



Land East of Leeds Road, Chidswell
Environmental Statement - Volume 2 – Chapter 10

April 2020

Important notice: This Environmental Statement has been prepared by Deloitte Real Estate, with technical input from Re-form; Delta Simons; Patrick Parsons; Brooks Ecological; Pell Frischmann; and Cotswold Archaeology ("the Consultants"). Chapter 1, Volume 1 of this Environmental Statement sets out the parties responsible for preparing each Chapter and associated figures and appendices.

Although we have read the Consultants' reports for consistency and provide our observations based on our knowledge and experience, we accept no liability or responsibility for the Consultant's Reports and will not be responsible for the technical content of Chapters 7-14 and Chapter 15, Volume 1; nor Volume 2, nor the technical content of the associated separate Non-Technical Summary.

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10.1 Construction Phase Assessment Methodology

Appendix 10.1

Construction Phase Assessment Methodology

Introduction

- 1.1 There is the potential for fugitive dust emissions to occur as a result of construction phase activities. These have been assessed in accordance with the methodology outlined within the Institute of Air Quality Management (IAQM) document 'Guidance on the Assessment of Dust from Demolition and Construction V1.1'¹.
- 1.2 Activities on the proposed construction Site have been divided into three types to reflect their different potential impacts. These are:
 - Earthworks;
 - Construction; and,
 - Trackout.
- 1.3 The potential for dust emissions was assessed for each activity that is likely to take place and considered three separate dust effects:
 - Annoyance due to dust soiling;
 - Harm to ecological receptors; and,
 - The risk of health effects due to a significant increase in exposure to PM₁₀.
- 1.4 The assessment steps are detailed below.

Step 1

- 1.5 Step 1 screens the requirement for a more detailed assessment. Should human receptors be identified within 350m from the boundary or 50m from the construction vehicle route up to 500m from the Site entrance, then the assessment proceeds to Step 2. Additionally, should ecological receptors be identified within 50m of the Site or the construction vehicle route up to 500m from the Site entrance, then the assessment also proceeds to Step 2.
- 1.6 Should sensitive receptors not be present within the relevant distances then **negligible** impacts would be expected and further assessment is not necessary.

Step 2

- 1.7 Step 2 assesses the potential dust impacts. A site is allocated a category based on two factors:
 - The scale and nature of the works, which determines the impact magnitude of dust arising as: **minor, moderate or major** (Step 2A); and,
 - The sensitivity of the area to dust impacts, which can be defined as **low, moderate or high** sensitivity (Step 2B).

¹ Guidance on the Assessment of Dust from Demolition and Construction V1.1, IAQM, 2016.

- 1.8 The two factors are combined in Step 2C to determine the effect significance without mitigation applied.
- 1.9 It should be noted that the standard IAQM terminology has been replaced to allow continuity throughout the ES and comparison of various effects. The magnitude of dust emission terms 'small', 'medium' and 'large' have therefore been replaced with 'minor', 'moderate' and 'major', and the sensitivity term 'medium' has been replaced with 'moderate'
- 1.10 Step 2A defines the potential impact magnitude of dust emissions through the construction phase. The relevant criteria are summarised in Table 10.A1.

Table 10.A1 - Construction Dust - Dust Emission Magnitude

| Dust Emission Magnitude | Activity | Criteria |
|-------------------------|--------------|--|
| Major | Earthworks | Total site area greater than 10,000m ² Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) More than 10 heavy earth moving vehicles active at any one time Formation of bunds greater than 8m in height More than 100,000 tonnes of material moved |
| | Construction | Total building volume greater than 100,000m ³ On site concrete batching Sandblasting |
| | Trackout | More than 50 Heavy Duty Vehicle (HDV) trips per day Potentially dusty surface material (e.g. high clay content) Unpaved road length greater than 100m |
| Moderate | Earthworks | Total site area 2,500m ² to 10,000m ² Moderately dusty soil type (e.g. silt) 5 to 10 heavy earth moving vehicles active at any one time Formation of bunds 4m to 8m in height Total material moved 20,000 tonnes to 100,000 tonnes. |
| | Construction | Total building volume 25,000m ³ to 100,000m ³ Potentially dusty construction material (e.g. concrete) On site concrete batching |
| | Trackout | 10 to 50 HDV trips per day Moderately dusty surface material (e.g. high clay content) Unpaved road length 50m to 100m |
| Minor | Earthworks | Total site area less than 2,500m ² Soil type with large grain size (e.g. sand) Less than 5 heavy earth moving vehicles active at any one time Formation of bunds less than 4m in height Total material moved less than 20,000 tonnes Earthworks during wetter months |

| Dust Emission Magnitude | Activity | Criteria |
|-------------------------|--------------|---|
| | Construction | Total building volume less than 25,000m ³ Construction material with low potential for dust release (e.g. metal cladding or timber) |
| | Trackout | Less than 10 HDV trips per day Surface material with low potential for dust release Unpaved road length less than 50m |

1.11 Step 2B defines the sensitivity of the area around the Proposed Development to potential dust impacts. The influencing factors are shown in Table 10.A2.

Table 10.A2 - Construction Dust - Examples of Factors Determining Sensitivity of an Area

| Sensitivity | Examples | |
|-----------------|--|---|
| | Human Receptors | Ecological Receptors |
| High | Users expect high levels of amenity High aesthetic or value property People expected to be present continuously for extended periods of time Locations where members of the public are exposed over a time period relevant to the AQO for PM ₁₀ . e.g. residential properties, hospitals, schools and residential care homes | Internationally or nationally designated site e.g. Special Area of Conservation |
| Moderate | Users would expect to enjoy a reasonable level of amenity Aesthetics or value of their property could be diminished by soiling People or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land e.g. parks and places of work | Nationally designated site e.g. Sites of Special Scientific Interest |
| Low | Enjoyment of amenity would not reasonably be expected Property would not be expected to be diminished in appearance Transient exposure, where people would only be expected to be present for limited periods. e.g. public footpaths, playing fields, shopping streets, playing fields, farmland, footpaths, short term car park and roads | Locally designated site e.g. Local Nature Reserve |

1.12 The guidance also provides the following factors to consider when determining the sensitivity of an area to potential dust impacts:

- Any history of dust generating activities in the area;
- The likelihood of concurrent dust generating activity on nearby sites;
- Any pre-existing screening between the source and receptors;
- Any conclusions drawn from analysing local meteorological data which accurately represent the area; and if relevant the season during which works will take place;
- Any conclusions drawn from local topography;
- Duration of the potential impact, as a receptor may become more sensitive over time; and,
- Any known specific receptor sensitivities which go beyond the classifications given in the document.

1.13 These factors were considered in the undertaking of the assessment.

1.14 The criteria for determining the sensitivity of the area to dust soiling impacts on people and property is summarised in Table 10.A3.

Table 10.A3 - Construction Dust - Sensitivity of the Area to Dust Soiling Impacts on People and Property

| Receptor Sensitivity | Number of Receptors | Distance from the Source (m) | | | |
|----------------------|---------------------|------------------------------|--------------|---------------|---------------|
| | | Less than 20 | Less than 50 | Less than 100 | Less than 350 |
| High | More than 100 | High | High | Moderate | Low |
| | 10 - 100 | High | Moderate | Low | Low |
| | 1 - 10 | Moderate | Low | Low | Low |
| Moderate | More than 1 | Moderate | Low | Low | Low |
| Low | More than 1 | Low | Low | Low | Low |

1.15 Table 10.A4 outlines the criteria for determining the sensitivity of the area to human health impacts.

Table 10.A4 - Construction Dust - Sensitivity of the Area to Human Health Impacts

| Receptor Sensitivity | Background Annual Mean PM ₁₀ Concentration | Number of Receptors | Distance from the Source (m) | | | |
|----------------------|---|---------------------|------------------------------|--------------|---------------|---------------|
| | | | Less than 20 | Less than 50 | Less than 100 | Less than 350 |
| High | Greater than 32µg/m ³ | More than 100 | High | High | High | Moderate |
| | | 10 - 100 | High | High | Moderate | Low |
| | | 1 - 10 | High | Medium | Low | Low |

| Receptor Sensitivity | Background Annual Mean PM ₁₀ Concentration | Number of Receptors | Distance from the Source (m) | | | | |
|-------------------------------|---|----------------------------------|------------------------------|--------------|---------------|---------------|-----|
| | | | Less than 20 | Less than 50 | Less than 100 | Less than 350 | |
| | 28 - 32µg/m ³ | More than 100 | High | High | Moderate | Low | |
| | | 10 - 100 | High | Moderate | Low | Low | |
| | | 1 - 10 | High | Moderate | Low | Low | |
| | 24 - 28µg/m ³ | 10 - 100 | High | Moderate | Low | Low | |
| | | 1 - 10 | High | Moderate | Low | Low | |
| | | More than 100 | Moderate | Low | Low | Low | |
| | Less than 24µg/m ³ | 10 - 100 | Moderate | Low | Low | Low | |
| | | 1 - 10 | Low | Low | Low | Low | |
| | | More than 100 | Low | Low | Low | Low | |
| | Moderate | Greater than 32µg/m ³ | More than 10 | High | Moderate | Low | Low |
| | | | 1 - 10 | Moderate | Low | Low | Low |
| | | 28 - 32µg/m ³ | More than 10 | Moderate | Low | Low | Low |
| 1 - 10 | | | Low | Low | Low | Low | |
| 24 - 28µg/m ³ | | More than 10 | Low | Low | Low | Low | |
| | | 1 - 10 | Low | Low | Low | Low | |
| Less than 24µg/m ³ | | More than 10 | Low | Low | Low | Low | |
| | | 1 - 10 | Low | Low | Low | Low | |
| Low | | - | 1 or more | Low | Low | Low | Low |

1.16 Table 10.A5 outlines the criteria for determining the sensitivity of the area to ecological impacts

Table 10.A5 - Construction Dust - Sensitivity of the Area to Ecological Impacts

| Receptor Sensitivity | Dust from the Source (m) | |
|----------------------|--------------------------|--------------|
| | Less than 20 | Less than 50 |
| High | High | Moderate |
| Moderate | Moderate | Low |

| Receptor Sensitivity | Dust from the Source (m) | |
|----------------------|--------------------------|--------------|
| | Less than 20 | Less than 50 |
| Low | Low | Low |

1.17 Step 2C combines the dust emission magnitude and the sensitivity of the area to determine the unmitigated effect significance.

