FOREWIND

DOGGER BANK
TEESSIDE A & B

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Environmental Statement
Chapter 30 Air Quality

Application Reference: 6.30

Cover photograph: Indicative image showing installation of meteorological mast within the Dogger Bank Zone

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1 Introduction

1.1 Background

1.1.1 This chapter of the Environmental Statement (ES) assesses the potential air quality impacts, at identified onshore receptor locations, associated with the proposed onshore and offshore works for Dogger Bank Teesside A & B during the construction, operation and decommissioning phases. Where the potential for impacts is identified, mitigation measures and residual impacts are presented.

1.1.2 Potential dust emissions associated with onshore construction activities in addition to vehicle exhaust emissions from construction, operational and decommissioning activities associated with both onshore and offshore activities are considered with regard to their impact on air quality at existing onshore sensitive residential receptor locations. The scope and methodology of the air quality assessment was agreed with the relevant stakeholders as part of the consultation process.

1.1.3 Other local community impacts are addressed in **Chapter 20 Seascape and Visual Impact Assessment**, **Chapter 21 Landscape and Visual Character**, **Chapter 23 Tourism and Recreation**, **Chapter 28 Traffic and Access** and **Chapter 29 Noise and Vibration**.

2 Guidance and Consultation

2.1 Policy and guidance

National Policy Statement

2.1.1 The assessment of potential impacts upon air quality receptors has been made with specific reference to the relevant National Policy Statements (NPS). These are the principal decision making documents for Nationally Significant Infrastructure Projects (NSIP). Those relevant to Dogger Bank Teesside A & B are:

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

2.1.2 The specific assessment requirements for air quality, as detailed in the NPS, are summarised in **Table 2.1**, together with an indication of the section of this chapter where each is addressed. Where any part of the NPS has not been followed within the assessment, an explanation as to why the requirement was not deemed relevant, or has been met in another manner, is provided.

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

Table 2.1 NPS assessment requirements

NPS Requirements	NPS Reference	ES Reference
Any ES chapter on air emissions will include an assessment of CO_2 emissions, but the policies set out in Section 2 [of EN-1], including the EU ETS, apply to these emissions. The IPC does not therefore need to assess individual applications in terms of carbon emissions against carbon budgets.	EN-1 paragraph 5.2.2	Not Applicable to Assessment
The ES should describe: • Any significant air emissions, their mitigation and any residual effects distinguishing between the project stages and taking account of any significant emissions from any road traffic generated by the project; • The predicted absolute emission levels of the proposed project, after mitigation methods have been applied; • Existing air quality levels and the relative change in air quality from existing levels; and • Any potential eutrophication impacts.	EN-1 paragraph 5.2.7	Sections 4, 6 and 7. Eutrophication impacts are not relevant to this proposal and have not been considered.

National Planning Policy

2.1.4 In paragraph 4.1.5 of the NPS EN-1, it is stated that:

"The energy NPSs have taken account of relevant Planning Policy Statements (PPSs) and older style Planning Policy Guidance Notes (PPGs) in England where appropriate."

2.1.5 The intention appears to be that no specific regard should be given to PPSs or PPGs or any successor policies, i.e. the National Planning Policy Framework (NPPF) (unless they are specifically highlighted within the NPS). There are no references to any other PPSs or PPGs within the assessment criteria for air quality as such; national planning policy has not been separately reviewed here.

Local Planning Policy

2.1.6 EN-1 states at paragraph 4.1.5 that:

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

2.1.7 In relation to Dogger Bank Teesside A & B, Policy 37 (Air Quality) of the Regional Spatial Strategy for the North East (CLG 2008) and Redcar & Cleveland Borough Councils (RCBC) Local Development Framework (LDF) Policy DP6 Pollution Control, and are considered relevant to the assessment of air quality impacts.

2.1.8 Policy 37 (Air Quality) of the Regional Spatial Strategy for the North East states that:

"Strategies, plans and programmes and planning proposals should:

a) Contribute to sustaining the current downward trend in air pollution in the region;

b) Consider the potential effects of new developments and increased traffic levels on air quality; and

c) Consider the potential impacts of new developments and increased traffic levels on internationally designated nature conservation sites, and adopt mitigation measures to address these impacts".

2.1.9 Policy DP6 Pollution Control of the RCBC LDF Development Polices Development Plan Document states that:

"Development that would give rise to increased levels of noise or vibration or which would add to air, land or water pollution, by itself or in accumulation with existing or other proposed uses, will only be permitted if it is acceptable in terms of:

a) Human health and safety;

b) Environment; and

c) General amenity.

Where pollution is unavoidable, mitigation measures to reduce pollution levels will be required in order to meet acceptable limits."

2.1.10 The RCBC LDF Development Polices Development Plan Document (section 2.17) states that:

"Some types of development may cause pollution to the air, water or land. The Council will ensure levels are kept to a minimum and are acceptable to human health, the environment and the amenity of neighbouring or nearby users".

2.2 Other legislation, standards and guidance

European Union Directives

2.2.1 Air pollution can have adverse effects on the health of humans and ecosystems. European Union (EU) legislation forms the basis for UK air quality policy. The EU Air Quality Framework Directive 96/62/EC on Ambient Air Quality Assessment and Management entered into force in 1996 (European Parliament 1996). Directive 96/62/EC and the first three daughter Directives (1999/30/EC, 2000/69/EC and 2002/3/EC) were combined to form the new European Union Directive 2008/50/EC (European Parliament 2008) on Ambient Air Quality and Cleaner Air for Europe, which came into force in June 2008.

2.3 United Kingdom Air Quality Strategy

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

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

Local Air Quality Management

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

2.3.4 The current Air Quality (England) Standards and objectives are presented in **Table 2.2**. Pollutant standards relate to ambient pollutant concentrations in air, set on the basis of medical and scientific evidence of how each pollutant affects human health. Pollutant objectives incorporate target dates and averaging periods which take into account economic considerations, practicability and technical feasibility.

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

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

Table 2.2 Air quality strategy objectives (England) for the purposes of LAQM

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

Pollutant	Air Quality Objective		To be achieved by and maintained thereafter
	Concentration	Measured as* (Averaging Period)	
		exceeded more than 3 times a year	
	266 µg.m^{-3}	15-minute mean not to be exceeded more than 35 times a year	31/12/2005

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

2.4 Consultation

2.4.1 To inform the ES, Forewind has undertaken a thorough pre-application consultation process, including the following key stages:

- Scoping Report submitted to the Planning Inspectorate (May 2012);
- Scoping Opinion received from the Planning Inspectorate (June 2012);
- First stage of statutory consultation (in accordance with sections 42 and 47 of the Planning Act 2008) on Preliminary Environmental Information (PEI) 1 (report published May 2012); and
- Second stage of statutory consultation (in accordance with sections 42, 47 and 48 of the Planning Act 2008) on the ES (published November 2013) designed to allow for comments before final application to the Planning Inspectorate).

2.4.2 In addition, consultation associated with the Dogger Bank Creyke Beck A & B application (Forewind August 2013) has been taken into account for Dogger Bank Teesside A & B where appropriate.

2.4.3 In between the statutory consultation periods, Forewind consulted specific groups of stakeholders on a non-statutory basis to ensure that they had an opportunity to inform and influence the development proposals. Consultation undertaken throughout the pre-application development phase has informed Forewind's design decision making and the information presented in this application. Further information on the consultation process is presented in **Chapter 7 Consultation**. A Consultation Report is also provided alongside this ES as part of the overall planning submission.

2.4.4 A summary of the consultation carried out at key stages throughout the project, of particular relevance to Air Quality, is presented in **Table 2.3**. This table only includes the key items of consultation that have defined the assessment. A full explanation of how the consultation process has shaped the ES, as well as tables of all responses received during the statutory consultation periods, is provided in the Consultation Report.

Table 2.3 Summary of consultation responses

Date	Consultee	Summary of Response	ES Reference
June 2012 (Scoping Opinion)	IPC	The onshore scoping area does not lie within a designated AQMA. The results of the most up to date Air Quality Progress Report for RCBC should be used to develop the baseline conditions for air quality in the area. The assessment should consider the implications on nearby designated sites, in particular Ramsar, Special Protection Area's (SPA's), Special Areas of Conservation (SAC's) and Site of Special Scientific Interest (SSSI's). Air quality and dust levels should be considered not only on site but also off site, including along access roads, local footpaths and other Public Rights of Way (PRoW). Consideration should be given to the monitoring of and procedure for dealing with, dust complaints during the construction and operation of the development.	Section 6 and 7
June 2012 (Scoping Opinion)	Join Nature Conservation Committee (JNCC)	Scoping Report Chapter 27 Air Quality proposes to scope out offshore sources of air pollution due to the distance from receptors, presumably meaning terrestrial Air Quality Management Area and sensitive habitats. However, it would be helpful to have the contribution of the construction and maintenance works, to wider air quality and climate change, outlined and quantified in the EIA. Best practice for minimising this contribution through all works and materials should also be considered.	Section 6 and 7
December 2012 – January 2013 (Non Statutory)	RCBC	Air quality assessment scope and methodology for air quality assessment sent to RCBC for approval (December 2012). Confirmation of agreement with proposed scope and methodology received January 2013.	Section 3
September 2013 (Non Statutory)	RCBC	Air quality assessment methodology and summary findings were sent for comment. RCBC stated that the methodology was satisfactory. It was requested, to prevent localised impacts on nearby receptors from dust- prior to commencement the Construction Environmental Management Plan ((CEMP) (detailed within the air Quality document)) to prevent or minimise the release of dust entering the atmosphere and/or being deposited on nearby receptors should be provided to the LA for consideration.	Section 3
December 2013 (Statutory)	RCBC	RCBC raised a comment as to whether the beach has been identified as a receptor within the air quality assessment.	Section 4
December 2013 (Statutory)	RCBC	RCBC gave formal written response stating that based on the information within the draft ES, there are no adverse comments to make with regard to the proposed development. It was reiterated as to whether the beach is a receptor and this may need addressing in the final ES.	Paragraph 4.3.13.

3 Methodology

3.1 Study areas

Onshore

3.1.1 Potential air quality impacts have been considered at selected onshore representative receptor locations within 100m of routes used by vehicles on the public highway, 500m from site entrance(s), and at the following distances from the proposed converter stations, cable route, landfall areas, access roads for the development, and the existing National Grid Electricity Transmission (NGET) substation at Lackenby (in accordance with IAQM guidance (IAQM 2012a):

- 0 to 20m;
- 21 to 50m;
- 51 to 100m; and
- 101 to 350m.

3.1.2 Potential air quality impacts have also been considered at selected representative receptor locations within 200m of roads used by construction vehicles, in accordance with Design Manual For Roads and Bridges Guidance (Highways Agency 2007).

3.1.3 The receptor locations and study area are detailed in section 4.4.

Offshore

3.1.4 The Dogger Bank Teesside A&B Export Cable Corridor is approximately 157km long from the Dogger Bank Teesside A & B wind farm landfall to the zone boundary. Potential air quality impacts, at identified onshore receptors, from offshore activities were considered within the identified offshore cable corridor, up to 2km from landfall. It is considered that any offshore activities beyond this distance are unlikely to impact upon air quality at onshore sensitive receptor locations.

