km Grid Squares Covering Sensitive Receptor Locations

Grid Square	Receptors	2013		2020		2023	
		NO_2	PM_{10}	NO_2	PM_{10}	NO_2	PM_{10}
615500, 245500	R1, R20, R22, R23	19.37	17.73	15.89	16.57	15.46	16.37
612500, 251500	R2	16.38	20.06	11.94	18.93	11.48	18.73
613500, 249500	R3	15.81	20.07	11.96	18.96	11.54	18.78
613500, 241500	R4	17.70	20.44	12.71	19.30	12.19	19.08
626500, 248500	R5	13.65	16.42	11.08	15.45	10.77	15.22
626500, 249500	R6. R7	14.84	17.98	11.86	16.98	11.46	16.76
622500, 249500	R8	11.51	16.53	9.23	15.62	8.96	15.39
625500, 248500	R9	14.78	17.24	11.66	16.23	11.25	16.01
625500, 247500	R10	14.36	17.32	11.47	16.32	11.12	16.10
627500, 247500	R11	13.14	17.18	10.85	16.24	10.59	16.01
624500, 246500	R12	16.24	17.17	12.97	16.09	12.57	15.87
624500, 244500	R13	15.93	17.98	12.76	16.93	12.38	16.71
627500, 238500	R14, R15	17.24	17.97	13.93	16.95	13.59	16.73
619500, 240500	R16	18.77	18.20	15.35	17.13	14.99	16.91
612500, 240500	R17	14.20	18.72	10.88	17.70	10.51	17.48
613500, 246500	R18	17.95	18.91	13.54	17.78	13.08	17.57
612500, 248500	R19	15.70	18.28	12.99	17.25	12.66	17.07
625500, 247500	R21	14.36	17.32	11.47	16.32	11.12	16.10
623500, 250500	R24	11.69	17.12	9.39	16.20	9.12	15.97
625500, 249500	R25	13.11	17.47	10.49	16.51	10.18	16.29
626500, 250500	R26	14.16	18.17	11.09	17.18	10.66	16.97
621500, 249500	R27	12.16	17.64	9.82	16.72	9.55	16.49
610500, 254500	R28	17.75	21.34	12.09	20.17	11.50	19.97
613500, 249500	R29	15.81	20.07	11.96	18.96	11.54	18.78
616500, 246500	R30	17.21	17.47	14.15	16.41	13.82	16.19

83. As shown in Table 20.22, backgrounds at all sensitive receptor locations are below the annual mean Objectives for NO_2 and PM_{10}.

20.6.3.2 Ecological Receptor Locations

84. Background nitrogen deposition rates for the Stour and Orwell Estuary SPA and Orwell Estuary SSSI were obtained from Defra (Defra, 2015b). The Design Manual for Roads and Bridges (DMRB) methodology (Highways Agency 2009) advises that the background concentrations obtained from APIS should be reduced by 2% per year to estimate deposition for the assessment years. The background concentrations obtained from Defra for 2012 and the reduced concentrations to 2020 and 2023 levels are detailed in *Table 20.23*.

Table 20.23 Background NO_2 and Nutrient Nitrogen Deposition Rates

Parameter	2012	2020	2023
NO_2 deposition	1.48	1.24	1.21
Nutrient nitrogen dry deposition	15.10	12.68	12.31

20.6.4 Nutrient Nitrogen Deposition

85. An assessment of nutrient nitrogen deposition, as a result of road traffic associated with the construction phase, was undertaken in accordance with DMRB guidance (Highways Agency, 2007). The guidance states that designated ecological sites within 200m of roads predicted to experience an increase in total vehicles of 1000 AADT or more or 200 HGVs AADT or more must be assessed to determine whether there are any impacts as a result of nutrient nitrogen deposition.

86. There are two designated ecological sites, the Stour and Orwell Estuary SPA and Orwell Estuary SSSI, within 200m of Link 9, the A14. This road link is anticipated to experience an increase in HGVs of more than 100 AADT in the Single Phase and Two-Phased approaches.

87. ADMS-Roads was utilised to predict concentrations of NO_2 within the ecological sites. The total deposition of nutrient nitrogen onto sensitive habitats within the designated sites was calculated using the methodology provided in the DMRB guidance document (Highways Agency, 2007).

88. The assessment steps are as follows:

- Identify sensitive ecological sites within 200m of affected roads;
- Obtain background nitrogen deposition values from the APIS website (Centre for Ecology and Hydrology, 2015);
- Obtain background NO_2 concentrations from Defra (Defra, 2015);
- Model NO2 concentrations in a transect up to 200m from the road;
- Estimate the dry deposition of NO_2 using the equation $1\mu g.m^{-3}$ $NO_2 = 0.1$ $kgNha^{-1}yr^{-1}$;
- Determine the road increment to NO_2 dry deposition by deducting the background concentration from the total concentration. Add the road increment to the background nutrient nitrogen deposition rate; and
- Compare to critical loads.