1.18 Table 10.A6 outlines the unmitigated effect significance from earthworks and construction activities.

Table 10.A6 - Construction Dust - Unmitigated Effect Significance from Earthworks and Construction

| Receptor Sensitivity | Dust Emission Impact Magnitude | | |
|----------------------|--------------------------------|----------|------------|
| | Major | Moderate | Minor |
| High | Major | Moderate | Minor |
| Moderate | Moderate | Moderate | Minor |
| Low | Minor | Minor | Negligible |

1.19 Table 10.A7 outlines the unmitigated effect significance from trackout activities.

Table 10.7 - Construction Dust - Unmitigated Effect Significance from Trackout

| Receptor Sensitivity | Dust Emission Magnitude | | |
|----------------------|-------------------------|----------|------------|
| | Major | Moderate | Minor |
| High | Substantial | Moderate | Minor |
| Moderate | Moderate | Moderate | Minor |
| Low | Minor | Minor | Negligible |

1.20 It should be noted that all construction dust impacts are classified as adverse as they relate to a deterioration in baseline air quality.

Step 3

1.21 Step 3 requires the identification of site specific mitigation measures within the IAQM guidance² to reduce potential dust impacts based on the predicted significance. When the significance is determined as **negligible**, mitigation measures beyond those required by legislation are not required. However, additional controls may be applied as part of good practice.

² Guidance on the Assessment of Dust from Demolition and Construction V1.1, IAQM, 2016.

Step 4

- 1.22 Once the significance of unmitigated dust impacts has been determined and the appropriate mitigation measures identified, the final step is to determine the significance of any residual impacts. For almost all construction activity, the aim should be to control effects through the use of effective mitigation. Experience shows this is normally possible. Hence the residual effect will normally be **not significant** with respect to the Town and Country Planning (Environmental Impact Assessment) Regulations (2017).

10.2 Dispersion Modelling Input Parameters

Appendix 10.2

Dispersion Modelling Input Parameters

Introduction

- 1.1 The Proposed Development has the potential to cause air quality impacts as a result of vehicles travelling to and from the site during the operational phase, as well as expose future occupants to any existing air quality issues at the Site. In order to assess NO₂ and PM₁₀ concentrations at sensitive locations, detailed dispersion modelling was undertaken in accordance with the following methodology.

Dispersion Model

- 1.2 Dispersion modelling was undertaken using the ADMS-Roads dispersion model (version 4.1.1.0). ADMS-Roads is developed by Cambridge Environmental Research Consultants (CERC) and is routinely used throughout the world for the prediction of pollutant dispersion from road sources. Modelling predictions from this software package are accepted within the UK by the Environment Agency and DEFRA.
- 1.3 The model requires input data that details the following parameters:
 - Assessment area;
 - Traffic flow data; and,
 - Vehicle emission factors;
 - Spatial co-ordinates of emissions;
 - Street width;
 - Meteorological data;
 - Roughness length (z_0);
 - Monin-Obukhov length.
- 1.4 These are detailed in the following Sections.

Assessment Area

- 1.5 Ambient concentrations were predicted over the area NGR: 426370, 422610 to 428080, 424320. One Cartesian grid was used within the model to produce data suitable for contour plotting using the Surfer software package. Reference should be made to Figure 10.5 for a graphical representation of the assessment grid extents.

Traffic Flow Data

- 1.6 Traffic data for use in the assessment, including 24-hour Annual Average Daily Traffic (AADT) flows and fleet composition as HDV proportion, was obtained from Pell Frishcman, the Transport Consultants for the project.
- 1.7 Traffic data was not available for the M62, M1 and the A638 Rishworth Road as they were outside the extents of the Transport Assessment. As such, flows for these links were

obtained from the Department for Transport (DfT)¹. The DfT web tool enables the user to view and download traffic flows on every link of the 'A' road and motorway network, as well as selected minor roads, in Great Britain for the years 1999 to 2018. It should be noted that the DfT web tool is referenced in DEFRA guidance² as being a suitable source of data for air quality assessments and it is therefore considered to provide a reasonable estimate of traffic flows in the vicinity of the Site.

- 1.8 It should be noted that the DM and DS scenarios include vehicle movements produced from a proposed residential scheme known as 'Land at Heybeck Lane, Chidswell', situated immediately to the north of the Site, as well as traffic growth associated with committed developments and allocated sites throughout Kirklees. As such, the assessment provides a robust prediction of future year traffic flows.
- 1.9 Road widths and vehicle speeds were estimated from aerial photography and UK highway design standards. A summary of the traffic data used in the assessment is provided in Table 10.A1.

¹ <https://roadtraffic.dft.gov.uk/#16/51.4518/-0.9760/basemap-countpoints>.

² Local Air Quality Management Technical Guidance (TG16), DEFRA, 2018.

Table 10.A1 - Traffic Data

| Link | | 24-hour AADT Flow | | | | HDV Proportion of Fleet (%) | | Speed (kph) | Road Width (m) |
|------------|--|-------------------|-----------|--------------------------------|-----------------------------|--------------------------------------|----------------------|-------------|----------------|
| | | 2018 | 2030 - DM | 2030 - DS - Without Mitigation | 2030 - DS - With Mitigation | 2018, DM and DS - Without Mitigation | DS - With Mitigation | | |
| L1 | A653 Dewsbury Road Northbound (NB), North of M62 J28 | 32,457 | 31,601 | 34,162 | 34,162 | 3.83 | 3.83 | 65 | 7.0 |
| L2 | A653 Dewsbury Road Southbound (SB), North of M62 J28 | 13,739 | 12,969 | 13,810 | 13,810 | 3.74 | 3.74 | 65 | 11.5 |
| L3 | M62, East of Roundabout | 133,421 | 156,148 | 157,700 | 157,700 | 14.31 | 14.31 | 95 | 32.5 |
| L4 | M62, Between on and off Slip Roads | 95,562 | 111,751 | 111,751 | 111,751 | 14.71 | 14.71 | 95 | 26.5 |
| L5 | M62, West of Roundabout | 121,412 | 142,029 | 144,635 | 144,635 | 15.15 | 15.15 | 95 | 27.5 |
| L6 | M62, Westbound (WB) off slip | 17,164 | 18,030 | 18,494 | 18,494 | 14.60 | 14.60 | 65 | 6.5 |
| L7 | M62, Eastbound (EB) on slip | 16,718 | 4,799 | 5,887 | 5,887 | 7.82 | 7.82 | 65 | 6.5 |
| L8 | M62, EB off slip | 9,767 | 7,878 | 8,601 | 8,601 | 5.20 | 5.20 | 65 | 6.9 |
| L9 | M62, WB on slip | 7,748 | 10,111 | 11,995 | 11,995 | 9.10 | 9.10 | 65 | 4.0 |
| L10 | A650 Braford Road, South of Tingley Hall Rise | 32,115 | 34,479 | 34,638 | 34,638 | 3.43 | 3.43 | 65 | 12.5 |

| Link | | 24-hour AADT Flow | | | | HDV Proportion of Fleet (%) | | Speed (kph) | Road Width (m) |
|------------|--|-------------------|-----------|--------------------------------|-----------------------------|--------------------------------------|----------------------|-------------|----------------|
| | | 2018 | 2030 - DM | 2030 - DS - Without Mitigation | 2030 - DS - With Mitigation | 2018, DM and DS - Without Mitigation | DS - With Mitigation | | |
| L11 | A650 Braford Road, North of Tingley Hall Rise | 32,115 | 34,479 | 34,638 | 34,638 | 3.43 | 3.43 | 65 | 19.1 |
| L12 | A650 Braford Road, Slow Phase (SP) | 32,115 | 34,479 | 34,638 | 34,638 | 3.43 | 3.43 | 20 | 18.8 |
| L13 | A650 Braford Road, EB from roundabout | 6,777 | 5,658 | 5,658 | 5,658 | 3.69 | 3.69 | 20 | 3.5 |
| L14 | A650 Braford Road, WB | 19,164 | 19,886 | 19,944 | 19,944 | 3.26 | 3.26 | 20 | 10.5 |
| L15 | A650 Braford Road, EB from across roundabout | 6,174 | 8,935 | 9,036 | 9,036 | 3.69 | 3.69 | 45 | 7.5 |
| L16 | A650 Braford Road, EB from across roundabout, SP | 6,174 | 8,935 | 9,036 | 9,036 | 3.69 | 3.69 | 20 | 7.5 |
| L17 | A650 Tingley Common EB, SP | 16,157 | 16,443 | 16,443 | 16,443 | 6.41 | 6.41 | 20 | 13.7 |
| L18 | A650 Tingley Common EB | 16,157 | 16,443 | 16,443 | 16,443 | 6.41 | 6.41 | 65 | 6.8 |
| L19 | A650 Tingley Common WB | 17,972 | 20,677 | 20,677 | 20,677 | 6.07 | 6.07 | 65 | 6.5 |
| L20 | A650 Tingley Common | 34,128 | 37,120 | 37,120 | 37,120 | 6.23 | 6.23 | 65 | 10.9 |
| L21 | A653 Dewsbury Road NB, South of Roundabout, SP | 22,400 | 20,805 | 26,438 | 26,438 | 5.00 | 5.00 | 20 | 10.5 |

| Link | | 24-hour AADT Flow | | | | HDV Proportion of Fleet (%) | | Speed (kph) | Road Width (m) |
|------------|--|-------------------|-----------|--------------------------------|-----------------------------|--------------------------------------|----------------------|-------------|----------------|
| | | 2018 | 2030 - DM | 2030 - DS - Without Mitigation | 2030 - DS - With Mitigation | 2018, DM and DS - Without Mitigation | DS - With Mitigation | | |
| L22 | A653 Dewsbury Road NB, South of Roundabout | 22,400 | 20,805 | 26,438 | 26,438 | 5.00 | 5.00 | 65 | 7.0 |
| L23 | A653 Dewsbury Road SB, South of Roundabout | 10,545 | 14,230 | 16,315 | 16,315 | 3.84 | 3.84 | 65 | 7.0 |
| L24 | A653 Dewsbury Road SB, South of Roundabout, SP | 10,545 | 14,230 | 16,315 | 16,315 | 3.84 | 3.84 | 20 | 10.1 |
| L25 | A653 Dewsbury Road, South of Lowry Road, SP | 28,660 | 34,363 | 42,082 | 42,082 | 4.43 | 4.43 | 35 | 22.5 |
| L26 | A653 Dewsbury Road, Between Hesketh Lane and Rein Road | 28,660 | 34,363 | 42,082 | 42,082 | 4.43 | 4.43 | 55 | 14.8 |
| L27 | A653 Dewsbury Road, Between Hesketh Lane and Rein Road, SP | 28,660 | 34,363 | 42,082 | 42,082 | 4.43 | 4.43 | 20 | 15.5 |
| L28 | A653 Dewsbury Road, South of Rein Road, SP | 30,452 | 38,746 | 47,406 | 47,406 | 4.43 | 4.43 | 20 | 16.2 |
| L29 | A653 Dewsbury Road, South of Rein Road | 30,452 | 38,746 | 47,406 | 47,406 | 4.43 | 4.43 | 65 | 14.2 |
| L30 | A653 Dewsbury Road, North of Soothill Lane, SP | 30,452 | 38,746 | 47,406 | 47,406 | 4.43 | 4.43 | 20 | 18.2 |

