Environmental Statement

Volume 2i: Scheme-wide Assessment

Chapter 7: Air quality

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7. AIR QUALITY

Summary of principal findings

This chapter presents the assessment of air quality effects associated with the construction and operation of the Huddersfield to Westtown (Dewsbury) section of the Transpennine Route Upgrade (TRU) Programme. This chapter covers the assessment of the entirety of the Huddersfield to Westtown (Dewsbury) Route (the 'Scheme').

Overall, the results of the nitrogen dioxide (NO_2) monitoring undertaken by Kirklees Council show that there has been a reduction in measured NO_2 concentrations between 2016 and 2019. However, concentrations in some areas still exceed the annual mean NO_2 objective particularly within the declared Air Quality Management Areas (AQMAs). Particulate Matter monitoring indicates that concentrations are well within the relevant air quality objectives.

Construction of the Scheme could result in significant short-term and long-term impacts at residential and non-residential receptors due to construction dust without the implementation of best practice methods (BPM). However, the residual effects following the implementation of the Code of Construction Practice (CoCP) which incorporates BPM would not be significant. The CoCP will also include measures to reduce adverse effects resulting from construction traffic emissions, which would also not be significant.

During operation, no significant adverse effects are anticipated as a result of the Scheme.

7.1 Introduction

7.1.1 This chapter presents the assessment of air quality effects associated with the construction and operation of the Huddersfield to Westtown (Dewsbury) section of the Transpennine Route Upgrade (TRU) Programme. This chapter covers the assessment of the entirety of the Huddersfield to Westtown (Dewsbury) Route (herein referred to as the 'Scheme'). The air quality assessment is further broken down into six Route Section Assessments in Volume 2ii of this Environmental Statement (ES) which provide additional detail to this chapter.

7.1.2 This chapter is set out as follows:

- Legislative and policy context – relevant international, national and local policy requirements, legal requirements and guidance which have been used to define the assessment approach are outlined;
- Assessment methodology – the methodology the assessment follows is defined including the justification for the study area and the approach for determining significance of effects;
- Baseline – a summary of the air quality baseline within the study area is provided;
- Potential effects – the potential impacts and effects (both beneficial and adverse) during construction and operation are characterised;
- Mitigation measures – agreed avoidance, mitigation, compensation and enhancement measures are described;
- Residual effects – the significance of residual effects (both beneficial and adverse) following the implementation of mitigation measures are assessed; and
- Cumulative effects - the potential likely significant cumulative effects of the Scheme are described and assessed.

7.1.3 A detailed description of the Scheme is provided in Chapter 2 (Scheme description) in Volume 2i of the ES and all appendices and figures referred to in this chapter are provided in Volumes 3 and 4 of this ES respectively.

7.2 Legislative and policy context

European

EU Framework Directive

7.2.1 Air pollutants at high concentrations can have adverse effects on the health of humans and ecosystems. European Union (EU) legislation on air quality forms the basis for UK legislation and policy on air quality.

7.2.2 The EU Framework Directive 2008/50/EC[1] on ambient air quality assessment and management came into force in May 2008 and was implemented by Member States, including the UK, by June 2010. The Directive aims to protect human health and the environment by avoiding, reducing or preventing harmful concentrations of air pollutants. The Directive was transposed into UK law by the Air Quality Standards Regulations 2010 (SI 2010/1001).

National

Air Quality Standards Regulations

7.2.3 The Air Quality Standards Regulations implement Limit Values prescribed by the EU

[1] Council Directive 2008/50/EC of 21 May 2008 on ambient air quality and cleaner air for Europe.

Framework Directive 2008/50/EC. Limit values are set for individual pollutants and are made up of a concentration value, an averaging time over which it is to be measured, the number of exceedances allowed per year, if any, and a date by which it must be achieved. Some pollutants have more than one limit value covering different endpoints or averaging times. The Limit Values are legally binding and the Secretary of State, on behalf of the UK Government, is responsible for their implementation.

The UK Air Quality Strategy

7.2.4 The current UK Air Quality Strategy (UK AQS) was published in July 2007[2] and sets out the objectives for Local Planning Authorities (LPA) in undertaking their Local Air Quality Management (LAQM) duties. The UK AQS objectives of air pollutants relevant to this assessment are summarised in Table 7-1.

Table 7-1 Summary of UK AQS objectives (EU Limit Values) relevant to the Scheme

Pollutant	Objective	
	Concentration	Measured as
For the Protection of Human Health		
Nitrogen Dioxide (NO_2)	200µg/m^3	1 hour mean not to be exceeded more than 18 times per year
	40µg/m^3	Annual Mean
Particulate Matter (PM_{10})	50µg/m^3	24 hour mean not to be exceeded more than 35 times per year
	40µg/m^3	Annual Mean
Particulate Matter ($PM_{2.5}$)	25µg/m^3	Annual Mean
For the Protection of Vegetation		
Nitrogen Oxides (NO_x)	30µg/m^3	Annual Mean

The Environment Act

7.2.5 Under Part IV of the Environment Act 1995[3], local authorities are required to review and assess air quality in their area by way of a staged process. Should this process suggest that any of the UK AQS objectives (as set out in Table 7-1) will not be met by the target dates, the local authority must consider the declaration of an AQMA and the subsequent preparation of an Air Quality Action Plan (AQAP) to improve the air quality in that area in pursuit of the objectives. A summary of the Kirklees Council Review and Assessment of air quality, as part of their LAQM regime, is provided in the 'Baseline' section.

National Planning Policy

National Planning Policy Framework

7.2.6 The National Planning Policy Framework (NPPF)[4], published in February 2019, sets out the Government's planning policies for England and how these should be applied.

7.2.7 Paragraph 170 states "… Development should, wherever possible, help to improve local environmental conditions such as air and water quality …"

[2] Department of the Environment, Food and Rural Affairs (Defra), (2007). 'The Air Quality Strategy for England, Scotland, Wales & Northern Ireland'.
[3] Office of the Deputy Prime Minister (ODPM), 1995, 'The Environment Act' 1995.
[4] Department for Communities and Local Government, 2019, 'National Planning Policy Framework'. DCLG, London.

7.2.8 Paragraph 180 states "…Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development…".

7.2.9 Paragraph 181 states "Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan."

National Air Quality Plan

7.2.10 The UK Government was required by the High Court to release an Air Quality Plan to meet the NO_2 Limit Value in the shortest timescale as possible. This document was adopted on 26 July 2017[5].

7.2.11 The Air Quality Plan focuses on reducing concentrations of NO_x and NO_2 around road vehicle emissions within the shortest possible time, with the principal aims to:

a. reduce emissions of NO_x from the current road vehicle fleet in problem locations now; and
b. accelerate road vehicle fleet turnover to cleaner vehicles to ensure that the problem remains addressed and does not move to other locations.

7.2.12 The other aims include reducing background concentrations of NO_x from:

- Other forms of transport such as rail, aviation and shipping;
- Industry and non-road mobile machinery; and
- Buildings, both commercial and domestic, and other stationary sources.

7.2.13 The Air Quality Plan provides measures to reduce NO_x and NO_2 concentrations in the UK, such measures include:

- Mandate local authorities to implement Clean Air Zones within the shortest possible time;
- Consultation on proposal for a Clean Air Zone Framework for Wales;
- Consultation on a draft National Low Emission Framework for Scotland;
- Commitment to establishing a Low Emission Zone for Scotland by 2018;
- Tackling air pollution on the English Road network;
- New real driving emissions requirement to address real world NO_x emissions;
- Additional funding to accelerate uptake of hydrogen vehicles and infrastructure;
- Additional funding to accelerate the uptake of electric taxis;
- Further investment in retrofitting alongside additional support of low emission buses and taxis;
- Regulatory changes to support the take up of alternatively fuelled light commercial vehicles

[5] Defra (2017) UK plan for tackling roadside nitrogen dioxide concentrations Detailed Plan July 2017

- Exploring the appropriate tax treatment for diesel vehicles;
- Call for evidence on updating the existing Heavy Goods Vehicle (HGV) Road User Levy
- Call for evidence on use of red diesel;
- Ensure wider environmental performance is apparent to consumers when purchasing cars
- Updating Government procurement policy;
- New emissions standards for non-road mobile machinery;
- New measures to tackle NO_x emissions from Medium Combustion Plants; and
- New measures to tackle NO_x emissions from generators.