3.2 Characterisation of the existing environment

Data sources

3.2.1 The air quality assessment was undertaken with reference to information from a number of sources, as described in **Table 3.1**.

Table 3.1 Key information sources

Data Source	Reference
RCBC	RCBC (2011) Air quality progress report for RCBC
	RCBC (2012) Air quality updating and screening assessment report for RCBC
	RCBC (2013) Air Quality Progress Report for RCBC
Department for Environment Food and Rural Affairs (Defra)	Defra (2009) Local Air Quality Management Technical Guidance TG(09)
Defra's Local Air Quality Management (LAQM) Support Portal	LAQM 1 x 1 km grid background pollutant maps
Environment Agency	Environment Agency (2011) H1 Environmental Risk Assessment Framework: Annex F – Air Emissions
Environmental Protection UK (EPUK)	EPUK (2010) Development Control: Planning for Air Quality 2010 Update
Highways Agency	Highways Agency (2007) Design Manual for Roads and Bridges (DMRB), Volume 11, Section 3, Part 1, HA 207/07
Highways Agency	Highways Agency (2012) Updated air quality advice on the assessment of future NOx and NO2 projections for users of DMRB Volume 11, Section 3, Part 1, HA 170/12
Institute of Air Quality Management (IAQM)	IAQM (2012a) Guidance on the Assessment of the Impacts of Construction on Air Quality and the Determination of their Significance
	IAQM (2012b) Dust and Air Emissions Mitigation Measures
United States Environmental Protection Agency (USEPA)	USEPA (2009) Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories

Baseline air quality conditions

3.2.2 RCBC has published a series of Review and Assessment documents in accordance with the LAQM process as described in Section 2.2. The 2012 LAQM Updating and Screening Assessment (USA) Report (RCBC 2012) and 2011 LAQM Progress Report (RCBC 2011) were obtained from RCBC and reviewed in order to establish the existing conditions along the proposed cable route and at the identified receptor locations.

3.2.3 Background air pollution concentrations corresponding to the 1km x 1km grid squares covering the proposed cable route and identified receptor locations were obtained from the LAQM support tools provided by Defra for use in air quality assessments. Background concentrations for the base year (2013) and anticipated earliest year for start of construction (2015) were obtained to establish baseline air quality concentrations within the study area.

3.2.4 Baseline traffic data for 2013 were used in the DMRB model to predict NO_2 and PM_{10} concentrations at existing sensitive receptors in proximity to the assessed road network.

3.3 Assessment of impacts

Construction phase dust emissions

3.3.1 The Institute of Air Quality Management (IAQM) published a guidance document (IAQM 2012a) for the assessment of construction phase impacts. The risk category of the construction site is assessed and used to specify the level of mitigation required. Descriptors for magnitude of impact and impact significance used in the assessment of construction phase dust emissions are taken from the IAQM guidance and are outlined in **Appendix 30A**. The risk category for potential dust effects arising from site works is defined by four potential activities; Demolition, Earthworks, Construction and Trackout[1].

3.3.2 **Step one** of the IAQM best practice guidance (IAQM 2012a) provides a screening criteria stating that a construction phase dust assessment will normally be required where there are sensitive receptors within 350m of the boundary of the site and/or within 100m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s). The distance criterion is based on guidance which takes into account the exponential decline in airborne particulate concentrations and the rate of deposition, and is regarded as conservative.

3.3.3 **Step two** assesses the risk of dust effects and is determined by the scale and nature of the works, which determines the risk of dust arising and the proximity of sensitive receptors to these potential risks. Risks are described in terms of there being a low, medium or high risk of dust effects for each of the four separate potential activities.

3.3.4 **Step three** provides appropriate site-specific mitigation measures. These measures are proportionate to the level of risk identified in the steps above. For those cases where the risk is assigned as 'negligible', no mitigation measures beyond those required by legislation are required.

3.3.5 **Step four** determines the overall significance of the effects arising from the construction phase. The sensitivity of the area surrounding the development is combined with the risk of the site giving rise to dust effects, identified in Step two, to define the significance of the effects for each of the activities.

[1] 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.

Construction phase traffic emissions

3.3.6 The DMRB model, and the Highways Agency Interim Advice Note 170/12[2] were used to assess the impact on local air quality of development-generated construction vehicle exhaust emissions on concentrations of NO_2 and PM_{10} at existing receptors located adjacent to the assessed road network. The assessment considered the following scenarios:

- Scenario 1 – base year (2013);
- Scenario 2 – earliest construction start year (2015) 'without construction traffic'; and
- Scenario 3 – earliest construction start year (2015) 'with construction traffic (detailed below)'.

3.3.7 Descriptors for magnitude of impact and impact significance used in the assessment of construction traffic emissions are taken from EPUK guidance and are outlined in paragraph 3.4.3.

Traffic data

3.3.8 Traffic data were provided by Royal HaskoningDHV (**Chapter 28**). The data were considered to be representative of local traffic movements for the scenarios assessed. The data were provided as 24 hour Annual Average Daily Traffic (AADT) flows for the following roads:

- Tees Dock Road;
- A66;
- B1380;
- A174;
- B1269;
- Redcar Road; and
- A1085.

3.3.9 Full details of the DMRB modelling, including traffic data composition and the average speed of vehicles for each assessed road, are presented within **Appendix 30B**.

Model verification

3.3.10 Model verification is the process of adjusting model outputs to improve the consistency of modelling results with respect to available monitored data. In this assessment, model uncertainty was minimised following Defra and EPUK guidance, however, model output adjustment could not be undertaken due to absence of monitoring data within the study area. As the modelled pollutant concentrations for the 'with development' scenario are well below the Air Quality

[2] Updated air quality advice on the assessment of future NO_x and NO_2 projections for users of DMRB Volume 11, Section 3, Part 1 Air Quality) (Highways Agency 2012)

objectives the lack of monitoring data with which to adjust model output is not seen as significant.

Background concentrations

3.3.11 The DMRB model requires the derivation of background pollutant concentration data that are factored to the year of assessment (2013 and 2015), to which the model adds contributions from the assessed roads.

3.3.12 There are no background monitoring locations in the vicinity of the proposed development and receptor locations, therefore background NO_x, NO_2 and PM_{10} concentrations were obtained from the Defra LAQM support tools for the 1km x 1km grid squares covering the study area (including receptor locations) for the years of assessment (2013 and 2015).

Construction phase Non-Road Mobile Machinery (NRMM)

3.3.13 The effects of emissions from NRMM are dependent upon a variety of factors including operational on-times, loading, ground and meteorological conditions, and are difficult to quantify accurately. As a result, emissions from NRMM were considered qualitatively within the context of existing air quality conditions and the transient nature of the onshore construction activities.

Construction phase marine vessel exhaust emissions

3.3.14 Potential impacts on local air quality from marine vessel exhaust emissions were assessed qualitatively with reference to proposed works and distance to sensitive receptor locations.

Operational phase impacts (onshore)

3.3.15 The potential impacts on local air quality associated with the onshore operational phase have been assessed.

Operational phase impacts (offshore)

3.3.16 The potential impacts on local air quality associated with the offshore operational phases were assessed qualitatively with reference to proposed works and distance to sensitive receptor locations.

Decommissioning

3.3.17 The potential air quality impacts associated with the decommissioning phase were assessed qualitatively with reference to the potential impacts associated with the construction phase.

3.4 Assessment criteria

Construction phase dust emissions

3.4.1 The predicted impact of any dust emissions from the construction of the proposed development were assessed in accordance with guidance provided by the IAQM (IAQM 2012a). To determine the significance of dust effects associated with the construction phase, the sensitivity of the study area was defined utilising the criteria outlined in **Table 3.2**.

Table 3.2 Sensitivity of the onshore area surrounding the site

Sensitivity	Human / Residential Receptors	Ecological Receptors
Very High	• Very densely populated area; • >100 dwellings within 20m; • Local PM_{10} concentrations exceed the objective; • Contaminated building present; • Very sensitive receptors (e.g. oncology units); and • Works continuing in one area of the site for more than 1 year.	European Designated Site
High	• Densely populated area; • 10 - 100 dwellings within 20m; • Local PM_{10} concentrations close to the objective; • (annual mean 36 - 40 µg.m^{-3}); and • Commercially sensitive horticultural land within 20m.	Nationally Designated Site
Medium	• Suburban or edge of town area; • <10 dwellings within 20m; • Local PM_{10} concentrations below the objective; and • (annual mean 30 – 36 µg.m^{-3}).	Locally Designated Site
Low	• Rural or industrial area; • No receptor within 20m; • Local PM_{10} concentrations well below the objective (<75%); and • Wooded area between site and receptors.	No Designations

3.4.2 The predicted impact is determined through the interaction of sensitivity of the onshore receptor identified and risk of the construction activities within the site giving rise to dust effects. The impact significance is detailed in Table A6 and Table A7 of **Appendix 30A** for both with mitigation and without mitigation in place respectively.

Construction phase vehicle exhaust emissions

3.4.3 The EPUK guidance document 'Development Control: Planning for Air Quality 2010 Update' (EPUK 2010) provides an example of criteria for magnitude of change and related level of impacts as a result of a development. **Table 3.3** presents the magnitude of change in air pollutant concentration descriptors and **Table 3.4** presents the impact descriptors that take account of the magnitude of change (both positive and negative) and the concentration in relation to the air quality objectives.

Table 3.3 Magnitude of change descriptor in relation to changes in concentrations of NO_2 / PM_{10}

Magnitude of Change	Annual Mean NO_2 / PM_{10}	Days PM10 >50 µg.m^{-3}
Large	Increase/decrease >4 µg.m^{-3}	Increase/decrease >4 days
Medium	Increase/decrease 2-4 µg.m^{-3}	Increase/decrease 2-4 days
Small	Increase/decrease 0.4-2 µg.m^{-3}	Increase/decrease 1-2 days
Imperceptible	Increase/decrease <0.4 µg.m^{-3}	Increase/decrease <1 day

Table 3.4 Air quality impact descriptors for changes to annual mean NO_2 / PM_{10} concentrations at a receptor

Sensitivity	Change in Concentration		
	Small	Medium	Large
Above Objective / Limit Value With Scheme (>40 µg.m^{-3})	Minor Adverse	Moderate Adverse	Major Adverse
Just Below Objective / Limit Value With Scheme (36 – 40 µg.m^{-3})	Minor Adverse	Moderate Adverse	Moderate Adverse
Below Objective / Limit Value With Scheme (30 – 36 µg.m^{-3})	Negligible	Minor Adverse	Minor Adverse
Well Below Objective / Limit Value With Scheme (<30 µg.m^{-3})	Negligible	Negligible	Minor Adverse
Above Objective / Limit Value Without Scheme (>40 µg.m^{-3})	Minor Beneficial	Moderate Beneficial	Major Beneficial
Just Below Objective / Limit Value Without Scheme (36 – 40 µg.m^{-3})	Minor Beneficial	Moderate Beneficial	Moderate Beneficial
Below Objective / Limit Value Without Scheme (30 – 36 µg.m^{-3})	Negligible	Minor Beneficial	Minor Beneficial
Well Below Objective / Limit Value Without Scheme (<30 µg.m^{-3})	Negligible	Negligible	Minor Beneficial

4 Existing Environment

4.1 National Policy Statements

Local Air Quality Management

4.1.1 RCBC has not declared any AQMAs in the Borough. The 2012 Updating and Screening Assessment (RCBC 2012), published by RCBC concluded that air quality objectives were likely to be achieved within the Borough in respect of all prescribed pollutants. Road traffic is reported as the largest overall source of ground level emissions, although traffic densities (within the Borough) are generally low and free flowing.