| Link | | 24-hour AADT Flow | | | | HDV Proportion of Fleet (%) | | Speed (kph) | Road Width (m) |
|------------|---|-------------------|-----------|--------------------------------|-----------------------------|--------------------------------------|----------------------|-------------|----------------|
| | | 2018 | 2030 - DM | 2030 - DS - Without Mitigation | 2030 - DS - With Mitigation | 2018, DM and DS - Without Mitigation | DS - With Mitigation | | |
| L31 | Syke Road | 8,393 | 9,719 | 9,719 | 9,719 | 3.25 | 3.25 | 45 | 7.1 |
| L32 | Syke Road. SP | 8,393 | 9,719 | 9,719 | 9,719 | 3.25 | 3.25 | 20 | 7.5 |
| L33 | A6029 Rein Road, SP | 12,412 | 14,359 | 15,300 | 15,300 | 2.20 | 2.20 | 20 | 7.5 |
| L34 | A6029 Rein Road | 12,412 | 14,359 | 15,300 | 15,300 | 2.20 | 2.20 | 35 | 6.5 |
| L35 | M62 Roundabout | 16,398 | 16,002 | 17,288 | 17,288 | 5.86 | 5.86 | 35 | 10.2 |
| L36 | Batley Road | 8,079 | 12,280 | 12,865 | 12,865 | 1.24 | 1.24 | 45 | 7.1 |
| L37 | Batley Road, East of Heybeck Lane Site Access | 8,079 | 12,280 | 12,865 | 12,865 | 1.24 | 1.24 | 45 | 7.7 |
| L38 | Batley Road, West of Heybeck Lane Site Access | 8,079 | 13,807 | 14,392 | 14,392 | 1.24 | 1.24 | 20 | 7.7 |
| L39 | Soothill Lane, SP | 11,424 | 12,575 | 14,981 | 14,981 | 3.42 | 3.42 | 20 | 8.3 |
| L40 | Soothill Lane | 11,424 | 12,575 | 14,981 | 14,981 | 3.42 | 3.42 | 45 | 8.5 |
| L41 | Soothill Lane, West of Manor Farm Drive | 11,424 | 12,575 | 14,981 | 14,981 | 3.42 | 3.42 | 45 | 8.2 |
| L42 | A653 Leeds Road NB, Between Soothill Lane and Site Access 1, SP | 14,615 | 20,237 | 26,063 | 26,063 | 3.07 | 3.07 | 25 | 9.3 |

| Link | | 24-hour AADT Flow | | | | HDV Proportion of Fleet (%) | | Speed (kph) | Road Width (m) |
|------------|---|-------------------|-----------|--------------------------------|-----------------------------|--------------------------------------|----------------------|-------------|----------------|
| | | 2018 | 2030 - DM | 2030 - DS - Without Mitigation | 2030 - DS - With Mitigation | 2018, DM and DS - Without Mitigation | DS - With Mitigation | | |
| L43 | A653 Leeds Road NB, Between Soothill Lane and Site Access 1 | 14,615 | 20,237 | 26,063 | 26,063 | 3.07 | 3.07 | 45 | 7.0 |
| L44 | A653 Leeds Road NB, Between Site Access 2 and Site Access 2 | 14,293 | 18,747 | 24,396 | 24,396 | 2.97 | 2.97 | 45 | 7.0 |
| L45 | A653 Leeds Road NB, Between Chidswell Lane and Site Access 2 | 13,971 | 17,257 | 21,994 | 21,994 | 2.87 | 2.87 | 45 | 7.0 |
| L46 | A653 Leeds Road NB, South of Chidswell Lane | 12,955 | 15,944 | 20,184 | 20,184 | 5.49 | 5.49 | 45 | 7.0 |
| L47 | A653 Leeds Road SB, Between Soothill Lane and Site Access 2, SP | 14,615 | 20,237 | 26,063 | 26,063 | 3.07 | 3.07 | 35 | 6.6 |
| L48 | A653 Leeds Road SB, Between Soothill Lane and Site Access 1 | 14,615 | 20,237 | 26,063 | 26,063 | 3.07 | 3.07 | 45 | 7.0 |
| L49 | A653 Leeds Road SB, Between Site Access 1 and Site Access 2 | 14,293 | 18,747 | 24,396 | 24,396 | 2.97 | 2.97 | 45 | 7.1 |
| L50 | A653 Leeds Road SB, Between Chidswell Lane and Site Access 2 | 13,971 | 17,257 | 21,994 | 21,994 | 2.87 | 2.87 | 45 | 7.1 |
| L51 | A653 Leeds Road SB, South of Chidswell Lane | 12,955 | 15,944 | 20,184 | 20,184 | 5.49 | 5.49 | 45 | 7.1 |

| Link | | 24-hour AADT Flow | | | | HDV Proportion of Fleet (%) | | Speed (kph) | Road Width (m) |
|------------|--|-------------------|-----------|--------------------------------|-----------------------------|--------------------------------------|----------------------|-------------|----------------|
| | | 2018 | 2030 - DM | 2030 - DS - Without Mitigation | 2030 - DS - With Mitigation | 2018, DM and DS - Without Mitigation | DS - With Mitigation | | |
| L52 | A653 Leeds Road, East of Owl Lane | 25,911 | 31,889 | 40,368 | 40,368 | 5.49 | 5.49 | 45 | 15.3 |
| L53 | A653 Leeds Road, East of Owl Lane | 25,911 | 31,889 | 40,368 | 40,368 | 5.49 | 5.49 | 35 | 9.2 |
| L54 | A653 Leeds Road, East of Owl Lane, SP | 25,911 | 31,889 | 40,368 | 40,368 | 5.49 | 5.49 | 25 | 9.2 |
| L55 | A653 Leeds Road, East of B6128 | 18,341 | 22,954 | 29,121 | 29,121 | 4.67 | 4.67 | 25 | 12.4 |
| L56 | B6128 Rouse Mill Lane, East of Rouse Mill | 13,421 | 14,918 | 17,967 | 17,967 | 6.92 | 6.92 | 45 | 7.1 |
| L57 | B6128 Rouse Mill Lane, East of Rouse Mill, SP | 13,421 | 14,918 | 17,967 | 17,967 | 6.92 | 6.92 | 25 | 9.8 |
| L58 | Rouse Mill Lane/Grange Road Roundabout | 6,711 | 7,459 | 8,984 | 8,984 | 6.92 | 6.92 | 25 | 10.1 |
| L59 | B6128 Grange Road, SP | 13,421 | 14,918 | 17,967 | 17,967 | 6.92 | 6.92 | 25 | 13.7 |
| L60 | B6128 Grange Road | 13,421 | 14,918 | 17,967 | 17,967 | 6.92 | 6.92 | 45 | 7.7 |
| L61 | B6128 Grange Road, Approach to Forest Way, SP | 13,421 | 14,918 | 17,967 | 17,967 | 6.92 | 6.92 | 25 | 10.2 |
| L62 | B6128 Grange Road/Challenge Way/Mill Forest Way Roundabout | 6,711 | 7,459 | 8,984 | 8,984 | 6.92 | 6.92 | 25 | 7.4 |

| Link | | 24-hour AADT Flow | | | | HDV Proportion of Fleet (%) | | Speed (kph) | Road Width (m) |
|------------|---|-------------------|-----------|--------------------------------|-----------------------------|--------------------------------------|----------------------|-------------|----------------|
| | | 2018 | 2030 - DM | 2030 - DS - Without Mitigation | 2030 - DS - With Mitigation | 2018, DM and DS - Without Mitigation | DS - With Mitigation | | |
| L63 | B6128 Challenge Way, East of Mill Forest Way, SP | 13,421 | 14,918 | 17,967 | 17,967 | 6.92 | 6.92 | 25 | 10.5 |
| L64 | B6128 Challenge Way, East of Mill Forest Way | 13,421 | 14,918 | 17,967 | 17,967 | 6.92 | 6.92 | 45 | 7.3 |
| L65 | B6128 Challenge Way, North of A653 Leeds Road, SP | 13,421 | 14,918 | 17,967 | 17,967 | 6.92 | 6.92 | 25 | 16.0 |
| L66 | B6128, South of A653 Leeds Road, SP | 17,797 | 19,894 | 23,011 | 23,011 | 5.85 | 5.85 | 25 | 11.6 |
| L67 | B6128, South of A653 Leeds Road | 17,797 | 19,894 | 23,011 | 23,011 | 5.85 | 5.85 | 45 | 10.7 |
| L68 | B6128 Owl Lane Roundabout | 16,873 | 19,278 | 22,726 | 22,726 | 5.74 | 5.74 | 25 | 7.9 |
| L69 | Owl Lane, South of Leeds Road, SP | 8,061 | 9,589 | 11,901 | 11,901 | 7.44 | 7.44 | 25 | 9.1 |
| L70 | Owl Lane | 8,061 | 9,589 | 11,901 | 11,901 | 7.44 | 7.44 | 45 | 8.1 |
| L71 | Owl Lane, North of B6128, SP | 8,061 | 9,589 | 11,901 | 11,901 | 7.44 | 7.44 | 25 | 11.3 |
| L72 | B6128, Between Owl Lane and Windsor Drive, SP | 24,761 | 28,352 | 33,265 | 33,265 | 5.10 | 5.10 | 25 | 12.9 |
| L73 | B6128, Between Owl Lane and Windsor Drive | 24,761 | 28,352 | 33,265 | 33,265 | 5.10 | 5.10 | 45 | 7.0 |