20.6.5 Identification of Receptor Locations

20.6.5.1 Human Receptor Locations

89. The sensitive receptor locations were selected based on their proximity to road links affected by the proposed East Anglia THREE project, where the potential effect of

project-related traffic emissions on local air pollution would be most significant. The sensitive receptor locations are presented in *Table 20.24* and are shown in *Figure 20.3.*

Table 20.24 Human Receptor Locations

Receptor Number	Location	Road Link Receptor is Located On	Grid Reference X	Y
R1	Valley Road, Ipswich	3	615384	245448
R2	The Crescent, Barham	1	612442	251252
R3	Paper Mill Lane, Clayton	2	613043	249233
R4	Grove Cottages, Grove Hill, Ipswich	9	613598	241604
R5	Cumberland Street, Woodbridge	28	626867	248712
R6	Grove Road, Woodbridge	16, 29	626039	249378
R7	Hasketon Road, Woodbridge	16	626098	249723
R8	Westholme, the Green, Grundisburgh	20	622436	251019
R9	Crane Close, Woodbridge	28	625737	248082
R10	Top Street, Martlesham	15	625349	247701
R11	Oakley, Woodbridge Road, Newbourne	13	627242	243808
R12	Woodman's Place, Martlesham Heath	22, 14	624080	246226
R13	Lancaster Drive, Martlesham Heath	14	624780	244648
R14	Kirton Road, Trimley St. Martin, Felixstowe	11, 12	627428	238188
R15	Kirton Road, Trimley St Martin, Felixstowe	11, 12	627530	238146
R16	Hollowtree Scout Campe Site, Nacton, Ipswich	10	619306	240895
R17	Oakfield Cottage, Oakfield Road, Copdock	6	612007	240884
R18	Morgan Drive, Ipswich	4	613347	246232
R19	The Common, Little Blakenham	7	612032	248790
R20	Norwich Road, ipswich	3	615250	245537
R21	Sonia, the Street, Martlesham	30	625315	247442
R22	Valley Road, Ipswich	3	615442	245534
R23	Norwich Road	3	615236	245505
R24	Hill House, Woodbridge Road, Grundisburgh	19	623026	250562
R25	Grundisburgh Road, Hasketon, Woodbridge	19	625719	249354
R26	Barton Road, Woodbridge	16	626857	250410
R27	Ipswich Road, Culpho	20	621155	249114
R28	Pippins, Kettle Lane, Creetin St.Mary	24, 25	610695	254248
R29	Lime Kiln Close, Claydon	1, 2, 6, 7	613019	249543
R30	Valley Road, Ipswich	3, 21, 22	616748	246166

20.6.5.2 Ecological Receptor Locations

90. As detailed in Section 20.5.4, the DMRB methodology for the assessment of nutrient nitrogen deposition on designated sites as a result of road traffic emissions requires the prediction of NO_2 concentrations in a transect up to 200m from the road.

91. Transects to the north and south of the A14 bridge that crosses the Stour and Orwell Estuaries SPA and Orwell Estuary SSSI were included within the dispersion model. The transects included receptor locations at the roadside and at 10m intervals from the road, up to 200m. The transects are shown in *Figure 20.3.*

20.6.6 Baseline Assessment

92. The ADMS-Roads model was used to estimate contributions of construction vehicle exhaust emissions to annual and short term NO_2 and PM_{10} concentrations for the 'baseline' and 'without proposed East Anglia THREE project' scenarios considered in the assessment.

93. The 24-hour AADT flows used in the assessment for 'without proposed East Anglia THREE project' scenarios are detailed in Section 20.4.3.2. *Table 20.25* details the results of the baseline assessment.

Table 20.25 Predicted Baseline NO_2 and PM_{10} Annual Mean Concentrations ($\mu g.m^{-3}$) at Sensitive Receptor Locations

Receptor Number	Base 2013		2020 'Without proposed East Anglia THREE project'		2023 'Without proposed East Anglia THREE project'	
	NO_2 ($\mu g.m^{-3}$)	PM_{10} ($\mu g.m^{-3}$)	NO_2 ($\mu g.m^{-3}$)	PM_{10} ($\mu g.m^{-3}$)	NO_2 ($\mu g.m^{-3}$)	PM_{10} ($\mu g.m^{-3}$)
R1	31.88	18.69	24.09	17.39	22.64	17.26
R2	31.86	21.73	20.41	20.37	18.14	20.20
R3	23.26	20.82	15.92	19.60	14.63	19.43
R4	24.96	21.19	16.58	19.94	15.22	19.74
R5	17.92	16.93	13.83	15.94	13.04	15.73
R6	30.10	19.30	21.59	18.14	19.44	17.94
R7	24.71	19.23	17.86	18.17	16.35	17.99
R8	13.98	16.77	10.74	15.83	10.22	15.61
R9	19.51	17.80	14.70	16.75	13.76	16.55
R10	19.08	17.85	14.50	16.81	13.62	16.60
R11	14.16	17.28	11.38	16.32	11.02	16.10
R12	23.26	17.93	17.30	16.80	16.25	16.63
R13	22.71	18.73	16.00	17.57	15.01	17.36
R14	30.57	19.35	20.50	18.14	18.58	17.94
R15	26.70	18.92	18.53	17.77	17.08	17.57
R16	28.25	19.21	20.39	17.99	18.93	17.78
R17	20.49	19.37	14.34	18.25	13.24	18.04
R18	29.20	20.12	19.72	18.82	17.97	18.63
R19	19.29	18.59	14.66	17.52	13.98	17.35
R20	30.59	18.59	23.20	17.31	21.85	17.17
R21	17.79	17.71	13.66	16.68	12.92	16.47
R22	24.84	18.35	19.30	17.15	18.44	17.01
R23	28.16	18.40	21.58	17.15	20.43	16.99
R24	14.09	17.35	10.86	16.40	10.34	16.18
R25	16.07	17.76	12.31	16.77	11.69	16.56
R26	18.50	18.57	13.72	17.55	12.79	17.34
R27	14.80	17.90	11.45	16.94	10.89	16.72
R28	27.38	22.12	17.05	20.82	15.30	20.63
R29	32.97	21.50	21.09	20.18	18.58	20.01
R30	23.38	18.08	18.06	16.98	17.31	16.83