NO_2 and PM_{10} monitoring in RCBC

4.1.2 RCBC undertakes ambient monitoring of NO_2 and PM_{10} at one automatic monitoring site (classified as a suburban industrial location) in Dormanstown which is in close proximity to the study area, approximately 500m from the cable route. NO_2 diffusion tube monitoring is not undertaken within the Borough due to the relatively low traffic densities in areas of relevant public exposure.

4.1.3 The Dormanstown monitoring site was previously located in the grounds of a local college (Corporation Road) and was relocated to Dormanstown at the end of 2011.

4.1.4 Monitoring results in **Table 4.1** indicate that annual mean NO_2 concentrations at the now decommissioned Corporation Road monitoring site were below the annual mean air quality objective of 40µg.m^{-3} in 2010 and 2011. There were no monitored exceedences of the annual mean Objectives at the Dormanstown location in 2012. There were no exceedences of the short term NO_2 or PM_{10} objectives at the monitoring sites during this period.

Table 4.1 Annual mean NO_2 and PM_{10} results for automatic monitoring locations in the study area 2010-2012

Location	OS Grid Reference	NO_2 (µg.m^{-3})			PM_{10} (µg.m^{-3})		
		2010*	2011*	2012	2010*	2011*	2012
Corporation Road	459900, 524600	17.4	16.2		18.1	20.1	
Dormanstown	458381, 523486	-	-	15.7	-	-	17.3
Annual Mean Objective	40 µg.m^{-3}						

*Years 2010 and 2011 had limited data capture for NO_2. 2010-2012 had limited data capture for PM_{10}. Data for each year of poor capture has been annualised by RCBC using Middlesborough Breckon Hill AURN Station (for NO_2) and Stockton Eaglescliffe AURN Station (for PM_{10})

~DC = Decommissioned

4.2 Background concentrations

Onshore study area

4.2.1 Air quality monitoring at background locations is not undertaken by RCBC within the study area. Background concentrations of NO_x, NO_2 and PM_{10} were therefore obtained from the background concentration maps provided by Defra for the ten 1km grid squares covering the onshore infrastructure and potential receptor locations to be considered. Average, minimum and maximum annual mean background concentrations for these grid squares are presented in **Table 4.2**. Background concentrations at selected representative receptor locations sensitive to vehicle exhaust emissions (located adjacent to access roads likely to be used for the development) are presented in **Table 4.3**.

4.2.2 Maximum and average NO_2 and PM_{10} annual mean background concentrations within the study area are below their respective air quality objectives.

4.2.3 Background NO_x concentrations are provided for information as they are required for conversion of modelled NO_x Road vehicle contributions to NO_2, as described in **Appendix 30B**, paragraph 14.1.21.

Table 4.2 2013 annual average, minimum, and maximum annual mean background concentrations of all grid squares covering the proposed onshore cable route and converter stations for NO_x, NO_2, and PM_{10}

	2013 ($\mu g.m^{-3}$)		
	NO_x	NO_2	PM_{10}
Minimum	15.13	10.76	12.23
Maximum	69.32	35.60	18.94
Average	25.55	16.86	14.24
Annual Mean Objective	-	40	

Table 4.3 2013 annual mean background concentrations at selected representative receptor locations sensitive to vehicle exhaust emissions (located adjacent to the assessed road network) for NO_x, NO_2, and PM_{10}

Receptor No.	Location		2013 ($\mu g.m^{-3}$)		
			NO_x	NO_2	PM_{10}
R1	1 High Street	(Near Eston)	29.19	19.10	15.17
R2	43 Keepersgate	(Near Eston)	26.10	17.44	13.87
R3	19 Chestnut Close	(Lazenby)	27.42	18.09	13.47
R4	18/19 Corncroft Mews	(Grangentown)	31.40	20.41	13.96
R5	The Granary	(Yearby)	20.06	13.86	14.88
R6	Sir Willam Turner's Court	(Kirkleatham)	29.76	19.42	16.23
R7	Grewgrass Farm	(Grewgrass)	20.10	13.89	15.93
R8	13 Kirkwood Drive	(Redcar)	25.67	17.15	16.33
R9	11/12 Pragnell Court	(Redcar)	25.67	17.15	16.33

Receptor No.	Location		2013 (µg.m^{-3})		
			NO_x	NO_2	PM_{10}
R10	51 High Street	(Marske-by-sea)	21.23	14.61	13.18
Annual Mean Objective			-	40	

Offshore study area

4.2.4 Air quality monitoring is not undertaken within the offshore study area and therefore no data or background concentrations are available for NO_x, NO_2 and PM_{10}.

4.3 Identification of receptors

Receptors sensitive to emissions from construction phase dust (Onshore)

4.3.1 Locations potentially sensitive to construction phase emissions (such as dust and particulate matter) were identified in accordance with IAQM guidance (IAQM 2012a) at the following distances from the site boundary or dust generating activities:

- 0 to 20m;
- 21 to 50m;
- 51 to 100m; and
- 101 to 350m.

4.3.2 A dust assessment would not normally be required where sensitive receptors are located beyond 350m of the boundary of the site and or within 100m of the route(s) used by construction vehicles on the public highway, and or up to 500m from the site entrance(s).

4.3.3 The closest existing sensitive residential receptors were selected and considered in the construction phase assessment. The receptor locations are detailed in **Table 4.4** and shown on **Figure 4.1**. There are no ecological sites (sensitive habitats), designated statutory or non-statutory sites which may be sensitive to dust within 350m of the proposed converter stations site or cable route.

Table 4.4 Representative onshore receptors sensitive to emissions of dust

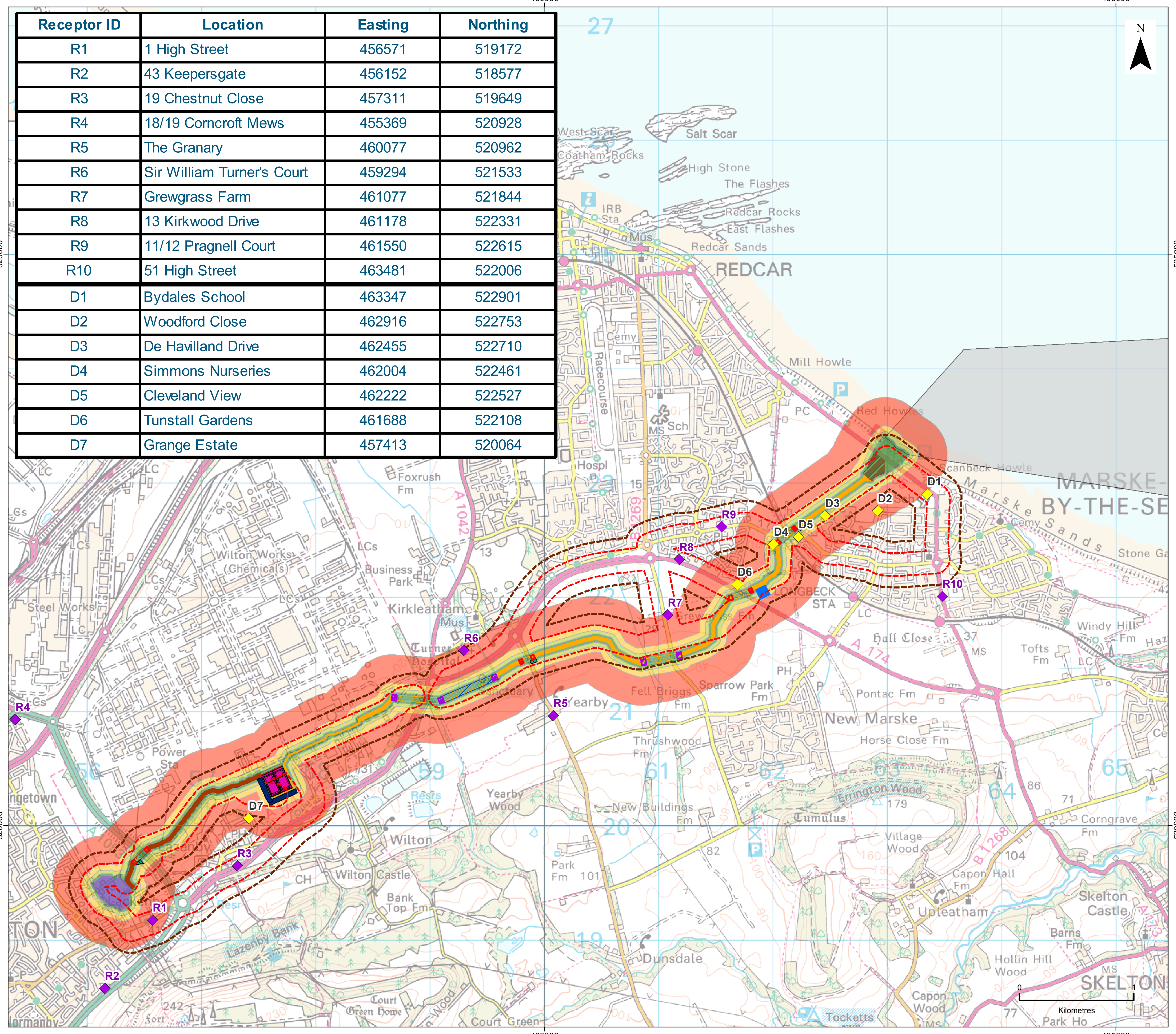
Receptor location		Grid coordinates		Nearest potential development dust generation	Distance / direction of receptor to closest construction activity*
		X	Y		
D1	Bydales School	463347	522901	Landfall Site	240m South East
D2	Woodford Close	462916	522753	Landfall Joint Transition Bay	260m South
D3	De Havilland Drive	462455	522710	HVDC Cable Route	50m South East

Receptor location		Grid coordinates		Nearest potential development dust generation	Distance / direction of receptor to closest construction activity*
		X	Y		
D4	Simmons Nurseries	462004	522461	HVDC Cable Route	15m East
D5	Cleveland View	462222	522527	Small Site Construction Compound	45m South
D6	Tunstall Gardens	461688	522108	Large Site Construction Compound	200m West
D7	Grange Estate	457413	520064	Converter Station	320m South West

* On the layout plan the Dogger Bank Teesside A & B cable systems within the route are not differentiated, as flexibility is required to build either project anywhere within the construction working width. Distances are therefore measured from the edge of the cable route shown on the layout plan – distances are therefore conservative.

4.3.4 The sensitivity of the study area in relation to the receptor locations identified has been determined using the sensitivity tables provided in the IAQM guidance (IAQM 2012a) and detailed in **Table 3.2**. Simmons Nurseries are located within 15m of the proposed onshore cable route. Existing PM_{10} concentrations are well below the air quality objective within the study area (see **Table 4.2**). The surrounding area was therefore defined as being of 'moderate' sensitivity with respect to sensitive receptors.

4.3.5 During consultation RCBC raised the question of whether the beach would be considered as a sensitive receptor. However, members of the public using the beach are unlikely to be exposed to dust emissions for a duration long enough to be considered as sensitive receptors. The beach is therefore not considered as a sensitive receptor in this assessment.