| Link | | 24-hour AADT Flow | | | | HDV Proportion of Fleet (%) | | Speed (kph) | Road Width (m) |
|------------|---|-------------------|-----------|--------------------------------|-----------------------------|--------------------------------------|----------------------|-------------|----------------|
| | | 2018 | 2030 - DM | 2030 - DS - Without Mitigation | 2030 - DS - With Mitigation | 2018, DM and DS - Without Mitigation | DS - With Mitigation | | |
| L74 | B6128, Between Windsor Drive and Dewsbury Rams | 26,972 | 30,751 | 36,925 | 36,925 | 1.53 | 1.53 | 45 | 7.7 |
| L75 | B6128, Between Dewsbury Rams and Amberwood Chase | 26,947 | 30,868 | 35,743 | 35,743 | 1.53 | 1.53 | 45 | 7.7 |
| L76 | B6128, Between Amberwood Chase and A638 Chancery Road | 26,549 | 30,403 | 35,279 | 35,279 | 4.55 | 4.55 | 45 | 10.5 |
| L77 | B6128, Between Amberwood Chase and A638 Chancery Road, SP | 28,778 | 29,448 | 34,323 | 34,323 | 1.60 | 1.60 | 35 | 10.7 |
| L78 | B6128/A638 Chancery Road Roundabout | 22,688 | 22,813 | 24,764 | 24,764 | 5.37 | 5.37 | 35 | 8.5 |
| L79 | A653 Leeds Road, West of B6128, SP | 16,353 | 19,093 | 24,955 | 24,691 | 4.24 | 3.28 | 25 | 12.8 |
| L80 | A653 Leeds Road, West of B6128 | 16,353 | 19,093 | 24,955 | 24,691 | 4.24 | 3.28 | 45 | 9.8 |
| L81 | A653 Leeds Road, West of B6128 | 16,353 | 19,093 | 24,955 | 24,691 | 4.24 | 3.28 | 45 | 9.8 |
| L82 | A653 Leeds Road, East of A638, SP 1 | 16,353 | 19,093 | 24,955 | 24,691 | 4.24 | 3.28 | 20 | 9.7 |
| L83 | A653 Leeds Road, East of A638, SP 2 | 16,353 | 19,093 | 24,955 | 24,691 | 4.24 | 3.28 | 15 | 10.5 |

| Link | | 24-hour AADT Flow | | | | HDV Proportion of Fleet (%) | | Speed (kph) | Road Width (m) |
|------------|--|-------------------|-----------|--------------------------------|-----------------------------|--------------------------------------|----------------------|-------------|----------------|
| | | 2018 | 2030 - DM | 2030 - DS - Without Mitigation | 2030 - DS - With Mitigation | 2018, DM and DS - Without Mitigation | DS - With Mitigation | | |
| L84 | A653 Leeds Road, East of A638, SP 3 | 16,353 | 19,093 | 24,955 | 24,691 | 4.24 | 3.28 | 15 | 10.2 |
| L85 | A653 Leeds Road, to and from A638 | 8,176 | 9,546 | 12,664 | 12,532 | 4.24 | 3.23 | 15 | 12.8 |
| L86 | A653 Leeds Road, SB to A638 | 4,088 | 4,680 | 4,680 | 4,680 | 4.24 | 4.24 | 15 | 7.6 |
| L87 | A653 Leeds Road, EB from A638 | 4,088 | 4,867 | 7,984 | 7,852 | 4.24 | 2.63 | 25 | 5.5 |
| L88 | A638 Dewsbury Ring Road, East of Bradford Road | 21,713 | 23,927 | 30,162 | 30,162 | 1.58 | 1.58 | 35 | 21.2 |
| L89 | A638 Dewsbury Ring Road, North of Leeds Road | 21,713 | 23,927 | 30,162 | 30,162 | 1.58 | 1.58 | 35 | 15.6 |
| L90 | A638 Dewsbury Ring Road, North of Leeds Road | 21,713 | 23,740 | 26,858 | 26,858 | 1.58 | 1.58 | 25 | 17.3 |
| L91 | A638 Dewsbury Ring Road, South of Leeds Road | 24,757 | 25,665 | 25,665 | 25,665 | 2.89 | 2.89 | 25 | 17.8 |
| L92 | A638 Dewsbury Road, South of Leeds Road | 24,757 | 25,665 | 25,665 | 25,665 | 2.89 | 2.89 | 25 | 20.6 |
| L93 | A638 Rishworth Road | 14,427 | 16,871 | 17,046 | 17,046 | 4.90 | 4.90 | 35 | 17.1 |

| Link | | 24-hour AADT Flow | | | | HDV Proportion of Fleet (%) | | Speed (kph) | Road Width (m) |
|-------------|---|-------------------|-----------|--------------------------------|-----------------------------|--------------------------------------|----------------------|-------------|----------------|
| | | 2018 | 2030 - DM | 2030 - DS - Without Mitigation | 2030 - DS - With Mitigation | 2018, DM and DS - Without Mitigation | DS - With Mitigation | | |
| L94 | A638 Wakefield Road, East of Rishworth Road, SP | 25,553 | 26,528 | 26,702 | 26,702 | 8.04 | 8.04 | 25 | 16.8 |
| L95 | A638 Wakefield Road, East of Rishworth Road | 25,553 | 26,528 | 26,702 | 26,702 | 8.04 | 8.04 | 45 | 9.5 |
| L96 | A638 Chancery Road, West of B6128, Junction | 25,553 | 26,528 | 26,702 | 26,702 | 8.04 | 8.04 | 25 | 8.8 |
| L97 | A638 Chancery Road, West of B6128 | 25,553 | 26,528 | 26,702 | 26,702 | 8.04 | 8.04 | 60 | 9.2 |
| L98 | A638 Chancery Road, West of B6128, SP | 25,553 | 26,528 | 26,702 | 26,702 | 8.04 | 8.04 | 25 | 19.1 |
| L99 | A638 EB, East of B6128, SP | 19,418 | 21,591 | 23,538 | 23,538 | 8.03 | 8.03 | 25 | 7.8 |
| L100 | A638 EB, East of B6128 | 19,418 | 21,591 | 23,538 | 23,538 | 8.03 | 8.03 | 80 | 7.2 |
| L101 | A638 WB, East of B6128 | 19,418 | 21,591 | 23,538 | 23,538 | 8.03 | 8.03 | 80 | 7.2 |
| L102 | A638 WB, East of B6128 | 19,418 | 21,591 | 23,538 | 23,538 | 8.03 | 8.03 | 80 | 7.2 |
| L103 | A638 EB, East of M1 | 21,907 | 20,617 | 21,400 | 21,400 | 7.97 | 7.97 | 30 | 7.0 |
| L104 | A638 EB, West of Queens Drive | 21,907 | 20,617 | 21,400 | 21,400 | 7.97 | 7.97 | 30 | 12.6 |

| Link | | 24-hour AADT Flow | | | | HDV Proportion of Fleet (%) | | Speed (kph) | Road Width (m) |
|-------------|---|-------------------|-----------|--------------------------------|-----------------------------|--------------------------------------|----------------------|-------------|----------------|
| | | 2018 | 2030 - DM | 2030 - DS - Without Mitigation | 2030 - DS - With Mitigation | 2018, DM and DS - Without Mitigation | DS - With Mitigation | | |
| L105 | A638 EB, East of Queens Drive, SP | 43,814 | 41,234 | 42,800 | 42,800 | 7.97 | 7.97 | 30 | 17.1 |
| L106 | A638 EB, East of Queens Drive | 43,814 | 41,234 | 42,800 | 42,800 | 7.97 | 7.97 | 30 | 12.1 |
| L107 | A638 WB, East of M1 | 21,907 | 20,617 | 21,400 | 21,400 | 7.97 | 7.97 | 30 | 7.0 |
| L108 | M1, South of Junction | 107,610 | 125,924 | 127,397 | 127,397 | 10.00 | 10.00 | 95 | 40.8 |
| L109 | M1, Between Slip Roads | 89,272 | 104,394 | 104,394 | 104,394 | 9.75 | 9.75 | 95 | 32.7 |
| L110 | M1, North of Junction | 130,448 | 152,546 | 153,402 | 153,402 | 9.55 | 9.55 | 95 | 32.8 |
| L111 | M1 NB on slip | 23,688 | 22,668 | 23,313 | 23,313 | 11.90 | 11.90 | 65 | 6.7 |
| L112 | M1 SB off slip | 18,630 | 20,996 | 21,207 | 21,207 | 13.50 | 13.50 | 65 | 9.5 |
| L113 | M1 NB off slip | 11,647 | 13,293 | 13,732 | 13,732 | 11.30 | 11.30 | 65 | 6.3 |
| L114 | M1 SB on slip | 13,006 | 14,472 | 15,507 | 15,507 | 6.60 | 6.60 | 65 | 6.3 |
| L115 | M1 Roundabout | 18,703 | 19,481 | 20,454 | 20,454 | 9.43 | 9.43 | 35 | 9.2 |
| L116 | Chidswell Lane, Between A653 Leeds Road and Site Access 3, SP | 3,525 | 4,537 | 14,295 | 14,295 | 0.33 | 0.33 | 25 | 7.8 |
| L117 | Chidswell Lane, Between A653 Leeds Road and Site Access 3 | 3,525 | 4,537 | 14,295 | 14,295 | 0.33 | 0.33 | 35 | 7.5 |

| Link | | 24-hour AADT Flow | | | | HDV Proportion of Fleet (%) | | Speed (kph) | Road Width (m) |
|-------------|---|-------------------|-----------|--------------------------------|-----------------------------|--------------------------------------|----------------------|-------------|----------------|
| | | 2018 | 2030 - DM | 2030 - DS - Without Mitigation | 2030 - DS - With Mitigation | 2018, DM and DS - Without Mitigation | DS - With Mitigation | | |
| L118 | Chidswell Lane, Between Site Access 4 and Windsor Drive | 3,030 | 7,251 | 10,482 | 10,482 | 0.33 | 0.33 | 35 | 7.1 |
| L119 | Chidswell Lane, Between Windsor Drive and Site Access 4 | 437 | 569 | 2,539 | 2,539 | 6.32 | 6.32 | 35 | 4.5 |
| L120 | Chidswell Lane, South of Site Access 4 | 437 | 569 | 2,539 | 2,539 | 6.32 | 6.32 | 35 | 3.5 |
| L121 | Cross Street | 437 | 569 | 2,539 | 2,539 | 6.32 | 6.32 | 35 | 6.5 |
| L122 | Windsor Road | 2,715 | 6,814 | 8,075 | 8,075 | 3.10 | 3.10 | 40 | 7.2 |
| L123 | Windsor Road, SP | 2,715 | 6,814 | 8,075 | 8,075 | 3.10 | 3.10 | 20 | 7.2 |
| L124 | B6128, South of A638 Chancery Road | 17,004 | 13,687 | 14,493 | 14,493 | 4.71 | 4.71 | 30 | 10.4 |
| L125 | B6128, South of Roundabout, SP | 17,004 | 13,687 | 14,493 | 14,493 | 4.71 | 4.71 | 20 | 11.7 |
| L126 | B6128, South of Roundabout | 17,004 | 13,687 | 14,493 | 14,493 | 4.71 | 4.71 | 45 | 10.5 |
| L127 | B6128 Roundabout | 8,502 | 6,844 | 7,246 | 7,246 | 4.71 | 4.71 | 35 | 7.4 |

- 1.10 Reference should be made to Figure 10.5 for a graphical representation of the road link locations.