94. The results of the air quality assessment for the base year (2013), and year of construction 'without proposed East Anglia THREE project' (2020 and 2023) scenarios show that concentrations of NO_2 and PM_{10} are below the annual mean air quality Objectives of 40µg.m^{-3} at all identified receptor locations.

95. In accordance with Defra guidance (Defra 2009), it may be assumed that exceedances of the 1-hour mean Objective for NO_2 are unlikely as the predicted annual mean concentrations are less than 60µg.m^{-3}.

96. The short term PM_{10} Objective is predicted to be met at all identified receptor locations with less than 35 exceedances of the daily mean Objective of 50µg.m^{-3}.

20.7 Potential Impacts

97. Potential impacts from the proposed East Anglia THREE project may arise from:

- Construction phase dust emissions; and
- Construction vehicle exhaust emissions.

98. As agreed with the Secretary of State (Planning Inspectorate 2012), impacts from the onshore operational phase and offshore construction and operational phases were not likely to be significant and were therefore not considered in the assessment.

20.7.1 Potential Impacts During Construction

20.7.1.1 Construction Phase Dust Emissions

99. A qualitative assessment of construction phase dust and PM_{10} emissions was carried out in accordance with the latest IAQM guidance (IAQM 2014). Full details of the methodology and dust assessment undertaken are provided in *Appendix 20.1*.

100. The construction works associated with the proposed development have the potential to impact on local air quality conditions as described below:

- Dust emissions generated by excavation, construction and earthwork activities associated with the construction of the proposed development, have the potential to cause nuisance to, and soiling of, sensitive receptors.
- Emissions of exhaust pollutants, especially NO_2 and PM_{10} from construction traffic on the local road network, have the potential to impact upon local air quality at sensitive receptors situated adjacent to the routes utilised by construction vehicles.

- Emissions of NO_2 and PM_{10} from non-road mobile machinery (NRMM) operating within the proposed development site, have the potential to impact local air quality at sensitive receptors in close proximity to the works.

101. If construction operations were un-mitigated, the effects of dust during dry and windy conditions could lead to an increase in the 24-hour mean PM_{10} concentration immediately surrounding the proposed development site. However, the maximum background PM_{10} concentration, for the 1km x 1km grid squares covering the study area, is 20.44µg.m^{-3} in 2013 based on 2010 mapped background estimates. Therefore, the mapped background concentrations are 'well below' the annual mean PM_{10} Objective of 40µg.m^{-3}. It is highly unlikely that the short-term construction operations would cause the annual mean or short-term Objectives to be exceeded within the vicinity of the proposed East Anglia THREE project.

102. A qualitative assessment of construction phase dust and PM_{10} emissions was carried out in accordance with the IAQM guidance (IAQM 2014).

103. Particulate matter emissions during the construction phase of the proposed East Anglia THREE project would arise from the 62 jointing bay locations, the seven CSS', the substation site and unpaved haul roads along the onshore cable route. Therefore the worst case scenario from dust and fine particulate matter emissions arising from these individual sites from the construction phase was considered.

20.7.1.1.1 Step 1: Screen the Need for a Detailed Assessment

104. The IAQM guidance states that a Detailed Assessment is required if there are human receptors located within 350m and ecological receptors within 50m of the site boundary. It was assumed that a jointing bay would be located within 50m of the Deben Estuary SPA, SSSI and Ramsar site. Human receptors are also present at many locations within 350m of the onshore electrical transmission works. A Detailed Assessment is therefore required.

20.7.1.1.2 Step 2A: Define the Potential Dust Emission Magnitude

105. The IAQM guidance recommends that the dust emission magnitude is determined for demolition, earthworks, construction and trackout. As there would be no demolition undertaken as part of the proposed East Anglia THREE project, it was not considered in the assessment.

106. The potential dust emission magnitude for the proposed development site was determined using the criteria detailed in *Table A1* of *Appendix 20.1*. The dust emission magnitudes were determined from the worst case scenarios identified in *Table 20.11* and detailed in *Table 20.26* below.