Receptor ID	Location	Easting	Northing
R1	1 High Street	456571	519172
R2	43 Keepersgate	456152	518577
R3	19 Chestnut Close	457311	519649
R4	18/19 Corncroft Mews	455369	520928
R5	The Granary	460077	520962
R6	Sir William Turner's Court	459294	521533
R7	Grewgrass Farm	461077	521844
R8	13 Kirkwood Drive	461178	522331
R9	11/12 Pragnell Court	461550	522615
R10	51 High Street	463481	522006
D1	Bydales School	463347	522901
D2	Woodford Close	462916	522753
D3	De Havilland Drive	462455	522710
D4	Simmons Nurseries	462004	522461
D5	Cleveland View	462222	522527
D6	Tunstall Gardens	461688	522108
D7	Grange Estate	457413	520064

LEGEND

- Teesside A&B cable landfall envelope
- Teesside A&B landfall construction envelope
- Teesside A&B HVDC, Open trench
- Teesside A&B HVDC, HDD
- Teesside A&B HVAC, Open trench
- Teesside A&B HVAC, HDD
- Teesside A&B major horizontal directional drill entry or exit locations (2,000m²)
- Teesside A&B minor horizontal directional drill entry or exit locations (1,200m²)
- HDD or open trench to be confirmed
- Teesside A&B cable route primary construction compound (10,000m²)
- Teesside A&B intermediate construction compound (784m²)
- Teesside A&B converter stations
- Teesside A&B converter stations construction compounds (10,000m² per project)
- Lackenby 400kV substation
- Export Cable Corridor

Human Receptors

- Human Receptors sensitive to vehicle exhaust emissions (with R1 to R10)
- Human Receptors sensitive to dust emissions (with D1 to D7)

Distances from Roads used in Construction

- 100 metres
- 200 metres

Distances from project elements

- 20 metres
- 50 metres
- 100 metres
- 350 metres

Data Source:
Ordnance Survey © Crown copyright and database right, 2014

PROJECT TITLE

DOGGER BANK TEESSIDE A & B

DRAWING TITLE

Figure 4.1 Representative Onshore Receptors Sensitive to Vehicle Exhaust Emissions and Dust

VER	DATE	REMARKS	Drawn	Checked
5	09/07/2013	Draft	SW	AM
7	03/07/2013	Submit for PEI3	SW	AM
8	27/01/2014	Pre-DCO submission review	SW	AM

DRAWING NUMBER: **F-ONL-MA-601**

SCALE	1:35,000	PLOT SIZE	A3	DATUM	OSGB	PROJECTION	BNG

FOREWIND

4.4 Receptors sensitive to emissions from construction phase traffic (onshore)

4.4.1 Receptors potentially sensitive to emissions from construction traffic were identified within 200m of roads likely to be used by construction traffic (in accordance with DMRB guidance (DMRB 2007) (as presented in **Table 4.5** and on **Figure 4.1**). Sensitive receptor locations were selected based on their proximity to road links in the vicinity of the cable route and converter stations site where construction traffic emissions would likely have the most impact. These receptors are considered to be representative of other receptors in the study area located at similar distances from the assessed road network.

Table 4.5 Representative onshore receptors sensitive to emissions from construction traffic

Receptor No.	Location	Assessed roads	Shortest distance between receptor and road centre	DMRB Road Link*
R1	1 High Street	B1380 (High Street)	14.7m	DD
R2	43 Keepersgate	A174	23.9m	EE
R3	19 Chestnut Close	A174 (south of Wilton)	21.4m	FF
R4	18/19 Corncroft Mews	Tees Dock Road and A66	108.6m and 60.4m	AN2 and AN1
R5	The Granary	B1269 (Fishponds Road)	6.9m	II
R6	Sir Willam Turner's Court	A174 (south of Redcar)	170.8m	HH
R7	Grewgrass Farm	Grewgrass Lane	15.5m	JJ
R8	13 Kirkwood Drive	A174 (south of Redcar)	28.6m	HH
R9	11/12 Pragnell Court	Redcar Road	7.6m	KK
R10	51 High Street	A1085 (Coast Road)	5.4m	LL

*Road link assessed in the DMRB model, detailed in **Appendix 30B**, Table B-1 and Table B-2.

4.5 Receptors sensitive to emissions from marine vessels (offshore)

4.5.1 There are a number of residential properties in the vicinity of the landfall envelope, including those along Coast Road (approximately 103m from the beach) and Cliff Terrace (approximately 35m from the beach). Bydales School is approximately 173m from the beach in the vicinity of the landfall envelope.

4.6 On road vehicle emissions

4.6.1 The DMRB model was used to estimate the contributions of existing (2013) vehicle emissions to annual and short term mean NO_2 and PM_{10} concentrations at sensitive receptor locations, the results of which are presented in **Table 4.6** inclusive of the background concentrations in **Table 4.3**.

Table 4.6 Baseline 2013 predicted annual mean NO_2 and PM_{10} concentrations at identified sensitive receptors.

Receptor	NO_2 (µg.m^{-3})	PM_{10} (µg.m^{-3})
R1	22.03	15.77
R2	24.10	15.33
R3	25.19	15.22
R4	24.00	14.55
R5	15.99	15.32
R6	19.72	16.29
R7	14.81	16.16
R8	23.19	17.66
R9	19.78	16.95
R10	18.03	14.02
Air Quality Objective	40	

4.6.2 The results for the base year (2013) scenario indicate that annual mean concentrations of NO_2 are predicted to be well below (i.e. less than 30µg.m^{-3}) the objective at all receptors. In accordance with guidance provided by Defra, it may be assumed that exceedences of the 1-hour mean objective for NO_2 are unlikely as the predicted annual mean concentrations are less than 60µg.m^{-3}.

4.6.3 PM_{10} concentrations are predicted to be well below the AQS objectives at all modelled locations. The short term PM_{10} objective is predicted to be met at all modelled locations with no exceedences of the daily mean objective of 50µg.m^{-3} predicted.

5 Assessment of Impacts – Worst Case Definition

5.1 Introduction

5.1.1 This section establishes the realistic worst case scenario for each category of impact as a basis for the subsequent impact assessment. For this assessment this involves both a consideration of the construction scenarios (i.e. the manner in which Dogger Bank Teesside A & B will be built), as well as the particular design parameters of each project that define the Rochdale Envelope.

5.1.2 Full details of the range of development options being considered by Forewind are provided within **Chapter 5 Project Description**. For the purpose of the air quality impact assessment, the realistic worst case scenarios, taking these options into consideration, are set out in **Table 5.1**.

5.1.3 The realistic worst case scenarios identified here are also applied to the Cumulative Impact Assessment. When the worst case scenarios for the project in isolation do not result in the worst case for cumulative impacts, this is addressed within the cumulative section of this chapter (see Section 10) and summarised in **Chapter 33 Cumulative Impact Assessment**.

5.2 Construction phasing scenarios

Onshore

5.2.1 **Chapter 5** provides details of the construction phasing scenarios associated with the onshore construction of Dogger Bank Teesside A & B.

5.2.2 The specific timing and phasing of the construction of the two projects will be determined post consent, and therefore a 'Rochdale Envelope' approach has been undertaken for the EIA. There are four key principles that form the basis of the Rochdale Envelope, relating to how the projects will be built. These are:

- The two projects may be constructed at the same time, or at different times;
- If built at different times, either project could be built first;
- If built at different times, the duration of the gap between the end of the first project to be built, and the start of the second project to be built may vary from overlapping, to up to five years; and
- Partial installation of elements of the second project may be completed during the construction of the first project, e.g. Through the use of ducts to provide conduits for a later cable installation.

5.2.3 The four construction phasing scenarios for Dogger Bank Teesside A & B considered within the assessment for air quality are therefore:

i. Build A or Build B in isolation;

ii. Build A and B concurrently – provides the worst 'peak' impact and maximum working footprint;

iii. Build A, gap of up 5 years, Build B (sequential) – provides the worst 'duration' of impact. The length of gap (0 to 5 years) which is considered to represent the worst case is defined in **Table 5.1**; and

iv. Build A and install conduits for B, gap of 5 years, install cables for B in conduits.

5.2.4 For the build in isolation options (scenario i), there is not considered to be a material difference in direct impacts to air quality receptors whether Dogger Bank Teesside A or B is built first, and therefore only a single impact assessment is presented. There are no differences in the distances to receptors between Dogger Bank Teesside A or B. Distances to receptors are measured from the edge of the cable route, distances are therefore conservative.

5.2.5 The concurrent scenario (ii) is considered to be the worst case traffic scenario, due to the assumed doubling of construction traffic. It is also the worst case scenario for dust generation due to the quantity of material moved for the HVDC and HVAC cable routes (during open cut trenching, removal of topsoil and subsoil for temporary access road, and backfilling and reinstatement).

5.2.6 For scenarios iii and iv there is not considered to be a significant difference from scenario i, in respect of potential air quality effects.

5.2.7 As such, the onshore construction scenarios presented within the impact assessment sections of this chapter which define the Rochdale Envelope for the projects are:

i. Single project; and

ii. Two projects – concurrent.

5.3 Offshore

5.3.1 **Chapter 5** provides details of the construction phasing scenarios associated with the offshore construction of Dogger Bank Teesside A & B.

5.3.2 The specific timing and phasing of the construction of the two projects will be determined post consent, and therefore a 'Rochdale Envelope' approach has been undertaken for the EIA. There are four key principles that form the basis of the Rochdale Envelope, relating to how the projects will be built. For the offshore assessment these are:

- The two projects may be constructed at the same time, or at different times;
- If built at different times, either project could be built first;

- If built at different times, the duration between the end of the first project to be built, and the start of the second project to be built may vary from overlapping, occurring in series or having a gap between projects;
- Offshore construction will commence no sooner than 18 months post consent, but must start within seven years of consent (as an anticipated condition of the development consent order); and
- Assuming a maximum construction period per project of six years, and taking the above into account, the maximum construction period over which the construction of Dogger Bank Teesside A & B could take place is 11 years and six months.

5.3.3 As with the onshore assessment, to determine which offshore construction scenario is the worst realistic case for a given receptor, two types of effect exist with the potential to cause a maximum level of impact on a given receptor:

- Maximum duration effects; and
- Maximum peak effects.

5.3.4 To ensure that the Rochdale Envelope incorporates all of the possible offshore construction scenarios (as outlined in **Chapter 5**), both the maximum duration effects and the maximum peak effects have been considered for each offshore receptor. Furthermore, the option to construct each project in isolation is also considered (‘Build A in isolation’ and ‘Build B in isolation’), enabling the assessment to identify any differences between the two projects. The three construction scenarios for Dogger Bank Teesside A & B considered within the offshore assessment for air quality are therefore:

i. Build A or Build B in isolation;

ii. Build A and B concurrently – provides the worst ‘peak’ impact and maximum working footprint; and

iii. Build A, then Build B (sequential) – provides the worst ‘duration’ of impact.