Emission Factors

- 1.11 In 2016, Air Quality Consultants Ltd (AQC) produced a spreadsheet entitled 'Calculator Using Realistic Emissions for Diesels' (CURED, versions V1A and V2A). This provided an alternative emissions calculator which took account of the large amount of evidence from real-world emissions tests showing that the European Environment Agency's COPERT and DEFRA's Emissions Factor Toolkit (EFT) were incorrect³.
- 1.12 DEFRA released EFT (v8.0.1) in December 2017. This included COPERT 5 vehicle emission factors and fleet information, which now better reflect the predictions made by CURED V1A and V2A. However, AQC noted there remained some uncertainty regarding how well the future vehicle fleet will perform in the real world. As such, in January 2018 AQC released CURED V3A⁴. This has been formulated to simulate failure of Euro 6d to provide any benefits over and above those of Euro6c, providing a more pessimistic view of the performance of post-2019 diesel cars and vans.
- 1.13 In May 2019, DEFRA released EFT (v9.0). Whilst a new version of CURED has not yet been developed, AQC have released a technical note⁵ providing a comparison of the new EFT (v9.0) with EFT (8.0.1) and CURED V3A. This concluded that the most recent version of CURED provides more pessimistic emission factors than both versions of the EFT. As such, CURED V3A was utilised in the dispersion modelling in order to provide a robust representation of future year NO_x emission factors.
- 1.14 As PM₁₀ emission factors do not require adjustment, factors were calculated for the relevant traffic flows using the EFT (version 9.0) produced by DEFRA.

Meteorological Data

- 1.15 Meteorological data used in the assessment was taken from Leeds Bradford International Airport meteorological station over the period 1st January 2018 to 31st December 2018 (inclusive). Leeds Bradford International Airport meteorological station is located at NGR: 422676, 441150, which is approximately 17.7km north-west of the Proposed Development. It is anticipated that conditions would be reasonably similar over a distance of this magnitude. The data was therefore considered suitable for an assessment of this nature.
- 1.16 All meteorological records used in the assessment were provided by Atmospheric Dispersion Modelling (ADM) Ltd, which is an established distributor of data within the UK. Reference should be made to Figure 10.6 for a wind rose of the utilised meteorological data.

Roughness Length

- 1.17 The roughness length (z_0) is a modelling parameter applied to allow consideration of surface height roughness elements. A z_0 of 0.5m was used to describe the modelling extents. This value of z_0 is considered appropriate for the morphology of the area and is suggested within ADMS-Roads as being suitable for 'parkland, open suburbia'.

³ Emissions of Nitrogen Oxides from Modern Diesel Vehicles, AQC, 2016.

⁴ Development of the CURED V3A Emissions Model, AQC, 2018.

⁵ Initial Comparison of EFT v9 with EFT v8 and CURED v3A, AQC, 2019.

- 1.18 A z_0 of 0.3m was used to describe the meteorological site. This value of z_0 is considered appropriate for the morphology of the area and is suggested within ADMS-Roads as being suitable for 'agricultural areas (max)'.

Monin-Obukhov Length

- 1.19 The Monin-Obukhov length provides a measure of the stability of the atmosphere. A minimum Monin-Obukhov length of 30m was used to describe the modelling extents and meteorological site. This value is considered appropriate for the nature of both areas and is suggested within ADMS-Roads as being suitable for 'cities and large towns'

NO_x to NO₂ Conversion

- 1.20 Predicted annual mean NO_x concentrations were converted to NO₂ concentrations using the spreadsheet (version 7.1) provided by DEFRA, which is the method detailed within DEFRA guidance⁶.

Verification

- 1.21 The predicted results from a dispersion model may differ from measured concentrations for a large number of reasons, including:

- Estimates of background concentrations;
- Uncertainties in source activity data such as traffic flows and emission factors; and,
- Variations in meteorological conditions;
- Overall model limitations; and,
- Uncertainties associated with monitoring data, including locations.

- 1.22 Model verification is the process by which these and other uncertainties are investigated and where possible minimised. In reality, the differences between modelled and monitored results are likely to be a combination of all of these aspects.

- 1.23 For the purpose of the assessment model verification was undertaken for 2018 using traffic data, meteorological data and monitoring results from this year.

- 1.24 Due to the large modelling extents and associated variation in local land uses and topography, two verification factors were produced for use in the assessment. These are described as follows:

- Verification Factor 1 - Calculated using the model inputs described previously, relevant background pollutant data obtained from the DEFRA maps and monitoring results from sites situated in LCC's administrative extents; and,
- Verification Factor 2 - Calculated using the model inputs described previously, relevant background pollutant data obtained from the DEFRA maps and monitoring results from sites situated in KMDC's administrative extents.

- 1.25 The above factors were subsequently utilised to adjust road NO_x concentrations at receptors most represented of the local land uses and topography surrounding the monitoring sites.

⁶ Local Air Quality Management Technical Guidance (TG16), DEFRA, 2018.

1.26 The background pollutant concentrations and monitoring results used to calculate the verification factors are provided in the following Sections.

Verification Factor 1

1.27 Background annual mean NO₂ and PM₁₀ concentrations were obtained from the DEFRA mapping study for the grid square containing diffusion tube D153 - 3 Oban Terrace, 427500, 426500.

1.28 Background levels of NO_x and NO₂ were adjusted in accordance with the approach provided by AQC⁷, which is to be adopted when using the CURED V3A emissions spreadsheet. This method uplifts the background concentrations predicted by DEFRA. The NO_x and NO₂ concentrations before and after adjustment are outlined in Table 10.A2. It should be noted that the motorway-in proportion of the background concentration was removed to avoid double-counting of these emissions.

Table 10.A2 - Background NO₂ and NO_x Concentrations - Verification Factor 1

| Pollutant | Predicted Background Pollutant Concentration (µg/m ³) | |
|------------------------------|---|-------|
| | 2018 | 2030 |
| NO _x - Unadjusted | - | 16.97 |
| NO _x - Adjusted | - | 19.75 |
| NO ₂ - Unadjusted | 18.02 | 12.28 |
| NO ₂ - Adjusted | 18.90 | 14.76 |

1.29 Adjustment of PM₁₀ concentrations is not required. As such, background levels were obtained from the DEFRA mapping study. These are shown in Table 10.A3.

Table 10.A3 - Background PM₁₀ Concentrations - Verification Factor 1

| Pollutant | Predicted Background Pollutant Concentration (µg/m ³) | |
|------------------|---|-------|
| | 2018 | 2030 |
| PM ₁₀ | 14.74 | 14.07 |

1.30 LCC undertook monitoring of NO₂ concentrations at three locations along roads included in the model during 2018. Results were obtained and the road contributions to total NO_x concentrations calculated following the methodology contained within DEFRA guidance⁸. The monitored annual mean NO₂ concentrations and calculated road NO_x concentrations are summarised in Table 10.A4.

Table 10.A4 - Verification Factor 1 - Monitoring Results

| Monitoring Site | Monitored NO ₂ Concentration (µg/m ³) | Calculated Road NO _x Concentration (µg/m ³) |
|-----------------|--|--|
| D151 | 2 Bradford Road | 27.9 |
| D153 | 3 Oban Terrace | 28.9 |

⁷ Adjusting Background NO₂ Maps for CURED, AQC, 2016.

⁸ Local Air Quality Management Technical Guidance (TG16), DEFRA, 2018.

| Monitoring Site | | Monitored NO ₂ Concentration (µg/m ³) | Calculated Road NO _x Concentration (µg/m ³) |
|-----------------|-----------------------------|--|--|
| D154 | The Brambles, Bradford Road | 27.5 | 17.08 |

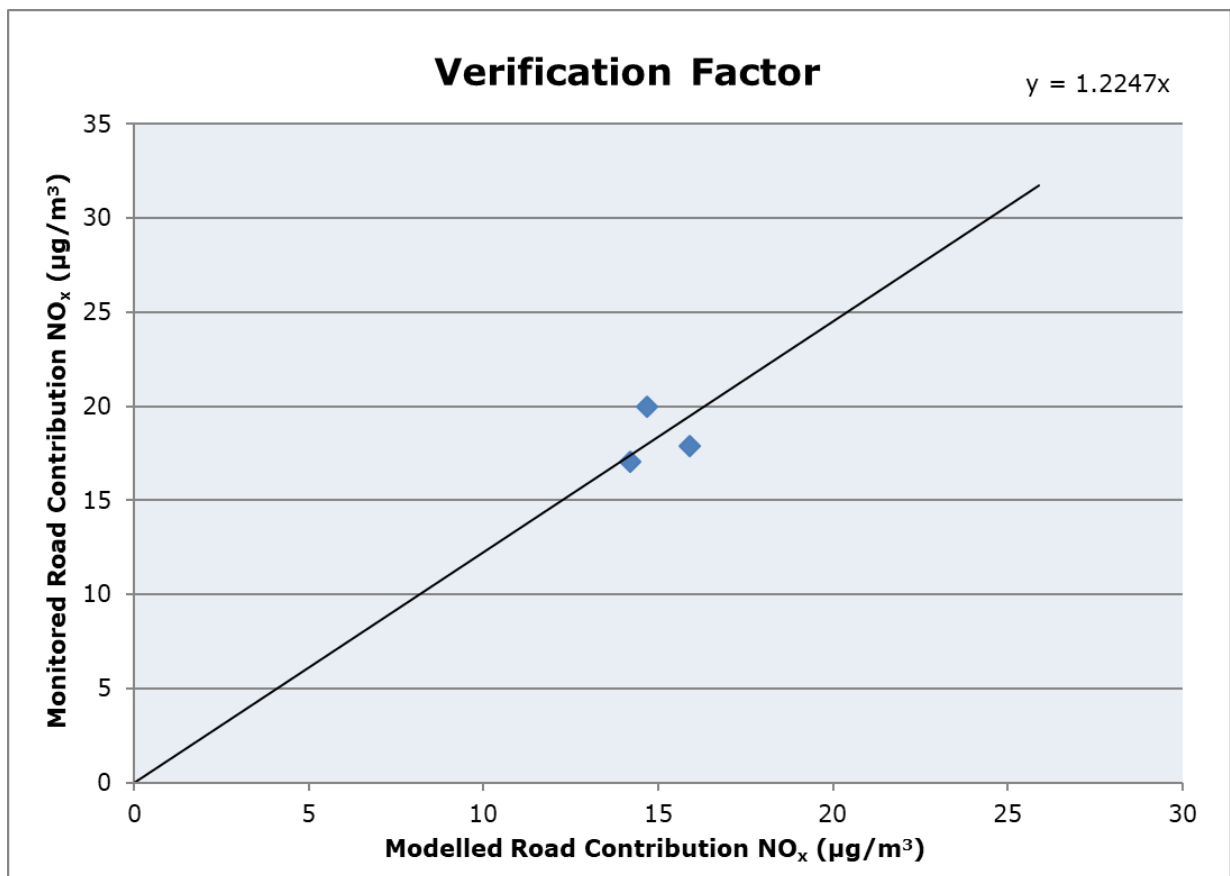
1.31 The annual mean road NO_x concentrations predicted from the dispersion model and the road NO_x concentrations calculated from the 2018 NO₂ monitoring results are summarised in Table 10.A5.