7.2.14 A High Court ruling[6] on 21 February 2018, stated the UK Government's air quality improvement plan adopted on 31 July 2017 was unlawful as '*it does not contain measures sufficient to ensure substantive compliance with the 2008 Directive and the English Regulations'*. The UK Government '*must ensure steps are taken to achieve compliance as soon as possible, by the quickest route possible and by a means that makes that outcome likely'*. The judgement stated that the UK Government must produce a supplementary plan, setting out requirements for feasibility studies to be undertaken in the 33 Local Authority Areas, Kirklees Council is one of these local authority areas.

7.2.15 In May 2018, it was announced the EU was going to take the UK to the European Commission over failure to meet the Limit Values for NO_2.

7.2.16 Following the requirement to create a supplement to the 2017 UK plan for tackling roadside NO_2 concentrations, on 23 March 2018 the government legally directed the 33 Local Authorities, including Kirklees Council, to develop a feasibility study.

7.2.17 Kirklees Council had one road link with a projected exceedance of the annual mean NO_2 limit value in the national PCM modelling: a section of the A62 feasibility study demonstrated that the identified area did not meet the criteria for the NO_2 limit value to apply and therefore no further action is required. The feasibility study demonstrated that the road link is less than 100m long. The Air Quality Standards Regulations 2010 states that *"the Secretary of State must locate sampling points so as to be representative of air quality in a street segment of no less than 100m in length at traffic-orientated sites".* Road links shorter than 100m are not included in the PCM national modelling and as such this road link is no longer part of the national model. This road link has therefore been removed from the PCM and no further action by Kirklees Council was required.

Local

Local planning policy

Kirklees Local Plan

7.2.18 The Kirklees Local Plan was adopted on 27 February 2019[7]. The Local Plan is now the statutory development plan for Kirklees. Planning applications must be determined in accordance with the development plan unless material considerations indicate otherwise. The following policies have relevance to the Scheme:

7.2.19 Policy LP20 of the Local Plan states that "*The council will support demand management measures which discourage single occupancy car travel within new development and*

[6] https://www.judiciary.gov.uk/judgments/the-queen-on-the-application-of-clientearth-no-3-claimant-v-secretary-of-state-for-environment-food-and-rural-affairs-and-othrs/
[7] Kirklees Council. 2019. Kirklees Local Plan.

encourage the use of low emission vehicles to improve areas with low levels of air quality. Proposals should include measures to encourage the use of sustainable travel options, including public transport, the promotion of personal journey planning, walking, cycling, car sharing, electronic communication and home working"

7.2.20 Policy LP21 states *"Proposals shall demonstrate that they can accommodate sustainable modes of transport and be accessed effectively and safely by all users. Proposals shall demonstrate adequate information and mitigation measures to avoid a detrimental impact on highway safety and the local highway network. Proposals shall also consider any impacts on the Strategic Road Network. All proposals shall: …c. be accompanied by a supporting Transport Assessment or Transport Statement where the development would generate significant trip generation, providing detail as to the impact on highway safety, air quality, noise and light restrictions.*

7.2.21 Policy LP51 states in terms of the "protection and improvement of local air quality:

1. Development will be expected to demonstrate that it is not likely to result, directly or indirectly, in an increase in air pollution which would have an unacceptable impact on the natural and built environment or to people;
2. Proposals that have the potential to increase local air pollution either individually or cumulatively must be accompanied by evidence to show that the impact of the development has been assessed in accordance with the relevant guidance. Development which has the potential to cause levels of local air pollution to increase must incorporate sustainable mitigation measures that reduce the level of this impact. If sustainable measures cannot be introduced the development will not be permitted; and
3. Where the development introduces new receptors into Air Quality Management Areas or Areas of Concern or near other areas of relatively poor air quality, for example near roads or junctions, the development must incorporate sustainable mitigation measures that protect the new receptors from unacceptable levels of air pollution. Where sustainable mitigation measures cannot be introduced which prevent receptors from being exposed to unsafe levels of air pollution, development will not be permitted.

Technical guidance and standards

Department for Environment, Food and Rural Affairs, Clean Air Strategy

7.2.22 Published in January 2019 the Clean Air Strategy[8] sets out a coherent framework and national action to improve air quality throughout the UK.

7.2.23 The Strategy is underpinned by new national powers to control major sources of air pollution, in line with the risk they pose to public health and the environment, plus new local powers to act in areas with an air pollution problem. The Strategy also supports the creation of Clean Air Zones to lower emissions from all sources of air pollution, backed up with clear enforcement mechanisms.

Environmental Protection UK & Institute of Air Quality Management Guidance; Land-Use Planning & Development Control: Planning for Air Quality, 2017

7.2.24 Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) provide guidance[9] for air quality considerations within the local development control

[8] Defra (2019) Clean Air Strategy, 2019
[9] Environmental Protection UK & Institute of Air Quality Management (2017), 'Land-Use Planning & Development Control: Planning for Air Quality',
EPUK & IAQM, London.

processes, promoting a consistent approach to the treatment of air quality issues.

7.2.25 The EPUK and IAQM guidance explains how development proposals can adopt good design principles to reduce emissions and contribute to better air quality. The guidance also provides a method for screening the need for an air quality assessment and a consistent approach for describing the impacts at individual receptors. The EPUK and IAQM guidance, advises that:

"In arriving at a decision about a specific proposed development the local planning authority is required to achieve a balance between economic, social and environmental considerations. For this reason, appropriate consideration of issues such as air quality, noise and visual amenity is necessary. In terms of air quality, particular attention should be paid to:

- Compliance with national air quality objectives and of EU Limit Values
- Whether the development will materially affect any air quality action plan or strategy
- The overall degradation (or improvement) in local air quality; or
- Whether the development will introduce new public exposure into an area of existing poor air quality".

IAQM: Guidance on the Assessment of Dust from Demolition and Construction

7.2.26 The IAQM Construction Dust Guidance[10] provides guidance to consultants, Environmental Health Officers (EHO), and Environmental Protection Officers (EPO) on how to assess air quality impacts from construction related activities. The guidance provides a risk-based approach based on the potential dust emission magnitude of the site (small, medium or large) and the sensitivity of the area to dust impacts. The importance of professional judgement is noted throughout the guidance. The guidance recommends that once the risk class of the site has been identified, the appropriate level of mitigation measures is implemented to ensure that the construction activities have no significant impacts.

West Yorkshire Low Emissions Strategy 2016 to 2021 'Delivering Cleaner Air for All in West Yorkshire', 2016

7.2.27 The West Yorkshire Low Emissions Strategy[11] (WYLES) has been developed through collaboration between the West Yorkshire local authorities (Bradford Metropolitan District Council, Calderdale Metropolitan Borough Council, Kirklees Metropolitan District Council, Leeds City Council and Wakefield Metropolitan District Council); West Yorkshire Combined Authority (WYCA) and Public Health England (PHE).

7.2.28 The WYLES outlines the key challenges in relation to air quality within West Yorkshire and how, the local authorities will deliver cleaner air to create a healthier place for people to live, work and visit. The WYLES sets out several initiatives to tackle emissions from passenger cars, buses, trains, freight, taxis, and public-sector fleet vehicles.

7.2.29 Trains are considered within the WYLES principally as a means of helping to resolve air quality within towns and cities, by enabling more people to move away from cars, even if for part of their journey, having a positive contribution to air quality. The key features to reduce emissions from trains are:

- Phase out older diesel trains and expand electrification of the West Yorkshire rail network;
- Increased capacity on the rail network;
- Increase Park and Rail provision; and

[10] Institute of Air Quality Management, 2014, 'Guidance on the Assessment of dust from demolition and construction.
[11] West Yorkshire Combined Authority, (2016) West Yorkshire Low Emissions Strategy 2016 to 2021 '*Delivering Cleaner Air for All in West Yorkshire',* December 2016

- EV Charging points at railway stations.

