Vattenfall Wind Power Ltd

Thanet Extension Offshore Wind Farm

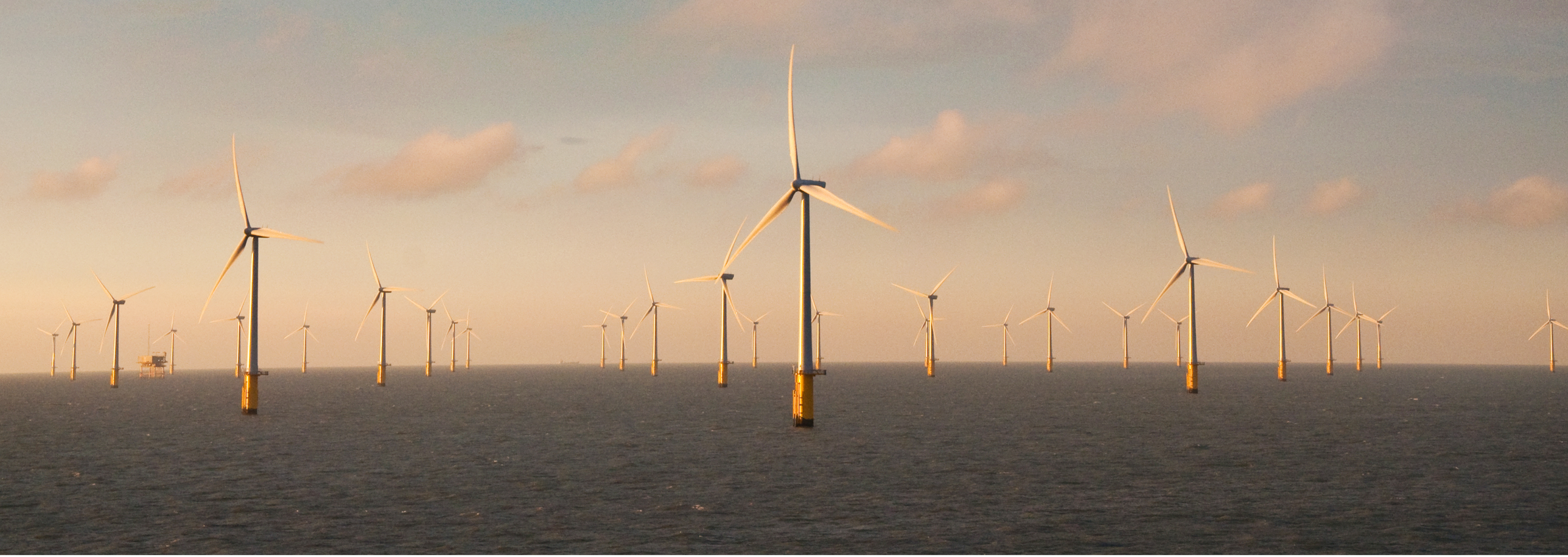
Environmental Statement Volume 3

Chapter 9: Air Quality

June 2018, Revision A

Document Reference:6.3.9

Pursuant to: APFP Reg. 5(2)(a)



Vattenfall Wind Power Ltd

Thanet Extension Offshore Wind Farm

Volume 3

Chapter 9: Air Quality

June 2018

Drafted By:	Amec Foster Wheeler
Approved By:	Helen Jameson
Date of Approval	June 2018
Revision	A

Vattenfall Wind Power Ltd

First Floor

1 Tudor Street

London

EC4Y 0AH

T +44 207 451 1150

www.vattenfall.co.uk

Table of Contents

9 AIR QUALITY

9.1 Introduction

9.1.1 This chapter of the Environmental Statement (ES) has been prepared by Amec Foster Wheeler Environment and Infrastructure UK Ltd and assesses the potential effect on air quality of the onshore works (including construction of the substation and cable) associated with Thanet Extension Offshore Wind Farm (Thanet Extension).

9.1.2 The Chapter should be read in conjunction with the project description in Volume 3, Chapter 1: Onshore Project Description (Document Ref: 6.3.1).

9.1.3 This chapter has also drawn upon information and assessment provided within Volume 3 Chapter 8: Traffic and Access (Document Ref: 6.3.8), which should also be referred to alongside this chapter.

9.1.4 The following sections of this chapter include:

- A summary of relevant legislation and planning policy;
- A description of the methodology for the assessment, including details of the study area and the approach to the assessment of effects;
- A summary of consultation with stakeholders;
- A review of baseline (existing) conditions;
- Details of the measures proposed as part of the project to avoid or reduce environmental effects, including mitigation and design measures that form part of the project (embedded mitigation);
- An assessment of the likely effects for the construction, Operations and Maintenance (O&M), and decommissioning phases of the project, taking into account the measures proposed;
- Identification of any further mitigation measures or monitoring required in relation to likely significant effects; and
- Assessment of any cumulative effects with other proposed developments.

9.2 Statutory and policy context

9.2.1 This section identifies legislation and national and local policy of particular relevance to air quality. The Planning Act 2008, Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 and the Environment Act (1995) are considered along with the legislation relevant to air quality.

Policy and Legislation

9.2.2 The legislative framework for air quality consists of legally enforceable EU limit values that are transposed into UK legislation as Air Quality Standards (AQS) that must be at least as challenging as the EU limit values. Action in the UK is then driven by the UK's Air Quality Strategy that sets national Air Quality Objectives (AQOs).

9.2.3 The EU limit values are set by the European Directive on air quality and cleaner air for Europe (2008/50/EC) and the European Directive relating to arsenic, cadmium, mercury, nickel, and polycyclic aromatic hydrocarbons in ambient air (2004/107/EC) as the principal instruments governing outdoor ambient air quality policy in the EU. The EU limit values are legally binding levels for concentrations of pollutants for outdoor air quality.

9.2.4 The two European directives, as well as the European Council's decision on exchange of information were transposed into UK Law via the Air Quality Standards Regulations 2010, which came into force in the UK on 11 June 2010, replacing the AQS Regulations 2007. AQS are concentrations recorded over a given time period, which are considered to be acceptable in terms of what is scientifically known about the effects of each pollutant on health and on the environment. The UK Air Quality Strategy sets the AQOs, which give target dates and some interim target dates to help the UK move towards achievement of the EU limit values. The AQOs are a statement of policy intentions or policy targets and as such, there is no legal requirement to meet these objectives except in as far as they mirror any equivalent legally binding limit values in EU legislation. The most recent UK Air Quality Strategy for England, Scotland, Wales and Northern Ireland was published in July 2007. The government also published an Air Quality Plan for nitrogen dioxide (NO_2) in July 2017.

9.2.5 Since Part IV of the Environment Act 1995 came into force, local authorities have been required periodically to review concentrations of the UK Air Quality Strategy pollutants within their areas and to identify areas where the AQOs may not be achieved by their relevant target dates. This process of Local Air Quality Management (LAQM) is an integral part of delivering the Government's AQOs detailed in the Strategy. When areas are identified where some or all of the AQOs might potentially be exceeded and where there is relevant public exposure, i.e. where members of the public would regularly be exposed over the appropriate averaging period, the local authority has a duty to declare an Air Quality Management Area (AQMA) and to implement an Air Quality Action Plan (AQAP) to reduce air pollution levels towards the AQOs. The latest guidance on the LAQM process is given in Department for Environment, Food and Rural Affairs (Defra) 2016 Local Air Quality Management Technical Guidance (LAQM TG (16)).

9.2.6 Table 9.1 sets out the AQOs set by the UK Government and the Devolved Administrations that are relevant to this assessment, and the dates by which they are to be achieved.

9.2.7 Planning policy for offshore renewable energy Nationally Significant Infrastructure Projects (NSIPs), and onshore transmission systems, is contained in the National Policy Statements (NPS), including Overarching Energy (EN-1; DECC, 2011), Renewable Energy Infrastructure (EN-3; DECC 2011) and Electricity Networks Infrastructure (EN-5; DECC 2011).

9.2.8 The NPS provide the principal policy framework within which decisions on NSIPs are made.

9.2.9 NPS EN-1 contains requirements for the assessment of impacts on air quality arising from NSIPs and any associated development. These are summarised in Table 9.2 below.

9.2.10 NPS EN-3 provides additional guidance on nationally significant renewable energy infrastructure, but air quality is only mentioned with regard to combustion plant and biomass/ waste impacts, and so is not relevant in this case.

9.2.11 NPS EN-5 provides additional technology-specific guidance on nationally significant electricity network infrastructure in England and Wales. However, EN-5 does not identify any further matters relating to air quality.

9.2.12 The National Planning Policy Framework (NPPF) (March 2012) does not contain specific policies for NSIPs, which are determined 'in accordance with the decision-making framework set out in the Planning Act 2008 and relevant NPSs for major infrastructure'. However, matters that the decision maker considers important and relevant when making decisions on NSIP applications are also applicable, and may include the NPPF. Table 9.2 includes relevant policy from the NPPF with regard to air quality.

9.2.13 The National Planning Practice Guidance (NPPG) for air quality (March 2014), was published to provide a degree of technical grounding to the policies described in the NPPF. The Planning Practice Guidance mirrors much of the policies and guidance introduced in EN-1 with the emphasis on undertaking proportionate assessments, avoiding significant adverse effects and implementing appropriate mitigation measures to prevent unacceptable risks. These principles form the basis upon which EN-1 (see Table 9.2) was written and on which this assessment is founded.

9.2.14 Reference should also be made to Volume 1 Chapter 2: Consents, Policy and Legislation (Document Ref: 6.1.2) of the ES, which considers policy in more detail.

Table 9.1: Summary of relevant air quality standards and objectives

Pollutant	Objective (UK)	Averaging period	Date to be achieved by and maintained thereafter (UK)
Nitrogen dioxide - NO_2	200 μgm^{-3} not to be exceeded more than 18 times a year	One-hour mean	31 Dec 2005
	40 μgm^{-3}	Annual mean	31 Dec 2005
Particles matters smaller than 10 microns - PM_{10}	50 μgm^{-3} not to be exceeded more than 35 times a year	24-hour mean	31 Dec 2004
	40 μgm^{-3}	Annual mean	31 Dec 2004
Particles matters smaller than 2.5 microns- $PM_{2.5}$	25 μgm^{-3}	Annual mean	2020
Particles - $PM_{2.5}$	Target of 15% reduction in concentration at urban background locations	3 year mean	Between 2010 and 2020

Source: National air quality objectives and European Directive limit and target values for the protection of human health.

9.2.15 Relevant policies are outlined in Table 9.2.

Table 9.2: Legislation and policy context

Policy/ legislation	Key provisions	Section where provision addressed
NPS EN-1 (Department of Energy and Climate Change (DECC), 2011)	The Environmental Statement (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.	This is considered in section 9.16 of this chapter.
	The ES should describe the predicted absolute emission levels of the proposed project, after mitigation methods have been applied.	This chapter assesses the risk and significance of potentially significant emissions to air, with and without appropriate mitigation.
	The ES should describe existing air quality levels and the relative change in air quality from existing levels.	Existing air quality is described in the section 9.7 of this chapter and the relative change is described in sections 9.10–9.12.
NPPF (Department for communities and Local Government (DCLG), 2012)	NPPF sets out the Government's planning policies for England and how these are expected to be applied. The NPPF states: "*Planning policies should sustain compliance with and contribute towards EU limits values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan*."	The potential impacts during the O&M phase of the proposed development are likely to be Negligible. Operation of the proposed built infrastructure (the substation) and maintenance activities would not lead to a significant change in vehicle flows within the study area. Section 9.7 assesses the existing air quality environment and sections 9.10–9.12 address the Annual Average Daily Traffic (AADT) change associated with the proposed development and likely contributions to complying with EU limit values.
National Planning Practice Guidance (NPPG) (DCLG, 2014)	The Government's online NPPG states that air quality concerns are more likely to arise where development is proposed within an area of existing poor air quality, or where it would adversely impact upon the implementation of air quality strategies and/ or action plans. It is stated in the NPPG that air quality is relevant to planning applications when the Development could: "*Expose people to existing sources of air pollutants. This could be by building new homes, workplaces or other development in places with poor air quality.*"	The proposed development does not introduce new residential receptors into areas of existing poor air quality. Section 9.7 assesses the existing air quality environment and sections 9.10–9.12 consider the impact of the proposed development on the existing air quality.
Thanet Local Plan Saved Policies and Proposals Map (Thanet District Council (TDC, no date)	Saved Policy EP5 – Local Air Quality Monitoring states: *"Proposals for New Development that would result in the National Air Quality Objectives being exceeded will not be permitted.* *Development proposals that might lead to such an exceedance, or to a significant deterioration in local air quality resulting in unacceptable effects on human health, local amenity or the natural environment, will require the submission of an air quality assessment, which should address:* 1. *The existing background levels of air quality;* 2. *The cumulative effect of further emissions;* 3. *The feasibility of any measures of mitigation that would prevent the national Air Quality Objectives being exceeded, or would reduce the extent of air quality deterioration*	The existing background is presented in section 9.7. The cumulative effect of further emissions is detailed in section 9.13. Mitigation measures are presented in section 9.9.

Policy/ legislation	Key provisions	Section where provision addressed
Air Quality Technical Planning Guidance (TDC, 2016)	Section 3.4 states that "*the key concern with regard to the air quality impacts of a development is the likely effect on human health. It is important that an air quality assessment evaluates modelled air quality in terms of changes in pollution concentrations where there is relevant public exposure. There are key areas where the magnitude of change as well as the concentration of pollutants in air caused by proposed development is a concern. In some cases, any additional contribution of emissions may worsen air quality and cause the creation of a new AQMA and, therefore, a small change in pollutant concentration can be as much a cause for concern as a large one.*"	The air quality impacts of the proposed development are assessed with regards to human health in sections 9.10–9.12.

Note: There are no specific air quality policies within any of the planning or strategy documents produced by Dover District Council (DDC).

Guidance

Local Air Quality Management Technical Guidance (TG16), 2016

9.2.16 The LAQM TG16 (Defra, 2016) is designed to support local authorities in carrying out their duties pertaining to air quality management. The document provides guidance on the accepted methods of assessment and dispersion modelling.

Institute of Air Quality Management Guidance, 2014a

9.2.17 The Institute of Air Quality Management (IAQM) has developed guidance regarding the assessment of the impacts of construction on air quality and the determination of their significance.

9.2.18 Local communities can be concerned that proposed development activities (particularly construction works) would result in regular and persistent dust emissions, which may affect local amenity and quality of life. The level of concern, and potential for annoyance, is directly related to the existing baseline dust levels, the number and proximity of residential areas to the proposed development, and the exact nature of the activities on-site. The degree of actual annoyance would also depend on factors, such as, the rate of dust deposition, and the application of mitigation measures on site.