Table 5.1 Realistic worst case scenario for air quality impact assessment

Impact	Realistic Worst Case Scenario	Rational
Construction		
Onshore construction phase	*Single project* • Working width of HVDC corridor of 18m; • Working width of HVAC corridor of 20m; • Each single excavated trench approximately 6km for HVDC (7km total cable length), approximately 2km for HVAC; and • Each single haul road with a total length of approximately 6km for HVDC, approximately 2km for HVAC.	Maximum ranges provided within **Chapter 5**
	Projects built concurrently • Working width of HVDC corridor of 36m; • Working width of HVAC corridor of 39m; • Two excavated trenches approximately 12km for	Maximum ranges provided within **Chapter 5**

Impact	Realistic Worst Case Scenario	Rational
	HVDC (14km total cable length), approximately 4km for HVAC; and • Two haul roads required with a total length of approximately 12km for HVDC, approximately 4km for HVAC.	
	All scenarios • All construction equipment will operate concurrently, at the closest point within each working area to a receptor; • There are a range of dust emission classes for each scenario; • The sensitivity of areas surrounding site access points to dust emissions is 'medium'. The rest of the study area has a 'low' sensitivity to dust emissions; and • Distances are taken from the nearest edge of the working width.	
Offshore impacts	*All scenarios* • Maximum of 66 construction vessels (indicative) per project on site at any one time. • Single project or both projects built concurrently • Maximum duration of offshore construction activities up to 6 years per project. • Projects built sequentially • Maximum duration of offshore construction programme is 11 years and six months.	Maximum ranges provided within **Chapter 5**

6 Assessment of Impacts During Construction

6.1 Introduction

6.1.1 Onshore construction activities associated with Dogger Bank Teesside A & B have the potential to affect local air quality. Reference should be made to **Chapter 5** for a description of the activities proposed during the construction phase. However, in summary, construction activities with the potential to impact local air quality are:

- Dust emissions generated by excavation, construction and earthworks along the cable route, construction of the converter stations and associated landscaping, and enabling works at the existing NGET substation at Lackenby which will have the potential to cause nuisance to, and soiling of, sensitive receptors, as well as potentially increasing local PM10 concentrations;
- Emissions of NO2 and PM10 from NRMM operating within the construction footprint, which have the potential to adversely impact local air quality at sensitive receptors close to the works: and
- Emissions of exhaust pollutants, especially NO2 and PM10 from construction traffic, which will have the potential to adversely impact upon local air quality at sensitive receptors situated close to those routes utilised by construction vehicles.

Embedded mitigation

6.1.2 The site selection process has identified a preferred onshore cable route and converter stations site, which minimises direct impacts to known environmental constraints, i.e. mitigation by design.

6.1.3 From an air quality point of view, this included routing of the cable to avoid sensitive receptor locations as far as possible.

6.1.4 The cable route selection process is described fully in **Chapter 6 Assessment of Alternatives**.

6.2 Onshore environment

Construction phase dust emissions

6.2.1 If construction operations and associated emissions were un-mitigated, the effects of dust during dry and windy conditions, could lead to an increase in the 24-hour mean PM_{10} concentrations immediately surrounding dust raising activities. However, the 2013 maximum background PM_{10} concentration within the study area is estimated to be 18.94µg.m^{-3} (based upon 2010 mapped background estimates). As presented within **Table 4.2**, this is ‘well below’ the Annual Mean PM_{10} objective of 40µg.m^{-3} (**Table 3.3**). It is therefore considered highly unlikely that the construction operations would cause an exceedence of the annual mean objective within the study area.

6.2.2 The potential overall significance, in terms of construction dust without any mitigation measures in place, is summarised in the form of a construction phase assessment matrix (for dust nuisance and soiling of sensitive receptors). The construction phase dust assessment matrix for a single project is presented in Table A6 of **Appendix 30A**, and for two projects (concurrent scenario) is displayed in Table A7 of **Appendix 30A**. Note that the impacts for each scenario (single project and two projects) were assessed separately although the predicted impacts are the same. The results are described below.

Single project

6.2.3 The sensitivity of the study area to dust emissions is moderate (see paragraph 4.3.4) and the dust assessment (Table A6 of **Appendix 30A**) shows that a single project has the potential for construction dust emissions to have at worst, a **moderate adverse** impact at the nearest sensitive human receptor locations without any mitigation measures applied (see **Appendix 30A**). This impact is associated with the risk of dust emissions from trackout (the transport of dust and dirt from the construction site onto the public road network), which may affect sensitive receptors which are in close proximity (less than 20m) from routes used by construction vehicles on the public highway. It is also associated with the risk of dust emissions from earthworks (soil stripping, ground levelling, excavation and landscaping), which may affect residents at Simmons Nurseries who are less than 20m from the cable route.

Two projects - concurrent

6.2.4 The sensitivity of the study area to dust emissions is moderate (see paragraph 4.3.4) and the dust assessment (Table A7 of **Appendix 30A**) indicates that two projects constructed concurrently have the potential for construction dust emissions to have at worst, a **moderate adverse** impact at the nearest sensitive human receptor locations without any mitigation measures applied (See **Appendix 30A**). This impact is associated with the risk of dust emissions from trackout as described in paragraph 6.2.3, and from earthworks due to the large volume of material moved.

Mitigation - all scenarios (single project and two projects - concurrent)

6.2.5 Standard good practice measures to mitigate dust emissions from Dogger Bank Teesside A & B will be included within a CEMP to prevent or minimise the release of dust entering the atmosphere and/or being deposited on nearby receptors. Particular attention will be paid to operations which must unavoidably take place close to the site boundary.

6.2.6 The slight adverse risk of dust emissions identified in paragraph 6.2.3 and paragraph 6.2.4 is associated with trackout and earthwork activities. It is therefore recommended that mitigation measures outlined in **Table 6.1** (taken from IAQM guidance (IAQM 2012b)) are included in the CEMP.

Table 6.1 Potential Dust Mitigation Measures

Mitigation measures
Earthworks: • Damping down all dusty activities and surfaces, especially during dry, windy weather; • Temporary covering of earthworks, or if possible secure covering during dry, windy weather; • Re-vegetation of earthworks and other exposed areas to stabilise surfaces; • Reuse hard core material where possible; • Removal of secure covers in small areas during work; and • Implementation of hessian or mulches where it is not possible to re-vegetate or cover with topsoil. **Trackout (the transport of dust and dirt from the construction site onto the public road network):** • Use of a wheel wash, limiting of vehicle speeds onsite, avoidance of unnecessary idling of engines and routing of site traffic as far from residential and commercial properties as possible; • Avoid dry sweeping of large areas; • Ensure vehicles transporting material entering and leaving sites are covered to prevent escape of materials during transport; • Use of a road sweeper to clean mud and other deposited particulates from hard-standing roads and footpaths; and • Use of hard surface haul routes where possible.

Residual Impact

6.2.7 Table A6 and Table A7 in **Appendix 30A** provide an overall summary (for both a single and two project build scenario) of the potential impacts generated from dust with appropriate mitigation (**Table 6.1**) in place.

6.2.8 Effective implementation of a CEMP and incorporation of mitigation measures would contribute to reducing the effect of earthworks, construction and trackout emissions to **negligible** at sensitive human and ecological receptors (for all scenarios).

Construction phase non road mobile machinery

Single project

6.2.9 Engine exhaust emissions from off road vehicles known as Non Road Mobile Machinery (NRMM) have the potential to affect local air quality. The main pollutants of concern from these emissions are those relating to fuel combustion such as CO, NO_2, SO_2 and PM_{10}.

6.2.10 The proposed NRMM to be used throughout the construction of the onshore infrastructure comprise:

- Horizontal Directional Drilling (HDD) equipment;
- Dump truck(s);
- Mobile crane(s);
- Grader(s);
- Compressor(s);
- Hydraulic piling equipment;
- Concrete pump and cement mixers; and

- Tracked excavators.

6.2.11 Existing background levels of pollutants are well below the respective air quality objectives and any emissions from NRMM will be both localised and short-term in duration during the operation of plant. Exhaust emissions of NO_2 and PM_{10} from the proposed NRMM are therefore considered to be **negligible** in the context of existing baseline vehicle emissions and proposed on road construction vehicle emissions.

Two Projects – Concurrent

6.2.12 Construction of both Dogger Bank Teesside A & B concurrently may constitute a requirement for double the amount of NRMM to be present along the cable route and at the converter stations site.

6.2.13 Existing background levels of pollutants are well below the respective air quality objectives and any emissions from NRMM will be both localised and short-term in duration during the operation of plant. Exhaust emissions of NO_2 and PM_{10} from the proposed NRMM are therefore considered to be **negligible** in the context of existing baseline vehicle emissions and proposed on road construction vehicle emissions.

Mitigation - all scenarios (single project and two projects - concurrent)

6.2.14 Mitigation measures in **Table 6.2** will be detailed in a CEMP to ensure that emissions from NRMM used during construction remain **negligible**.

Table 6.2 Potential Mitigation Measures – NRMM

Mitigation measures - NRMM
• All NRMM will use fuel equivalent to ultra-low sulphur diesel (fuel meeting the specification within EN590:2004); • All NRMM will comply with either the current or previous EU Directive Staged Emission Standards (97/68/EC, 2002/88/EC, and 2004/26/EC). As new emission standards are introduced the acceptable standards will be updated to the previous and most current standard; • All NRMM will be fitted with Diesel Particulate Filters conforming to defined and demonstrated filtration efficiency (load / duty cycle permitting); • The ongoing conformity of plant retrofitted with Diesel Particulate Filters, to a defined performance standard, will be ensured through a programme of onsite checks; and • Implementation of energy conservation measures including instructions to: throttle down or switch off idle construction equipment; switch off the engines of trucks while they are waiting to access the site and while they are being loaded or unloaded; ensure equipment is properly maintained to ensure efficient energy consumption.

Residual impact

Single project

6.2.15 The sensitivity of the study area in relation to residential receptors is low (as described in paragraph 4.4.3). Existing background levels of pollutants are well below the respective air quality objectives and any emissions from NRMM will be both localised and short-term in duration released only during the operation of plant. With the implementation of the mitigation measures detailed above, exhaust emissions of NO_2 and PM_{10} from the proposed NRMM are therefore considered to be **negligible** in the context of existing baseline vehicle emissions and proposed on road construction vehicle emissions.

Two projects – concurrent

6.2.16 Construction of both Dogger Bank Teesside A & B concurrently may constitute a requirement for double the amount of NRMM to be present along the cable route and at the converter stations site. However, it is unlikely that all NRMM would be in operation at the same time. The sensitivity of the study area in relation to residential receptors is low (as described in paragraph 4.4.3). Existing background levels of NO_2 and PM_{10} are well below the respective air quality objectives and any emissions from NRMM will be both localised and short-term in duration during the operation of plant. Exhaust emissions of NO_2 and PM_{10} from the proposed NRMM are therefore considered to be **negligible** in the context of existing baseline vehicle emissions and proposed on road construction vehicle emissions.

Construction phase vehicle exhaust emissions

All scenarios (single project and two project - concurrent)

6.2.17 Emissions of NO_2 and PM_{10} are strongly related to vehicle speeds, with highest vehicle emission rates occurring at very slow speeds and lowest emission rates occurring in free flowing traffic. Heavy Goods Vehicles (HGVs) associated with site construction works will change the traffic volume and composition on haul roads, potentially resulting in reduced speeds and hence increased NO_2 and PM_{10} emissions along the route.