7.2.30 The Scheme complies with the WYLES as it will electrify the railway and introduce bi-modal trains, removing older trains and improving local air quality.

7.3 Assessment methodology

7.3.1 This section describes the study area, the data sources and methodologies used to undertake the air quality assessment.

Study area

Construction dust

7.3.2 Construction dust for the purpose of this assessment is defined as solid particles that are suspended in air or have settled out onto a surface after having been suspended in air. The term dust incorporates both nuisance dust and Particulate Matter (PM). In this assessment a distinction has been made to separate the two elements covered under the term 'dust'. Nuisance dust is that which may cause annoyance and loss of amenity. PM is airborne particulate matter with a diameter less than either 10 microns (PM_{10}) or 2.5 microns ($PM_{2.5}$) which have the potential to be inhaled and cause serious health problems.

7.3.3 The assessment of dust emissions arising from construction sites associated with the Scheme has been carried out in accordance with the IAQM guidance[12] as:

- A 'human receptor' within: 350m of the Scheme boundary; or 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance; and
- An 'ecological receptor' within: 50m of the Scheme boundary; or 50m of the route(s) used by construction vehicles on the public highway, up to 500m, from the site entrance(s).

7.3.4 Where receptors are outside of these study areas, IAQM guidance concludes that the level of risk would be negligible based on the exponential decline in both airborne concentrations and the rate of deposition with distance. The study area is shown in Figure 7-1.

Road emissions

7.3.5 The assessment of the effects of emissions arising from construction traffic and changes to road layouts once the Scheme is operational is limited to receptors located along roads that meet any of the following criteria specified in the EPUK & IAQM guidance. The EPUK/IAQM guidance criteria[13] is more conservative than the criteria specified in the Design Manual for Roads and Bridges (DMRB) guidance (the methodology proposed in the Scoping Report) and thus the EPUK/IAQM criteria is deemed more appropriate for screening the extent of the air quality modelling study area. Further information on the traffic data is provided in Appendix 7-1.

7.3.6 In accordance with the EPUK/IAQM criteria, roads have been included in the model where the of the following criteria are met:

- A change of LDV flows of more than 100 Annual Average Daily Traffic (AADT) within or adjacent to an AQMA, or more than 500 AADT elsewhere; or

[12] Institute of Air Quality Management (2014) Assessment of Dust from Demolition and Construction
[13] EPUK/IAQM - Land-Use Planning & Development Control: Planning For Air Quality 2017
http://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf

- A change of HDV flows of more than 25 AADT within or adjacent to an AQMA, or more than 100 AADT; or
- A change in road realignment, where the change is 5m or more and the road is within an AQMA.

7.3.7 The study area for such assessment includes a buffer zone extending 15m either side of affected roads and junctions. The study area for the operational phase is shown in Figure 7-2.

7.3.8 Assessment of nitrogen deposition (for ecological effects) will be required if there are significant changes in traffic flows, as identified by the criteria above, within 200m of ecologically sensitive sites.

Rail emissions

7.3.9 As set out in LAQM.TG(16)[14], the assessment of rail emissions will be relevant receptors within 15m of the platform edge for stationary locomotives at railway stations, and within 30m of the trackside for moving locomotives.

Temporal scope

7.3.10 The baseline assessment year is 2019 which is the latest full year of ratified air quality monitoring data is available from Kirklees Council.

7.3.11 The assessment year for the construction effects is assumed to be 2024 (see paragraph 7.3.35).

7.3.12 The opening year for operational effects is assumed to be 2026.

Data sources

7.3.13 Existing air quality data has been collected for the desk-based study using the following sources:

- Kirklees 2018 Local Air Quality Management Annual Status Report[15];
- Defra Background Mapping Data[16];
- National Atmospheric Emissions Inventory[17]; and
- Multi-Agency Geographic Information for the Countryside (MAGIC)[18].

Assessment criteria

Construction

Nuisance dust

7.3.14 The assessment of the construction activities in relation to dust has been based on the IAQM's Guidance on the Assessment of Dust from Demolition and Construction, 2014[19]**Error! Bookmark not defined.** and the following:

- Consideration of planned construction activities and their phasing; and

[14] Defra Local Air Quality Management Technical Guidance (TG16) 2018 - https://laqm.defra.gov.uk/technical-guidance/
[15] Kirklees Council (2018) Local Air Quality Management Annual Status Report
[16] https://uk-air.defra.gov.uk/data/laqm-background-home
[17] https://naei.beis.gov.uk/
[18] https://magic.defra.gov.uk/
[19] https://iaqm.co.uk/text/guidance/construction-dust-2014.pdf

- A review of the sensitive uses in the area immediately surrounding the Scheme.

7.3.15 The IAQM guidance identifies receptors within 350m of the Scheme boundary, and within 50m of construction routes would be sensitive to emissions and nuisance dust from construction activities.

7.3.16 Following the IAQM guidance, construction activities can be divided into the following four distinct activities:

- Demolition – any activity involved in the removal of an existing structure;
- Earthworks – the excavation, haulage, tipping and stockpiling of material, but may also involve levelling the site and landscaping;
- Construction – any activity involved with the provision of a new structure; and
- Trackout – the movement of vehicles from unpaved ground on a site, where they can accumulate mud and dirt, onto the public road network where dust might be deposited.

7.3.17 The IAQM guidance considers three separate dust effects, with the proximity of sensitive receptors being taken into consideration for:

- Annoyance due to dust soiling;
- Potential effects on human health due to significant increase in exposure to PM_{10}; and
- Harm to ecological receptors.

7.3.18 A summary of the four-step process which has been undertaken for the dust assessment of construction activities as set out in the IAQM guidance is presented in Table 7-2.

Table 7-2 Summary of the guidance for undertaking a construction dust assessment

Step		Description
1	Screen the need for a detailed assessment	Simple distance-based criteria are used to determine the requirement for a detailed dust assessment. An assessment will normally be required where there are 'human receptors' within 350m of the Scheme boundary and/or within 50m of the route(s) used by construction vehicles on public highway, up to 500m from the site entrance or 'ecological receptors' within 50m of the Scheme boundary and/or within 50m of the route(s) used by construction vehicles on public highway, up to 500m from the site entrance.
2	Assess the risk of dust effects	The risk of dust arising in sufficient quantities to cause annoyance and/or health or ecological effects should be determined using three risk categories, low, medium and high, based on the following factors: • the scale and nature of the works, which determines the risk of dust arising (i.e. the magnitude of potential dust emissions) classed as small, medium or large; and • the sensitivity of the area to dust effects, considered separately for ecological and human receptors (i.e. the potential for effects) defined as low, medium or high.
3	Site-specific mitigation	Determine the site-specific measures to be adopted at the site based on the risk categories determined in Step 2 for the four activities. For the cases where the risk is 'insignificant' no mitigation measures beyond those required by legislation are required. Where a local authority has issued guidance on measures to be adopted these should be taken into account.

4	Determine significant effects	Following Steps 2 and 3, the significance of the potential dust effects should be determined, using professional judgement, taking into account the factors that define the sensitivity of the surrounding area and the overall pattern of potential risks.

7.3.19 Given the nature and extent of the Scheme (i.e. large-scale linear development) the IAQM classification of activities, which are predominately for smaller scale urban regeneration sites, do not readily apply to the construction works. However, the guidance provides a base point which has been modified (using professional judgement) to make appropriate for the Scheme. A precautionary approach to determining the dust magnitude from each set of activities has been applied. The assessment has considered a reasonable worst-case scenario for dust by using the highest dust emission magnitude available (Large) where the above activities apply.

7.3.20 Following the above air quality dust risk assessment, appropriate dust and pollution measures are provided to ensure the air quality impacts of construction are minimised and any mitigation measures employed are effective.