9.2.19 Dust complaints are usually associated with periods of peak deposition, occurring during particular weather conditions. There is a 'normal' level of dust deposition in every community and it is only when the rate of deposition is high relative to the norm that complaints tend to occur. The guidance sets out the factors which includes the effects of dust on a community. The risk of demolition and construction activities causing exceedance of PM_{10} AQOs is also considered.

Institute of Air Quality Management Guidance, 2014b

9.2.20 The IAQM has developed guidance regarding the assessment of the impacts of odour and the determination of their significance. This guidance uses a risk-based approach to estimating impacts of odours.

Environmental Protection UK and Institute of Air Quality Management Guidance, 2017

9.2.21 The IAQM and Environmental Protection UK (EPUK) have produced guidance regarding the assessment of air quality issues within planning applications, which includes a summary of relevant legislation and the assessment of significance. Using this guidance, the magnitude of change due to an increase/ decrease in the annual mean concentration of NO_2 and PM_{10} and other pollutants due to the proposed development is described using specified criteria. The overall significance of the proposed development is then determined using professional judgement.

Kent and Medway Air Quality Partnership Guidance, 2015

9.2.22 The air quality planning guidance issued by the Kent and Medway Air Quality Partnership details the requirements of an air quality assessment and appropriate mitigation measures that may be used to improve air quality.

9.3 Consultation and scoping

9.3.1 The formal Scoping Opinion was issued by the Secretary of State (SoS) in February 2017, which included comments from several consultation bodies in relation to air quality. A Preliminary Environmental Information Report (PEIR) was issued for consultation in November 2017. Comments from consultees relating to air quality are summarised in Table 9.3.

Table 9.3: Summary of consultation relating to air quality

Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
February 2017 Scoping Opinion, paragraph 3.140	The Scoping Opinion states at Paragraph 691 that the proposed development's onshore Area of Interest (AoI) is adjacent to an AQMA. The SoS expects to see due consideration of this as part of the EIA process.	The AoI is discussed in sections 9.7 and 9.10–9.12.
February 2017 Scoping Opinion, paragraph 3.141	SoS and Natural England (NE) raise the *"need to consider designated nature conservation sites with dust sensitive ecological receptors within 200 m of construction activities (not 50 m as is proposed at Paragraph 692 of the Scoping Report)."* The SoS recommends that the distances to be used in the study area are justified and agreed with Statutory Consultees.	The designated nature conservation sites considered are detailed in sections 9.10–9.12.
February 2017 Scoping Opinion, paragraph 3.142	Paragraph 3.142 of the Scoping Opinion states the following: *"The ES should also consider how traffic and transport to and from the proposed development (particularly during construction) would contribute to air quality levels in the AQMA.* *When assessing the air quality impacts from construction traffic on designated nature conservation sites sensitive to such impacts a distance of 200 m from relevant roads is appropriate. We would consider relevant roads to be those which meet one or more of the criteria set out in Volume 11, Section 3 of the Design Manual for Roads and Bridges (DMRB) guidance which include roads where:* • *Daily traffic flows will change by 1,000 AADT or more.* • *HGV flows will change by 200 AADT or more.*	The air quality impacts from construction traffic on designated nature conservation sites is considered in sections 9.10–9.12.
	Furthermore, when assessing the potential air quality impacts of construction traffic on sensitive ecological receptors we would advise that both critical levels and critical loads of all relevant nitrifying and acidifying compounds are assessed. We would encourage the applicant to make use of data available from the UK Air Pollution Information System (APIS) website.	
February 2017 Scoping Opinion, paragraph 3.143	*Paragraph 3.143 of the Scoping Opinion states the following:* *The Scoping Report does not provide any information regarding the need for surveys in order to characterise the baseline environment or otherwise inform the Air Quality Impact Assessment. The Scoping Report does not contain details of a methodology to assess the potential impacts of dust and road traffic emissions although the SoS expects this to be considered.*	The baseline environment is assessed in section 9.7 as a desk-based study. The methodology to assess the potential impacts of dust and road traffic is addressed in section 9.4.
February 2017 Scoping Opinion, paragraph 3.144	Paragraph 3.144 of the Scoping Opinion states the following: *The Scoping Report proposes to scope out operational air quality. Paragraph 698 states that "impacts during the operation…… and maintenance activities will not lead to a significant change in vehicle flows within the study area". This conclusion is not justified through the provision of vehicle movement figures. These figures are also not present in the traffic and transportation chapter. However, the SoS considers that having had regard to the likely numbers of movements associated with this activity the conclusion is reasonable and therefore agrees that onshore operational air quality can be scoped out of the assessment.*	Conclusion is justified through the provision of vehicle movement figures in section 9.11.

Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
February 2017 Scoping Opinion, paragraph 3.145	Paragraph 3.145 of the Scoping Opinion states the following: *The SoS welcomes the commitment to the preparation of an Air Quality Management Plan (AQMP) as part of the CoCP. The Applicant should ensure that drafts of these documents, demonstrating the minimum measures relied upon as mitigation, are submitted with the ES and appropriately secured.*	Embedded mitigation measures are summarised in Table 9.16. Air quality management measures will be set out in a Construction Environmental Management Plan (CEMP), the principles for which are presented in the Code of Construction Practice (CoCP) (Document Ref: 8.1).
August 2017 Comment by DDC as documented in the EIA Evidence Plan (Document Ref: 8.5)	Question is raised as to the justification for the scoping out of traffic during the construction. Para 3.142 states that the "ES should consider how traffic and transport to and from the site (particularly during construction) would contribute to air quality levels in the AQMA". It is noted that the AQMA is within the TDC boundary.	Following revisions to expected traffic numbers, construction has been scoped into the assessment, and is addressed in section 9.10.
August 2017 Comment by DDC as documented in the EIA Evidence Plan (Document Ref: 8.5)	Para 3.166 of the Scoping opinion states that "the SOS considers that the assessment of potential disturbance to protected species should take account of impacts from air quality (inc dust)". In view of this and the change to the Red Line Boundary (RLB) which is now shown to extend through the Country Park, NNR, there is a heightened expectation that the inter-relationships at all stages between ecology, traffic and transport and air quality is assessed. Table 3.9 details a summary of impacts relating to onshore ecology and includes all three stages of the project, which also reinforces the question as to why emissions from the construction phase has been scoped out.	Following revisions to expected traffic numbers, construction has been scoped into the assessment, and is addressed in section 9.10.
August 2017 Comment by DDC	It is expected that details of the number of vehicles will be provided.	Traffic data is provided in section 9.10.
August 2017 Comment by DDC	It is expected that the cumulative impact during the operational stage will be assessed	Justification for scoping out emissions during O&M is given in section 9.11.
January 2018 Port of London Authority Section 42 response.	It is recommended that air emissions from the construction plant as well as the vessels should also be included in the construction and maintenance assessment.	Following revisions to expected traffic numbers, construction has been scoped into the assessment, and is addressed in section 9.10. Justification for scoping out emissions during O&M is given in section 9.11.
January 2018 TDC Section 42 response	The subsequent ES will require a detailed assessment and dispersion modelling of short-term air quality impacts from Heavy Duty Vehicles (HDVs) on residential receptors.	Following revisions to expected traffic numbers, construction has been scoped into the assessment, and is addressed in section 9.10.
January 2018 TDC Section 42 response	Table 9.19: Predicted construction traffic flows for the proposed development and use estimated Annual Average Daily Traffic (AADT) construction flows and our KCC transport colleagues should be satisfied that these estimates are reliable.	Reliable conservative estimates of AADT flows have been used, as described in section 9.10. Further information is presented in Volume 3, Chapter 8: Traffic and Access (Document Ref: 6.3.8).

9.4 Scope and methodology

9.4.1 The scope of the assessment has been determined through consideration of emission sources. This assessment has been produced to determine the impact of Thanet Extension proposed development on air quality. It therefore allows the suitability of Thanet Extension for the proposed use to be determined.

9.4.2 The potential effects of dust generation and dispersion arising from activities such as excavation, movement of vehicles (on and off-site) and general construction activities have been assessed. Dust and PM_{10} emissions arising as a result of the construction phase of the proposed development has the potential to cause annoyance at receptors close to the proposed development if not properly managed.

9.4.3 The construction may require excavation through the historic landfill site underneath the Country Park, which presents the risk of odours being released. This has therefore been assessed.

9.4.4 The pollutants of concern which require consideration in an assessment of this nature are principally those generated from the exhaust of road vehicles, for which one might anticipate potential breaches of the AQOs, which are shown in Table 9.1, resulting in exposure to concentration levels deemed potentially damaging to human health or ecological sites. The future exposure of human and ecological receptors to road traffic generated pollutants has been assessed through quantification of AADT data for the construction and O&M phases. For the decommissioning phase, it has not yet been possible to specify traffic data, so the AADT for the construction phase has been used, which is expected to be an upper bound. This addresses paragraph 3.144 of the Scoping Opinion.

9.4.5 The air quality studies undertaken by TDC confirm that concentrations of CO, SO_2, 1,3-butadiene and benzene are very unlikely to exceed the AQOs in this area. The small incremental change due to emission of these pollutants in relation to the proposed development would not change this situation. As a result, these pollutants have been scoped out and are not assessed further in this chapter. The methodology has been agreed with the relevant environmental officers at Dover and Thanet councils.

9.4.6 The air pollutants to be assessed for human receptors are therefore annual mean NO_2, 99.79th percentile hourly mean NO_2, annual mean PM_{10}, 90.41st percentile daily mean PM_{10} and annual mean $PM_{2.5}$. The air pollutants to be assessed for ecological receptors are annual mean NO_x, maximum daily mean NO_x, annual mean nitrogen deposition and annual mean acidity deposition.

9.4.7 An assessment of cumulative effects has been undertaken. A summary of these effects is provided in Table 9.34.

9.4.8 An assessment of the odour risk during construction has been undertaken in section 9.10.

Roads assessment methodology

9.4.9 Where it is not possible to scope out emissions from road traffic, namely for construction activity, a dispersion modelling assessment has been carried out. The methodology for this is described here.

9.4.10 The ADMS-Roads dispersion modelling tool (Cambridge Environmental Research Consultants, 2017) was used to calculate both emissions and concentrations from the road traffic generated by the proposed development as well as non-development traffic. Emissions were calculated using factors from v8 of Defra's Emission Factors Toolkit (Defra, 2017b). There is limited information on the routes that will used by traffic generated by the proposed development. It is expected that most construction traffic will exit the site either directly onto the A256, or onto Sandwich Road, from which they will then join the A256 at Ebbsfleet Roundabout. The bulk of the construction traffic will then travel north on the A256. However, it is not possible at this stage to exclude the possibility that some construction traffic may travel north on Sandwich Road or south on the A256. Therefore, as a conservative approach and to ensure the possible impact at all potentially affected receptors has been accounted for, construction traffic has been triple-counted: the full amount of construction traffic has been modelled on the A256/A299 between the junction with the A257 and the junction with the Canterbury Road West (that is, for at least 2 km from the proposed development), and also on Sandwich Road.

9.4.11 Concentrations were calculated at human receptors near the road, and at a receptor representing the closest location of the AQMA to the road. Concentrations were also calculated at the locations where the designated ecological sites are closest to the road. Receptor locations are summarised in Table 9.4 and shown in Figure 9.1.

Table 9.4: Receptors modelled

Description	Easting	Northing	Height above ground level (m)
St Augustines Golf Club	633881	164161	1.6
Ebbsfleet Farm	633353	163118	1.6
Jutes Lane	633216	163043	1.6
Stonelees Golf Club	633495	162956	1.6
Ebbsfleet House	633595	162587	1.6
Stonelees Bungalow	633684	162533	1.6
Ebbsfleet Lane 1	633662	162405	1.6
Ebbsfleet Lane 2	633643	162422	1.6
Ebbsfleet Lane 3	633635	162436	1.6
Ebbsfleet Lane 4	633627	162450	1.6
Baypoint Club	633714	162225	1.6
Sandwich Road 1	634503	163841	1.6
Foads Lane	634609	163931	1.6
Sandwich Road 2	635371	164599	1.6
Stonar Gardens	633372	158608	1.6
AQMA	634280	164123	1.6
SAC, SPA, Ramsar, SSSI 1	633700	162424	0
SSSI	633529	162186	0
SAC, SPA, Ramsar, SSSI 2	633495	161108	0
SAC, SPA, Ramsar, SSSI 3	633511	160544	0
SAC, SPA, Ramsar, SSSI 4	633411	160248	0

THANET EXTENSION OFFSHORE WIND FARM

Figure 9.1

Receptors for Air Quality Assessment

631000 632000 633000 634000 635000 636000 637000 638000

165000 164000 163000 162000 161000 160000

St Augustines Golf Club
AQMA
Foads Lane
Sandwich Road 2
Sandwich Road 1
Ebbsfleet Farm
Jutes Lane
Stonelees Golf Club
Ebbsfleet House
Stonelees Bungalow
Ebbsfleet Lane 4
Ebbsfleet Lane 3
Ebbsfleet Lane 2
Ebbsfleet Lane 1
SAC, SPA, Ramsar, SSSI 1
SSSI
Baypoint Club
SAC, SPA, Ramsar, SSSI 2
SAC, SPA, Ramsar, SSSI 3
SAC, SPA, Ramsar, SSSI 4

Sandwich & Pegwell Bay NNR & SAC
Thanet Coast & Sandwich Bay Ramsar and SPA
Sandwich Bay to Hacklinge Marshes SSSI

MINSTER CP
CLIFFSEND CP
RAMSGATE CP
Minster Marshes
Sandwich Flats
Sandwich Bay
Pegwell Bay
River Stour
Goshall Stream

Legend

- Onshore Red Line Boundary
- Receptor for air quality assessment
- National Nature Reserve (NNR)
- Ramsar site
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)
- Site of Special Scientific Interest (SSSI)

Datum: OSGB 1936
Projection: BNG

1:25,000 0 0.5 1 km

Drg No	39080-Lon137a		
Rev	1.0	Date	01/05/2018
By	JP	Layout	N/A

Figure 9.1

9.4.12 Baseline traffic flows were taken from traffic modelling forecasts for 2020 (see Chapter 14), which gives AADT flows of 1356 for HGVs and 25470 for Light Duty Vehicles (LDVs) on the A256, and 281 for HGVs and 2887 for LDVs on Sandwich Road. Daily estimates of vehicle numbers required for construction showed that the greatest activity is during the twelve-month period beginning at week 28 of the programme, so this period was used to obtain the worst-case development-related two-way AADTs of 152 for HGVs and 73 for LDVs (staff cars and light vans).