Table 20.26 Defined Dust Emission Magnitudes Associated for Each Construction Activity for the Onshore Electrical Transmission Works

Construction Activity	Human Receptors	Ecological Receptors
Earthworks	The total site area associated with the PCCS and jointing bay is larger than 10,000m^2. Therefore the dust emission magnitude was considered to be large.	The total site area associated with a jointing bay is between 2,500 and 10,000m^2. Therefore the dust emission magnitude was considered to be medium.
Construction	The total building volume associated with the PCCS and jointing bay is likely to be less than 25,000m^3, therefore the dust emission magnitude was considered to be small.	The total building volume associated with a jointing bay is likely to be less than 25,000m^3, therefore the dust emission magnitude was considered to be small.
Trackout	There are likely to be more than 50 outward HGV trips from the PCCS and jointing bay. The dust emission magnitude was therefore considered to be large.	There are likely to be less than 50 outward HGV trips from a jointing bay and the unpaved road length is likely to be less than 50m. Therefore the dust emission magnitude was considered to be small.

107. The dust magnitudes for earthworks, construction and trackout are summarised for each worst case area in *Table 20.27.*

Table 20.27 Dust Emission Magnitudes for the Onshore Electrical Transmission Works

Activity	Dust Emission Magnitude for Worst Case Scenario for Human Receptors	Dust Emission Magnitude for Worst Case Scenario for Ecological Receptors
Earthworks	Large	Medium
Construction	Small	Small
Trackout	Large	Small

20.7.1.1.3 Step 2B: Define the Sensitivity of the Area

108. The sensitivity of the area to dust soiling, impacts on human health and ecological effects was determined using the criteria in *Table A3* to *Table A5* of *Appendix 20.1*. *Figure 20.2* details the distance bands from the site boundary used in determining the sensitivity of the area. The sensitivity of the area is defined as:

Sensitivity of People to Dust Soiling

- Earthworks and Construction: There are 10 - 100 receptors within 50m of the PCCS and jointing bay. The sensitivity is therefore medium; and
- Trackout: There are greater than 100 receptors within 50m of the PCCS, jointing bay and haul roads. The sensitivity is therefore medium.

Sensitivity of People to Health Effects of PM_{10}

- Earthworks and Construction: The highest annual mean background PM_{10} concentration across the study area is less than 24µg.m^{-3} and there are 10 - 100 receptors within 50m from the PCCS and jointing bay. The sensitivity is therefore low; and
- Trackout: There are 10 - 100 receptors within 50m from the PCCS, jointing bay and unpaved roads. The sensitivity is therefore low.

Sensitivity of Ecological Receptors

- Earthworks and Construction: The sensitivity is considered to be medium as a jointing bay is located within 50m of the Deben Estuary SSSI; and
- Trackout: The sensitivity is considered to be medium as a jointing bay is located within 50m of the Deben Estuary SSSI.

109. The sensitivity of the area to dust soiling, human health and ecological sites for each activity is summarised in *Table 20.28* and shown on *Figure 20.1.*

Table 20.28 Sensitivity of the Area to Each Activity

Potential Impact	Sensitivity of the Surrounding Area		
	Earthworks	Construction	Trackout
Dust Soiling	High	High	High
Human Health	Low	Low	Low
Ecological Sites	Medium	Medium	Medium

20.7.1.1.4 Step 2C: Define the Risk of Impacts

110. The dust emission magnitude and sensitivity of the area are combined and the risk of impacts determined using *Tables A6-A8* in *Appendix 20.1*. The risks for dust soiling, human health and ecological sites are shown in *Table 20.29*.

Table 20.29 Risk of Dust Impacts

Potential Impact	Dust Risk		
	Earthworks	Construction	Trackout
Dust Soiling	High Risk	Low Risk	Medium Risk
Human Health	Low Risk	Negligible	Low Risk
Ecological Sites	Medium Risk	Low Risk	Low Risk

111. It should be noted that the proposed East Anglia THREE project would employ embedded mitigation measures relating to construction dust. The IAQM construction dust assessment methodology does not include the consideration of embedded mitigation measures when determining the potential risk of dust impacts.

112. Implementation of embedded mitigation measures would ensure that the risk of dust impacts is lower than those identified in *Table 20.29*. Embedded mitigation measures are detailed in *Table 20.5*.

113. Step 3 of the IAQM guidance identifies the appropriate good practice mitigation measures required based on the findings of Step 2 of the assessment methodology. Step 2 of the dust assessment determined that the greatest risk of impacts was 'high risk' resulting from construction activities without the implementation of mitigation measures.

114. The recommendations detailed below are taken from the IAQM guidance document, and are considered to be 'highly recommended' by the IAQM for sites with a high risk of dust impacts. The measures below would be undertaken in addition to those measures included as embedded mitigation within the scheme. The measures below would be considered and where appropriate incorporated into a CoCP, to be agreed with the local planning authority prior to construction commencing.

Communications:

- Display the name and contact details of person(s) accountable for air quality and dust issues at suitable positions along the site boundary. This would generally be the environment manager/engineer or the site manager.
- Display the head or regional office contact information.

Dust Management:

- Make the complaints log available to the local authority when asked.
- Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book.
- It is not expected that there would be other high risk construction sites within 500m of the site boundary. However, if any are identified, liaison should be undertaken with the sites to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes.

- Where works are ongoing, undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to note any dust deposition, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces, subject to landowner approval where necessary, such as street furniture, cars and window sills within 100m of site boundary.
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- Cover, seed or fence stockpiles to prevent wind whipping.
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
- Produce a Traffic Management Plan to manage the sustainable delivery of goods and materials and implement a Travel Plan that supports and encourages sustainable travel for contractor operatives and staff (public transport, cycling, walking, and car-sharing).
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Measures Specific to Earthworks:

- Ensure sand, other aggregates, bulk cement and other fine power material are stored in a controlled and well-managed manner.
- For smaller supplies of fine powder materials, ensure bags are sealed after use and stored appropriately to prevent dust release.