7.3.21 The potential effects of construction activities on local air quality have been based on professional judgement and reference to the criteria set out in the IAQM guidance. This includes an assessment of the risk of dust effects arising from the likely construction activities, based on the magnitude of potential dust emissions and the sensitivity of the area. The risk category matrix for each of the construction activity types, taken from the criteria set out in the IAQM, are presented in Table 7-3 to Table 7-6.

Table 7-3 Risk category from demolition activities

Sensitivity of area	Dust emission magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible

Table 7-4 Risk category from earthworks activities

Sensitivity of area	Dust emission magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table 7-5 Risk category from construction activities

Sensitivity of area	Dust emission magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table 7-6 Risk category from trackout activities

Sensitivity of area	Dust emission magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible

Low	Low Risk	Low Risk	Negligible

7.3.22 The IAQM outlines that experience of implementing mitigation measures for construction activities demonstrates that total mitigation is normally possible such that likely residual impacts would not be 'significant'.

Construction traffic

7.3.23 The IAQM guidance on assessing construction effects states that:

"*Experience of assessing the exhaust emissions from on-site plant (also known as non-road mobile machinery (NRMM)) and site traffic suggests that they are unlikely to make a significant effect on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed. For site plant and on-site traffic, consideration should be given to the number of plant/vehicles and their operating hours and locations to assess whether a significant effect is likely to occur. For site traffic on the public highway, if it cannot be scoped out, then if should be assessed using the same methodology and significance criteria as operational traffic impacts.*"

7.3.24 As described above, changes in traffic flows will be screened using the EPUK/IAQM criteria. Where roads meet the criteria, a detailed assessment of construction traffic emissions will be undertaken using the detailed dispersion model ADMS-Roads. The dispersion model will use the latest vehicle emission factors, toolkits and methodologies from Defra.

Construction plant

7.3.25 In line with the IAQM guidance which states exhaust emissions from construction plant are unlikely to make a significant impact on local air quality, the assessment of emissions from construction plant will be based on professional judgement considering the number of plant on site, their operating hours and any control measures proposed.

Operation

Road traffic

7.3.26 The EPUK/IAQM guidance provides an approach to assigning the magnitude of changes as a result of a development as a proportion of a relevant assessment level. The change is then examined against the new total concentration and its relationship with the assessment criterion to provide a description of the impact at selected receptor locations.

7.3.27 Table 7-7 presents the IAQM framework for describing the impacts (the change in concentration of an air pollutant) at individual receptors. The term Air Quality Assessment Level (AQAL) is used to include air quality objectives or Limit Values, where these exist.

Table 7-7 Impact descriptors for individual receptors

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

Note: AQAL may be an air quality objective, EU limit value, or an Environment Agency 'Environmental Assessment Level (EAL). The table is intended to be used by rounding the change in percentage pollutant concentration to

whole numbers. Changes of 0% (i.e. less than 0.5%) are described as Negligible. The table is only to be used with annual mean concentrations.

7.3.28 The approach set out in the EPUK/IAQM guidance provides a method for describing the impact magnitude at individual receptors only. The guidance outlines that this change may have an effect on the receptor depending on the severity of the impact and other factors that may need to be considered. The assessment framework for describing impacts can be used as a starting point to make a judgement on the significance of the effect. However, whilst there may be 'slight', 'moderate' or 'substantial' impacts described at one or more receptors, the overall effect may not necessarily be judged as being significant in some circumstances.

7.3.29 Where the impact is sufficiently slight that it has no effect on receptors it can therefore be described as 'not significant'. Similarly, when an impact is clearly substantial it can be considered 'significant'. The problem lies in the intermediate region where there is likely to be uncertainty on the transition from insignificant to significant effects. The IAQM guidance uses the example that of an individual property exposed to a moderately adverse impact might not be considered a significant effect, but many hundreds of properties exposed to a slight adverse impact could be.

7.3.30 The starting point for the assessment of the significance of likely residual effects of the Scheme on air quality is therefore the degree of impact. However, the overall judgement on significance is established through professional judgement and the consideration of the following factors:

- The geographical extent (local, district or regional) of effects;
- Their duration (temporary or long term);
- Their reversibility (reversible or permanent);
- The magnitude of changes in pollution concentrations;
- The exceedance of standards (e.g. AQS objectives); and
- Changes in pollutant exposure.

Rail emissions

7.3.31 LAQM.TG(16) states that emissions from railways should be considered in relation to stationary emissions from idling locomotives in stations and depots, and mobile emissions on busy lines with high numbers of diesel locomotives. The guidance provides screening criteria for locations where local authorities may need to assess air quality as follows:

- Stationary diesel locomotives – locations where locomotives are regularly stationary for periods of 15 minutes or more, and relevant exposure within 15m of the locomotives; and
- Moving diesel locomotives – tracks with heavy traffic of diesel passenger trains and background annual mean NO_2 concentrations above 25µg/m^3, and relevant exposure within 30m of the railway tracks.

7.3.32 Given the nature of the Scheme, including plans for electrification and that, although Kirklees Council have declared Air Quality Management Areas (AQMA), they have not declared any due to railway emissions and it is therefore considered that none of the stations would require assessment under the criteria for either stationary or moving locomotives and therefore impacts from rail emissions are scoped out of the assessment.

Consultation

7.3.33 The Environmental Scoping Report and the subsequent Scoping Opinion informed the approach to the assessment reported in this ES. Consultation has been ongoing throughout the EIA process and further details are provided below:

- The Scoping Opinion stated that "The ES should give consideration to West Yorkshire's Low Emissions Strategy"; and
- Consultation was undertaken with Kirklees Council with Environmental Protection Officers invited to comment on the methodology proposed for the assessment of construction and operational air quality impacts. No issues were raised.

Cumulative effects

7.3.34 Reasonably Foreseeable Future Projects (RFFP) that have the potential to affect or be affected by the Scheme are detailed in Chapter 22 (Cumulative effects).

7.3.35 The IAQM guidance is clear that, with appropriate mitigation measures in place, any residual demolition and construction dust effects from an individual site will be 'not significant'. The guidance also suggests that cumulative construction dust impacts are only likely where sites are within 500m of each other. Therefore, only sites within 500m of the Scheme have been considered for cumulative effects.

7.3.36 Road traffic air quality impacts are assessed inclusive of natural growth factors including increased traffic due to consented developments.

Assumptions and limitations

7.3.37 The construction phase will cover a period of four years, the construction traffic effects have been modelled in 2024 to be consistent with the traffic data supplied. The construction scenarios have been selected from several scenarios on the basis that they provide the worst-case situations in terms of major road closures and construction compounds.

7.3.38 The limitations with regards to the air quality model are discussed in Appendix 7-4 and where necessary appropriate model refinement, including a model verification, has been undertaken.

7.4 Baseline

Air Quality Management Areas

7.4.1 As a result of work undertaken to date as part of their Review and Assessment of air quality process, Kirklees Council currently has 10 AQMAs declared within its borough.

7.4.2 Following the 2008 detailed assessment the Kirklees Council declared the first two AQMAs due to exceedances of annual mean NO_2 along the A62 in Bradley (AQMA 1) and the 24-hour PM_{10} along the A644 in Scout Hill (AQMA 2).