6.2.18 It is anticipated that the installation of cable systems, trenching and HDD works, and construction of the converter stations will result in changes in traffic volume and composition on roads used by construction vehicles. In addition, construction works have the potential to result in disruption to traffic due to temporary road closures, temporary traffic lights and detours, all of which can potentially result in localised traffic congestion.

6.2.19 Vehicle emissions may increase around the primary compound areas, which will be established at specified locations along the length of the cable route and at the converter stations site (see **Chapter 5**).

6.2.20 National Grid will undertake enabling works at the existing NGET substation at Lackenby for the Dogger Bank Teesside A & B projects. These works will be within the existing substation site footprint and include installation of new plant and cabling and removal of some existing plant.

6.2.21 The first phase of works at the existing NGET substation at Lackenby is expected to last 18 months and the second phase 22 months. NGET has indicated that due to available space and safe working requirements it is unlikely that the two phases will be completed concurrently. It is however conceivable that NGET works will overlap with the main works for Dogger Bank Teesside A & B, therefore for a realistic worst case it was assumed that the peak for NGET works will overlap with the peak for main works.

6.2.22 24 hour Annual Average Daily Traffic (AADT) flows used in the DMRB model for 'with' and 'without' construction scenarios are detailed in **Appendix 30B**; these include traffic generated by NGET works at the existing NGET substation at Lackenby. During the construction phase the development is predicted to result in an increase in road traffic on the main access roads. The greatest increase (on roads assessed in the DMRB model) for all scenarios is predicted on Tees Dock road where flows increase by 4.7% (single project), and 8.7% (two project - concurrent). Large quantities of bulk materials such as aggregate are likely to be sourced locally and transported via Tees Dock Road.

Single Project

6.2.23 The results of the DMRB assessment at the identified sensitive receptors for the 'with' and 'without' construction scenarios in 2015 (earliest likely year for construction) are presented in **Table 6.3** including adjusted NO_2 concentrations following the Gap Analysis.

6.2.24 The highest NO_2 concentration 'with construction' is predicted at receptor 3 – 19 Chestnut Close (25.41µg.m^{-3}) which is located in close proximity to a section of the A174 which has the highest AADT flows within the study area.

6.2.25 All predicted adjusted NO_2 concentrations are well below 60µg.m^{-3} and therefore, in accordance with guidance in LAQM.TG(09), the 1-hour mean objective is unlikely to be exceeded.

6.2.26 The highest PM_{10} concentration 'with construction' is predicted at receptor 8 – 13 Kirkwood Drive (17.32µg.m^{-3}) where existing background PM_{10} concentrations (**Table 4.3**) are higher than at other modelled receptor locations. Receptor 8 is also in close proximity to a section of the A174 where AADT flows are high.

6.2.27 No exceedences of the daily mean PM_{10} objective of 50µg.m-3 were predicted.

6.2.28 Changes in NO_2 concentrations between 'without construction' and 'with construction' scenarios at all modelled receptors are less than 2µg.m^{-3} (the maximum change is 0.4µg.m^{-3} at receptor 3) which is defined as a 'small' magnitude of change.

6.2.29 Changes in PM_{10} concentrations between 'without construction' and 'with construction' scenarios at all modelled receptors are less than 0.4µg.m^{-3} which is defined as an 'imperceptible' magnitude of change.

6.2.30 All predicted annual mean NO_2 and PM_{10} concentrations (**Table 6.3**) are well below their respective air quality objectives during construction. Changes in NO_2 and PM_{10} concentrations are predicted to be small and imperceptible respectively. The impact of construction vehicles on NO_2 and PM_{10} concentrations at sensitive receptor locations can therefore be defined as **negligible**.

Two Project - Concurrent

6.2.31 The results of the DMRB assessment at the identified sensitive receptors for the 'with' and 'without' Construction scenarios in 2015 (earliest likely construction year) are presented in **Table 6.4** including adjusted NO_2 concentrations.

6.2.32 The highest NO_2 concentration 'with construction' is predicted at receptor 3 – 19 Chestnut Close (25.79µg.m^{-3}) which is located in close proximity to a section of the A174 which has the highest AADT flows within the study area.

6.2.33 All predicted adjusted NO_2 concentrations are well below 60µg.m^{-3} and therefore, in accordance with guidance in LAQM.TG(09), the 1-hour mean objective is unlikely to be exceeded.

6.2.34 The highest PM_{10} concentration 'with construction' is predicted at receptor 8 – 13 Kirkwood Drive (17.32µg.m^{-3}) where existing background PM_{10} concentrations (**Table 4.3**) are higher than at other modelled receptors. Receptor 8 is also in close proximity to a section of the A174 where AADT flows are high.

6.2.35 No exceedences of the daily mean PM_{10} objective of 50µg.m^{-3} were predicted.

6.2.36 Changes in NO_2 concentrations between 'without construction' and 'with construction' scenarios at all modelled receptors are less than 2µg.m^{-3} (the maximum change is 0.8µg.m^{-3} at receptor 3) which is defined as a 'small' magnitude of change.

6.2.37 Changes in PM_{10} concentrations between 'without construction' and 'with construction' scenarios at all modelled receptors are less than 0.4µg.m^{-3} which is defined as an 'imperceptible' magnitude of change.

6.2.38 All predicted annual mean NO_2 and PM_{10} concentrations are well below their respective air quality objectives during construction. Changes in NO_2 and PM_{10} concentrations are predicted to be small and imperceptible respectively. The impact of construction vehicles on NO_2 and PM_{10} concentrations at existing receptor locations can therefore be defined as **negligible**.

Table 6.3 Annual mean DMRB results and impact of construction vehicles at sensitive receptor locations – single project

Receptor	Scenario	2015 (µg.m^{-3})		
		NO_2	NO_2 Adjusted	PM_{10}
R1	Without Construction	20.93	21.76	15.46
	With Construction	21.08	21.92	15.48
	Impact	**0.15**	**0.16**	**0.01**
	Magnitude of Change (1)	**Imperceptible**	**Imperceptible**	**Imperceptible**
	Change in Concentration (2)	**Negligible**	**Negligible**	**Negligible**
R2	Without Construction	22.78	23.9	14.98
	With Construction	23.08	24.21	14.99
	Impact	**0.30**	**0.31**	**0.02**

Receptor	Scenario	2015 (µg.m^{-3})		
		NO_2	NO_2 Adjusted	PM_{10}
	Magnitude of Change (1)	**Imperceptible**	**Imperceptible**	**Imperceptible**
	Change in Concentration (2)	**Negligible**	**Negligible**	**Negligible**
R3	Without Construction	24.15	24.98	14.90
	With Construction	24.57	25.41	14.92
	Impact	**0.42**	**0.43**	**0.03**
	Magnitude of Change (1)	**Small**	**Small**	**Imperceptible**
	Change in Concentration (2)	**Negligible**	**Negligible**	**Negligible**
R4	Without Construction	22.67	23.76	14.22
	With Construction	22.88	23.98	14.24
	Impact	**0.21**	**0.22**	**0.01**
	Magnitude of Change (1)	**Imperceptible**	**Imperceptible**	**Imperceptible**
	Change in Concentration (2)	**Negligible**	**Negligible**	**Negligible**
R5	Without Construction	15.19	15.80	15.05
	With Construction	15.30	15.91	15.06
	Impact	**0.11**	**0.11**	**0.01**
	Magnitude of Change (1)	**Imperceptible**	**Imperceptible**	**Imperceptible**
	Change in Concentration (2)	**Negligible**	**Negligible**	**Negligible**
R6	Without Construction	18.79	19.45	16.00
	With Construction	18.80	19.46	16.00
	Impact	**0.01**	**0.01**	**0.00**
	Magnitude of Change (1)	**Imperceptible**	**Imperceptible**	**Imperceptible**
	Change in Concentration (2)	**Negligible**	**Negligible**	**Negligible**
R7	Without Construction	14.11	14.61	15.92
	With Construction	14.14	14.64	15.92
	Impact	**0.03**	**0.03**	**0.00**
	Magnitude of Change (1)	**Imperceptible**	**Imperceptible**	**Imperceptible**
	Change in Concentration (2)	**Negligible**	**Negligible**	**Negligible**
R8	Without Construction	22.10	22.98	17.32
	With Construction	22.21	23.09	17.32
	Impact	**0.11**	**0.11**	**0.00**
	Magnitude of Change (1)	**Imperceptible**	**Imperceptible**	**Imperceptible**
	Change in Concentration (2)	**Negligible**	**Negligible**	**Negligible**
R9	Without Construction	18.90	19.54	16.65
	With Construction	18.94	19.58	16.65
	Impact	**0.04**	**0.04**	**0.00**
	Magnitude of Change (1)	**Imperceptible**	**Imperceptible**	**Imperceptible**
	Change in Concentration (2)	**Negligible**	**Negligible**	**Negligible**
R10	Without Construction	17.26	17.95	13.77
	With Construction	17.33	18.03	13.78

Receptor	Scenario	2015 (µg.m^{-3})		
		NO_2	NO_2 Adjusted	PM_{10}
	Impact	**0.07**	**0.07**	**0.01**
	Magnitude of Change (1)	**Imperceptible**	**Imperceptible**	**Imperceptible**
	Change in Concentration (2)	**Negligible**	**Negligible**	**Negligible**

(1) Refer to **Table 3.3**

(2) Refer to **Table 3.4**

Table 6.4 Annual mean DMRB results and impact of construction vehicles at sensitive receptor locations – two projects

Receptor	Scenario	2015 (µg.m^{-3})		
		NO_2	NO_2 Adjusted	PM_{10}
R1	Without Construction	20.93	21.76	15.46
	With Construction	21.08	21.92	15.48
	Impact	**0.15**	**0.16**	**0.01**
	Magnitude of Change (1)	**Imperceptible**	**Imperceptible**	**Imperceptible**
	Change in Concentration (2)	**Negligible**	**Negligible**	**Negligible**
R2	Without Construction	22.78	23.90	14.98
	With Construction	23.27	24.41	15.01
	Impact	**0.49**	**0.51**	**0.03**
	Magnitude of Change (1)	**Small**	**Small**	**Imperceptible**
	Change in Concentration (2)	**Negligible**	**Negligible**	**Negligible**
R3	Without Construction	24.15	24.98	14.90
	With Construction	24.93	25.79	14.95
	Impact	**0.78**	**0.81**	**0.06**
	Magnitude of Change (1)	**Small**	**Small**	**Imperceptible**
	Change in Concentration (2)	**Negligible**	**Negligible**	**Negligible**
R4	Without Construction	22.67	23.76	14.22
	With Construction	23.00	24.10	14.25
	Impact	**0.33**	**0.35**	**0.03**
	Magnitude of Change (1)	**Imperceptible**	**Imperceptible**	**Imperceptible**
	Change in Concentration (2)	**Negligible**	**Negligible**	**Negligible**
R5	Without Construction	15.19	15.80	15.05
	With Construction	15.36	15.97	15.07
	Impact	**0.17**	**0.18**	**0.01**
	Magnitude of Change (1)	**Imperceptible**	**Imperceptible**	**Imperceptible**
	Change in Concentration (2)	**Negligible**	**Negligible**	**Negligible**
R6	Without Construction	18.79	19.45	16.00
	With Construction	18.80	19.46	16.00
	Impact	**0.01**	**0.01**	**0.00**
	Magnitude of Change (1)	**Imperceptible**	**Imperceptible**	**Imperceptible**