9.4.13 Meteorological data from the Manston Airport meteorological station, approximately 4 km north of the proposed development site, for 2016 was used. There is no suitable roadside air quality monitoring data near the A256, so it was not possible to carry out the recommended model verification process. In the absence of this, a verification factor of 3 was applied, which is at the upper end of verification factors commonly obtained in this type of modelling. Background concentrations were taken from Defra (Defra, 2017a) maps for the relevant 1 km squares containing the receptors.

Study area

9.4.14 The study area for the construction dust assessment has been derived according to the IAQM (2014a) guidance.

9.4.15 The study area has been broken down into three sections, and these sections have been assessed individually in terms of their potential air quality impacts. The sections considered within this chapter comprise the following:

- Landfall;
- Onshore Cable Route (including temporary construction compounds); and
- Substation and connection works at the existing National Grid connection.

Data collection

9.4.16 The data sources used to inform the air quality assessment are listed below:

- Defra background mapping (UK-AIR database);
- Defra list of AQMAs by local authorities;
- LAQM Reports by TDC and DDC, including the 2016 Annual Status Reports;
- Automatic monitoring sites from TDC;
- NO_2 diffusion tube network from TDC;
- Traffic counts and predictions from the appointed transport consultants and the Department for Transport; and
- Construction data from the construction schedule.

9.5 Assessment criteria and assignment of significance

Demolition and Construction Assessment

Demolition and Construction Dust

9.5.1 The IAQM guidance (2014a) provides a method to assess the significance of construction effects by considering the annoyance due to dust soiling as well as harm to ecological receptors and the risk of health effects due to any significant increases to PM_{10} or $PM_{2.5}$. Site activities are divided into four types to reflect their different potential effects:

- Demolition – an activity involved with the removal of an existing structure or structures;
- Earthworks – the processes of soil-stripping, ground-levelling, excavation and landscaping;
- Construction – an activity involved in the provision of a new structure; and
- Trackout – the transport of dust and dirt from the site onto the public road network. This arises when vehicles leave site with dusty materials or transfer dust and dirt onto the road having travelled over muddy ground on-site.

9.5.2 A detailed assessment is deemed to be required as described in the IAQM guidance (2014a) where there is:

- A ‘human receptor’ located within: 350 m from the site boundary; and/ or within 50 m of the route(s) used by vehicles on the public highway, up to 500 m from the site entrance(s); or
- An ‘ecological receptor’ located within: 200 m of the boundary of the site; or 200 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance (in line with the requirements of the SoS detailed in Table 9.3).

9.5.3 The construction site has been classified according to the risk of effects (based upon the scale and nature of the works, plus the proximity of sensitive receptors), appropriate site-specific mitigation measures have been identified and the significance of effects has been determined.

Construction Vehicle and Plant Emissions

9.5.4 Guidance from the IAQM (2017) suggests that the impact of emissions from the additional road traffic vehicles can be scoped out of the assessment if the change in HGV flows on local roads with relevant human receptors is less than 25 AADT movements within or adjacent to an AQMA or 100 elsewhere, and the change in LDV flows on local roads is less than 100 AADT within or adjacent to an AQMA and 500 elsewhere. Also, with regard to sensitive ecological receptors, it is stated within the Scoping Opinion that the DMRB criteria are appropriate for determining significance of impacts, as detailed in Table 9.3, significant being defined as more than 200 AADT HGV and 1,000 AADT on any roads (all vehicles). Using these criteria, the impact of emissions from the additional road traffic vehicles during the construction phase has been scoped in for assessment by dispersion modelling. The Evidence of predicted HGV flows is provided in Table 9.21.The number of plant and Non-Road Mobile Machinery (NRMM) on site at any one time will be relatively small. Although the proposed development is not located in London, any NRMM used will comply with London NRMM emission standards and guidance from the Control of Dust and Emissions during Construction and Demolition SPG (Mayor of London, 2013). Consequently, the potential effects of emissions from NRMM on air quality are not likely to be significant and therefore do not require further assessment.

O&M Assessment

9.5.5 The impact of emissions from the additional road traffic vehicles during the O&M phase has been considered in order to determine the air quality impact on nearby human and ecological receptors.

9.5.6 The impact of emissions from the additional road traffic vehicles during the operation of the proposed development has been scoped out because the proposed development will not cause a significant change in AADT flows on local roads with relevant receptors (where significant is defined as more than 100 AADT within an AQMA or 500 elsewhere for LDV in IAQM (2017) guidance). Evidence of predicted AADT data is provided in section 9.10. This approach has been agreed with the environmental officers at Thanet and Dover councils.

Assignment of significance: dust

9.5.7 The significance of the impact of windblown dust from the proposed development is generally assigned after applying the site-specific mitigation. This would take account of the risk of effects, and other factors that might affect the risk of dust effects arising, even after any site-specific mitigation has been implemented. The overall significance of the effects arising from the entire construction phase of the proposed development is based on professional judgement, taking into account the significance of the effects of each of the four activities.

9.5.8 The sensitivity/ importance of the environment with regards to dust impacts is defined in Table 9.5.

Table 9.5: Sensitivity/ importance of the environment in respect to dust

Receptor sensitivity/ importance	Description/ reason
High	Residential receptors are high sensitivity receptors for dust soiling effects. The IAQM (2014a) guidance states that high sensitivity receptors are where: • Users can reasonably expect enjoyment of a high level of amenity; • The appearance, aesthetics or value of their property would be diminished by soiling; and • The people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. High sensitivity ecological receptors include: • Locations with an international or national designation and the designated features may be affected by dust soiling; or • Locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red Data List For Great Britain.
Medium	Non-residential receptors, including users of the St Augustine's golf course, Stonelees golf course. The IAQM (2014a) guidance suggests that medium sensitivity receptors are: • Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or • The appearance, aesthetics or value of their property could be diminished by soiling; or • The people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land. • Medium sensitivity ecological receptors include: • Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or • Locations with a national designation where the features may be affected by dust deposition.

Receptor sensitivity/ importance	Description/ reason
Low	Low sensitivity ecological receptors include locations with a local natural designation where the features may be affected by dust deposition. Indicative example is a local Natural Reserve with dust-sensitive features.
Negligible	Not defined in IAQM guidance (2014a).

Source: IAQM (2014a) Guidance on the assessment of dust from construction and demolition.

9.5.9 The dust emission magnitude is based on the scale of the anticipated works and should be classified as Small, Medium, or Large. IAQM (2014a) guidance provides examples of how the potential dust emission magnitude for different activities can be defined. The magnitude of impact is defined in Table 9.6.

Table 9.6: Magnitude of impact

Phase	Magnitude	Examples
Demolition	Large	Total building volume > 50,000 m^3, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities > 20 m above ground level.
	Medium	Total building volume 20,000 – 50,000 m^3, potentially dusty construction material, demolition activities 10 - 20 m above ground level.
	Small	Total building volume < 20,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities < 10 m above ground, demolition during wetter months.
	Negligible	IAQM (2014a) guidance does not provide a definition for negligible magnitude but it is assumed to be relevant where there are no planned demolition activities.
Earthworks	Large	Total site area > 10,000 m^2, potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size), > 10 heavy earth moving vehicles active at any one time, formation of bunds > 8 m in height, total material moved > 100,000 tonnes.
	Medium	Total site area 2,500 – 10,000 m^2, moderately dusty soil type (e.g. silt), 5 - 10 heavy earth moving vehicles active at any one time, formation of bunds 4 - 8 m in height, total material moved 20,000 – 100,000 tonnes.
	Small	Total site area < 2,500 m^2, soil type with large grain size (e.g. sand), < 5 heavy earth moving vehicles active at any one time, formation of bunds < 4 m in height, total material moved < 20,000 tonnes, earthworks during wetter months.
	Negligible	IAQM (2014a) guidance does not provide a definition for negligible magnitude but it is assumed to be relevant where there are no planned earthworks activities.
Construction	Large	Total building volume > 100, 000 m^3, on site concrete batching, sandblasting.
	Medium	Total building volume 25,000 – 100,000 m^3, potentially dusty construction material (e.g. concrete), on site concrete batching.
	Small	Total building volume < 25,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber).
	Negligible	IAQM (2014a) guidance does not provide a definition for negligible magnitude but it is assumed to be relevant where there are no planned construction activities.
Trackout	Large	> 50 HGV (> 3.5 t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length > 100 m.
	Medium	10 - 50 HGV (> 3.5 t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 – 100 m.

Phase	Magnitude	Examples
	Small	< 10 HGV (> 3.5 t) outward movements in any one day, surface material with low potential for dust release, unpaved road length < 50 m.
	Negligible	IAQM (2014a) guidance does not provide a definition for negligible magnitude but it is assumed to be relevant where there are no planned trackout activities.

Source: IAQM (2014a) Guidance on the assessment of dust from demolition and construction.

9.5.10 The following significance matrices are different from the EIA methodology matrix and are based on industry standards provided in the IAQM (2014a) guidance. This guidance provides a different matrix for each activity (demolition, construction, earthworks and trackout) to determine the level of mitigation required for each activity individually.

9.5.11 The assessment of the significance of potential effects is determined by assessing the risk of dust impacts for demolition, earthworks and construction, and trackout activities as described in Table 9.7, Table 9.8 and Table 9.9, respectively, taking into account the dust emission magnitude combined with the sensitivity of the area.

9.5.12 It is considered for the purpose of the assessment that High and Medium risks of dust impacts (in IAQM terms) represent, in terms of the EIA Regulations, major and moderate magnitude impacts, respectively, that are considered as significant. Low risk of dust impacts (in IAQM terms) represents minor magnitude impacts and are considered not significant in terms of the EIA Regulations.

Table 9.7: Significance of potential effects (Risk of dust impacts) for demolition activities

		Negative magnitude			
		Large	Medium	Small	Negligible
Sensitivity	High	*Major (High Risk)*	*Moderate (Medium Risk)*	*Moderate (Medium Risk)*	*Negligible*
	Medium	*Major (High Risk)*	*Moderate (Medium Risk)*	*Minor (Low Risk)*	*Negligible*
	Low	*Moderate (Medium Risk)*	*Minor (Low Risk)*	*Negligible*	*Negligible*
	Negligible	*Negligible*	*Negligible*	*Negligible*	*Negligible*

Table 9.8: Significance of potential effects (Risk of dust impacts) for earthworks and construction activities

		Negative magnitude			
		Large	Medium	Small	Negligible
Sensitivity	High	*Major (High Risk)*	*Moderate (Medium Risk)*	*Minor (Low Risk)*	*Negligible*
	Medium	*Moderate (Medium Risk)*	*Moderate (Medium Risk)*	*Minor (Low Risk)*	*Negligible*
	Low	*Minor (Low Risk)*	*Minor (Low Risk)*	*Negligible*	*Negligible*
	Negligible	*Negligible*	*Negligible*	*Negligible*	*Negligible*

Table 9.9: Significance of potential effects (Risk of dust impacts) for trackout activities

		Negative magnitude			
		Large	Medium	Small	Negligible
Sensitivity	High	*Major (High Risk)*	*Moderate (Medium Risk)*	*Minor (Low Risk)*	*Negligible*
	Medium	*Moderate (Medium Risk)*	*Minor (Low Risk)*	*Negligible*	*Negligible*
	Low	*Minor (Low Risk)*	*Minor (Low Risk)*	*Negligible*	*Negligible*
	Negligible	*Negligible*	*Negligible*	*Negligible*	*Negligible*

Assignment of significance: air quality pollutants

9.5.13 Although no official procedure exists for classifying the magnitude and significance of air quality effects from a new development for planning purposes, guidance issued by the IAQM and Environmental Protection UK (EPUK) (2017) suggests ways to address the issue. In the IAQM/EPUK guidance, the magnitude of impact due to an increase/decrease in annual mean concentration is described as "negligible", "slight", "moderate" or "substantial", taking into account both the change in concentration at a receptor brought about by a new development as a percentage of the assessment level, and the actual concentration at that receptor. These descriptors are given in Table 9.10.

9.5.14 It must be emphasised that these descriptors are not intended to be used robotically as a measure of the significance (in EIA terms) of a proposed development. As the IAQM/EPUK guidance states:

9.5.15 "The overall significance is determined using professional judgement. For example, a 'moderate' adverse impact at one receptor may not mean that the overall impact has a significant effect. Other factors need to be considered."

9.5.16 These descriptors are only designed for annual mean concentrations. Descriptors for short-term (daily or hourly) concentrations are not available.

Table 9.10: Impact descriptors for increases in annual mean concentrations

Absolute concentration with proposed development, relative to assessment level	Increase in Concentration Relative to Assessment Level				
	0%	1%	2–5%	6-10%	>10%
75% or less	*Negligible*	*Negligible*	*Negligible*	*Slight*	*Moderate*
76–94%	*Negligible*	*Negligible*	*Slight*	*Moderate*	*Moderate*
95–102%	*Negligible*	*Slight*	*Moderate*	*Moderate*	*Substantial*
103–109%	*Negligible*	*Moderate*	*Moderate*	*Substantial*	*Substantial*
110% or more	*Negligible*	*Moderate*	*Substantial*	*Substantial*	*Substantial*

9.6 Uncertainty and technical difficulties encountered

9.6.1 Traffic data supplied includes a number of assumptions for traffic growth, O&M trip generation and trip distribution, and construction trip generation and trip distribution. There is limited information on routes used by traffic, so a simple but conservative approach to modelling traffic emissions was used, as described in section 9.4.

9.6.2 NO_2 diffusion tube results provided in the baseline assessment of this chapter have a level of uncertainty of ±20% (Defra, 2016).

9.6.3 These uncertainties have been taken into account when assessing the air quality impacts.

9.7 Existing environment

9.7.1 This section assesses the current condition of air quality that is likely to be affected significantly by the proposed development.

Local Authority Review and Assessment

9.7.2 The information available from the local review and assessment of air quality in TDC and DDC has been used to determine the baseline air quality around the vicinity of the proposed development.

9.7.3 Thanet Extension is not located within any AQMAs, but it is located near the Thanet AQMA (approximately 550 m at the closest point on the RLB). This AQMA was declared in 2011 for an area encompassing a number of urban areas within Thanet as a result of exceedances of the annual mean AQO for NO_2. The AQMA includes residential areas in Ramsgate, Broadstairs and Margate. Exceedances of AQO of 40 μgm^{-3} for NO_2 were predicted at two monitored locations (Table 9.14) in 2015 (TDC, 2016). Figure 9.2 shows the AQMA boundary with reference to the proposed development.