7.4.3 Following the 2009 Updating and Screening Assessment undertaken by Kirklees Council, a detailed assessment was undertaken for exceedances of NO_2 in seven areas around Kirklees and a further assessment for PM_{10} exceedances within the Bradley AQMA. Following this work a further 7 AQMAs were declared in November 2017 for exceedances of the annual mean objective for NO_2 as follows:

- AQMA 3: Ainley Top - The designated area incorporates Halifax Road (A629), Lindley Moor Road Bradley Road (A643), Warren House Lane and Stirling Wood Close, which is in close proximity to the Ainley Top Roundabout at Birchencliffe;
- AQMA 4: Birkenshaw - The designated area incorporates Bradford Road (A651), Whitehall Road East (A58), Carlton Court, Grove Terrace, Swincliffe Crescent, Milford Grove, Tetley Drive and Manor Park Gardens, which is in close proximity to the M62 and A651- A58 Roundabout at Birkenshaw;

- AQMA 5: Eastborough - The designated area incorporates Leeds Road (A653), Dewsbury Ring Road (A638), Wakefield Road (A638), Highgate Road, Highgate Terrace, Bank Street and Old Bank Road, which is in close proximity to Dewsbury Town Centre;
- AQMA 6: Edgerton - The designated area incorporates Edgerton Road (A629) and Blacker Road, which is in close proximity to Huddersfield Town Centre;
- AQMA 7: Liversedge - The designated area incorporates Huddersfield Road (A62), Bradford Road (A638), Wakefield Road (A638), Wormald Street and Well Street, which is in Liversedge;
- AQMA 8: Outlane - The designated area incorporates New Hey Road and Round Ings Road, which is in close proximity to the M62 at Outlane; and
- AQMA 9: Huddersfield Town Centre - The designated area incorporates roads bordering and within the Huddersfield Ring Road.

7.4.4 The 2018 Annual Status Report[20] confirms that Kirklees Council is currently in the process of amending AQMA 1. Kirklees Council is also in the process of revoking AQMA 2 due to levels of PM_{10} being recorded in both 2014 and 2015 below the 24-hour objective level following the successful implementation of mitigation measures at Scout Hill. Modelling work carried out in the 2018 report has identified the extent of exceedances of the annual mean NO_2 objective along Lindley Moor Road and as a result it is proposed to declare a new AQMA in the Thornton Lodge area. As a result, in June 2019 AQMA 10 was declared for the annual mean NO_2 objective. The designated area incorporates Manchester Road (A62), Birkhouse Lane and Thornton Lodge Road.

7.4.5 Huddersfield Station is situated within AQMA 9 and the Scheme is located in proximity to three other AQMAs:

- AQMA 1: An area encompassing properties along two sections of the A62 Leeds Road, in the vicinity of the junctions with the A6107 Bradley Road, and with the A644. Located approximately 250m northwest of the railway line;
- AQMA 2: An area incorporating a number of properties along part of the Huddersfield Road A644 in Scout Hill. Located approximately 100m northwest of the railway line; and
- AQMA 5: The area incorporates Leeds Road (A653), Dewsbury Ring Road (A638), Wakefield Road (A638), Highgate Road, Highgate Terrace, Bank Street and Old Bank Road, which is in close proximity to Dewsbury Town Centre. Located approximately 250m east of the railway line.

7.4.6 The location of these AQMAs is shown in Figure 7-3.

Defra mapping

Pollution climate mapping

7.4.7 Within the study area the 2018 mapped background concentrations from the national modelling[21] are below the air quality objectives for NO_2. Concentrations range from 9.4-23.9µg/m^3, concentrations of PM_{10} range from10.3-13.6µg/m^3, and concentrations of $PM_{2.5}$ range from 6.8-9.0µg/m^3.

Background mapping

7.4.8 Background mapping is also available from Defra for 1km grid squares across the UK for the

[20] Kirklees Council. 2018. 2018 Air Quality Annual Status Report (ASR). June 2018
[21] Defra, 2016, UK Ambient Air Quality Interactive Map https://uk-air.defra.gov.uk/data/gis-mapping/ accessed 28.10.2019

years 2018-2030[22], 2019 background concentrations across the study area for NO_2 range from 22.9 – 10.6µg/m^3, concentrations range from 13.6 – 10.7µg/m^3 for PM_{10} and from 9.1 – 7.1µg/m^3 for $PM_{2.5}$. Future estimated background concentrations for 2024 across the study area for NO_2 range from 19.7 – 8.9µg/m^3, concentrations range from 12.9 – 10.0µg/m^3 for PM_{10} and from 8.6 – 6.7µg/m^3 for $PM_{2.5}$. Background concentrations used in the assessment are presented in Table A7-1 in Appendix 7-2.

Local authority monitoring

7.4.9 Kirklees Council currently undertakes monitoring of NO_2 and PM_{10} at two locations using automatic monitors. The automatic monitors are:

- RS3-Bradley – Roadside site; and
- RS6-Ainley Top – Roadside site.

7.4.10 The results for the two automatic monitoring locations are presented in Table 7-8 and their locations are shown in Figure 7-4, neither location is within the Scheme boundary however they are included here as they are representative of concentrations within the Kirklees administrative boundary.

Table 7-8 Annual mean monitored concentrations at Kirklees Council's automatic monitors

Monitor	Pollutant	Averaging period	AQS Objective	2013	2014	2015	2016	2017
RS3 – Bradley	NO_2	Annual Mean	40µg/m^3	33.2	36.0	39.8	N/A	N/A
		Hourly (No. of hours)	200µg/m^3 not to be exceeded more than 18 times a year	0	2	7	N/A	N/A
	PM_{10}	Annual Mean	40µg/m^3	22.1	20.1	18.7	N/A	N/A
		24-Hour Mean (No. of days).	50µg/m^3 not to be exceeded more than 35 times a year	13	8	3	N/A	N/A
RS6 – Ainley Top	NO_2	Annual Mean	40µg/m^3	42.3	41.7	44.4	N/A	N/A
		Hourly (No. of hours)	200µg/m^3 not to be exceeded more than 18 times a year	0	2	0	N/A	N/A
	PM_{10}	Annual Mean	40µg/m^3	N/A	17.1	25.9	N/A	N/A
		24-Hour Mean (No. of days).	50µg/m^3 not to be exceeded more than 35 times a year	N/A	0	10	N/A	N/A

Note: Data taken from Kirklees Council's 2018 Air Quality Annual Status Report, June 2018
Exceedances of the Air Quality Strategy (AQS) Objective are highlighted in Red, concentrations that meet the AQS Objective are highlighted in green
Data is unavailable for 2016-2019 due to a corrupted database

[22] Defra, 2019, Background Mapping data for local authorities https://uk-air.defra.gov.uk/data/laqm-background-home accessed 28.10.2019

7.4.11 The monitoring results in Table 7-8 indicate the annual mean NO_2 objective was exceeded in all years (2013-2015) at the RS6 automatic monitor. The annual mean NO_2 objective is met at the RS3 automatic monitor and the NO_2 1-hour mean, PM_{10} annual mean, and PM_{10} 24-hour mean objectives are met at both automatic monitors.

7.4.12 NO_2 is also measured at 87 locations using diffusion tubes shown in Figure 7-5. The results for the diffusion tubes within 500m of the railway line are presented in Table 7-9. None of the locations are within the Scheme boundary, however, they have been included in this baseline section as they are representative of baseline concentrations within the study area which is affected by emissions from road traffic.

7.4.13 Overall, the monitored concentrations show that there has been a reduction in concentrations between 2016 and 2019. However, concentrations in some areas still exceed the annual mean NO_2 objective particularly within the Kirklees Council AQMAs. It is therefore expected that future baseline concentrations will decrease further through improvements in vehicle fleet emissions and background concentrations. Future baseline concentrations have been predicted using the ADMS model for the Do Minimum scenarios (2024 and 2026) and are lower than the 2019 Baseline. The results are presented in Appendix 7.6.