Measures Specific to Trackout:

- Avoid dry sweeping of large areas.

- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable and regularly dampen down with fixed or mobile sprinkler systems, or mobile water bowsers, where necessary.
- Record all inspections of haul routes and any subsequent action in a site log book.
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
- Locate site access gates at least 10m from receptors where practicable.

115. With the implementation of the appropriate mitigation measures, in addition to embedded mitigation measures, the residual impacts from construction are considered to be **not significant**, in accordance with IAQM guidance.

20.7.1.2 Construction Vehicle Exhaust Emissions

20.7.1.2.1 Human Receptor Locations

116. The 24 hour AADT flows used in the air quality assessment for 'with development' scenarios are detailed in *Appendix 20.2*.

117. Predicted NO_2 and PM_{10} concentrations for the earliest year of onshore construction (2020) 'with single phase' are detailed in *Appendix 20.3*. Predicted concentrations for the 'without proposed East Anglia THREE project' scenario and the predicted change in NO_2 and PM_{10} concentrations, as a result of the single phase approach, are also shown for comparison purposes. The results of the air quality assessment predict that concentrations of NO_2 and PM_{10} are below the annual mean air quality Objective of 40µg.m^{-3} at all receptors for the Single Phase approach.

118. In accordance with Defra guidance (Defra 2009), it may be assumed that exceedances of the 1-hour mean Objective for NO_2 are unlikely as the predicted annual mean concentrations are less than 60µg.m^{-3}.

119. The short term PM_{10} Objective is predicted to be met at all identified receptor locations with less than 35 exceedances of the daily mean Objective of 50µg.m^{-3}.

120. Changes in predicted NO_2 and PM_{10} concentrations between 'without proposed East Anglia THREE project' and with Single Phase were compared to the significance criteria provided in IAQM and EPUK guidance (IAQM and EPUK 2015) and detailed in *Table 20.20.*

121. The impacts as a result of the Single Phase approach can be described as **'negligible'** for both NO_2 and PM_{10}.

122. Predicted NO_2 and PM_{10} concentrations for the year of construction (2020) 'with Two Phased – Phase 1' and year of construction (2023) 'with Two Phased – Phase 2'are detailed in *Appendix 20.3*. Predicted concentrations for the 'without proposed East Anglia THREE project' scenario and the predicted change in NO_2 and PM_{10} concentrations, as a result of the Two Phased approach, are also shown for comparison purposes.

123. The results of the air quality assessment predict that annual mean concentrations of NO_2 and PM_{10} are below the air quality Objective of 40µg.m^{-3} at all receptors for the Two Phased approach, with Phase 1 and with Phase 2.

124. In accordance with Defra guidance (Defra 2009), it may be assumed that exceedances of the 1-hour mean Objective for NO_2 are unlikely as the predicted annual mean concentrations are less than 60µg.m^{-3}.

125. The short term PM_{10} Objective is predicted to be met at all identified receptor locations with less than 35 exceedances of the daily mean Objective of 50µg.m^{-3}.

126. Changes in predicted NO_2 and PM_{10} concentrations between 'without proposed East Anglia THREE project' and 'with Two Phased – Phase 1' and 'with Two Phased - Phase 2' were compared to the significance criteria provided in IAQM and EPUK guidance (IAQM and EPUK 2015) and detailed in *Table 20.20.*

127. The significance of impacts as a result of the Two Phased approach can be described as **'negligible'** for both NO_2 and PM_{10}.

20.7.1.2.2 Ecological Receptor Locations

128. Predicted nutrient nitrogen deposition values for the Stour and Orwell Estuaries SPA and Orwell Estuary SSSI are detailed in *Table 20.39.* Nutrient nitrogen deposition was calculated at 10m intervals along the transects; however, deposition rates are only reported every 50m.

Table 20.39 Nutrient Nitrogen Deposition Rates with the Proposed East Anglia THREE Project

Receptor	Nutrient Nitrogen Deposition ($kgNha^{-1}yr^{-1}$)				
	2020 Without Proposed East Anglia THREE Project	2020 With Single Phase	2020 With Two Phased – Phase 1	2023 Without Proposed East Anglia THREE Project	2023 With Two Phased – Phase 2
Transect 1 – 0m from road	15.90	15.93	15.92	15.03	15.04
Transect 1 – 50m from road	13.92	13.92	13.92	13.44	13.44
Transect 1 – 100m from road	13.72	13.73	13.73	13.29	13.29
Transect 1 – 150m from road	13.65	13.65	13.65	13.23	13.23
Transect 1 – 200m from road	13.61	13.61	13.61	13.20	13.20
Transect 2 – 0m from road	15.79	15.81	15.81	14.94	14.95
Transect 2 – 50m from road	13.86	13.87	13.87	13.39	13.40
Transect 2 – 100m from road	13.69	13.69	13.69	13.26	13.26
Transect 2 – 150m from road	13.62	13.63	13.63	13.21	13.21
Transect 2 – 200m from road	13.59	13.59	13.59	13.18	13.18

129. The impact of the proposed East Anglia THREE project on nutrient nitrogen deposition is detailed in *Table 20.40*. The percentage of the lowest CL is given in parentheses.