THANET EXTENSION OFFSHORE WIND FARM

Figure 9.2
Thanet Air Quality Management Area

Legend

- Onshore Red Line Boundary
- Thanet urban air quality management area

Datum: OSGB 1936
Projection: BNG

1:45,000 0 1 2 km

Drg No	39080-Lon140a		
Rev	1.0	Date	01/05/2018
By	JP	Layout	N/A

Figure 9.2

9.7.4 Thanet Extension onshore infrastructure is located approximately 20 km away from DDC's AQMAs and air quality monitoring sites.

Air Quality Monitoring

9.7.5 The RLB of Thanet Extension falls within the administrative areas of TDC and DDC.

9.7.6 There are no monitoring stations operated by DDC in the vicinity of the proposed development. The nearest monitoring stations are located around 18 km south of the proposed development in the 2016 Annual Status Report (DDC, 2016). DDC does not operate any monitoring locations on the predicted construction and O&M traffic routes, therefore, only monitoring stations operated by TDC are discussed below.

9.7.7 There were two automatic air quality monitoring stations near the proposed development in Thanet in 2013 to 2015 and one in 2016 (TDC, 2017).

9.7.8 Table 9.11 shows the details of the nearest automatic monitoring stations and Table 9.12 shows the latest recorded NO_2 and PM_{10} concentrations since 2013, where available. The locations of the monitors are shown in Figure 9.3.

Table 9.11: Automatic monitoring sites near to the proposed development

Site Name	Classification Type	X Coordinate	Y Coordinate	Distance to Kerb of Nearest Road (m)	Distance to trenching RLB (km)	In AQMA?
ZH3 Thanet Airport	Suburban Background	635931	165331	N/A	2.3	Y
ZH4 Thanet Ramsgate	Roadside	638483	165430	4	4.4	Y

Table 9.12: Summary of automatic monitoring data: NO_2 annual mean (μgm^{-3}) and PM_{10} annual mean (μgm^{-3})

Site	2013		2014		2015		2016	
	NO_2	PM_{10}	NO_2	PM_{10}	NO_2	PM_{10}	NO_2	PM_{10}
ZH3 Thanet Airport	16.0	N/A	16.5	N/A	14.7	N/A	N/A	N/A
ZH4 Thanet Ramsgate	25.2	30.7	25.6	24.7	22.9	24.3	22.6	25.9

9.7.9 Table 9.12 shows that there were no exceedances of the AQOs of NO_2 or PM_{10} recorded at any of the automatic monitors near to the proposed development between 2013 and 2016.

9.7.10 In 2016, TDC monitored NO_2 concentrations using passive diffusion tubes at 26 locations. There are several passive diffusion tube monitoring locations around the proposed development. The nearest passive monitoring location to the proposed development in 2016 was the diffusion tube located at Earlsmede Crescent, Cliffsend (TH16), around 0.7 km north-east of the proposed development. Details of the closest diffusion tubes to the proposed development and their concentrations from 2013 – 2016 are provided in Table 9.13 and Table 9.14, respectively.

Table 9.13: Locations of passive monitoring sites near to the proposed development

Site Name	Classification Type	X Coordinate	Y Coordinate	Distance to trenching RLB (km)	In AQMA?
TH16	Background	634445	164416	0.7	Y
TH33	Urban Background	631161	165486	3.6	N
TH32	Urban Background	632994	166428	3.0	N
TH31	Urban Background	634662	166026	2.4	N
TH37/38/45	Kerbside	635932	165333	2.3	Y
TH54/64/65	Roadside	637135	165354	3.2	Y
TH70/71/72	Roadside	637092	165340	3.2	Y

Table 9.14: Summary of passive monitoring data: NO_2 annual mean (μgm^{-3})

Site Name	2013 (Bias Adjustment Factor = 0.82)	2014 (Bias Adjustment Factor = 0.81)	2015 (Bias Adjustment Factor = 0.88)	2016 (Bias Adjustment Factor = 0.85)
TH16	16.6	20.0	14.7	16.7
TH33	18.3	15.2	14.9	16.5
TH32	15.9	15.7	14.4	15.4
TH31	15.6	16.4	12.9	14.7
TH37/38/45	16.7	16.4	14.8	16.0
TH54/64/65	38.0	41.2	38.2	40.9
TH70/71/72	43.7	44.4	42.8	44.9

Sources: TDC (2016) Annual Status Report, Kent Air website: http://www.kentair.org.uk/home/text/802 (viewed 25/07/17)

9.7.11 Table 9.14 shows that NO_2 concentrations around the vicinity of the proposed development are generally below the AQO of 40 μgm^{-3}. An annual mean concentration of 16.7 μgm^{-3} was recorded in 2016 at diffusion tube TH16, which is the closest diffusion tube to Thanet Extension RLB.

9.7.12 There have been several exceedances of the annual mean AQO for NO_2 at diffusion tubes located within the AQMA, including on the High Street in St. Lawrence. The concentrations have been above 40 μgm^{-3} each year between 2013 and 2016 at triplicate tubes TH70/71/72. This is an urban centre with high levels of congested traffic, which is not representative of the area around the proposed development.

9.7.13 The monitoring results indicate that annual mean concentrations have been consistently exceeding the AQO at some locations within the AQMA in recent years. The monitoring results therefore indicate that it is likely there would be exceedances of the AQOs at some receptors within the AQMA if the proposed development were not to proceed (in the future baseline or the “do-nothing scenario”).

THANET EXTENSION OFFSHORE WIND FARM

Figure 9.3

Air Quality Monitoring Locations near to the proposed development

Legend

- Onshore Red Line Boundary
- Automatic monitoring location
- Diffusion Tube monitoring location

TH76
TH10
TH13/46/47
TH48
TH49
TH36
TH34
TH78
TH05
TH59
TH55
TH32
TH31
TH27
TH50
TH51
TH67/68/69
TH37
TH54
TH70/71/72
TH66
TH26
TH73, 74&75
ZH4 Thanet Ramsgate
TH33
TH77
TH16

Datum: OSGB 1936
Projection: BNG

1:40,000 0 1 2 km

Drg No	39080-Lon141a		
Rev	1.0	Date	01/05/2018
By	JP	Layout	N/A

Figure 9.3

9.8 Key parameters for assessment

9.8.1 This section identifies the maximum adverse scenario in environmental terms, defined by the project design envelope, to establish the maximum potential adverse impact.

9.8.2 The maximum design scenarios identified in Table 9.15 have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. These scenarios have been selected from the details provided in the project description (Volume 3, Chapter 1: Onshore Project Description (Document Ref: 6.3.1)). Effects of greater adverse significance are not predicted to arise should any other development scenario, based on details within the project Design Envelope to that assessed here, be taken forward in the final design scheme.

Table 9.15: Design envelope scenario assessed

Potential effect	Maximum design scenario assessed	Justification
Construction		
Increase in road traffic generated air quality pollutant concentrations – human receptor locations	The construction traffic assessment assumes that the construction programme is largely sequential, due to dependencies between work items, with a small degree of parallel working. For the peak twelve-month period, starting at week 28 of the work programme, there are 152 HGV and 73 light vehicle (including personnel vehicles) two-way AADT movements.	Exhaust emissions emitted by construction activities have the potential to cause adverse effects at nearby receptors, such as residential properties, through effects on human health.
Increase in road traffic generated air quality pollutant concentrations – ecological habitats	The construction traffic assessment assumes that the construction programme is largely sequential, due to dependencies between work items, with a small degree of parallel working. For the peak twelve-month period, starting at week 28 of the work programme, there are 152 HGV and 73 light vehicles (including personnel vehicles) two-way AADT movements.	Exhaust emissions emitted by construction activities have the potential to cause adverse effects at nearby receptors, such as exceeding critical loads for nitrogen deposition on sensitive habitats.
Construction dust impacts – human receptors	It has been assumed that any construction activities may occur simultaneously and that they could occur during the duration of the construction phase of up to 30 months. This is a conservative assumption given that in practice they will be phased over the duration of construction works. In some cases the design has not yet specified the exact locations of construction activity. For example the exact landfall location and TJBs may occur anywhere within an envelope defined by the 'Landfall area 350m from the seawall'; similarly the substation may be located anywhere within the Onshore Substation Area. Where this is the case, it has been assumed that the activity takes place at a location within the enveloped area within the RLB closest to sensitive receptors. The dust assessment methodology is not sensitive to the differences between the three landfall options, which are similar in terms of their dust-generating potential, so each of the three landfill options has been considered in the dust assessment.	The construction dust has the potential to impact on dust sensitive receptors within 350 m of the RLB, or within 50 m of the routes used by construction vehicles up to 500 m from the site entrance, including residential properties close to the proposed onshore cable route and onshore substation in the villages of Cliffs End, Stonelees, Sandwich Bay Estate, and the properties of New Downs Farm Cottage and Tollgate Cottages. Non-residential receptors include users of the St Augustine's golf course, Stonelees golf course.

Potential effect	Maximum design scenario assessed	Justification
	The principal dust-generating activities include: • Excavation of trenches for the onshore cable and subsequent backfilling trenches with cement-bound sand and excavated subsoil and topsoil; • For Landfall Options 1 and 3, excavation of pits for the Transition Joint Bays (TJB) and subsequent construction of sub-surface TJBs; • For Landfall Option 2, construction of berms for cable and TJBs; • For Landfall Options 2 and 3, trenching across the sea wall for the cable and later reinstating it; or for Landfall Option 1, drilling horizontally below it; • HDD of cable route below the A256; • Construction of substation; • Temporary construction compounds; and • Running track along length of the onshore cable. Where the direction of construction traffic flow is not yet known, trackout impacts have been assessed in all directions along the highway network, from the anticipated site exit. Maximum dimensions (up to 350 m from the RLB and along the cable route length) and 'worst-case' construction scenario have been assessed. Maximum dimensions include up to and beyond the cable route (the construction dust assessment looks at receptors up to 350 m beyond the RLB and 50 m of routes used by construction traffic up to 500 m from the site entrance(s)), including the onshore substation.	
Construction dust impacts – ecological habitats	Assumptions as for human receptors above. Maximum dimensions (up to 350 m from the RLB and along the cable route length) and 'worst-case' construction scenario have been assessed. Maximum dimensions include up to and beyond the cable route (the construction dust assessment looks at receptors up to 200 m beyond the RLB and 50 m of routes used by construction traffic up to 500 m	Dust from demolition and construction sites deposited on vegetation may create ecological stress within the local plant community. During long dry periods dust can coat plant foliage adversely affecting photosynthesis and other biological functions. Rainfall removes the deposited dust from foliage and can rapidly leach chemicals into the soil. An 'ecological receptor' refers to any sensitive habitat affected by dust soiling. This includes the direct impacts on vegetation or aquatic ecosystems of dust deposition, and the indirect impacts on fauna (e.g. on foraging habitats). IAQM (2014a)

Potential effect	Maximum design scenario assessed	Justification
	from the site entrance(s)), including the substation.	guidance states that ecological receptors within 50 m of the RLB or 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s), should be assessed. SoS and Natural England requested that ecological receptors within 200 m should be considered. The construction dust impact has been assessed on Pegwell Bay (National Nature Reserve (NNR), Special Protection Area (SPA), Ramsar site, Site of Special Scientific Interest (SSSI), Special Area of Conservation (SAC)) Pegwell Bay Country Park, the Thanet Coast Path, Stour Valley Walk, Saxon Shore Way and local Public Right of Way (PRoW) within the Onshore AoI, Roadside Nature Reserve A256 (Ramsgate Road), Woods and Grassland, Minster Larshes LWS and Ash Level and South Richborough Pasture LWS.
Construction odour impacts	Trenching through and exposing the historic landfill.	Exposing the landfill has the potential to cause loss of amenity through release of odour.
Operation		
Increase in road traffic generated air quality pollutant concentrations – human receptor locations	It is anticipated that up to one staff round-trip per week will be made by light vehicle for the onshore cable works, plus approximately 48 round trip HGV movements per year. The substation will be unmanned, but will require occasional inspection and maintenance.	The operation of the proposed built infrastructure (the substation and onshore cables) and maintenance activities would not lead to a significant change in vehicle flows within the study area. Minimal trips will be required for the ongoing maintenance of the onshore cable works. Evidence to support this has been provided in section 9.11.
Increase in road traffic generated air quality pollutant concentrations – ecological receptor locations	It is anticipated that up to one staff round-trip per week will be made by light vehicle for the onshore cable works, plus approximately 48 round trip HGV movements per year. The substation will be unmanned, but will require occasional inspection and maintenance.	The operation of the proposed built infrastructure (the substation and onshore cable) and maintenance activities would not lead to a significant change in vehicle flows within the study area. Minimal trips will be required for the ongoing maintenance of the onshore cable works. Evidence to support this has been provided in section 9.11.
Decommissioning		
Demolition dust impacts – human receptors	As the full details of the decommissioning phase are not available yet, it is assumed that the substation will be demolished during decommissioning. It is anticipated that any mounding will be left *in situ* but that the substation building will be demolished and external switchgear/ infrastructure removed. Maximum dimensions (up to 350 m from the RLB and along the cable route length) and 'worst-case' construction scenario has been assessed. Maximum dimensions include up to and beyond the cable route (the construction dust assessment looks at receptors up to 350 m beyond the RLB and 50 m of routes used by construction traffic up to 500 m from the site entrance(s)), including the substation.	The decommissioning phase of Thanet Extension may result in fugitive dust emissions and a temporary increase in vehicle movements (including HDVs) on the local road network. The construction dust has the potential to impact on dust sensitive receptors within 350 m of RLB, or within 50 m of the routes used by construction vehicles up to 500 m from the site entrance, including residential properties close to the proposed onshore cable route and substation in the villages of Cliffs End, Stonelees, Sandwich Bay Estate, and the properties of New Downs Farm Cottage and Tollgate Cottages. Non-residential receptors include users of the St Augustine's golf course, Stonelees golf course. As the full details of the decommissioning phase are not available yet, it is assumed that the substation will be demolished during decommissioning.