Table 7-9 Measured NO_2 concentrations at the nearest Kirklees Council diffusion tubes

ID	Site	Classification	2015	2016	2017	2018	2019
2^	Bus Station - Huddersfield	Other	46.7	41.6	42.3	39.3	38.5
7^	Westgate Huddersfield	Urban Centre	44.8	38.8	35.4	38.5	40.8
28^	Ring Road Huddersfield	Roadside	54.7	53.1	55.9	43.2	46.4
21^	Castlegate Huddersfield	Roadside	44.9	45.1	40.1	42.5	34.7
57	Cambridge Road 1	Roadside	41.6	46.9	27.2	29.7	22.2
58	Cambridge Road 2	Roadside	32.4	30.4	41.7	44.9	39.6
8	Bradford Road Fartown 1	Roadside	38.3	33.3	35.5	36.1	36.0
45	Bradford Road Fartown 2	Roadside	37.5	36.7	35.7	35.1	30.8
46	Willow Lane East Fartown	Roadside	37.9	39.5	37.1	36.3	36.4
9	Bradley Road	Kerbside	39.2	36.6	35.3	27.5	34.4
10^	Leeds Road Bradley 1	Roadside	42.1	43.7	37.3	39.3	34.5
12^	Leeds Road Bradley 2	Roadside	42.6	43.4	37.4	38.8	27.3
22^	Leeds Road Bradley 3	Roadside	43.4	43.9	41.4	40.6	33.4
23	Leeds Road Mirfield 2	Roadside	42.6	40.0	40.2	38.5	35.3
36	Huddersfield Road Mirfield 1	Kerbside	42.5	38.8	42.2	42.2	49.4
25	Leeds Road - RS3 - 1	Other	20.4	n/a	28.0	28.5	27.3
26	Leeds Road - RS3 - 2	Other	20.6	n/a	24.7	31.4	26.9
27	Leeds Road - RS3 - 3	Other	20.0	n/a	26.6	31.5	27.9
70^	Huddersfield Road – Scout Hill - Airstation	Roadside	n/a	n/a	31.7	37.0	31.8
19^	Huddersfield Road Scout Hill	Roadside	39.8	45.2	33.0	38.8	31.6
1	Dewsbury Bus Station	Other	45.3	47.4	42.5	41.1	41.0
20^	Rockley Street Dewsbury	Roadside	40.7	36.2	35.7	34.0	28.4
40^	Leeds Road Dewsbury	Roadside	60.4	54.4	53.4	52.4	55.8
42	Leeds Road Dewsbury - 2	Roadside	43.0	43.6	45.9	39.6	35.1

Note: Data taken from Kirklees Council's 2018 Air Quality Annual Status Report, June 2018; 2018 and 2019 data supplied by Kirklees Council
Exceedances of the Air Quality Strategy (AQS) Objective are highlighted in Red, concentrations that meet the AQS Objective are highlighted in green
^ indicates tubes located within an AQMA

7.5 Potential effects

Construction

7.5.1 There are no embedded mitigation measures associated with the construction phase of the Scheme which are relevant to air quality.

Nuisance dust

7.5.2 There are a number of sources of potential nuisance dust within the Scheme as part of the construction phase:

- Set up of site compounds;
- Operation of site compounds;
- Earthworks;
- Structures; and
- Highway works.

Construction traffic emissions

7.5.3 Likely effects on local air quality associated with the Scheme would result from changes to traffic flows on the local road network as a result of the use of construction compounds and the temporary road closures.

Operation

Road traffic

7.5.4 Traffic data, detailed in Chapter 14 (Traffic and transport), has confirmed that there would be no modal shift because of the Scheme and therefore there are no operational phase effects due to changes in traffic flows as a result of the operation of the Scheme. There is the potential for air quality impacts due to realignments moving roads closer to residential receptors. The proposed road realignments in the Scheme are located at:

- A62 Leeds Road;
- B6118 Colne Bridge Road
- Calder Road/Ravensthorpe Road; and
- Thornhill Road.

7.5.5 None of these road realignments are located within an AQMA, and thus according to guidance could be screened out of the assessment, however, as a precautionary approach they have been included in the operational phase assessment. Based on the results of the air quality dispersion modelling presented in Table A7-12 in Appendix 7.6, the proposed road realignments would not result in significant effects to air quality.

Rail emissions

7.5.6 Impacts from emissions from rail locomotives during operation of the Scheme have been scoped out of this assessment using the LAQM.TG(16) criteria, as background concentrations of NO_2 within the Scheme are below 25µg/m^3.

7.5.7 Given the nature of the Scheme, which is for the electrification of the route between Huddersfield and Westtown (Dewsbury) and the use of electric trains over diesel trains which would result in less emissions and a beneficial impact on local air quality, the effects of emissions from rail locomotives will not be significant.

7.6 Mitigation measures

Construction

7.6.1 A range of environmental management controls in line with best practice would be implemented as set out in this Section.

Nuisance dust

7.6.2 Measures to reduce and avoid nuisance dust during the construction phase of the Scheme are identified in Part A of the Code of Construction Practice (CoCP) which can be found at Appendix 2-1.

7.6.3 The measures from Part A of the CoCP are summarised as follows. These measures are routinely applied to construction sites and are effective at reducing the potential for dust nuisance:

- Ensure an adequate water supply on the site;
- Ensure water suppression is used during demolition operations where appropriate;
- Maintain all dust control equipment in good condition and record maintenance activities;
- Keep site fencing, barriers and scaffolding clean;
- Ensure regular cleaning of hardstanding;
- Provide and ensure the use of wheel cleaning facilities near the site exits wherever there is a potential for carrying dust or mud off the site;
- Ensure all vehicles carrying loose or potentially dusty material to or from the site are fully sheeted;
- Mix large quantities of cement, bentonite, grouts and other similar materials in designated areas which will be enclosed or shielded;
- Store materials with the potential to produce dust away from site boundaries where reasonably practicable;
- Minimise the amount of excavated material held on site;
- Sheet, seal or damp down unavoidable stockpiles of excavated material held on site, where required;
- Avoid double handling of material wherever reasonably practicable;
- Use enclosed rubble chutes and conveyors where reasonably practicable or use water to suppress dust emissions from such equipment;
- Sheet or otherwise enclose loaded bins and skips;
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate;
- Use design/prefabrication to reduce the need for grinding, sawing and cutting on site wherever reasonably practicable;
- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction;
- Carry out site inspections regularly to monitor compliance with dust control procedures set out above and record the results of the inspections, including nil returns, in a site log book;
- Record any exceptional incidents causing dust episodes on or off the site and the action taken to resolve the situation in the site log book;
- Distances from crushing plant to stockpiles will be kept to the minimum practicable to control dust generation associated with the fall of materials; and

- Appropriate speed limits on access roads will be imposed and enforced for safety reasons and for the purposes of suppressing dust emissions.

7.6.4 Part B of the CoCP will include a Nuisance Management Plan (NMP) which will be submitted to and agreed by the Local Authority pursuant to a condition attached to the deemed planning permission[23] before construction works commence.

Construction traffic emissions

7.6.5 Temporary traffic diversions and traffic routes will be managed through the Construction Traffic Management Plan (CTMP). This will be submitted to and agreed by the Local Authority pursuant to a condition attached to the deemed planning permission before construction works commence.

Operation

Road traffic emissions

7.6.6 Traffic data, detailed in Chapter 14 (Traffic and transport), has confirmed that there would be no modal shift as a result of the Scheme. The operational effect of the Scheme on local air quality from road traffic emissions is therefore predicted to not be significant. Accordingly, mitigation measures are not required.

Rail emissions

7.6.7 The operational impact of the Scheme on local air quality from the use of electric trains over diesel trains would be beneficial and contribute to Network Rail's Decarbonisation Strategy and climate policy, the effect of rail emissions is therefore predicted to not be significant. Accordingly, mitigation measures are not required.

7.7 Residual effects

Construction

Nuisance dust

7.7.1 As set out in the IAQM guidance, it is considered that following the implementation of the proposed mitigation measures, which are routinely and successfully applied to major construction projects throughout the UK and are proven to reduce significantly the potential for adverse nuisance dust effects associated with the various stages of construction work, the residual effects would be not significant.

Construction traffic

7.7.2 As identified earlier above, the construction traffic is predicted to not have a significant effect on local air quality. Accordingly, mitigation measures would not be required so residual effects would not be significant.

Operation

7.7.3 The operation of the Scheme is predicted to not have a significant effect on local air quality. Accordingly, mitigation measures would not be required so residual effects would remain not

[23] On making an order under the Transport and Works Act 1992, the Secretary of State may direct that planning permission shall be deemed to be granted, subject to such conditions (if any) as may be specified in the direction.

significant.