Table 10.A5 - Verification Factor 1 - Modelling Results

| Monitoring Site | Calculated Road NO _x Concentration (µg/m ³) | Modelled Road NO _x Concentration (µg/m ³) |
|-----------------|--|--|
| D151 | 2 Bradford Road | 17.91 |
| D153 | 3 Oban Terrace | 19.99 |
| D154 | The Brambles, Bradford Road | 17.08 |

1.32 The monitored and modelled road NO_x concentrations were graphed and the equation of the trendline based on linear progression through zero calculated. This indicated that a verification factor of 1.2247 was required to be applied to the road NO_x model output, as shown in Graph 1.

Graph 1 - NO_x Verification Factor 1



- 1.33 Monitoring of PM₁₀ concentrations is not undertaken within the assessment extents. The NO_x verification factor was therefore used to adjust PM₁₀ model predictions in lieu of more accurate data in accordance with DEFRA guidance⁹.
- 1.34 The modelling results for positions R1 to R25 and R34 to R52 were adjusted using Verification Factor 1. This was because the receptors are situated in a similar context to LCC's monitors, adjacent to roads within a suburban location.

Verification Factor 2

- 1.35 Background annual mean NO₂ and PM₁₀ concentrations were obtained from the DEFRA mapping study for the grid square containing diffusion tube 40 - Leeds Road, Dewsbury, 424500, 421500.
- 1.36 Background levels of NO_x and NO₂ were adjusted in accordance with the approach provided by AQC¹⁰, as outlined previously. The values before and after adjustment are outlined in Table A.6.

Table 10.A6 - Background NO₂ and NO_x Concentrations - Verification Factor 2

| Pollutant | Predicted Background Pollutant Concentration (µg/m ³) | |
|------------------------------|---|-------|
| | 2018 | 2030 |
| NO _x - Unadjusted | - | 26.75 |
| NO _x - Adjusted | - | 29.18 |
| NO ₂ - Unadjusted | 23.11 | 17.95 |
| NO ₂ - Adjusted | 24.24 | 20.29 |

- 1.37 Adjustment of PM₁₀ concentrations is not required. As such, background levels were obtained from the DEFRA mapping study. These are shown in Table 10.A7.

Table 10.A7 - Background PM₁₀ Concentrations - Verification Factor 2

| Pollutant | Predicted Background Pollutant Concentration (µg/m ³) | |
|------------------|---|-------|
| | 2018 | 2030 |
| PM ₁₀ | 12.25 | 11.60 |

- 1.38 KMDC undertook monitoring of NO₂ concentrations at six locations along roads included in the model during 2018. Results were obtained and the road contributions to total NO_x concentrations calculated following the methodology contained within DEFRA guidance¹¹. The monitored annual mean NO₂ concentrations and calculated road NO_x concentrations are summarised in Table 10.A8.

⁹ Local Air Quality Management Technical Guidance (TG16), DEFRA, 2018.

¹⁰ Adjusting Background NO₂ Maps for CURED, AQC, 2016.

¹¹ Local Air Quality Management Technical Guidance (TG16), DEFRA, 2018.

Table 10.A8 - Verification Factor 2 - Monitoring Results

| Monitoring Site | Monitored NO ₂ Concentration (µg/m ³) | Calculated Road NO _x Concentration (µg/m ³) |
|-----------------|--|--|
| 20 | Rockley Street, Dewsbury | 33.96 |
| 40 | Leeds Road, Dewsbury | 52.40 |
| 42 | Leeds Road, Dewsbury - 2 | 39.60 |
| 43 | John Street, Dewsbury | 42.93 |
| 44 | Calmswood Road, Eastborough | 35.07 |
| 54 | Wakefield Road, Dewsbury | 33.87 |

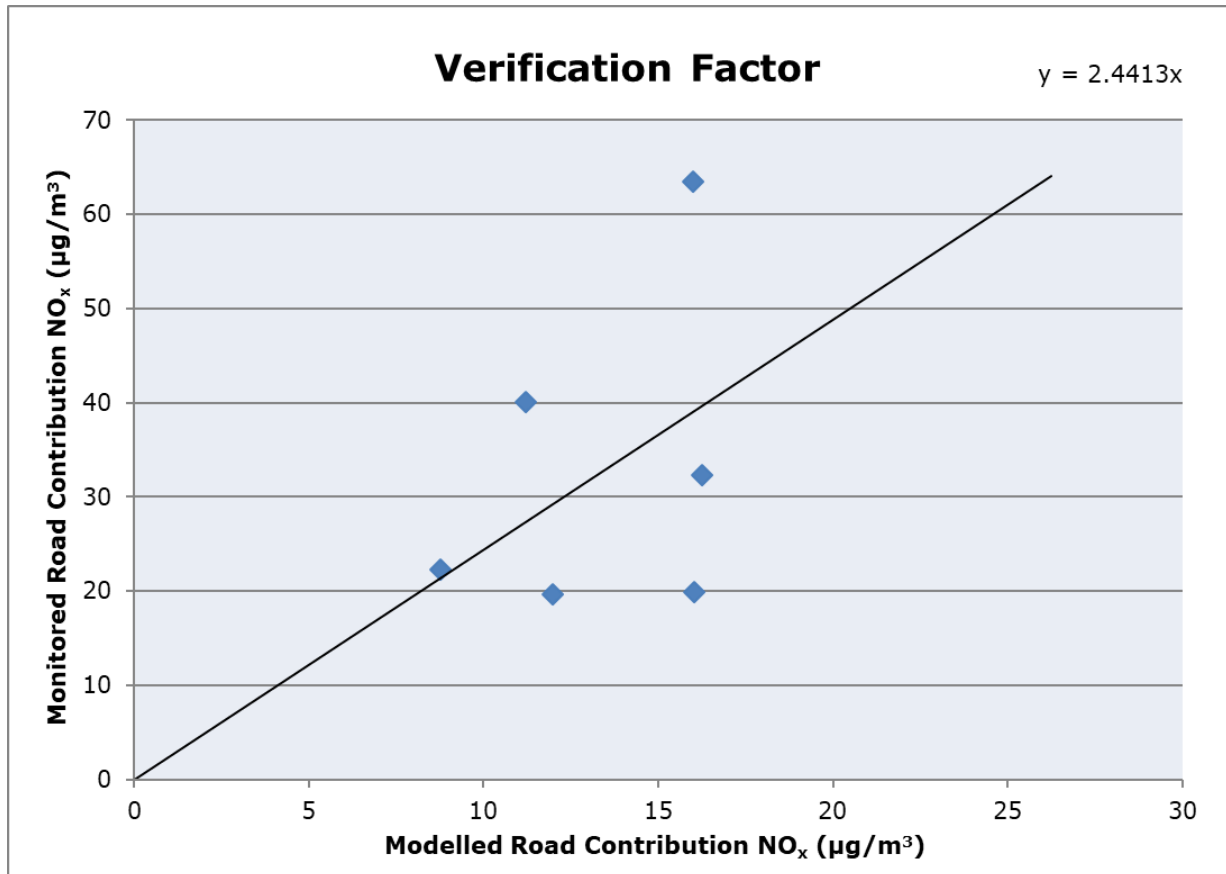
1.39 The annual mean road NO_x concentrations predicted from the dispersion model and the road NO_x concentrations calculated from the 2018 NO₂ monitoring results are summarised in Table 10.A9.

Table 10.A9 - Verification Factor 2 - Modelling Results

| Monitoring Site | Calculated Road NO _x Concentration (µg/m ³) | Modelled Road NO _x Concentration (µg/m ³) |
|-----------------|--|--|
| 20 | Rockley Street, Dewsbury | 19.92 |
| 40 | Leeds Road, Dewsbury | 63.44 |
| 42 | Leeds Road, Dewsbury - 2 | 32.38 |
| 43 | John Street, Dewsbury | 40.08 |
| 44 | Calmswood Road, Eastborough | 22.31 |
| 54 | Wakefield Road, Dewsbury | 19.72 |

1.40 The monitored and modelled road NO_x concentrations were graphed and the equation of the trendline based on linear progression through zero calculated. This indicated that a verification factor of 2.4413 was required to be applied to the road NO_x model outputs, as shown in Graph 2.

Graph 2 - NO_x Verification Factor 2



- 1.41 Monitoring of PM₁₀ concentrations is not undertaken within the assessment extents. The NO_x verification factor was therefore used to adjust PM₁₀ model predictions in lieu of more accurate data in accordance with DEFRA guidance¹².
- 1.42 The modelling results for positions R26 and R33 were adjusted using Verification Factor 2. This was because the receptors are situated in a similar context to KMDC's monitors, adjacent to roads situated within an urban location and close to Dewsbury Town Centre.

¹² Local Air Quality Management Technical Guidance (TG16), DEFRA, 2018.

10.3 Dispersion Modelling Results

Appendix 10.3

Dispersion Modelling Results

Nitrogen Dioxide

Annual mean NO₂ concentrations were predicted at the sensitive receptor locations for the DM and DS - Without Mitigation scenarios. These are summarised in Table 10.A1.