Potential effect	Maximum design scenario assessed	Justification
Demolition dust impacts – ecological habitats	As for human receptors above. Maximum dimensions (up to 350 m from the RLB and along the cable route length) and 'worst-case' construction scenario have been assessed. Maximum dimensions include up to and beyond the cable route (the construction dust assessment looks at receptors up to 200 m beyond the RLB and 50 m of routes used by construction traffic up to 500 m from the site entrance(s)), including the substation.	IAQM (2014a) guidance states that ecological receptors within 50 m of the RLB of the site or 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s), should be assessed. SoS and Natural England requested that ecological receptors within 200 m should be considered. The demolition dust has the potential to impact on dust sensitive receptors in the area including Nature conservation designations located at Pegwell Bay (NNR, SPA, Ramsar site, SSSI, SAC) Pegwell Bay Country Park, the Thanet Coast Path, Stour Valley Walk, Saxon Shore Way and local PRoW within the onshore AoI. As the full details of the decommissioning phase are not available yet, it is assumed that the substation will be demolished during decommissioning.
Cumulative effects		
Construction effects	Cumulative impacts of construction dust effects for all cumulative developments in the area	Cumulative impacts could occur where construction or decommissioning phase activities are undertaken concurrently with other similar activities associated with other developments within the study area. Projects which may result in cumulative impacts associated with potential construction or operation air quality impacts include other developments within 350 m of the proposed onshore AoI and roads used by construction traffic which involve changes to traffic flows and or increases in dust or air pollutant emissions. Due to the low numbers of development trips and their locations, it is assumed that the cumulative
Decommissioning effects	Cumulative impacts of demolition dust effects during decommissioning for all cumulative developments in the area	
		development trips will disperse before interacting with the study area, and therefore have no cumulative impact as a result.
Construction effects	Cumulative impacts of construction traffic effects for all cumulative developments in the area	Traffic from other developments is included in the baseline traffic (see Volume 3, Chapter 8: Traffic and Access (Document Ref: 6.3.8)).

9.9 Embedded mitigation

9.9.1 This section describes elements of the adopted design, materials and construction approach that will be included in the project either to specifically mitigate anticipated impacts or to avoid or reduce impacts.

9.9.2 Mitigation measures that were identified and adopted as part of the evolution of the project design (embedded into the project design) and that are relevant to air quality are listed in Table 9.16.

Table 9.16: Embedded mitigation relating to air quality

Parameter	Mitigation measures embedded into the project design
General	
Onshore cable and substation	The preparation of a CEMP will include air quality management measures, where required and as outlined in the CoCP.
Construction	
Onshore cable and substation	IAQM (2014a) and TDC (2018) suggest standard measures for mitigating the impacts of dust during construction and demolition. The mitigation measures required have been identified using the results of the dust assessment described in section 9.10, and are described in the CoCP (Document Ref: 8.1).
Operation	
Onshore cable and substation	The principles of good practice should be applied to the proposed development, as set out in chapter 5 of the EPUK and IAQM guidance (IAQM 2017). The proposed development does not contravene the Council's AQAP, or render any of the measures unworkable. The proposed development does not create a new "street canyon" or building configuration that inhibits effective pollution dispersion. Delivering sustainable development is a key theme of the application. The proposed development is designed to minimise public exposure to pollution sources.
Decommissioning	
Onshore cable and substation	IAQM (2014a) and TDC (2018) suggest standard measures for mitigating the impacts of dust during construction and demolition. The mitigation measures required have been identified using the results of the dust assessment described in section 9.12.

9.10 Environmental assessment: construction phase

9.10.1 Construction activities associated with the onshore components of Thanet Extension may give rise to dust emissions, although these will likely be temporary in nature and restricted to areas close to construction activity.

9.10.2 Construction activities that are considered to be the most significant potential sources of fugitive dust emissions are:

- Earthworks – large risk due to the excavation, handling, storage and disposal of soil and subsoil materials;
- Construction – large risk due to aggregate usage, due to the transport, unloading, storage and use of dry and dusty materials (such as cement and sand) over a long period; and
- Trackout (i.e. movement of vehicles) – medium risk due to movement of vehicles over surfaces where muddy materials have been transferred off site (for example, on to public highways).

Temporary increases in dust soiling from construction and demolition activities on human and ecological receptors.

9.10.3 This assessment of dust/ PM_{10} presents the effects which are likely to be relevant both without and with the implementation of the appropriate mitigation measures on-site, which would be outlined by the site contractor.

9.10.4 Dust is defined as "solid particles that are suspended in air, or have settled out onto a surface after having been suspended in air". The terms dust and particulate matter (PM) are often used interchangeably, although in some contexts one term tends to be used in preference to the other. In the IAQM (2014a) guidance the term 'dust' has been used to include the particles that give rise to soiling, and to human health and ecological effects. Note: this is different to the definition given in BS 6069 (British Standards Institute, 1994), where dust refers to particles up to 75 µm in diameter.

9.10.5 As per the IAQM (2014a) guidance, the risk associated with the proposed development to potentially generate dust/ PM_{10} in the absence of any mitigation has been determined and the required site-specific measures have been identified to ensure residual dust/ PM_{10} effects associated with the construction phase are not significant.

9.10.6 Table 9.17 details the human and ecological receptors near the proposed development. Figure 9.4 shows the locations with reference to the proposed development.

Table 9.17: Human and ecological receptors near to the proposed development

Receptor ID	Receptor	Receptor Type	Distance from substation boundary (m)	Distance from trenching RLB (m)	Distance from trackout (m)	Direction from proposed development	Sensitivity	Reason for selection
R1	Ebbsfleet Lane	Residential	520	40	< 20	North	High	Residents can reasonably expect enjoyment of a high level of amenity and the appearance, aesthetics or value of their property has the potential to be diminished by soiling.
R2	Stonelees Bungalow	Residential	620	65	< 20	North-east	High	
R3	Ebbsfleet Cottage	Residential	700	170	< 20	North-east	High	
R4	Sandwich Road	Residential	2100	550	< 20	North	High	
R5	Foads Lane	Residential	2200	650	< 20	North-east	High	
R6	Sandwich Road	Residential	3200	1600	< 20	North-east	High	
R7	Stonar Gardens	Residential	3000	3000	<20	South	High	
R8	Stonelees Golf Centre	Commercial	1000	350	< 20	North	Medium	Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home.
Sandwich and Pegwell Bay	Sandwich and Pegwell Bay (NNR, KWTR and SAC) and Roadside Nature Reserve A256	Ecological	< 20	< 20	< 20	East	High	Location with an international designation which may have designated features affected by dust soiling.
Thanet Coast and Sandwich Bay	Thanet Coast and Sandwich Bay (Ramsar and SPA)	Ecological	< 20	< 20	< 20	East	High	Location with an international designation which may have designated features affected by dust soiling.
Sandwich Bay to Hacklinge Marshes	Sandwich Bay to Hacklinge Marshes (SSSI)	Ecological	230	< 20	< 20	All	Medium	Location with a national designation where the features may be affected by dust deposition.

631000 632000 633000 634000 635000 636000 637000 638000

164000 163000 162000 161000 160000 159000

R6 R5 R4 R8 R2 R3 R1 R7

Sandwich & Pegwell Bay NNR & SAC
Thanet Coast & Sandwich Bay Ramsar and SPA
Sandwich Bay to Hacklinge Marshes SSSI

N

amec foster wheeler

VATTENFALL

THANET EXTENSION OFFSHORE WIND FARM

Figure 9.4

Receptors for Dust Assessment near to the proposed development

Legend

- Onshore Red Line Boundary
- Receptor for dust assessment
- National Nature Reserve (NNR)
- Ramsar site
- Special Area of Conservation
- Special Protection Area
- Site of Special Scientific Interest (SSSI)

Datum: OSGB 1936
Projection: BNG

1:25,000 0 0.5 1 km

Drg No	39080-Lon142a		
Rev	1.0	Date	01/05/2018
By	JP	Layout	N/A

Figure 9.4

9.10.7 Potential sources of impacts associated with demolition activities include fugitive dust/ PM_{10} emissions resulting from disturbance of dusty materials by construction plant, vehicle movements and wind action.

9.10.8 It is understood that there is no demolition required prior to construction but that demolition will be involved in the decommissioning phase. Therefore, demolition activities have been scoped out of the construction dust assessment.

9.10.9 Potential sources of impacts associated with earthworks, including ground preparation activities and remediation (if required), include fugitive dust/ PM_{10} emissions resulting from disturbance of dusty materials by construction plant, the construction materials used, vehicle movements, and wind action. The proposed development exceeds the IAQM (2014a) screening criteria of 10,000 m^2 in area and more than 100,000 tonnes of material to be moved. As a result, the dust emission magnitude for the earthworks phase of the proposed development is considered to be Large as defined by in the IAQM guidance.

9.10.10 Potential sources of impacts associated with construction of structures include fugitive dust/ PM_{10} emissions resulting from disturbance of dusty materials by construction plant, the construction materials used, vehicle movements and wind action. Considering the amount of construction activity, including the onshore substation, TJBs, running track, construction compounds etc., the potential dust emission magnitude for construction activities associated with the structures and supporting infrastructure is considered to be Large. The potential dust magnitude is the same for each of the three landfall options.

9.10.11 Dust emissions during trackout from the proposed development may occur from the transport of dust and dirt from the construction site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network. As a result of the size of the proposed development, there is expected to be over 50 HGV movements per day and the length of unpaved road is likely to exceed 100 m. The dust emission magnitude for the effects of trackout is considered to be Large.

9.10.12 The magnitude of impacts from the four activities is summarised in Table 9.18 below.

Table 9.18: Construction dust emissions magnitude as defined by the IAQM (2014a) guidance

Source	Dust emission magnitude
Demolition	Negligible
Earthworks	Large
Construction	Large
Trackout	Large

9.10.13 There are fewer than 10 residential and commercial properties located within 50 m of the proposed development Red Line Boundary, and fewer than 100 within 100 m. Therefore, the sensitivity of the current area with respect to dust soiling effects on people and property in relation to earthworks and construction activities is considered to be Low, based on IAQM (2014a) guidance.

9.10.14 There are between 10 and 100 residential properties located within 50 m of roads which could be used by construction traffic up to 500 m from the proposed development. The sensitivity of the area with respect to dust soiling effects on people and property in relation to trackout is therefore considered to be High. This is considered to be a worst-case assessment as many of the residential receptors are to the north of the proposed development and the transport assessment suggests that the majority of construction traffic will be routed to and from the south where there are fewer than 10 residential properties which meet this criterion.

9.10.15 The maximum estimated existing background PM_{10} concentration at the proposed development is 15.6 μgm^{-3} (taken from Defra (Defra, 2017) background maps). Given that there are fewer than 10 residential and commercial properties located within 50 m of the proposed development RLB or trackout zone, and fewer than 100 within 100 m, the sensitivity of the area with respect to human health impacts in relation to demolition, earthworks and construction is Low, as defined by IAQM guidance.

9.10.16 As noted above, there are between 10 and 100 residential properties located within 50 m of roads which could be used by construction traffic up to 500 m from the proposed development. Given this and the background PM_{10} concentration of 15.6 $\mu g\ m^{-3}$ maximum, the sensitivity of the area with respect to human health impacts in relation to trackout is Low, as defined by IAQM guidance

9.10.17 There are ecological sites located within 20 m of earthworks, construction and future demolition activities. The sensitivity of the area with respect to dust soiling effects on ecological receptors in relation to earthworks and construction is therefore considered to be 'High'.

9.10.18 The ecological sites are all located within 20 m of roads which may be used by construction traffic up to 500 m from the proposed development. The sensitivity of the area with respect to dust soiling effects on ecological receptors in relation to trackout is therefore also considered to be 'High'.

9.10.19 The sensitivity of the surrounding area is summarised in Table 9.19 below.

Table 9.19: Sensitivity of surrounding site as defined by IAQM (2014a) guidance

Potential Impact	Sensitivity of the surrounding area		
	Earthworks	Construction	Trackout
Dust Soiling	Low	Low	High
Human Health	Low	Low	Low
Ecological Receptors	High	High	High

9.10.20 The risk of dust impacts is defined using Tables 7, 8 and 9 in the IAQM (IAQM, 2014a) guidance for earthworks, construction and trackout, respectively. The dust emission magnitude classes combined with the sensitivity of surrounding area classes, result in the proposed development risk categories (before mitigation) shown in Table 9.20.

Table 9.20: Construction dust summary of dust risk as defined by IAQM guidance, before mitigation

Potential impact	Risk		
	Earthworks	Construction	Trackout
Dust Soiling	Low Risk	Low Risk	High Risk
Human Health	Low Risk	Low Risk	Low Risk
Ecological	High Risk	High Risk	High Risk

9.10.21 The IAQM (2014a) guidance considers the risk of effects in the absence of mitigation measures so that the mitigation approach can be developed accordingly. Before mitigation measures are applied, the impact of construction dust is assessed to be Negligible for demolition activities, 'Low Risk' for earthworks and construction activities for soiling and human health, 'Low Risk' for trackout effects on human health, 'High Risk' for trackout activities and dust soiling, and 'High Risk' for ecological receptors for earthworks, construction and trackout in the short-term.

9.10.22 The IAQM (2014a) guidance states that "*For almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be 'not significant'.*" (IAQM, 2014a, page 28). The finding that without dust controls there would be a high risk of impact has helped inform the mitigation measures to be applied (section 9.9), and these measures are expected to ensure that the risk of impact is reduced to Negligible levels. Furthermore, the impact is predicted to be of local spatial extent, short-term duration, intermittent and effects are not anticipated to continue beyond the construction phase (i.e. they are predominantly reversible).

9.10.23 The magnitude of impact with the dust controls in place will, therefore, be Negligible. The significance is therefore deemed to be of **Negligible** significance, which is not significant in terms of the EIA Regulations.

Temporary increases in traffic based air quality pollutant concentrations – human and ecological receptor locations.

9.10.24 Table 9.21 shows the predicted construction vehicles for the proposed development for the worst-case twelve-month period of the construction programme. This is based on the same data as used in Volume 3 Chapter 8: Traffic and Access (Document Ref: 6.3.8), although a different measure of traffic increase is appropriate for the air quality assessment than for the traffic impact assessment. These figures have been considered in Table 9.34 for the Cumulative Rochdale envelope.

Table 9.21: Predicted construction traffic flows for the proposed development

Vehicle type	Estimated two-way AADT construction flows	Indicative AADT criteria for undertaking a detailed air quality assessment under IAQM guidance
HGVs	152 (twelve-month period from week 28)	100 (outside of an AQMA) 25 (within or adjacent to an AQMA)
LDVs	73 (twelve-month period from week 28)	500 (outside of an AQMA) 100 (within or adjacent to an AQMA)

9.10.25 With reference to Volume 3, Chapter 8: Traffic and Access (Document Ref: 6.3.8), it is expected that the majority of construction traffic will enter and leave the proposed development via the A256 to the south and will be mainly accessing the substation construction area, which is approximately 2.5 km south of the AQMA. The proposed construction traffic route as it currently stands avoids entering any roads within or adjacent to the Thanet and Dover AQMAs. Therefore, it is not thought likely that construction traffic will significantly affect the Thanet AQMA, to the north of the proposed development, and the thresholds of significant change in traffic flows outside of an AQMA in Table 9.21 have been applied.