7.7.4 A summary of the principal findings of Scheme-wide Assessment is provided in Table 7-10.

Table 7-10 Principal findings of the air quality assessment

Topic	Receptor	Description of impact	Significant of effect pre-mitigation	Mitigation	Significance of residual effect
Construction dust	Residential and non-residential receptors	Long and short-term impacts from construction activities	Likely significant adverse effects	Implementation of CoCP including best practice methods.	No significant adverse effects
Construction traffic emissions	Residential and non-residential receptors	Temporary impacts from construction traffic and temporary diversions	No significant adverse effects	Implementation of best practice methods and CTMP.	No significant adverse effects
Operational road traffic emissions	Residential and non-residential receptors	Long-term impact from road traffic emissions	No significant adverse effects	N/A	No significant adverse effects
Operational rail emissions	Residential and non-residential receptors	Long-term impact from railway operation	No significant adverse effects	N/A	No significant adverse effects

7.8 Cumulative effects

7.8.1 Cumulative effects can include intra-Scheme effects and inter-Scheme effects.

- Intra-Scheme effects (or in-combination synergistic effects) are the combined impact from a single project on a single receptor or resource; and
- Inter-Scheme effects are the combined impact of a number of different projects within the vicinity (in combination with the Scheme) on a single receptor.

7.8.2 Further consideration of cumulative effects is provided in Chapter 22 (Cumulative effects) of this ES.

Intra-Scheme (synergistic) impacts

7.8.3 Potential intra-Scheme effects may occur from interaction with other environmental topics.

7.8.4 There are potential cumulative construction air quality effects due to the multiple construction activities associated with the Scheme.

7.8.5 Potential synergistic impacts have been identified that correspond to air quality. These include:

- Chapter 8 (Noise and vibration);
- Chapter 9 (Biodiversity); and
- Chapter 14 (Traffic and transport).

Inter-Scheme effects

7.8.6 Inter-Scheme cumulative effects may occur from interaction with other proposed developments (Reasonably Foreseeable Future Projects (RFFPs) located near the Scheme. When combined with the works in the Scheme area these could cumulatively affect sensitive receptors. Inclusion of RFFPs includes their proximity to the Scheme, likely impacts and timing of construction and operation.

7.8.7 The potential inter-Scheme cumulative effects in relation to air quality are provided in Table 7-11.

Table 7-11 Potential inter-scheme cumulative effects

Route Section	Planning Application ref.	Development description	Location	Planning status	EIA available	Potential cumulative	
						Construction	Operation
1 – Huddersfield	2020/90014	Demolition of existing building and erection of car sales and speculative B1/B2 unit with associated parking and access	11, The Triangle, Market Street, Paddock, Huddersfield, HD1 4RN	Conditional Full Permission – March 2020	No supporting environmental information	Construction may overlap with construction of Scheme. IAQM guidance suggests that cumulative construction dust impacts are only likely where sites are within 500m of each other. Therefore, without appropriate mitigation measures, there is the potential for significant adverse effects to arise. However, it assumed that the site of the RFFP will be required to implement a range of mitigation measures and therefore no significant cumulative effects are predicted.	No significant cumulative effects are predicted
1 – Huddersfield	Strategic highway scheme	Highways improvements to the junction of Huddersfield Ring Road/Southgate/ Northumberland Street.	Kirklees Council	Strategic Scheme	No information available.	Construction may overlap with construction of Scheme. IAQM guidance suggests that cumulative construction dust impacts are only likely where sites are within 500m of each other. Therefore, without appropriate mitigation measures, there is the potential for significant adverse effects to arise. However, it assumed that the site of the RFFP will be required to implement a range of mitigation measures and therefore no significant cumulative effects are predicted.	No significant cumulative effects are predicted
1 – Huddersfield	Strategic highway scheme	Highways improvements to the junction of Leeds Road/Lower Fitzwilliam Street/Gasworks Street.	Kirklees Council	Strategic Scheme	No information available.	Construction may overlap with construction of Scheme. IAQM guidance suggests that cumulative construction dust impacts are only likely where sites are within 500m of each other. Therefore, without appropriate mitigation measures, there is the potential for significant adverse effects to arise. However, it assumed that the site of the RFFP will be required to implement a range of mitigation measures and therefore no significant cumulative effects are predicted.	No significant cumulative effects are predicted
1 – Huddersfield 2 – Hillhouse and Fartown	Strategic highway scheme	A62 Smart Corridor (Leeds Road - Phase 1)	Kirklees Council	Strategic Scheme	No information available.	Construction may overlap with construction of Scheme. IAQM guidance suggests that cumulative construction dust impacts are only likely where sites are within 500m of each other. Therefore, without appropriate mitigation measures, there is the potential for significant adverse effects to arise. However, it assumed that the site of the RFFP will be required to implement a range of mitigation measures and therefore no significant cumulative effects are predicted.	No significant cumulative effects are predicted
1 – Huddersfield 2 – Hillhouse and Fartown	Strategic highway scheme	Highways improvements to the junction of Leeds Road/Thistle Street/Hillhouse Lane.	Kirklees Council	Strategic Scheme	No information available.	Construction may overlap with construction of Scheme. IAQM guidance suggests that cumulative construction dust impacts are only likely where sites are within 500m of each other. Therefore, without appropriate mitigation measures, there is the potential for significant	No significant cumulative effects are predicted

Route Section	Planning Application ref.	Development description	Location	Planning status	EIA available	Potential cumulative	
						Construction	Operation
						adverse effects to arise. However, it assumed that the site of the RFFP will be required to implement a range of mitigation measures and therefore no significant cumulative effects are predicted.	
2 – Hillhouse and Fartown	Strategic highway scheme	Highways improvements to the junction of Leeds Road/Old Fieldhouse Road.	Kirklees Council	Strategic Scheme	No information available.	Construction may overlap with construction of Scheme. IAQM guidance suggests that cumulative construction dust impacts are only likely where sites are within 500m of each other. Therefore, without appropriate mitigation measures, there is the potential for significant adverse effects to arise. However, it assumed that the site of the RFFP will be required to implement a range of mitigation measures and therefore no significant cumulative effects are predicted.	No significant cumulative effects are predicted
3 – Deighton and Bradley	2017/91111	Outline application for erection of industrial development for B1 (business), B2 (general industry), and B8 (storage and distribution) uses	Station Road, Bradley, HD2 1UT	Conditional Outline Permission August 2017	No EIA but application is supported by environmental assessments in relation to contaminated land, transport, arboriculture, ecology as well as a FRA	Construction may overlap with construction of Scheme. IAQM guidance suggests that cumulative construction dust impacts are only likely where sites are within 500m of each other. Therefore, without appropriate mitigation measures, there is the potential for significant adverse effects to arise. However, it assumed that the site of the RFFP will be required to implement a range of mitigation measures and therefore no significant cumulative effects are predicted.	No significant cumulative effects are predicted
4 – Colne Bridge and Battyeford	2016/93896	Erection of 4 dwellings and associated works	Site off, Station Road, Bradley, Huddersfield, HD2 1US	Conditional Full Permission – February 2017	No EIA – application is supported by a Design and Access Statement.	RFFP is a small-scale development and therefore no significant cumulative effects are predicted.	No significant cumulative effects are predicted
4 – Colne Bridge and Battyeford	2017/91208	Outline application for erection of industrial development of up to 3684 sqm B1c/B2/B8, with means of access (to, but not within, the site) from Colnebridge Road	Land adjacent to Colnebridge WWTW, Colnebridge Road, Bradley	Conditional Outline Permission – Nov 2017	No EIA but application is supported by environmental assessments in relation to noise, transport, arboriculture, ecology as well as a FRA.	Construction may overlap with construction of Scheme. IAQM guidance suggests that cumulative construction dust impacts are only likely where sites are within 500m of each other. Therefore, without appropriate mitigation measures, there is the potential for significant adverse effects to arise. However, it assumed that the site of the RFFP will be required to implement a range of mitigation measures and therefore no significant cumulative effects are predicted.	No significant cumulative effects are predicted
4 – Colne Bridge and Battyeford	Strategic highway scheme	A62/A644 Wakefield Road (Cooper Bridge) - The junction of A62 Cooper Bridge/A644 Wakefield Road/A62 Leeds Road lies further to the north of the proposed works.	Kirklees Council	Strategic Scheme	No information available.	Construction may overlap with construction of Scheme. IAQM guidance suggests that cumulative construction dust impacts are only likely where sites are within 500m of each other. Therefore, without appropriate mitigation measures, there is the potential for significant adverse effects to arise. However, it assumed that the site of the RFFP will be required to	No significant cumulative effects are predicted