Table 10.A1 - Predicted Annual Mean NO₂ Concentrations - DM and DS - Without Mitigation Scenarios

| Receptor | | Predicted Annual Mean NO ₂ Concentration (µg/m ³) | | |
|------------|------------------------------------|--|-------------------------|--------|
| | | DM | DS - Without Mitigation | Change |
| R1 | Residential - Oban Close | 20.81 | 20.98 | 0.17 |
| R2 | Residential - Tingley Hall Rise | 19.43 | 19.79 | 0.36 |
| R3 | Residential - Bradford Road | 18.05 | 18.18 | 0.13 |
| R4 | Residential - Station Hall Farm | 19.28 | 19.40 | 0.12 |
| R5 | Residential - Tingley Avenue | 18.99 | 19.12 | 0.13 |
| R6 | Residential - Bradford Road | 21.36 | 21.45 | 0.09 |
| R7 | Education Facility - Bradford Road | 16.98 | 17.02 | 0.04 |
| R8 | Residential - Aspen Court | 20.66 | 20.80 | 0.14 |
| R9 | Residential - Dewsbury Road | 19.66 | 20.53 | 0.87 |
| R10 | Residential - Dewsbury Road | 23.49 | 24.93 | 1.44 |
| R11 | Residential - Dewsbury Road | 20.69 | 21.66 | 0.97 |
| R12 | Education Facility - Rein Road | 17.27 | 17.38 | 0.11 |
| R13 | Residential - Rein Road | 17.54 | 17.69 | 0.15 |
| R14 | Residential - Dewsbury Road | 19.14 | 20.02 | 0.88 |
| R15 | Residential - Leeds Road | 21.74 | 23.34 | 1.60 |
| R16 | Residential - Leeds Road | 19.02 | 19.87 | 0.85 |
| R17 | Residential - Heybeck Lane | 23.05 | 24.62 | 1.57 |
| R18 | Residential - Leeds Road | 18.97 | 20.06 | 1.09 |
| R19 | Residential - Leeds Road | 18.52 | 20.20 | 1.68 |
| R20 | Residential - Leeds Road | 19.91 | 21.21 | 1.30 |

| Receptor | | Predicted Annual Mean NO ₂ Concentration (µg/m ³) | | |
|------------|-----------------------------------|--|-------------------------|--------|
| | | DM | DS - Without Mitigation | Change |
| R21 | Residential - Leeds Road | 19.80 | 21.04 | 1.24 |
| R22 | Residential - Leeds Road | 21.75 | 23.42 | 1.67 |
| R23 | Residential - Leeds Road | 20.32 | 21.66 | 1.34 |
| R24 | Residential - Leeds Road | 19.70 | 21.00 | 1.30 |
| R25 | Residential - Leeds Road | 18.32 | 19.31 | 0.99 |
| R26 | Residential - Leeds Road | 26.86 | 28.64 | 1.78 |
| R27 | Residential - Leeds Road | 25.70 | 27.10 | 1.40 |
| R28 | Residential - Leeds Road | 27.68 | 29.64 | 1.96 |
| R29 | Residential - Leeds Road | 29.09 | 31.40 | 2.31 |
| R30 | Residential - Leeds Road | 29.20 | 31.42 | 2.22 |
| R31 | Education Facility - Leeds Road | 27.38 | 28.98 | 1.60 |
| R32 | Residential - Highgate Road | 27.70 | 28.17 | 0.47 |
| R33 | Residential - Highgate Road | 27.20 | 27.41 | 0.21 |
| R34 | Residential - Soothill Lane | 16.78 | 17.12 | 0.34 |
| R35 | Residential - Soothill Lane | 16.95 | 17.34 | 0.39 |
| R36 | Residential - Grange Road | 17.49 | 18.01 | 0.52 |
| R37 | Education Facility- Soothill Lane | 15.35 | 15.43 | 0.08 |
| R38 | Residential - Heybeck Lane | 17.70 | 17.99 | 0.29 |
| R39 | Residential - Heybeck Lane | 17.04 | 17.24 | 0.20 |
| R40 | Education Facility - Heybeck Lane | 15.66 | 15.72 | 0.06 |
| R41 | Residential - Chidswell Lane | 16.78 | 17.38 | 0.60 |
| R42 | Residential - Windsor Drive | 17.55 | 18.05 | 0.50 |
| R43 | Residential - Owl Lane | 16.80 | 17.11 | 0.31 |
| R44 | Residential - Owl Lane | 19.15 | 19.80 | 0.65 |
| R45 | Residential - Chidswell Lane | 15.55 | 15.84 | 0.29 |
| R46 | Residential - Kingsway | 18.36 | 18.58 | 0.22 |
| R47 | Residential - Kingsway | 17.50 | 17.66 | 0.16 |
| R48 | Education Facility - Leeds Road | 17.40 | 17.65 | 0.25 |

| Receptor | | Predicted Annual Mean NO ₂ Concentration (µg/m ³) | | |
|------------|-------------------------------|--|-------------------------|--------|
| | | DM | DS - Without Mitigation | Change |
| R49 | Residential - Lodge Hill Road | 17.39 | 17.61 | 0.22 |
| R50 | Residential - Cross Keys | 20.91 | 21.06 | 0.15 |
| R51 | Residential - Wakefield Road | 18.46 | 18.57 | 0.11 |
| R52 | Residential - Batley Road | 24.53 | 24.62 | 0.09 |

1.1 As indicated in Table 10.A1, predicted annual mean NO₂ concentrations were below the relevant AQO at all sensitive receptors in both scenarios.

1.2 Annual mean NO₂ concentrations were predicted at the sensitive receptor locations for the DM and DS - With Mitigation scenarios. These are summarised in Table 10.A2.

Table 10.A2 - Predicted Annual Mean NO₂ Concentrations - DM and DS - With Mitigation Scenarios

| Receptor | | Predicted Annual Mean NO ₂ Concentration (µg/m ³) | | |
|------------|------------------------------------|--|----------------------|--------|
| | | DM | DS - With Mitigation | Change |
| R1 | Residential - Oban Close | 20.81 | 20.98 | 0.17 |
| R2 | Residential - Tingley Hall Rise | 19.43 | 19.79 | 0.36 |
| R3 | Residential - Bradford Road | 18.05 | 18.18 | 0.13 |
| R4 | Residential - Station Hall Farm | 19.28 | 19.40 | 0.12 |
| R5 | Residential - Tingley Avenue | 18.99 | 19.12 | 0.13 |
| R6 | Residential - Bradford Road | 21.36 | 21.45 | 0.09 |
| R7 | Education Facility - Bradford Road | 16.98 | 17.02 | 0.04 |
| R8 | Residential - Aspen Court | 20.66 | 20.80 | 0.14 |
| R9 | Residential - Dewsbury Road | 19.66 | 20.53 | 0.87 |
| R10 | Residential - Dewsbury Road | 23.49 | 24.93 | 1.44 |

| Receptor | | Predicted Annual Mean NO ₂ Concentration (µg/m ³) | | |
|------------|--------------------------------|--|----------------------|--------|
| | | DM | DS - With Mitigation | Change |
| R11 | Residential - Dewsbury Road | 20.69 | 21.66 | 0.97 |
| R12 | Education Facility - Rein Road | 17.27 | 17.38 | 0.11 |
| R13 | Residential - Rein Road | 17.54 | 17.69 | 0.15 |
| R14 | Residential - Dewsbury Road | 19.14 | 20.02 | 0.88 |
| R15 | Residential - Leeds Road | 21.74 | 23.34 | 1.60 |
| R16 | Residential - Leeds Road | 19.02 | 19.87 | 0.85 |
| R17 | Residential - Heybeck Lane | 23.05 | 24.61 | 1.56 |
| R18 | Residential - Leeds Road | 18.97 | 20.06 | 1.09 |
| R19 | Residential - Leeds Road | 18.52 | 20.20 | 1.68 |
| R20 | Residential - Leeds Road | 19.91 | 21.21 | 1.30 |
| R21 | Residential - Leeds Road | 19.80 | 21.04 | 1.24 |
| R22 | Residential - Leeds Road | 21.75 | 23.42 | 1.67 |
| R23 | Residential - Leeds Road | 20.32 | 21.65 | 1.33 |
| R24 | Residential - Leeds Road | 19.70 | 20.91 | 1.21 |
| R25 | Residential - Leeds Road | 18.32 | 19.25 | 0.93 |
| R26 | Residential - Leeds Road | 26.86 | 28.53 | 1.67 |
| R27 | Residential - Leeds Road | 25.70 | 26.99 | 1.29 |
| R28 | Residential - Leeds Road | 27.68 | 29.43 | 1.75 |
| R29 | Residential - Leeds Road | 29.09 | 31.12 | 2.03 |
| R30 | Residential - Leeds Road | 29.20 | 31.17 | 1.97 |

| Receptor | | Predicted Annual Mean NO ₂ Concentration (µg/m ³) | | |
|------------|------------------------------------|--|----------------------|--------|
| | | DM | DS - With Mitigation | Change |
| R31 | Education Facility - Leeds Road | 27.38 | 28.84 | 1.46 |
| R32 | Residential - Highgate Road | 27.70 | 28.13 | 0.43 |
| R33 | Residential - Highgate Road | 27.20 | 27.39 | 0.19 |
| R34 | Residential - Soothill Lane | 16.78 | 17.12 | 0.34 |
| R35 | Residential - Soothill Lane | 16.95 | 17.34 | 0.39 |
| R36 | Residential - Grange Road | 17.49 | 18.00 | 0.51 |
| R37 | Education Facility - Soothill Lane | 15.35 | 15.43 | 0.08 |
| R38 | Residential - Heybeck Lane | 17.70 | 17.99 | 0.29 |
| R39 | Residential - Heybeck Lane | 17.04 | 17.24 | 0.20 |
| R40 | Education Facility - Heybeck Lane | 15.66 | 15.72 | 0.06 |
| R41 | Residential - Chidswell Lane | 16.78 | 17.38 | 0.60 |
| R42 | Residential - Windsor Drive | 17.55 | 18.05 | 0.50 |
| R43 | Residential - Owl Lane | 16.80 | 17.11 | 0.31 |
| R44 | Residential - Owl Lane | 19.15 | 19.80 | 0.65 |
| R45 | Residential - Chidswell Lane | 15.55 | 15.84 | 0.29 |
| R46 | Residential - Kingsway | 18.36 | 18.58 | 0.22 |
| R47 | Residential - Kingsway | 17.50 | 17.66 | 0.16 |
| R48 | Education Facility - Leeds Road | 17.40 | 17.65 | 0.25 |
| R49 | Residential - Lodge Hill Road | 17.39 | 17.61 | 0.22 |

| Receptor | | Predicted Annual Mean NO ₂ Concentration (µg/m ³) | | |
|------------|------------------------------|--|----------------------|--------|
| | | DM | DS - With Mitigation | Change |
| R50 | Residential - Cross Keys | 20.91 | 21.06 | 0.15 |
| R51 | Residential - Wakefield Road | 18.46 | 18.57 | 0.11 |
| R52 | Residential - Batley Road | 24.53 | 24.62 | 0.09 |

1.3 As indicated in Table 10.A2, predicted annual mean NO₂ concentrations were below the relevant AQO at all sensitive receptors in both scenarios.

Particulate Matter

1.4 Annual mean PM₁₀ concentrations were predicted at the sensitive receptor locations for the DM and DS - Without Mitigation scenarios. These are summarised in Table 10.A3.