Receptor	Scenario	2015 (µg.m^{-3})		
		NO_2	NO_2 Adjusted	PM_{10}
	Change in Concentration (2)	**Negligible**	**Negligible**	**Negligible**
R7	Without Construction	14.11	14.61	15.92
	With Construction	14.15	14.65	15.92
	Impact	**0.04**	**0.04**	**0.00**
	Magnitude of Change (1)	**Imperceptible**	**Imperceptible**	**Imperceptible**
	Change in Concentration (2)	**Negligible**	**Negligible**	**Negligible**
R8	Without Construction	22.10	22.98	17.32
	With Construction	22.22	23.10	17.32
	Impact	**0.12**	**0.12**	**0.00**
	Magnitude of Change (1)	**Imperceptible**	**Imperceptible**	**Imperceptible**
	Change in Concentration (2)	**Negligible**	**Negligible**	**Negligible**
R9	Without Construction	18.90	19.54	16.65
	With Construction	18.97	19.62	16.66
	Impact	**0.07**	**0.07**	**0.00**
	Magnitude of Change (1)	**Imperceptible**	**Imperceptible**	**Imperceptible**
	Change in Concentration (2)	**Negligible**	**Negligible**	**Negligible**
R10	Without Construction	17.26	17.95	13.77
	With Construction	17.39	18.09	13.78
	Impact	**0.13**	**0.14**	**0.01**
	Magnitude of Change (1)	**Imperceptible**	**Imperceptible**	**Imperceptible**
	Change in Concentration (2)	**Negligible**	**Negligible**	**Negligible**

(1) Refer to **Table 3.3**

(2) Refer to **Table 3.4**

Mitigation and Residual Impacts

6.2.39 The impact of construction vehicles on local air quality at identified receptor locations is predicted to be **negligible**. It is not therefore necessary to recommend mitigation measures for road vehicle exhaust emissions. Residual impacts are also predicted to be **negligible**.

6.3 Offshore environment

Marine vessel exhaust emissions

6.3.1 Additional engine exhaust emissions from marine vessels associated offshore cable installation works will comprise NO_2, SO_2 and PM_{10}.

6.3.2 There are a number of residential properties (sensitive receptors) in the vicinity of the landfall envelope including those along Coast Road (approximately 103m from the beach) and Cliff Terrace (approximately 35m from the beach). Bydales School is approximately 173m from the beach in the vicinity of the landfall envelope.

6.3.3 It is unlikely that marine vessels will be operating in close proximity to residential properties identified in paragraph 6.3.2 due to the shallow water depths close to the shoreline. Engine exhaust emissions from marine vessels operating offshore will be subject to effective dilution and dispersion, and will have dispersed well by the time they reach any terrestrial receptors. It is therefore likely that their impact on air quality at existing human receptors along the coastline within the study area will be **negligible**.

7 Assessment of Impacts During Operation

7.1 Onshore environment

7.1.1 Following completion of construction, local traffic will return to existing flows and volumes. There will be minimal maintenance and site traffic associated with the operation of the cable systems and converter stations. As a worst case there will be eight vehicle movements per converter station per day (based upon two full time personnel per converter station and each converter station being staffed 24 hours a day with two employees arriving and two departing per daytime shift, and two employees departing and two employees arriving per night time shift). As such, a **negligible** impact on local air quality is anticipated.

7.2 Offshore environment

7.2.1 Additional engine exhaust emissions from marine vessels associated offshore cable maintenance activities will comprise NO_2, SO_2 and PM_{10}. However, emissions from vessels operating offshore will be subject to effective dilution and dispersion, and will have dispersed well by the time they reach any terrestrial receptors. It is therefore likely that their impact on air quality at existing human receptors along the coastline within the study area will be **negligible**.

8 Assessment of Impacts During Decommissioning

8.1 Onshore environment

8.1.1 The decommissioning of the onshore elements of Dogger Bank Teesside A & B, including the cable route and the converter stations will form part of an overall Decommissioning Plan, for which a full EIA will be carried out ahead of any decommissioning works being undertaken.

8.1.2 In relation to the converter stations, the programme for decommissioning is expected to be similar in duration to the construction phase. The detailed activities and methodology will be determined later within the project lifetime, but is expected to include:

- Dismantling and removal of above ground electrical equipment;
- Removal of any building services equipment;
- Demolition of the buildings and removal of security fences; and
- Landscaping and reinstatement of the site.

8.1.3 At the time of decommissioning, it will be evaluated whether the buried cable system could be used for another purpose. If this is not feasible, the above ground features will be removed to a sufficient depth to allow agricultural (or other) practices to occur unhindered. The buried cable system will be isolated and left in place unless otherwise specified by RCBC.

8.2 Offshore environment

8.2.1 As a precautionary worst case scenario it is assumed that all infrastructure including cables will be removed. Exact decommissioning arrangements will be detailed in a Decommissioning Plan, which will be drawn up and agreed with DECC prior to construction. Any impacts arising from the decommissioning process will be the subject of future assessment, once the nature of activities is understood, however impacts are unlikely to exceed those in the construction phase.

8.3 Air quality impacts

8.3.1 Air quality impacts associated with the decommissioning of the cable route, converter stations and offshore infrastructure will be similar to those identified during construction. These include emissions of dust, emissions from NRMM and emissions from road traffic during the decommissioning phase.

8.3.2 The mitigation measures outlined for the control of dust emissions to the atmosphere and vehicle emission controls, during construction, would also be expected to be adopted for the decommissioning phase. Once appropriate site specific mitigation measures are defined the residual impact of dust emissions will be **negligible** for most sites (IAQM 2012a). The residual impacts of the decommissioning phase on air quality are therefore predicted to be **negligible** as detailed in the construction phase assessment matrix in Table A6 of **Appendix 30A**.

9 Inter-Relationships

9.1 Inter-relationships

9.1.1 In order to address the environmental impact of Dogger Bank Teesside A & B as a whole, this section summarises the inter-relationships between air quality and other physical, environmental and human receptors (**Table 9.1**). The objective is to identify where the accumulation of impacts on a single receptor, and the relationship between those impacts, may give rise to a need for additional mitigation.

9.1.2 **Table 9.1** summarises the inter-relationships that are considered of relevance to the assessment of impacts on air quality and identifies where they have been considered within the ES.

9.1.3 When considering the potential for impacts to inter-relate it is assumed that any residual effect determined as having no impact will not result in a significant inter-relationship when combined with other effects on receptors.

Table 9.1 Inter-relationships relevant to the assessment of air quality

Source of impact	Nature of interrelated effect	Source chapter	Relevant chapters to be cross reference
Construction Vehicles	Air quality impacts on receptors along proposed construction travel route	**Chapter 30 Air Quality**	**Chapter 28 Traffic and Transport**
Construction Works	Dust impacts on ecological receptors	**Chapter 30 Air Quality**	**Chapter 25 Terrestrial Ecology**

9.1.4 **Chapter 31 Inter-relationships** provides an overview of all the inter-related impacts associated within Dogger Bank Teesside A & B.

10 Cumulative Impacts

10.1 Cumulative impacts

10.1.1 This section describes the cumulative impact assessment, taking into consideration other plans, projects and activities. A summary of the Cumulative Impact Assessment (CIA) is presented in **Chapter 33**.

10.1.2 In its simplest form the CIA onshore and offshore involves consideration of whether impacts on a receptor can occur on a cumulative basis between the onshore and offshore elements of Dogger Bank Teesside A & B and other activities, projects and plans for which sufficient information regarding location and scale exist.

10.1.3 The strategy recognises that data and information sufficient to undertake an assessment will not be available for all potential projects, activities, plans and/or parameters, and seeks to establish the ‘confidence’ we can have in the data and information available.

10.2 Onshore Cumulative Impact Assessment (CIA)

Screening

10.2.1 Onshore projects identified and considered for the assessment of cumulative impacts on air quality include are presented in **Table 10.1** along with a screening exercise to identify whether these are taken forward to the assessment.

Table 10.1 CIA screening for air quality onshore

Project no.	Project name	Description	Expected construction date	Approximate distance to onshore element of Dogger Bank Teesside	Potential to result in cumulative air quality impacts?
1	Tees Renewable Energy Plant	300MW biomass power station that will burn woodchip to generate electricity for the equivalent of 600,000 homes	Expected Operational in 2015	4km (from HVAC cable route)	No, given distance from development
2	Tees Renewable Energy Plant underground cable	400kV underground cable for connection of Tees Renewable Energy Plant 'Tees Dock - Lackenby, Grangetown'	Expected Operational in 2015	Partially within same site as the existing NGET substation at Lackenby	Yes
3	York Potash Project	A 600mm diameter pipeline buried to a depth of 1.2m extending from the mine to its processing and port facilities on the Tees	Unknown	Partially within same site as a section of HVDC cable route	Yes
4	Anemometry Mast at The Wilton Centre	Installation of a temporary 70m high anemometry mast (for 2yrs and 6mths)	Approved February 2011, construction must begin within 3 years	Adjacent to Dogger Bank Teesside A converter station	No, given small size of development
5	Northern Gateway Terminal	Approval of reserved matters (access, appearance, landscaping, layout and scale) following the approval of outline planning permission r/2006/0433/00) for a container terminal	Outline permission given in 2007. October 2012 decision: Grant Reserved Matters	3km from Dogger Bank Teesside A & B converter stations	No, given distance from development
6	Breagh Pipeline	Installation of an underground 20" natural gas pipeline (6.12km) and a 3" monoethylene glycol pipeline (6.12km) (revised route) including a beach valve compound	Approved April 2012, development must begin within 3 years	3km from HVDC cable route	No, given distance from development
7	Two storey 2, 3 and 4 bedroom dwelling houses and garages	Housing development including new vehicular and pedestrian accesses and associated landscaping	Public consultation ends March 2013	3km from HVDC cable route	No, given distance from development

Project no.	Project name	Description	Expected construction date	Approximate distance to onshore element of Dogger Bank Teesside	Potential to result in cumulative air quality impacts?
8	Installation of single pole to house transformer unit	Application submitted under section 37 of the electricity act 1989.	Public consultation end February 2013	4km from HVDC cable route	No, given distance from development
9	Redevelopment comprising the erection of 288 dwellings and ancillary works (amended scheme)	Redevelopment comprising the erection of 288 dwellings and ancillary works (amended scheme)	Granted planning /permission	2km from HVDC cable route	No, given distance from development
10	Demolition of various buildings	Demolition of various buildings and replace with new caretakers bungalow and garage; new two storey building; extension to existing school buildings with new lay-by; extended car parking; boundary fencing and vehicular gates with associated landscaping	Grant Deemed Consent February 2013	<1km from HVDC cable route	No, given small size of development
11	Erection of 6 dwellings	Residential development, erection of 6 dwellings and associated infrastructure	Granted planning permission February 2013	<1km from HVDC cable route	No, given small size of development
12	Teesside Power Station	Prior notification for the proposed demolition of 8 off heat recovery system generator exhaust stacks	Permission not required December 2012	<1km from HVAC cable route	Yes
13	Three storey 72 bedroom care home	Three storey 72 bedroom care home; two storey 12 bedroom special needs unit and a single storey 5 apartment special needs unit including new pedestrian access; car parking and associated landscaping	Planning permission granted, March 2013	4km from HVDC cable route	No, given distance from development
14	Screening opinion request for new biomass import facility	New facilities required to enable the import, short term storage and forward transportation	EIA not required, November 2012	3km from HVAC cable route	No, given distance from development