Table 20.40 Impact of the Proposed East Anglia THREE Project on Nutrient Nitrogen Deposition

Receptor	Nutrient Nitrogen Deposition ($kgNha^{-1}yr^{-1}$)		
	Impact of Single Phase Approach	Impact of Two Phased Approach – Phase 1	Impact of Two Phased Approach – Phase 2
Transect 1 – 0m from road	0.025 (0.12)	0.023 (0.11)	0.012 (0.06)
Transect 1 – 50m from road	0.006 (0.03)	0.005 (0.03)	0.002 (0.01)
Transect 1 – 100m from road	0.003 (0.02)	0.002 (0.01)	0.002 (0.01)
Transect 1 – 150m from road	0.002 (0.01)	0.002 (0.01)	0.001 (0.00)
Transect 1 – 200m from road	0.002 (0.01)	0.002 (0.01)	0.001 (0.00)
Transect 2 – 0m from road	0.024 (0.12)	0.022 (0.11)	0.012 (0.06)
Transect 2 – 50m from road	0.005 (0.02)	0.005 (0.02)	0.002 (0.01)
Transect 2 – 100m from road	0.003 (0.02)	0.003 (0.02)	0.002 (0.01)
Transect 2 – 150m from road	0.002 (0.01)	0.002 (0.01)	0.001 (0.00)
Transect 2 – 200m from road	0.002 (0.01)	0.002 (0.01)	0.000 (0.00)

130. The results of the assessment of nutrient nitrogen deposition on the identified ecological habitat showed that in the 'without proposed East Anglia THREE project',

'With Single Phase', 'with Two Phased – Phase 1' and 'with Two Phased – Phase 2' approach, total nutrient nitrogen deposition across the Stour and Orwell Estuaries SPA and Orwell Estuaries SSSI was below the CL of 20kg $Nha^{-1}yr^{-1}$ at all locations on the considered transects.

131. As detailed in *Table 20.40,* the impact of the proposed East Anglia THREE project resulted in contributions to nutrient nitrogen deposition below 1% of the CL (0.2kg $Nha^{-1}yr^{-1}$) in each scenario. The increase in nutrient nitrogen deposition is therefore considered to be **not significant**.

20.7.2 Potential Impacts During Operation

132. Operational phase impacts were scoped out of the assessment, as agreed by the Planning Inspectorate (Planning Inspectorate 2012, also see *Table 20.1*), and therefore they have not been considered within this assessment.

20.7.3 Potential Impacts During Decommissioning

133. This section describes the potential impacts of the decommissioning of the onshore electrical transmission works with regards to impacts on air quality. The decommissioning of the project would be as required by the requirements in the Development Consent Order. The approach provided below provides a high level likely approach which could be taken. Further details are provided in Chapter 5 Description of the Development.

134. The onshore export cables would be decommissioned (de-energised) and the ducts, cables and jointing bays left in-situ, therefore there would be **no impact** for any receptor upon decommissioning at the landfall or along the onshore cable route.

135. Kiosks would be removed, which would involve concrete breaking. The 2014 IAQM guidance (IAQM 2014) details best-practice mitigation measures to reduce the impacts of dust from demolition, which would be implemented during decommissioning. These include:

- Soft-strip the inside of buildings before demolition (retaining walls and windows where possible to provide a screen against dust);
- Ensure effective water suppression is used during demolition operations;
- Avoid explosive blasting, using appropriate mechanical or manual alternatives; and
- Bag and remove any biological debris or damp down such material prior to demolition.

136. Vehicle movements would also be associated with the removal of the kiosks. The impacts of traffic associated with the construction phase of the proposed East Anglia THREE project were predicted to be negligible at receptor locations. It is therefore not considered that there would be any impacts associated with the decommissioning phase.

137. In relation to the substation, the programme for decommissioning is expected to be similar in duration to the construction phase. The detailed activities and methodology would be determined later within the project lifetime, but are expected to include:

- Dismantling and removal of outside electrical equipment from site located outside of the substation buildings;
- Dismantling and removal of electrical equipment from within the substation buildings;
- Removal of main substation building and minor services equipment;
- Demolition of the support buildings and removal of fence;
- Removal of hard standing; and
- Landscaping and reinstatement of the site (including land drainage).

138. Whilst details regarding the decommissioning of the substation are currently unknown, considering the worst case scenario which would be the removal and reinstatement of the current land use at the site, it is anticipated that the impacts would be similar to those during construction.

139. The decommissioning methodology would be finalised nearer to the end of the lifetime of the project so as to be in line with current guidance, policy and legislation at that point. Any such methodology would be agreed with the relevant authorities and statutory consultees.

20.8 Potential Cumulative Impacts During Construction

20.8.1 Construction Dust Impacts

140. Under either the Single Phase and Two Phased approach for the construction of the proposed East Anglia THREE project, East Anglia ONE will undertake preparatory works for the following project(s) (i.e. the proposed East Anglia THREE project and a future EAOW project) therefore cumulative impacts would arise from cable pulling and jointing operations (and construction of jointing bays) and the construction of

the substation. For the cumulative impact therefore East Anglia ONE will have the greatest magnitude of impact with subsequent projects having smaller and more localised overall impact magnitudes (at the jointing bays, access points to these and at the substation location). As the projects would not overlap, there are no anticipated cumulative impacts.