9.10.26 Table 9.21 shows the estimated construction vehicles for the proposed development based on a conservative worst-case scenario. The estimated flows are based on traffic figures presented in Volume 3 Chapter 8: Traffic and Access (Document Ref: 6.3.8). The predicted HGV two-way AADT during the worst twelve-month period of the construction programme is 152, which is above the indicative AADT criterion for undertaking a detailed air quality assessment under IAQM guidance of 100 AADT (outside an AQMA) (IAQM, 2017). This indicates that dispersion modelling is required to determine the impact of construction traffic on human receptors.

9.10.27 The predicted LDV two-way AADT for the worst twelve-month period of construction is 73, which is below the indicative AADT criterion for undertaking a detailed air quality assessment under IAQM guidance of 500 AADT (outside an AQMA) (IAQM, 2017). Nevertheless, these LDVs are included in the dispersion assessment triggered by the HGVs.

9.10.28 For sensitive ecological receptors, the predicted construction traffic is below the DMRB significance criteria of more than 200 HGVs and 1000 LDVs AADT. Nevertheless, for completeness ecological receptors are included in the dispersion assessment triggered by human receptors.

9.10.29 A dispersion modelling assessment has therefore been carried out as described in sections 9.4 and 9.5 and concentrations predicted at all receptors listed in Table 9.4.

9.10.30 The calculated concentrations of annual mean NO_2 at relevant (human) receptors are shown in Table 9.22, for the Without Proposed Development and With Proposed Development cases. These concentrations may be compared with the AQS of 40 µg m^{-3}. It shows that the change in concentration due to the construction traffic is less than 0.2 µg m^{-3} at all relevant receptors, including the AQMA, which is classified as negligible under the IAQM (2017) criteria. The magnitude of the impact is therefore considered to be Negligible. The significance is therefore deemed to be of **Negligible** significance, which is not significant in terms of the EIA Regulations.

Table 9.22: Modelled annual mean NO_2 concentrations with and without construction traffic at human receptors

Receptor	Without Proposed Development		With Proposed Development		Difference
	Road NO_2 (µg m^{-3})	Total NO_2 (µg m^{-3})	Road NO_2 (µg m^{-3})	Total NO_2 (µg m^{-3})	Total NO_2 (µg m^{-3})
St Augustines Golf Club	4.12	12.99	4.18	13.05	0.06
Ebbsfleet Farm	5.64	14.15	5.72	14.23	0.08
Jutes Lane	2.91	11.42	2.95	11.46	0.04
Stonelees Golf Club	2.64	11.56	2.68	11.61	0.05
Ebbsfleet House	3.64	12.57	3.71	12.64	0.07
Stonelees Bungalow	3.28	12.21	3.43	12.35	0.14
Ebbsfleet Lane 1	4.79	13.72	4.99	13.92	0.20
Ebbsfleet Lane 2	4.55	13.47	4.67	13.60	0.13
Ebbsfleet Lane 3	4.52	13.44	4.63	13.56	0.12
Ebbsfleet Lane 4	4.53	13.46	4.63	13.56	0.10
Baypoint Club	2.41	11.33	2.45	11.38	0.05
Sandwich Road 1	1.94	10.91	2.11	11.09	0.18
Foads Lane	2.06	11.04	2.25	11.23	0.19
Sandwich Road 2	1.99	11.65	2.20	11.85	0.20
Stonar Gardens	0.20	9.23	0.20	9.24	0.01
AQMA	0.83	9.89	0.85	9.91	0.02

9.10.31 The calculated concentrations of 99.79th percentile hourly mean NO_2 at relevant (human) receptors are shown in Table 9.23, for the Without Proposed Development and With Proposed Development cases. These concentrations may be compared with the AQS of 200 µg m^{-3}. It shows that the change in concentration due to the construction traffic is less than 0.3 µg m^{-3} at all relevant receptors, including the AQMA. The IAQM (2017) descriptors do not apply for short-period assessment levels such as hourly means, but the magnitude of the impact is considered to be Negligible. The significance is therefore deemed to be of **Negligible** significance, which is not significant in terms of the EIA Regulations.

Table 9.23: Modelled 99.79th percentile daily mean NO_2 concentrations with and without construction traffic at human receptors

Receptor	Without Proposed Development		With Proposed Development		Difference
	Road NO_2 (µg m^{-3})	Total NO_2 (µg m^{-3})	Road NO_2 (µg m^{-3})	Total NO_2 (µg m^{-3})	Total NO_2 (µg m^{-3})
St Augustines Golf Club	5.15	21.90	5.22	21.97	0.07
Ebbsfleet Farm	5.90	21.73	5.98	21.81	0.08
Jutes Lane	6.15	21.97	6.23	22.06	0.08
Stonelees Golf Club	3.71	20.61	3.76	20.66	0.05
Ebbsfleet House	5.13	22.03	5.20	22.09	0.07
Stonelees Bungalow	4.47	21.37	4.61	21.51	0.14
Ebbsfleet Lane 1	5.95	22.85	6.12	23.02	0.17
Ebbsfleet Lane 2	5.98	22.87	6.11	23.00	0.13
Ebbsfleet Lane 3	6.00	22.89	6.10	22.99	0.10
Ebbsfleet Lane 4	5.99	22.88	6.09	22.99	0.11
Baypoint Club	3.74	20.63	3.82	20.71	0.08
Sandwich Road 1	2.72	19.75	2.93	19.96	0.21
Foads Lane	2.73	19.76	2.94	19.97	0.22
Sandwich Road 2	2.55	21.28	2.75	21.49	0.21
Stonar Gardens	1.01	18.18	1.03	18.20	0.02
AQMA	1.27	18.52	1.29	18.54	0.02

9.10.32 The calculated concentrations of annual mean PM_{10} at relevant (human) receptors are shown in Table 9.24, for the Without Proposed Development and With Proposed Development cases. These concentrations may be compared with the AQS of 40 µg m^{-3}. It shows that the change in concentration due to the construction traffic is less than 0.03 µg m^{-3} at all relevant receptors, including the AQMA, which is classified as negligible under the IAQM (2017) criteria. The magnitude of the impact is therefore considered to be Negligible. The significance is therefore deemed to be of **Negligible** significance, which is not significant in terms of the EIA Regulations.

Table 9.24: Modelled annual mean PM_{10} concentrations with and without construction traffic at human receptors

Receptor	Without Proposed Development		With Proposed Development		Difference
	Road PM_{10} (µg m^{-3})	Total PM_{10} (µg m^{-3})	Road PM_{10} (µg m^{-3})	Total PM_{10} (µg m^{-3})	Total PM_{10} (µg m^{-3})
St Augustines Golf Club	0.42	16.90	0.43	16.91	0.01
Ebbsfleet Farm	0.57	16.68	0.59	16.69	0.01
Jutes Lane	0.29	16.39	0.30	16.40	0.01
Stonelees Golf Club	0.27	15.45	0.27	15.46	0.01
Ebbsfleet House	0.37	15.56	0.38	15.57	0.01
Stonelees Bungalow	0.34	15.52	0.36	15.55	0.02
Ebbsfleet Lane 1	0.49	15.68	0.53	15.71	0.03
Ebbsfleet Lane 2	0.46	15.65	0.49	15.67	0.02
Ebbsfleet Lane 3	0.46	15.65	0.48	15.67	0.02
Ebbsfleet Lane 4	0.46	15.65	0.48	15.67	0.02
Baypoint Club	0.24	15.43	0.25	15.44	0.01
Sandwich Road 1	0.20	14.68	0.23	14.71	0.03
Foads Lane	0.22	14.70	0.25	14.73	0.03
Sandwich Road 2	0.21	16.06	0.24	16.10	0.03
Stonar Gardens	0.02	15.24	0.02	15.24	0.00
AQMA	0.08	15.80	0.09	15.80	0.00

9.10.33 The calculated concentrations of 90.41st percentile daily mean PM_{10} at relevant (human) receptors are shown in Table 9.25, for the Without Proposed Development and With Proposed Development cases. These concentrations may be compared with the AQS of 50 µg m^{-3}. It shows that the change in concentration due to the construction traffic is less than 0.02 µg m^{-3} at all relevant receptors, including the AQMA. The IAQM (2017) descriptors do not apply for short-period assessment levels such as daily means, but the magnitude of the impact is considered to be Negligible. The significance is therefore deemed to be of **Negligible** significance, which is not significant in terms of the EIA Regulations.

Table 9.25: Modelled 90.41st percentile daily mean PM_{10} concentrations with and without construction traffic at human receptors

Receptor	Without Proposed Development		With Proposed Development		Difference
	Road PM_{10} (µg m^{-3})	Total PM_{10} (µg m^{-3})	Road PM_{10} (µg m^{-3})	Total PM_{10} (µg m^{-3})	Total PM_{10} (µg m^{-3})
St Augustines Golf Club	0.25	33.21	0.25	33.22	0.01
Ebbsfleet Farm	0.31	32.52	0.32	32.52	0.01
Jutes Lane	0.26	32.47	0.27	32.47	0.01
Stonelees Golf Club	0.16	30.53	0.16	30.54	0.00
Ebbsfleet House	0.22	30.59	0.22	30.60	0.00
Stonelees Bungalow	0.19	30.56	0.20	30.57	0.01
Ebbsfleet Lane 1	0.27	30.64	0.28	30.66	0.01
Ebbsfleet Lane 2	0.26	30.63	0.27	30.64	0.01
Ebbsfleet Lane 3	0.26	30.64	0.27	30.64	0.01
Ebbsfleet Lane 4	0.27	30.64	0.27	30.65	0.01
Baypoint Club	0.15	30.53	0.16	30.53	0.00
Sandwich Road 1	0.12	29.08	0.14	29.10	0.02
Foads Lane	0.13	29.09	0.15	29.11	0.02
Sandwich Road 2	0.13	31.84	0.15	31.86	0.02
Stonar Gardens	0.02	30.47	0.02	30.47	0.00
AQMA	0.05	31.48	0.05	31.48	0.00

9.10.34 The calculated concentrations of annual mean $PM_{2.5}$ at relevant (human) receptors are shown in Table 9.26, for the Without Proposed Development and With Proposed Development cases. These concentrations may be compared with the AQS of 25 µg m^{-3}. It shows that the change in concentration due to the construction traffic is less than 0.03 µg m^{-3} at all relevant receptors, including the AQMA, which is classified as negligible under the IAQM (2017) criteria. The magnitude of the impact is therefore considered to be Negligible. The significance is therefore deemed to be of **Negligible** significance, which is not significant in terms of the EIA Regulations.

Table 9.26: Modelled annual mean $PM_{2.5}$ concentrations with and without construction traffic at human receptors

Receptor	Without Proposed Development		With Proposed Development		Difference
	Road $PM_{2.5}$ (µg m^{-3})	Total $PM_{2.5}$ (µg m^{-3})	Road $PM_{2.5}$ (µg m^{-3})	Total $PM_{2.5}$ (µg m^{-3})	Total $PM_{2.5}$ (µg m^{-3})
St Augustines Golf Club	0.26	11.56	0.26	11.57	0.01
Ebbsfleet Farm	0.35	11.44	0.36	11.45	0.01
Jutes Lane	0.18	11.27	0.19	11.27	0.00
Stonelees Golf Club	0.16	10.79	0.17	10.80	0.00
Ebbsfleet House	0.23	10.86	0.24	10.86	0.01
Stonelees Bungalow	0.21	10.84	0.22	10.85	0.01
Ebbsfleet Lane 1	0.31	10.94	0.33	10.95	0.02
Ebbsfleet Lane 2	0.29	10.92	0.30	10.93	0.01
Ebbsfleet Lane 3	0.29	10.91	0.30	10.93	0.01
Ebbsfleet Lane 4	0.29	10.92	0.30	10.93	0.01
Baypoint Club	0.15	10.78	0.15	10.78	0.00
Sandwich Road 1	0.13	10.39	0.14	10.41	0.02
Foads Lane	0.13	10.40	0.15	10.42	0.02
Sandwich Road 2	0.13	11.13	0.15	11.15	0.02
Stonar Gardens	0.01	10.78	0.01	10.78	0.00
AQMA	0.05	10.99	0.05	11.00	0.00

9.10.35 Representation of ecological receptors have been taken at the closest points to the road for each sensitive area (Table 9.4). The A256 north of the proposed development site passes about 4 m from the Sandwich Bay to Hacklinge Marshes SSSI at its closest point, and about 140 m from the Thanet Coast and Sandwich Bay Ramsar/SPA at its closest point. To the south of the proposed development site, the road passes about 32 m from the Thanet Coast and Sandwich Bay Ramsar/SPA/SAC/SSSI at its closest point. However, this does not imply that there are relevant sensitive ecological features at these closest points.

9.10.36 Concentrations of annual mean NO_x at the ecological receptors are shown in Table 9.27, for the Without Proposed Development and With Proposed Development cases. These concentrations may be compared with the AQS of 30 µg m^{-3}. It shows that the increase in concentrations due to the proposed development is well below 1 µg m^{-3} at the SSSI, which is the closest designated site to the road at its closest point. Total NO_x concentrations are above 30 µg m^{-3} at the SSSI's closest point, but this is almost entirely due to the existing road traffic — this is common for roads with this level of traffic. The additional contribution from the construction traffic is just 1.3% of the AQS. The annual mean NO_x is below the AQS throughout the SPA/SAC/Ramsar site, and the additional contribution from the construction traffic is just 2% of the critical level. However, it should be repeated that this is on the highly conservative modelling assumption that all the construction traffic passes along Sandwich Road alongside the receptor. In reality, the road contribution will be substantially lower. The magnitude of the impact is therefore considered to be Negligible. The significance is therefore deemed to be of **Negligible** significance, which is not significant in terms of the EIA Regulations.