Route Section	Planning Application ref.	Development description	Location	Planning status	EIA available	Potential cumulative	
						Construction	Operation
						implement a range of mitigation measures and therefore no significant cumulative effects are predicted.	
4 – Colne Bridge and Battyeford	Strategic housing scheme	Kirklees Local Plan Allocation HS11 – housing allocation for 1.460 dwellings with potential for a further 498 dwellings beyond the plan period	Land north of Bradley Road, Bradley		No information available.	Construction may overlap with construction of Scheme. IAQM guidance suggests that cumulative construction dust impacts are only likely where sites are within 500m of each other. Therefore, without appropriate mitigation measures, there is the potential for significant adverse effects to arise. However it assumed that the site of the RFFP will be required to implement a range of mitigation measures and therefore no significant cumulative effects are predicted.	No significant cumulative effects are predicted
6 – Ravensthorpe and Westtown	2017/94119	Demolition of existing building, erection of new building for educational classroom, cafe and toilets, upgraded access road, car parking, cycle parking, picnic and play areas.	Land off Sands Lane, Mirfield, WF14	Conditional Full Permission – May 2018	No EIA but application is supported by a bat survey and FRA sequential test.	Construction may overlap with construction of Scheme. IAQM guidance suggests that cumulative construction dust impacts are only likely where sites are within 500m of each other. Therefore, without appropriate mitigation measures, there is the potential for significant adverse effects to arise. However it assumed that the site of the RFFP will be required to implement a range of mitigation measures and therefore no significant cumulative effects are predicted.	No significant cumulative effects are predicted
6 – Ravensthorpe and Westtown	2017/90443	Erection of 3 units for B1 (light industrial) and B8 use, erection of two storey office building and alterations to existing building	Ratcliffe Mills, Forge Lane, Thornhill Lees, Dewsbury, WF12 9BU	Conditional Full Permission – Nov 2017	No EIA but application is supported by environmental assessments in relation to agriculture, transport as well as a FRA.	Construction may overlap with construction of Scheme. IAQM guidance suggests that cumulative construction dust impacts are only likely where sites are within 500m of each other. Therefore, without appropriate mitigation measures, there is the potential for significant adverse effects to arise. However it assumed that the site of the RFFP will be required to implement a range of mitigation measures and therefore no significant cumulative effects are predicted.	No significant cumulative effects are predicted No significant cumulative effects are predicted
6 – Ravensthorpe and Westtown	2016/94241	Non-Material Amendment to previous permission 2007/91742 for erection of 7 terraced industrial units	Calder Bank Road, Thornhill Lees, Dewsbury, WF12 9QB	NMA Approved – May 2017		Construction may overlap with construction of Scheme. IAQM guidance suggests that cumulative construction dust impacts are only likely where sites are within 500m of each other. Therefore, without appropriate mitigation measures, there is the potential for significant adverse effects to arise. However it assumed that the site will be required to implement a range of mitigation measures and therefore no significant cumulative effects are predicted.	No significant cumulative effects are predicted
6 – Ravensthorpe and Westtown	2016/94118	Outline application for residential development	Land off Ravensthorpe Road, Dewsbury	Conditional Outline Permission – April 2017	No EIA but application is supported by environmental assessments in relation to	Construction may overlap with construction of Scheme. IAQM guidance suggests that cumulative construction dust impacts are only likely where sites are within 500m of each	No significant cumulative effects are predicted.

Route Section	Planning Application ref.	Development description	Location	Planning status	EIA available	Potential cumulative	
						Construction	Operation
					contaminated land, ecology, arboriculture and transport. A conservation/heritage assessment and FRA have also been submitted.	other. Therefore, without appropriate mitigation measures, there is the potential for significant adverse effects to arise. However it assumed that the site of the RFFP will be required to implement a range of mitigation measures and therefore no significant cumulative effects are predicted.	
6 – Ravensthorpe and Westtown	2016/94117	Outline application for 120 residential units at Lees Hall Road	Land off Lees Hall Road, Dewsbury	Conditional Outline Permission	No EIA but application is supported by environmental assessments in relation to contaminated land, ecology and transport. A conservation/heritage assessment and FRA have also been submitted.	Construction may overlap with construction of Scheme. IAQM guidance suggests that cumulative construction dust impacts are only likely where sites are within 500m of each other. Therefore, without appropriate mitigation measures, there is the potential for significant adverse effects to arise. However, it assumed that the site of the RFFP will be required to implement a range of mitigation measures and therefore no significant cumulative effects are predicted.	No significant cumulative effects are predicted.
6 – Ravensthorpe and Westtown	2017/94080	Erection of precast concrete production unit, demolition of existing casting shed and ancillary buildings, associated site works to modify external storage areas and installation of gantry cranes – condition to vary plans and specs (2019/92570)	C R Longley And Co Ltd, Ravensthorpe Road, Thornhill Lees, WF12 9EF	Conditional Full Permission – July 2018 (approval of condition November 2019)	No EIA but application is supported by environmental assessments in relation to noise, ecology and transport. A conservation/heritage assessment and FRA have also been submitted.	Construction may overlap with construction of Scheme. IAQM guidance suggests that cumulative construction dust impacts are only likely where sites are within 500m of each other. Therefore, without appropriate mitigation measures, there is the potential for significant adverse effects to arise. However, it assumed that the site of the RFFP will be required to implement a range of mitigation measures and therefore no significant cumulative effects are predicted.	No significant cumulative effects are predicted.
6 – Ravensthorpe and Westtown	Strategic housing scheme	Kirklees Local Plan Allocation HS61 (Dewsbury Riverside) – housing allocation for 4000 units (1869 units during plan period, with potential for a further 2131 beyond the plan period).	Land off Ravensthorpe Road, Dewsbury		Dewsbury Riverside Masterplan document is available.	Construction may overlap with construction of Scheme. IAQM guidance suggests that cumulative construction dust impacts are only likely where sites are within 500m of each other. Therefore, without appropriate mitigation measures, there is the potential for significant adverse effects to arise. However, it assumed that the site of the RFFP will be required to implement a range of mitigation measures and therefore no significant cumulative effects are predicted.	No significant cumulative effects are predicted

7.8.8 Due to the scale of other developments proposed or distance from the construction areas within the Scheme it is not anticipated that any significant cumulative effects will occur in relation to the other RFFPs identified in Chapter 22 (Cumulative effects) of this ES.

7.8.9 The IAQM guidance is clear that, with appropriate mitigation measures in place, any residual demolition and construction dust effects from an individual site will be 'not significant'.

7.8.10 It is anticipated that any developments brought forward will be subject to National and Local Policy as well as legislative requirements and application of best practice measures and will be required to ensure that mitigation and control measures are adopted during construction and operation of the projects.

7.8.11 Where there is concurrent construction work on sites within 500m of each other, the construction contractors should "hold regular liaison meetings with other high-risk construction sites within 500m of the Scheme, to ensure plans are coordinated and dust and particulate matter emissions are minimised".

7.8.12 With the implementation of best practice mitigation measures which are effective at reducing the impacts from construction activities, the cumulative air quality effects would not be significant.

7.8.13 Traffic data, detailed in Chapter 14 (Traffic and transport), has confirmed that there would be no modal shift as a result of the Scheme and the operation of the Scheme is considered to not be significant. The cumulative effects of the Scheme and the committed developments would not be significant.