Table 10.A3 - Predicted Annual Mean PM₁₀ Concentrations - DM and DS - Without Mitigation Scenarios

| Receptor | | Predicted Annual Mean PM ₁₀ Concentration (µg/m ³) | | |
|------------|------------------------------------|---|-------------------------|--------|
| | | DM | DS - Without Mitigation | Change |
| R1 | Residential - Oban Close | 15.88 | 15.93 | 0.05 |
| R2 | Residential - Tingley Hall Rise | 15.34 | 15.45 | 0.11 |
| R3 | Residential - Bradford Road | 15.00 | 15.04 | 0.04 |
| R4 | Residential - Station Hall Farm | 15.15 | 15.19 | 0.04 |
| R5 | Residential - Tingley Avenue | 15.22 | 15.26 | 0.04 |
| R6 | Residential - Bradford Road | 16.19 | 16.22 | 0.03 |
| R7 | Education Facility - Bradford Road | 14.70 | 14.72 | 0.01 |
| R8 | Residential - Aspen Court | 15.36 | 15.39 | 0.04 |
| R9 | Residential - Dewsbury Road | 15.52 | 15.80 | 0.28 |
| R10 | Residential - Dewsbury Road | 16.27 | 16.66 | 0.39 |
| R11 | Residential - Dewsbury Road | 15.57 | 15.83 | 0.26 |
| R12 | Education Facility - Rein Road | 14.67 | 14.70 | 0.03 |
| R13 | Residential - Rein Road | 14.76 | 14.81 | 0.04 |
| R14 | Residential - Dewsbury Road | 15.55 | 15.87 | 0.31 |
| R15 | Residential - Leeds Road | 15.93 | 16.38 | 0.45 |

| Receptor | | Predicted Annual Mean PM ₁₀ Concentration (µg/m ³) | | |
|------------|-----------------------------------|---|-------------------------|--------|
| | | DM | DS - Without Mitigation | Change |
| R16 | Residential - Leeds Road | 15.25 | 15.50 | 0.25 |
| R17 | Residential - Heybeck Lane | 16.20 | 16.63 | 0.43 |
| R18 | Residential - Leeds Road | 15.35 | 15.70 | 0.35 |
| R19 | Residential - Leeds Road | 15.20 | 15.68 | 0.48 |
| R20 | Residential - Leeds Road | 15.65 | 16.07 | 0.42 |
| R21 | Residential - Leeds Road | 15.66 | 16.07 | 0.41 |
| R22 | Residential - Leeds Road | 15.98 | 16.45 | 0.48 |
| R23 | Residential - Leeds Road | 15.56 | 15.93 | 0.37 |
| R24 | Residential - Leeds Road | 15.45 | 15.83 | 0.38 |
| R25 | Residential - Leeds Road | 15.18 | 15.50 | 0.32 |
| R26 | Residential - Leeds Road | 13.75 | 14.37 | 0.62 |
| R27 | Residential - Leeds Road | 13.25 | 13.69 | 0.45 |
| R28 | Residential - Leeds Road | 13.46 | 13.97 | 0.51 |
| R29 | Residential - Leeds Road | 13.69 | 14.26 | 0.57 |
| R30 | Residential - Leeds Road | 13.75 | 14.31 | 0.55 |
| R31 | Education Facility - Leeds Road | 13.40 | 13.82 | 0.42 |
| R32 | Residential - Highgate Road | 13.56 | 13.69 | 0.12 |
| R33 | Residential - Highgate Road | 13.55 | 13.61 | 0.06 |
| R34 | Residential - Soothill Lane | 14.67 | 14.78 | 0.11 |
| R35 | Residential - Soothill Lane | 14.73 | 14.85 | 0.12 |
| R36 | Residential - Grange Road | 14.95 | 15.12 | 0.17 |
| R37 | Education Facility- Soothill Lane | 14.23 | 14.25 | 0.02 |
| R38 | Residential - Heybeck Lane | 14.80 | 14.88 | 0.08 |
| R39 | Residential - Heybeck Lane | 14.71 | 14.76 | 0.06 |
| R40 | Education Facility - Heybeck Lane | 14.31 | 14.32 | 0.02 |
| R41 | Residential - Chidswell Lane | 14.63 | 14.80 | 0.17 |
| R42 | Residential - Windsor Drive | 14.88 | 15.03 | 0.15 |
| R43 | Residential - Owl Lane | 14.69 | 14.79 | 0.10 |

| Receptor | | Predicted Annual Mean PM ₁₀ Concentration (µg/m ³) | | |
|------------|---------------------------------|---|-------------------------|--------|
| | | DM | DS - Without Mitigation | Change |
| R44 | Residential - Owl Lane | 15.33 | 15.52 | 0.19 |
| R45 | Residential - Chidswell Lane | 14.29 | 14.38 | 0.09 |
| R46 | Residential - Kingsway | 15.12 | 15.19 | 0.07 |
| R47 | Residential - Kingsway | 14.80 | 14.84 | 0.05 |
| R48 | Education Facility - Leeds Road | 14.96 | 15.04 | 0.09 |
| R49 | Residential - Lodge Hill Road | 15.01 | 15.10 | 0.08 |
| R50 | Residential - Cross Keys | 15.72 | 15.78 | 0.06 |
| R51 | Residential - Wakefield Road | 15.00 | 15.03 | 0.03 |
| R52 | Residential - Batley Road | 15.86 | 15.89 | 0.02 |

1.5 As indicated in Table 10.A3, predicted annual mean PM₁₀ concentrations were below the relevant AQO at all sensitive receptors in both scenarios.

1.6 Annual mean PM₁₀ concentrations were predicted at the sensitive receptor locations for the DM and DS - With Mitigation scenarios. These are summarised in Table 10.A4.

Table 10.A4 - Predicted Annual Mean PM₁₀ Concentrations - DM and DS - With Mitigation Scenarios

| Receptor | | Predicted Annual Mean PM ₁₀ Concentration (µg/m ³) | | |
|------------|------------------------------------|---|----------------------|--------|
| | | DM | DS - With Mitigation | Change |
| R1 | Residential - Oban Close | 15.88 | 15.93 | 0.05 |
| R2 | Residential - Tingley Hall Rise | 15.34 | 15.45 | 0.11 |
| R3 | Residential - Bradford Road | 15.00 | 15.04 | 0.04 |
| R4 | Residential - Station Hall Farm | 15.15 | 15.19 | 0.04 |
| R5 | Residential - Tingley Avenue | 15.22 | 15.26 | 0.04 |
| R6 | Residential - Bradford Road | 16.19 | 16.22 | 0.03 |
| R7 | Education Facility - Bradford Road | 14.70 | 14.72 | 0.01 |
| R8 | Residential - Aspen Court | 15.36 | 15.39 | 0.04 |
| R9 | Residential - Dewsbury Road | 15.52 | 15.80 | 0.28 |
| R10 | Residential - Dewsbury Road | 16.27 | 16.66 | 0.39 |
| R11 | Residential - Dewsbury Road | 15.57 | 15.83 | 0.26 |

| Receptor | | Predicted Annual Mean PM ₁₀ Concentration (µg/m ³) | | |
|------------|-----------------------------------|---|----------------------|--------|
| | | DM | DS - With Mitigation | Change |
| R12 | Education Facility - Rein Road | 14.67 | 14.70 | 0.03 |
| R13 | Residential - Rein Road | 14.76 | 14.81 | 0.04 |
| R14 | Residential - Dewsbury Road | 15.55 | 15.87 | 0.31 |
| R15 | Residential - Leeds Road | 15.93 | 16.38 | 0.45 |
| R16 | Residential - Leeds Road | 15.25 | 15.50 | 0.25 |
| R17 | Residential - Heybeck Lane | 16.20 | 16.63 | 0.43 |
| R18 | Residential - Leeds Road | 15.35 | 15.70 | 0.35 |
| R19 | Residential - Leeds Road | 15.20 | 15.68 | 0.48 |
| R20 | Residential - Leeds Road | 15.65 | 16.07 | 0.42 |
| R21 | Residential - Leeds Road | 15.66 | 16.07 | 0.41 |
| R22 | Residential - Leeds Road | 15.98 | 16.45 | 0.48 |
| R23 | Residential - Leeds Road | 15.56 | 15.93 | 0.37 |
| R24 | Residential - Leeds Road | 15.45 | 15.79 | 0.33 |
| R25 | Residential - Leeds Road | 15.18 | 15.45 | 0.27 |
| R26 | Residential - Leeds Road | 13.75 | 14.28 | 0.53 |
| R27 | Residential - Leeds Road | 13.25 | 13.63 | 0.38 |
| R28 | Residential - Leeds Road | 13.46 | 13.89 | 0.44 |
| R29 | Residential - Leeds Road | 13.69 | 14.18 | 0.49 |
| R30 | Residential - Leeds Road | 13.75 | 14.24 | 0.48 |
| R31 | Education Facility - Leeds Road | 13.40 | 13.77 | 0.37 |
| R32 | Residential - Highgate Road | 13.56 | 13.67 | 0.11 |
| R33 | Residential - Highgate Road | 13.55 | 13.61 | 0.05 |
| R34 | Residential - Soothill Lane | 14.67 | 14.78 | 0.11 |
| R35 | Residential - Soothill Lane | 14.73 | 14.85 | 0.12 |
| R36 | Residential - Grange Road | 14.95 | 15.12 | 0.17 |
| R37 | Education Facility- Soothill Lane | 14.23 | 14.25 | 0.02 |
| R38 | Residential - Heybeck Lane | 14.80 | 14.88 | 0.08 |
| R39 | Residential - Heybeck Lane | 14.71 | 14.76 | 0.06 |

| Receptor | | Predicted Annual Mean PM ₁₀ Concentration (µg/m ³) | | |
|------------|-----------------------------------|---|----------------------|--------|
| | | DM | DS - With Mitigation | Change |
| R40 | Education Facility - Heybeck Lane | 14.31 | 14.32 | 0.02 |
| R41 | Residential - Chidswell Lane | 14.63 | 14.80 | 0.17 |
| R42 | Residential - Windsor Drive | 14.88 | 15.03 | 0.15 |
| R43 | Residential - Owl Lane | 14.69 | 14.79 | 0.10 |
| R44 | Residential - Owl Lane | 15.33 | 15.52 | 0.19 |
| R45 | Residential - Chidswell Lane | 14.29 | 14.38 | 0.09 |
| R46 | Residential - Kingsway | 15.12 | 15.19 | 0.07 |
| R47 | Residential - Kingsway | 14.80 | 14.84 | 0.05 |
| R48 | Education Facility - Leeds Road | 14.96 | 15.04 | 0.09 |
| R49 | Residential - Lodge Hill Road | 15.01 | 15.10 | 0.08 |
| R50 | Residential - Cross Keys | 15.72 | 15.78 | 0.06 |
| R51 | Residential - Wakefield Road | 15.00 | 15.03 | 0.03 |
| R52 | Residential - Batley Road | 15.86 | 15.89 | 0.02 |

1.7 As indicated in Table 10.A4, predicted annual mean PM₁₀ concentrations were below the relevant AQO at all sensitive receptors in both scenarios.

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Real Estate

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