Table 9.27: Modelled annual mean NO_x concentrations with and without construction traffic at ecological receptors

Receptor	Without Proposed Development		With Proposed Development		Difference
	Road NO_x (µg m^{-3})	Total NO_x (µg m^{-3})	Road NO_x (µg m^{-3})	Total NO_x (µg m^{-3})	Total NO_x (µg m^{-3})
SAC, SPA, Ramsar, SSSI 1	10.18	21.47	10.87	22.16	0.69
SSSI	35.09	46.39	35.59	46.88	0.49
SAC, SPA, Ramsar, SSSI 2	8.02	19.08	8.13	19.20	0.11
SAC, SPA, Ramsar, SSSI 3	7.61	18.09	7.72	18.20	0.11
SAC, SPA, Ramsar, SSSI 4	10.26	20.74	10.40	20.88	0.14

9.10.37 Concentrations of 24-hour mean NO_x at ecological receptors are shown in Table 9.28, for the Without Proposed Development and With Proposed Development cases. These concentrations may be compared with the target of 75 µg m^{-3}. It shows that the increase in concentrations due to the proposed development is below 1 µg m^{-3} at the SSSI, which is the closest of the designated sites to the road at its closest point. Total 24-hour NO_x concentrations are below the 75 µg m^{-3} target at all relevant receptors. The additional contribution from the construction traffic is up to 1% of the target at all receptors. The additional contribution from the construction traffic is therefore not significant. The magnitude of the impact is therefore considered to be Negligible. The significance is therefore deemed to be of **Negligible** significance, which is not significant in terms of the EIA Regulations.

Table 9.28: Modelled 24-hour mean NO_x concentrations with and without construction traffic at ecological receptors

Receptor	Without Proposed Development		With Proposed Development		Difference
	Road NO_x ($\mu g\ m^{-3}$)	Total NO_x ($\mu g\ m^{-3}$)	Road NO_x ($\mu g\ m^{-3}$)	Total NO_x ($\mu g\ m^{-3}$)	Total NO_x ($\mu g\ m^{-3}$)
SAC, SPA, Ramsar, SSSI 1	13.97	36.56	14.88	37.47	0.91
SSSI	46.91	69.50	47.54	70.13	0.63
SAC, SPA, Ramsar, SSSI 2	10.95	33.08	11.10	33.23	0.15
SAC, SPA, Ramsar, SSSI 3	10.82	31.77	10.97	31.92	0.15
SAC, SPA, Ramsar, SSSI 4	14.43	35.38	14.63	35.58	0.20

9.10.38 Deposition rates of nitrogen onto ecological receptors are shown in Table 9.29, for the Without Proposed Development and With Proposed Development cases. These concentrations may be compared with a minimum critical load of 8 kg N ha^{-1} yr^{-1}. It shows that the increase in concentrations due to the proposed development is well below 0.1 $\mu g\ m^{-3}$ and is below 1% of the critical load at all receptors. The additional contribution from the construction traffic is therefore not significant. The magnitude of the impact is therefore considered to be Negligible. The significance is therefore deemed to be of **Negligible** significance, which is not significant in terms of the EIA Regulations.

Table 9.29: Modelled nitrogen deposition rates with and without construction traffic

Distance from kerb	Without Proposed Development	With Proposed Development	Difference
	Road N (kg N ha^{-1} yr^{-1})	Road N (kg N ha^{-1} yr^{-1})	Road N (kg N ha^{-1} yr^{-1})
SAC, SPA, Ramsar, SSSI 1	0.12	0.12	<0.01
SSSI	0.79	0.85	0.05
SAC, SPA, Ramsar, SSSI 2	2.59	2.63	0.03
SAC, SPA, Ramsar, SSSI 3	0.63	0.64	0.01
SAC, SPA, Ramsar, SSSI 4	0.60	0.61	0.01

9.10.39 Deposition rates of acidity onto ecological receptors are shown in Table 9.30, for the Without Proposed Development and With Proposed Development cases. These concentrations may be compared with a minimum MinCLminN of 0.223. It shows that the increase in concentrations due to the proposed development is well below 1% of the critical load at all receptors. The additional contribution from the construction traffic is therefore not significant. The magnitude of the impact is therefore considered to be Negligible. The significance is therefore deemed to be of Negligible significance, which is not significant in terms of the EIA Regulations.

Table 9.30: Modelled acidity deposition rates with and without construction traffic

Distance from kerb	Without Proposed Development	With Proposed Development	Difference
	Road N (keq ha^{-1} yr^{-1})	Road N (keq ha^{-1} yr^{-1})	Road N (keq ha^{-1} yr^{-1})
SAC, SPA, Ramsar, SSSI 1	0.01	0.01	0.0002
SSSI	0.06	0.06	0.0037
SAC, SPA, Ramsar, SSSI 2	0.19	0.19	0.0024
SAC, SPA, Ramsar, SSSI 3	0.04	0.05	0.0006
SAC, SPA, Ramsar, SSSI 4	0.04	0.04	0.0006

Temporary increases in odour during construction

9.10.40 There is a risk of temporary odour from the construction phase due to excavation works in the historic landfill within the Country Park. A simple risk-based assessment based on IAQM (IAQM, 2014b) guidance has therefore been carried out.

9.10.41 The exact nature of the landfill will not be known until site investigations are complete later in 2018. However, it is likely that the source odour potential is Large, given that odour from landfill is potentially in the "Most Offensive" category.

9.10.42 The pathway effectiveness is considered to be Moderately Effective, given that the sources of odour will be in a confined underground space, which will reduce wind flow across the surfaces, so that passive diffusion is the main way of transporting odours from the source to the ambient air.

9.10.43 The receptor sensitivity is classified as Medium, since the Country Park meets the following description from the IAQM (IAQM, 2014b) guidance:

- *"Land where users would expect to enjoy a reasonable level of amenity but wouldn't necessarily expect to enjoy the same level of amenity as in their home;*
- *"People wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land; or*
- *"Examples may include ... playing/recreation fields."*

9.10.44 Given the large source odour potential, moderately effective pathway effectiveness, and the Medium receptor sensitivity, the likely magnitude of odour effect is categorised as Slight adverse in the IAQM (2014b) guidance.

9.10.45 The odour source will only be present temporarily, during that part of construction work between excavating and refilling the trench. This is in contrast to the typical development for which the IAQM (2014b) guidance is designed, which are permanent sources of odour. In view of this, the overall magnitude of the impact is therefore considered to be Low and the sensitivity of the receptor as Medium. The significance is therefore deemed to be of **Minor** significance, which is not significant in terms of the EIA Regulations.

9.11 Environmental assessment: O&M phase

9.11.1 The potential impacts during the O&M phase of the proposed development are likely to be Negligible. Operation of the proposed built infrastructure (the substation and maintenance of the onshore cable) and maintenance activities would not lead to a significant change in vehicle flows within the study area or other significant sources of emissions of air pollutants, dust or odour.

9.11.2 Estimated traffic flows for the O&M phase are approximately 50 round-trips per day by light vehicle, equivalent to a two-way AADT of about 70, plus approximately 48 round trip HGV movements per year, equivalent to a two-way AADT of 0.3. These flows are below the indicative AADT criteria for undertaking a detailed air quality assessment under IAQM guidance (IAQM, 2017). Therefore, effects are deemed to be **Negligible** against the agreed criteria and therefore no further assessment is necessary. The magnitude of the impact is therefore considered to be Negligible. The significance is therefore deemed to be of **Negligible** significance, which is not significant in terms of the EIA Regulations.

9.12 Environmental assessment: decommissioning phase

Temporary increases in dust soiling from decommissioning activities on human and ecological receptors

9.12.1 No decision has been made regarding the final decommissioning for the onshore components of Thanet Extension; however, at the end of the operational life of the project, it is likely that onshore cables would be removed from the ducts and recycled, with TJBs capped, sealed and left *in situ*. Where it is preferable to do so, cables could be cut and left *in situ*, if it is deemed closer to the time that removing would have a greater impact than leaving *in situ*.

9.12.2 The programme for decommissioning is expected to be similar in duration to the construction phase. Any final decommissioning methodology will adhere to industry best practice, rules and regulations at the time of decommissioning. The detailed activities and methodology for decommissioning will be determined later within the project lifetime, but would be expected to include:

- Dismantling and removal of electrical equipment;
- Removal of cabling from site where required (or cutting and leaving *in situ*);
- Removal of any building services equipment;
- Demolition of the buildings and removal of fences; and
- Landscaping and reinstatement of the site.

9.12.3 The same methodology and receptors apply as for the construction dust assessment.

9.12.4 It is estimated that the total building volume of the substation, according to the maximum design envelope, will be just over 20,000 m^3 (indicative of medium demolition magnitude) and include potentially dusty construction material (e.g. concrete). As a result, the dust emission magnitude for the demolition phase of the proposed development is considered to be Medium, as defined by the IAQM dust from demolition and construction guidance (IAQM, 2014a).

9.12.5 There are fewer than 10 residential and commercial properties located within 50 m of the proposed development RLB, and fewer than 100 within 100 m. Therefore, the sensitivity of the current area with respect to dust soiling effects on people and property in relation to demolition activities during decommissioning is considered to be Low, based on IAQM guidance.

9.12.6 The maximum estimated existing background PM_{10} concentration at the proposed development is 15.6 μgm^{-3} (taken from Defra background maps). Given that there are fewer than 10 residential and commercial properties located within 50 m of the proposed development RLB, and fewer than 100 within 100 m. The sensitivity of the area with respect to human health impacts in relation to demolition during decommissioning is 'Low', as defined by IAQM guidance.

9.12.7 There are ecological sites located within 20 m of future demolition activities. The sensitivity of the area with respect to dust soiling effects on ecological receptors in relation to earthworks and construction is therefore also considered to be 'High'.

9.12.8 The sensitivity of the surrounding area is summarised in Table 9.31.

Table 9.31: Sensitivity of surrounding site as defined by IAQM (2014a) guidance

Potential impact	Sensitivity of the surrounding area to demolition during decommissioning
Dust Soiling	Low
Human Health	Low
Ecological Receptors	High

9.12.9 The dust emission magnitude classes combined with the sensitivity of surrounding area classes, result in the site risk categories shown in Table 9.32.

Table 9.32: Construction dust summary of dust risk for demolition decommissioning as defined by IAQM (2014a) guidance

Potential impact	Risk
Dust Soiling	Low Risk
Human Health	Low Risk
Ecological	Medium Risk

9.12.10 The IAQM (2014a) guidance considers the risk of effects in the absence of mitigation measures so that the mitigation approach can be developed accordingly. Before mitigation measures are applied, the impact of construction dust is assessed to be 'Low Risk' for dust soiling and human health and 'Medium Risk' for Ecological receptors for demolition activities during the decommissioning phase.

9.12.11 Before dust control measures are applied, the decommissioning phase is assessed to be of temporary Moderate adverse significance in regard to the effects on ecological receptors; this would be significant in terms of the EIA Regulations. The decommissioning phase is assessed to be of temporary Low adverse significance in regard to effects on dust soiling and human health; this would not be significant in terms of the EIA Regulations. There are no predicted permanent or long-term impacts, so the significance will be Negligible in the long-term.

9.12.12 The IAQM (2014a) guidance states that "*For almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be 'not significant'.*" (IAQM, 2014a, page 28). The impact, which would affect receptors directly, is considered to be potentially high, before dust controls; however, with the application of controls, the risk of impacts would be expected to be reduced such that the effect is not significant. The finding that without dust controls there would be a significant impact has helped inform the mitigation measures to be applied (section 9.9). Furthermore, the impact is predicted to be of local spatial extent, short-term duration, intermittent and effects are not anticipated to continue beyond the construction phase (i.e. they are predominantly reversible). The magnitude of impact with the dust controls in place will, therefore, be Negligible. The significance is therefore deemed to be of **Negligible** significance, which is not significant in terms of the EIA Regulations.

Temporary increases in traffic based air quality pollutant concentrations – human and ecological receptor locations.

9.12.13 Traffic flows associated with decommissioning are expected to be comparable with or lower than those from construction. Given that all air quality impacts from construction traffic are comfortably within assessment levels, and given that emission factors for road vehicles will continue to fall over coming years and decades, it is not plausible that impacts from decommissioning will be greater than from construction. The magnitude of the impact is therefore considered to be Negligible. The significance is therefore deemed to be of **Negligible** significance, which is not significant in terms of the EIA Regulations.

9.13 Environmental assessment: cumulative effects

9.13.1 Cumulative effects refer to effects upon receptors arising from Thanet Extension when considered alongside other proposed developments and activities and any other *reasonably foreseeable project(s)* proposals. In this context the term *projects* is considered to refer to any project with comparable effects and is not limited to offshore wind projects.

9.13.2 The approach to cumulative assessment for Thanet Extension takes into account the Cumulative Impact Assessment Guidelines issued by RenewableUK in June 2013, together with comments made in response to other renewable energy developments within the Southern North Sea, and the Planning Inspectorate (PINS) 'Advice Note 9: Rochdale Approach'. The relevant projects, the suggested tiers, and the Cumulative Impact Assessment approach conducted for Thanet Extension have been agreed with the stakeholders under the auspices of the EIA Evidence Plan (Document Ref: 8.5).

9.13.3 In assessing the potential cumulative impact(s) for Thanet Extension, it is important to bear in mind that some projects, predominantly those 'proposed' or identified in development plans etc. may or may not actually be taken forward. There is thus a need to build in some consideration of certainty (or uncertainty) with respect to the potential impacts which might arise from such proposals. For example, relevant projects/ plans that are already under construction are likely to contribute to cumulative impact with Thanet Extension (providing effect or spatial pathways exist), whereas projects/ plans not yet approved or not yet submitted are less certain to contribute to such an impact, as some may not achieve approval or may not ultimately be built due to other factors.

9.13.4 For this reason, all relevant projects/ plans considered cumulatively alongside Thanet Extension have been allocated into 'Tiers', reflecting their current stage within the planning and development process. This allows the cumulative impact assessment to present several future development scenarios, each with a differing potential for being ultimately built out. Appropriate weight may therefore be given to each scenario (Tier) in the decision making process when considering the potential cumulative impact associated with Thanet Extension (e.g., it may be considered that greater weight can be placed on the Tier 1 assessment relative to Tier 2).

9.13.5 The projects and plans selected as relevant to the assessment of impacts to air quality are based upon an initial screening exercise undertaken on a long list. Each project/ plan or activity has been considered and scoped in or out on the basis of effect–receptor pathway, data confidence and the temporal and spatial scales involved.

9.13.6 The proposed tier structure that is intended to ensure that there is a clear understanding of the level of confidence in the cumulative assessments provided in Thanet Extension ES is as follows:

Tier 1

9.13.7 Thanet Extension is considered alongside other projects/ plans currently under construction and/ or those consented but not yet implemented, and/ or those submitted but not yet determined where data confidence for the projects falling within this category is high.

Tier 2

9.13.8 All projects included in Tier 1 plus other projects/ plans consented but not yet implemented and/ or submitted applications not yet determined where data confidence for the projects falling into this category is medium.

Tier 3

9.13.9 The above plus projects on relevant plans and programmes (the PINS Programme of Projects and other appropriate planning portals. Specifically, all projects where the developer has advised PINS in writing that they intend to submit an application in the future were considered.