20.8.2 Construction Vehicle Exhaust Emission Impacts

141. Traffic data for the project were collected by Royal HaskoningDHV (RHDHV) from site surveys commissioned by East Anglia ONE Limited (EAOL) and the Department for Transport (DfT). Data were adjusted to the year of construction using TEMPRO factors, in order to account for future increases in background flows as a result of traffic generated by nearby committed developments. Traffic movements associated with the Garden Suburb committed development were also included, as this development was identified as having the potential to increase traffic flows through the Norwich Road / Valley Road AQMA in Ipswich. Cumulative impacts associated with future traffic growth were therefore considered in the prediction of pollutant concentrations at sensitive receptor locations (see section 20.6).

Table 20.41 Summary of Projects considered for the CIA in Relation to Air Quality

Project	Status	Construction / operation Period	[1]Approx. Distance from EA THREE site (km)	Project definition	Project data status	Included in CIA	Rationale
East Anglia ONE	Consented	2018 –2019 / 25 years	0	Offshore Windfarm Project Project description available	East Anglia ONE	Consented	Construction would not overlap but consecutive disturbance possible. Operational and decommissioning impacts considered.
Future EAOW project	Pre-application	Unknown	0	Offshore Windfarm Project Outline project data only	Future EAOW project	Pre-application	Construction would not overlap but consecutive disturbance possible. Operational and decommissioning impacts considered.
Sizewell C	Pre-application	Unknown	24.7	Nuclear Power Station No project detail available	Sizewell C	Pre-application	Sufficient distance from site to not impact on construction dust levels. Development traffic data includes future traffic growth.
Bramford-Twinstead	Pre-application	Unknown	0	Outline only	Bramford-Twinstead	Pre-application	Detail unknown
SITA (Energy from	Operational	Unknown	0.5	Energy From	SITA (EfW plant)	Operational	Construction would not overlap

[1] Shortest distance between the considered project and East Anglia THREE onshore electrical transmission works – unless specified otherwise.

Project	Status	Construction / operation Period	[1]Approx. Distance from EA THREE site (km)	Project definition	Project data status	Included in CIA	Rationale
Waste (EfW) plant)				Waste Plant Project description available			
SnOasis	Planning permission granted	Unknown	0.7	Winter sport centre. Master plans available	SnOasis	Planning permission granted	Sufficient distance from site to not impact on construction dust levels. Development traffic data includes future traffic growth.
Old Fisons site (land west of Paper Mill Lane)	Planning Application TBD	Unknown	0.7	Business park and housing scheme. Master plans available	Old Fisons site (land west of Paper Mill Lane)	Planning Application TBD	Sufficient distance from site to not impact on construction dust levels. Development traffic data includes future traffic growth.
Adastral park	Planning permission granted	Unknown	0.8	Business park and housing scheme. Master plans available	Adastral park	Planning permission granted	Sufficient distance from site to not impact on construction dust levels. Development traffic data includes future traffic growth.
Ipswich Garden Suburb	Identified in adopted Core Strategy	Primarily after 2020	3	Urban development north of Ipswich. Master Plan at consultation	Ipswich Garden Suburb	Identified in adopted Core Strategy	Greenfield site. No overlap with landfall, onshore cable route or substation location.

Project	Status	Construction / operation Period	[1]Approx. Distance from EA THREE site (km)	Project definition	Project data status	Included in CIA	Rationale
				phase.			
Progress Power, Eye, Suffolk	Planning permission granted	Construction 2017-18, operation by 2019.	28	Gas fired power station development	Progress Power, Eye, Suffolk	Planning permission granted	No overlap with landfall, onshore cable route or converter station location. Likely to be constructed prior to East Anglia THREE commencement
Land North Of Woods Lane, Melton, Suffolk	Conditionally Allowed	Unknown	2.7	Outline planning for a residential development for 180 dwellings (8.27ha in size) to include open space and provision of ecological habitat areas.	High	No	Sufficient distance from site to not impact on construction dust levels. Development traffic data includes future traffic growth.

20.9 Inter-relationships

142. The following chapters have been identified as having inter-relationships with Air Quality. These chapters are listed in *Table 20.42*.

Table 20.42 Chapter topic inter-relationships

Topic and description	Related Chapter	Where addressed in this Chapter
Traffic and Transport	27	Section 20.6 and 20.7
Terrestrial Ecology	23	Section 20.6

20.10 Summary

143. A summary of the potential impacts identified for air quality is detailed in *Table 20.43*. Operational phase impacts were scoped out of the assessment and therefore they have not been considered within this assessment. Whilst details regarding the decommissioning of the substation are currently unknown, considering the worst case scenario which would be the removal and reinstatement of the current land use at the site, it is anticipated that the impacts would be similar to those during construction.