Project no.	Project name	Description	Expected construction date	Approximate distance to onshore element of Dogger Bank Teesside	Potential to result in cumulative air quality impacts?
		of wood pellet biomass to power station customers			
15	Screening opinion for proposed potash processing plant	Processing up to 15 million tonnes of potash ore per year	Insufficient info in planning application, Nov 2012	2km from HVDC cable route	No, given distance from development
16	Two storey management block with associated 92 space car park	Including 2 lighting columns and above ground septic tank (permission required until 31 December 2014)	Planning permission granted Dec 2012, development must begin within 3 years	<1km from HVDC cable route	No, given small size of development
17	Dogger Bank Teesside C & D	Third and fourth projects of the second stage of the Dogger Bank development	Application expected in 2015	Adjacent to HVDC cable route	Yes
18	Scoping request for two wind turbines	Scoping request for 2 wind turbines (140m max height to top) including compound; equipment; buildings; new vehicular access onto A174 and associated infrastructure	Unknown	Site boundary adjacent to HVDC cable Route	No, given small size of development
19	One Wind Turbine	Siting of 1 wind turbine (78m max height to tip) and transformer/ substation compound including new vehicular access road	Application Withdrawn	<1 km from HVDC cable route	No, given small size of development
20	Waste Treatment Facility	Waste Treatment Facility for bioremediation and treatment of hazardous wastes. The WTF will be located within the footprint of the Teesport Landfill Site.	Public consultation end date: 11 October 2013	3km north east of the existing NGET substation at Lackenby	No, given distance from development
21	Extension to Factory	Extension to existing factory building with ancillary new access roads	Major application, Approved	1km north of HVDC cable route	Yes
22	Teesside Power Plant	Prior notification for demolition of a power station and associated structures and equipment	PN Permission not required. (decided 26 June 2013)	<1km from HVAC cable route	Yes

Project no.	Project name	Description	Expected construction date	Approximate distance to onshore element of Dogger Bank Teesside	Potential to result in cumulative air quality impacts?
23	Anaerobic Power Plant	Proposed anaerobic digestion and combined heat and power plant	Planning permission granted 24 July 2013. Development to begin within 3 years of permission	3 km north of HVDC cable route	Yes
24	Erection of wind turbine	Erection of single wind turbine (max height 80m) and associated infrastructure including access tracks, hard standings, control buildings and cabling	Planning permission granted 6 June 2013. Development to begin within 3 years of permission	1 km north of HVDC cable route	No, given small size of development
25	Effluent main pipeline	Installation of above ground effluent main pipeline to replace underground corrosive pipeline	Planning permission granted 29 August 2013. Development to begin within 3 years of permission	3 km north of converter stations	No, given distance from development
26	Wind Farm	Wind farm including 5 No. wind turbines, control building and associated access	Public consultation ends 30 November 2013	3km south of HVDC cable route	No, given small size of development
27	Single wind turbine	Installation of a single wind turbine (max height to tip 51m), associated infrastructure, including external compact housing with underground cabling, turbine foundation and access tracks	Public consultation end date 2 September 2013	2km south of HVAC cable route	No, given small size of development
28	Changes to house types	Substitution of 30 approved house types of planning permission with 28 new house types, boundary treatments and associated landscaping	Consultation end date 2 August 2013	2km from HVDC cable route	No, given distance from development
29	Four bungalows	3x four bedroomed special needs bungalows and daycare centre including new vehicular and pedestrian accesses and associated	Planning permission granted 1 July 2013. Development to begin within 3 years of	2km north of HVDC cable	No, given small size of development

Project no.	Project name	Description	Expected construction date	Approximate distance to onshore element of Dogger Bank Teesside	Potential to result in cumulative air quality impacts?
		landscaping	permission		
30	1000 dwelling development	Outline application for up to 1000 dwellings together with ancillary uses including a park- and- ride car park, petrol filling station, drive-through, public house/ restaurant and 60 bed hotel with details of access	Public consultation end date 26 November 2013	<1km south east of HVDC cable route	Yes
31	Erection of agricultural building	Resubmission	Public consultation ends 12 June 2013	Adjacent to HVDC cable route	No, given small size of development
32	Residential development	Residential development comprising of 14 two storey detached dwellings with new access and landscaping	Planning permission granted 4 November 2013. Development to begin within three years of permission	1km south east of HVDC cable route	No, given small size of development

Cumulative impacts during the construction phase onshore

10.2.2 The traffic flows modelled in the construction phase vehicle exhaust emissions assessment included traffic from some of the committed developments detailed in **Table 10.1** (see **Chapter 28**, cumulative impacts). The impact of construction vehicles on NO_2 and PM_{10} concentrations at receptor locations can be defined as **negligible**.

10.2.3 The main effect on local air quality with regard to the construction phase is in relation to dust. Due to the typical dispersal and deposition rates of dust over distances, it is considered that the potential for dust to create a cumulative effect is only likely to be an issue for the closest developments, i.e. those within 50 to 100m of the Project, and if they were to be constructed concurrently. Tees Renewable Energy Plant underground cable, York Potash Project, Teesside Power Station, the Factory Extension, Teesside Power Plant, Anaerobic Power Plant, and the 1000 dwelling development are in close proximity to onshore elements of the proposed Dogger Bank Teesside A & B.

10.2.4 The proposed Dogger Bank Projects C & D HVDC onshore cable route runs parallel to the proposed Dogger Bank Teesside A & B HVDC onshore cable route. If these developments were constructed concurrently there may be an increased risk of dust emissions adversely affecting sensitive receptors within 350m of the site boundaries.

10.2.5 It is anticipated that the developments detailed in **Table 10.1**, in addition to the Dogger Bank Teesside A & B, would be required to implement CEMPs to ensure operational best practice is achieved and emissions resulting from construction activities are controlled. In addition there are legal requirements for management of construction activities. IAQM guidance (IAQM 2012a) reports that once appropriate site-specific mitigation measures have been defined, the residual impact will be **negligible** for most sites. Therefore, even with concurrent construction schedules, the implementation of robust and well managed CEMPs, as has been demonstrated in the assessment of construction phase dust emissions (see Section 6.17 and Section 6.18), would ensure that any offsite cumulative dust impacts would be **negligible**.

10.3 Offshore CIA

Screening

10.3.1 Offshore projects identified and considered for the assessment of cumulative impacts on air quality are presented in **Table 10.2** along with a screening exercise to identify whether these are taken forward to the assessment.

10.3.2 For offshore air quality, the potential for cumulative impacts are likely to be associated with engine exhaust emissions from marine vessels used during construction, operation, and decommissioning phases of each project.

Cumulative impacts during the construction phase offshore

10.3.3 There are unlikely to be human receptors at the offshore locations for the projects identified in Table 10.2 present and exposed for a period of time appropriate to the averaging period of air quality objectives (Table 2.2). It is likely that engine exhaust emissions from marine vessels operating offshore will have dispersed well by the time they reach any terrestrial receptors. The cumulative impact of marine vessels on NO2 and PM10 concentrations at terrestrial receptor locations can therefore be defined as negligible.

Table 10.2 CIA screening for air quality offshore

Type of project	Project name	Project status	Expected construction date	Distance from Dogger Bank Teesside A & B	Potential to result in cumulative air quality impacts?
Offshore wind farm	Dogger Bank Creyke Beck	Submitted in August 2013	Construction may start 2015	Dogger Bank Creyke Beck A approximately 35km Dogger Bank Creyke Beck B approximately 5km	No
Offshore wind farm	Dogger Bank Teesside C & D	Pre-Application		Teesside C approximately 7km Teesside D approximately 6km	N/A*
Offshore wind farm	Dogger Bank Zone – other future developments	Potential	Not confirmed	Not confirmed	N/A*
Offshore wind farm	Teesside offshore wind farm	Construction	2013	Dogger Bank Teesside A: 236km Dogger Bank Teesside B: 198km	No
Offshore wind farm	Hornsea Project One	Pre-Application	Project One may start construction 2015	Dogger Bank Teesside A: 116km Dogger Bank Teesside B: 98km	No
Offshore wind farm	Hornsea Zone – other future developments	Potential	Not confirmed	Not confirmed	N/A*
Oil and Gas	Cygnus gas field development (Alpha and Bravo)	Development (pre-production)	Ongoing – production to start in 2015	Alpha: Dogger Bank Teesside A: 47km Dogger Bank Teesside B: 30km Bravo: Dogger Bank Teesside A: 47km Dogger Bank Teesside B: 27km	No

Type of project	Project name	Project status	Expected construction date	Distance from Dogger Bank Teesside A & B	Potential to result in cumulative air quality impacts?
Aggregate extraction	Area 466/1	Application area	Decision expected 2013	Dogger Bank Teesside A: 65km Dogger Bank Teesside B: 28km	No

*Where Forewind is aware that a plan, project or activity could take place in the future, but has no information on how the plan, project or activity will be executed, it is screened out of the assessment.

Cumulative impacts during the operational phase onshore and offshore

10.3.4 The operational phase of all the projects onshore and offshore are unlikely to result in impacts on local air quality, with any transport emissions likely to be low level and sporadic; the potential for cumulative impacts is therefore **negligible**.

11 Transboundary Effects

11.1 Transboundary effects

11.1.1 It is acknowledged that Dogger Bank Teesside A is within 500m from the Dutch boundary. However, no sensitive receptors have been identified offshore as part of this assessment, and therefore, it is concluded that there will be no transboundary air quality impact.

11.1.2 A summary of the likely transboundary effects of Dogger Bank Teesside A & B is provided in **Chapter 32 Transboundary Effects**.

12 Summary

12.1 Summary

12.1.1 This chapter of the ES assesses the potential impact of onshore and offshore activities, associated with Dogger Bank Teesside A & B, on air quality at identified receptor locations.

12.1.2 Existing air quality in the Study Area is considered to be good in the context of national air quality objectives for NO_2 and PM_{10}.

12.1.3 **Table 12.1** provides a summary of the potential impacts on air quality arising from the realistic worst case scenarios set out in Section 5 of the this ES chapter. Standard good practice measures to mitigate dust emissions from Dogger Bank Teesside A & B will be included within a CEMP to prevent or minimise the release of dust entering the atmosphere and/or being deposited on nearby receptors. With these mitigation measures in place, all residual impacts to receptors identified, have been assessed as **negligible**.

Table 12.1 Summary of predicted impacts of Dogger Bank Teesside A & B on air quality

Description of impact	Mitigation measures	Residual impact
Construction phase		
Dust Emissions	Dust mitigation measures included in CEMP	**Negligible**
Non Road Mobile Machinery	Mitigation measures included in CEMP	**Negligible**
Vehicle Exhaust Emissions	N/A	**Negligible**
Marine Vessel Exhaust Emissions	N/A	**Negligible**
Operation phase		
Onshore air quality	N/A	**Negligible**
Offshore air quality	N/A	**Negligible**
Decommissioning phase		
Onshore	As for construction	**Negligible**
Offshore	As for construction	**Negligible**

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