9.13.10 The specific projects scoped into this cumulative impact assessment, and the tiers into which they have been allocated are presented in Table 9.33 below. The operational projects included within Table 9.33 are included due to their completion/ commission subsequent to the data collection process for Thanet Extension and as such not included within the baseline characterisation.

Table 9.33: Projects for cumulative assessment

Development type	Project	Status	Data confidence assessment/ phase	Tier
Solar Farm	Thanet Solar Ltd, Land West of Richborough Power Station, Ramsgate Road	Permission granted, construction started	High - Third party project details published in the public domain.	Tier 1
Richborough Connection electricity transmission connection	Richborough Energy Park	Development consent granted	High - Third party project details published in the public domain.	Tier 1

9.13.11 The cumulative Rochdale Envelope is described in Table 9.34.

Table 9.34: Cumulative Rochdale envelope

Impact	Scenario	Justification
Cumulative temporary construction dust impacts	Assess committed developments within 350 m of the proposed development RLB during the construction phase where the cumulative impact of windblown dust could occur at nearby receptors.	The potential dust emission magnitude for construction activities associated with the residential dwellings and supporting infrastructure is considered to be large, assuming that the total building volume will be over 100,000 m^3, as a worst-case approach. As a result of the size of the proposed development, there is potential for over 50 HGV movements per day and the length of unpaved road is likely to exceed 100 m. The dust emission magnitude for the effects of trackout is considered to be large as a worst-case approach.
Cumulative impacts of increase in traffic based air quality pollutant concentrations	Assess committed developments within the vicinity of the proposed development that may have construction traffic using the same route, at the same time, as the proposed development where there is a chance of: • LDV flows greater than 100 AADT within and adjacent to an AQMA or 500 AADT elsewhere, and/ or • HGV flows greater than 25 AADT within and adjacent to an AQMA or 100 AADT elsewhere.	To determine if cumulative construction trips from multiple sites would result in significant increases in traffic flows according to IAQM (2017) guidance.

9.13.12 A shortlist of committed developments in the vicinity of Thanet Extension (Volume 1, Chapter 3: Cumulative Impact Assessment — Methodology and Project List (Document Ref: 6.1.3.1)) has been agreed with stakeholders and assessed to determine the potential cumulative effect with the proposed development. Of these committed developments, only two have the potential to cause cumulative impacts in terms of construction dust emitted from the proposed development. These are the Thanet Solar Ltd. Solar Farm and the Richborough Connection project. These are the only developments considered that are within the IAQM's 350 m buffer for the potential of windblown dust, so are the only developments with the potential to cause a cumulative dust emission impact. Other developments, which are at greater distances, are mainly residential developments or small industrial units; these may generate road traffic which would be additional to the Thanet Extension traffic.

9.13.13 The impact from either of the Solar Farm or Richborough Connection developments, which would affect receptors directly, is considered to be potentially high, before dust controls; however, with the application of controls included in the respective projects' CoCPs, the risk of impacts would be expected to be reduced such that the effect is not significant. Furthermore, due to the fact that the impact is predicted to be of local spatial extent and short-term duration, effects are not anticipated to continue beyond the construction phase (i.e. they are predominantly reversible).

9.13.14 The committed Thanet Solar Ltd. Solar Farm will be located within 350 m of the proposed development RLB, which is the maximum distance that windblown dust is likely to travel from Thanet Extension RLB as determined in accordance with the IAQM (2014a) guidance. Therefore, there may be the potential for dust from both sites to cause a cumulative effect to sensitive ecological receptors (there are no human receptors within 350 m of the Solar Farm site). However, it is understood that construction of this installation has already started, so may well be completed before construction of the Thanet Extension is able to start. It should also be noted that both developments include the commitment to produce a CoCP, and with the application of controls included in the respective CoCPs, the risk of impacts would be expected to be reduced such that the effect is not significant. Furthermore, the application of additional mitigation measures determined during the outcome of the dusk risk assessment, and due to the fact that the impact is predicted to be of local spatial extent and short-term duration, effects are not anticipated to continue beyond the construction phase (i.e. they are predominantly reversible).

9.13.15 The committed Richborough Connection project will be located within 350 m of the proposed development RLB, which is the maximum distance that windblown dust is likely to travel from Thanet Extension RLB as determined in accordance with the IAQM (IAQM, 2014a) guidance. Therefore, there may be the potential for dust from both sites to cause a cumulative effect to sensitive human and ecological receptors. The programme for construction of the Richborough Connection extends to mid-2021, with broadly speaking most construction of the new installation taking place during 2018 and 2019 and decommissioning of existing infrastructure during 2020 and 2021. It is therefore likely that there will be simultaneous construction activity from the Richborough Connection and Thanet Extension projects, perhaps for as much as 2 years, but the peak of Richborough Connection construction will take place before the Thanet Extension works start. It should be noted that both developments include the commitment to produce a CoCP, and with the application of controls included in the respective CoCPs, the risk of impacts would be expected to be reduced such that the effect is not significant. Furthermore, the application of additional mitigation measures determined during the outcome of the dusk risk assessment, and due to the fact that the impact is predicted to be of local spatial extent and short-term duration, effects are not anticipated to continue beyond the construction phase (i.e. they are predominantly reversible).

9.13.16 As far as the cumulative impact of traffic from any of the other developments is concerned, the assessment above shows that the impacts from Thanet Extension are sufficiently below assessment levels that other developments would have to generate about ten times as much traffic as Thanet Extension for the cumulative effect to be significant. The other developments would also have to generate this additional traffic during the short period of Thanet Extension construction phase. In fact, the traffic assessment (Volume 3, Chapter 8: Traffic and Access (Document Ref: 6.3.8)) shows that no significant cumulative impacts to traffic due to other developments, so there will be no cumulative effects on air quality. The magnitude of the cumulative impact is therefore considered to be Negligible. The significance is therefore deemed to be of **Negligible** significance, which is not significant in terms of the EIA Regulations.

9.14 Inter-relationships

9.14.1 Inter-related impacts concern the accumulation of impacts on a single receptor between air quality and other environmental disciplines. It is considered likely that during the construction phase, human receptors impacted by air quality are also likely to be affected by traffic and noise impacts, which is considered in in Volume 3 Chapter 8: Traffic and Access (Document Ref: 6.3.8) and in Volume 3 Chapter 10: Noise and Vibration (Document Ref: 6.3.10) respectively. It is not anticipated that these inter-relationships will lead to any significant effects.

9.15 Mitigation

9.15.1 The embedded mitigation measures described in Table 9.16 have been demonstrated to avoid significant adverse effects therefore no additional mitigation is proposed.

9.16 Summary of effects

Table 9.35: Summary of predicted effects of Thanet Extension

Description of Impact	Effect	Possible mitigation measures	Residual effect
Construction			
Increase in road traffic generated air quality pollutant concentrations from construction traffic – human receptor locations	**Negligible** (not significant)	None required	**Negligible** (not significant)
Increase in road traffic generated air quality pollutant concentrations – ecological habitats	**Negligible** (not significant)	None required	**Negligible** (not significant)
Construction dust impacts – human receptors	**Negligible** (not significant)	None required	**Negligible** (not significant)
Construction dust impacts – ecological habitats	**Negligible** (not significant)	None required	**Negligible** (not significant)
Construction odour impacts	**Negligible** (not significant)	None required	**Negligible** (not significant)
Operation			
Increase in road traffic generated air quality pollutant concentrations – human receptor locations	**Negligible** (not significant)	None required	**Negligible** (not significant)
Increase in road traffic generated air quality pollutant concentrations – ecological receptor locations	**Negligible** (not significant)	None required	**Negligible (**not significant)
Decommissioning			
Demolition dust impacts – human receptors	**Negligible** (not significant)	**None required**	**Negligible** (not significant)
Demolition dust impacts – ecological habitats	**Negligible** (not significant)	None required	**Negligible** (not significant)
Cumulative effects			
Cumulative impacts of construction dust effects for all committed developments in the area	**Negligible** (not significant)	None Required	**Negligible** (not significant)
Cumulative impacts of demolition dust effects during decommissioning for all cumulative developments in the area	**Negligible** (not significant)	None Required	**Negligible** (not significant)

Description of Impact	Effect	Possible mitigation measures	Residual effect
Cumulative impacts of increase in construction road traffic generated air quality pollutant concentrations – human receptor locations	**Negligible** (not significant)	None required	**Negligible** (not significant)
Cumulative impacts of increase in construction road traffic generated air quality pollutant concentrations – ecological receptor locations	**Negligible** (not significant)	None required	**Negligible** (not significant)

References

- Defra in partnership with the Scottish Executive, Welsh Assembly Government and Department of the Environment Northern Ireland (2007), 'The Air Quality Strategy for England, Scotland, Wales and Northern Ireland';
- DDC (2016), 'Annual Status Report';
- Official Journal of the European Union (2008), 'Directive 2008/50/EC of the European Parliament and of The Council of 21 May 2008 on ambient air quality and cleaner air in Europe';
- Official Journal of the European Union (2004), 'Directive 2004/107/EC of the European Parliament and of The Council of 15 December 2004 relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air';
- The Stationery Office Limited (2010), 'Statutory Instrument 2010 No. 1001 Environmental Protection – The Air Quality Standards Regulation 2010';
- The Stationery Office Limited (2007), 'Statutory Instrument 2010 No. 64 Environmental Protection – The Air Quality Standards Regulation 2007';
- HMSO (1995), 'Environment Act 1995';
- British Standards Institute (1994), 'BS 6069-2:1994, ISO 4225:1994. Characterization of air quality';
- Cambridge Environmental Research Consultants (2017), 'ADMS-Roads', http://www.cerc.co.uk/environmental-software/ADMS-Roads-model.html [Accessed: March 2018];
- Defra (2016), 'Local Air Quality Management Technical Guidance LAQM.TG (16)';
- Defra (2017a), 'Background Mapping data for local authorities'. https://uk-air.defra.gov.uk/data/laqm-background-home [Accessed: March 2018];
- Defra (2017b) 'Emissions Factors Toolkit';
- Department for Communities and Local Government (DCLG) (2012), 'National Planning Policy Framework';
- Department for Communities and Local Government (2014), 'National Planning Practice Guidance – Air Quality';
- Department of Energy and Climate Change (DECC) (2011), 'Overarching National Policy Statement for Energy (EN-1)';
- Institute of Air Quality Management (IAQM) (2014a), 'Guidance on the Assessment of Dust from Demolition and Construction';
- Institute of Air Quality Management (IAQM) (2014b), 'Guidance on the Assessment of Odour for Planning;
- EPUK and IAQM (2017), 'Land-Use Planning and Development Control: Planning For Air Quality. Updated January 2017';
- Kent and Medway Air Quality Partnership (2015), 'Air Quality Planning Guidance';
- Mayor of London (2013), 'The Control Of Dust And Emissions During Construction And Demolition: Supplementary Planning Guidance';
- TDC (no date), 'Thanet Local Plan 2006 Saved Policies', https://www.thanet.gov.uk/your-services/planning-policy/thanets-current-planning-policy/thanet-local-plan-2006/ [Accessed: March 2018];
- TDC (2018), 'Guidance for small scale building sites', https://www.thanet.gov.uk/your-services/noise-and-air-quality/nuisance-noise/small-scale-building-sites/ [Accessed: March 2018]; and
- TDC (2016), 'Annual Status Report'.

Glossary

- *ADMS-Roads* – A software tool dispersion modelling marketed by Cambridge Environmental Research Consultants;

- *Air Quality Management Area* – If a Local Authority identifies any locations within its boundaries where the Air Quality Objectives are not likely to be achieved, it must declare the area as an Air Quality Management Area (AQMA). The area may encompass just one or two streets, or it could be much bigger. The Local Authority is subsequently required to put together a plan to improve air quality in that area - a Local Air Quality Action Plan;

- *Air Quality Objectives* - The Air Quality Objectives are policy targets generally expressed as a maximum ambient concentration to be achieved, either without exception or with a permitted number of exceedances, within a specified timescale. The Objectives are set out in the UK Government's Air Quality Strategy for the key air pollutants;

- *Annual Mean* – The annual mean is the average concentration of a pollutant measured over one year. This is normally for a calendar year, but some species are reported for the period April to March, which is known as a pollution year. This period avoids splitting a winter season between two years, which is useful for pollutants that have higher concentrations during the winter months;

- *Automatic Monitoring* – Monitoring is usually termed "automatic" or "continuous" if it produces real-time measurements of pollutant concentrations. Automatic fixed point monitoring methods exist for a number of pollutants, providing high resolution data averaged over very short time periods;

- *Construction* – used both to refer to the whole construction phase of a project, and more specifically to refer to an activity involved in the provision of a new structure (building, road, etc.);

- *Data Capture* - "Data capture" is the term given to the percentage of measurements for a given period that were validly measured;

- *Demolition* - an activity involved with the removal of an existing structure or structures;

- *Diffusion tubes* – Passive diffusion tube samplers collect nitrogen dioxide and other pollutants by molecular diffusion along an inert tube to an efficient chemical absorbent. After exposure for a known time, the absorbent material is chemically analysed and the concentration calculated;

- *Dispersion modelling* – Dispersion modelling is a means of calculating air pollution concentrations using information about the pollutant emissions and the nature of the atmosphere;

- *Earthworks* - the processes of soil-stripping, ground-levelling, excavation and landscaping;

- *EU Directives* – The European Union has been legislating to control emissions of air pollutants and to establish air quality objectives since the early 1970s. European Directives on ambient air quality require the UK to undertake air quality assessment, and to report the findings to the European Commission on an annual basis;

- *Exceedance* - An exceedance defines a period of time during which the concentration of a pollutant is greater than, or equal to, the appropriate air quality criteria. For Air Quality Standards, an exceedance is a concentration greater than the Standard value;

- *Local Air Quality Management* – The Local Air Quality Management (LAQM) process requires Local Authorities to periodically review and assess the current and future quality of air in their areas;

- *Micrograms per cubic metre ($\mu g\ m^{-3}$)* – A measure of concentration in terms of mass per unit volume. A concentration of 1 $\mu g\ m^{-3}$ means that one cubic metre of air contains one microgram (10-6 grams) of pollutant;

- *Particulate Matter* – Airborne Particulate Matter (PM) includes a wide range of particle sizes and different chemical constituents. It consists of both primary components, which are emitted directly into the atmosphere, and secondary components, which are formed within the atmosphere as a result of chemical reactions; and

- *Trackout* - the transport of dust and dirt from the site onto the public road network. This arises when vehicles leave site with dusty materials or transfer dust and dirt onto the road having travelled over muddy ground on-site.