Table 20.43 Potential Impacts Identified for Air Quality

Potential Impact	Receptor	Value/ Sensitivity	Magnitude	Significance	Mitigation	Residual Impact
Construction						
Construction Dust	Nearby residential properties, places of work, car parks, public rights of way and ecological sites	Single Phase and Two Phased: High	Single Phase and Two Phased: Large	Not significant due to embedded mitigation.	No additional mitigation required.	Not significant
Construction Vehicle Exhaust Emissions	Residential properties, schools, hospitals and care homes within 200m of roads experiencing an increase greater than 100 HGVs per day (25 within an AQMA)	Single Phase and Two Phased: High	Single Phase and Two Phased: maximum increase in pollutant concentration was 0.6µg.m^{-3} of NO_2 in the 2020 Single Phase approach	Negligible	No additional mitigation measures required.	Not significant
Construction Vehicle Exhaust Emissions	Stour and Orwell Estuaries SPA, Orwell Estuary SSSI	Single Phase and Two Phased: High	Single Phase and Two Phased: below critical load	Not Significant	No additional mitigation measures required.	Not Significant
Operation						
Scoped out						
Decommissioning						
As per construction						

20.11 References

AEAT (2008), Analysis of the relationship between annual mean nitrogen dioxide concentration and exceedances of the 1-hour mean AQS Objective, http://laqm.defra.gov.uk/documents/NO2relationship_report.pdf

Babergh District Council (2014). *Core Strategy and Policies*

Babergh District Council and Mid-Suffolk District Council (2011) *2011 Air Quality Progress Report for Babergh District Council and Mid-Suffolk District Council*

Centre for Ecology and Hydrology (2015) *Air Pollution Information System Website, accessible via URL www.APIS.ac.uk.*

Department of Energy and Climate Change (DECC) (2011a). *Draft Overarching National Policy Statement for Energy (EN-1)* London: The Stationery Office

Department of Energy and Climate Change (DECC) (2011b). *National Policy Statement for Renewable Energy Infrastructure (EN-3)* London: The Stationery Office

Department of Energy and Climate Change (DECC) (2011c). *National Policy Statement for Electricity Networks Infrastructure (EN-1)* London: The Stationery Office

Department for the Environment Food and Rural Affairs (Defra) (2007). *The Air Quality Strategy for England, Scotland, Wales and Northern Ireland*. London: HMSO

Department for the Environment Food and Rural Affairs (Defra) (2009). *Local Air Quality Management Technical Guidance Document Local Air Quality Management.TG (09)* London: Defra

Department for the Environment Food and Rural Affairs (Defra) (2014). NO_x to NO_2 Calculator. Available at: <http://laqm.defra.gov.uk/tools-monitoring-data/no-calculator.html >

Department for the Environment Food and Rural Affairs (Defra) (2014). Emission Factor Toolkit v6.0.1. Available at: <http://laqm.defra.gov.uk/review-and-assessment/tools/emissions.html#eft >

Department for the Environment Food and Rural Affairs (Defra) (2015a). Background Mapping Data. Available at: < http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2011 >

Department for the Environment Food and Rural Affairs (Defra) (2015b). UK Deposition Data. Available at: < http://pollutantdeposition.defra.gov.uk/data>

Department of the Environment (DoE) (1997). *The UK National Air Quality Strategy* London: HMSO

Department of the Environment, Transport & the Regions (DETR) (2000). *Air Quality Strategy for England, Scotland, Wales and Northern Ireland*. London: HMSO

Department of the Environment, Transport & the Regions (DETR) (2003). *Air Quality Strategy for England, Scotland, Wales and Northern Ireland – Addendum.* London: HMSO

European Parliament (1996). *Council Directive 96/62/EC on Ambient Air Quality Assessment and Management*

European Parliament (2008). *Council Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe*

Greater London Authority and London Councils (2006) *The Control of Dust and Emissions from Construction and Demolition Best Practice Guidance*

Her Majesty's Stationary Office (HMSO) (1995). *The Environment Act 1995 (c.25) London:* TSO

Her Majesty's Stationary Office (HMSO) (2000). *Statutory Instrument 2000 No. 928 The Air Quality (England) Regulations 2000* London: HMSO

Her Majesty's Stationary Office (HMSO) (2002). *Statutory Instrument 2002 No. 3043 The Air Quality (England) (Amendment) Regulations 2002* London: HMSO

Highways Agency (2007). *Design Manual for Roads and Bridges Volume 11 Environmental Assessment Section 3 Environmental Assessment Techniques Part 1 HA207/07 Air Quality*

Institute of Air Quality Management (IAQM) (2014). *Guidance on the Assessment Dust from Demolition and Construction*

Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK) (2015). *Land-Use Planning & Development Control: Planning for Air Quality*

Ipswich Borough Council (2011). *Core Strategy and Policies Development Plan Document*

Ipswich Borough Council (2013) *Air Quality Progress Report for Ipswich Borough Council*

Laxen and Marner (2003) Analysis of the Relationship Between 1-Hour and Annual Mean Nitrogen Dioxide at UK Roadside and Kerbside Monitoring Sites

Mid-Suffolk District Council (2008). *Core Strategy Development Plan Document*

Planning Inspectorate (2012). *SCOPING OPINION Proposed East Anglia THREE Offshore Windfarm*

Suffolk Coastal District Council (2013). *Suffolk Coastal District Local Plan*

Suffolk Coastal District Council (2013) *Air Quality Progress Report for Suffolk Coastal District Council (Draft)*

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