TAG Unit 3.3.3 – Local Air Quality

Baseline Conditions

1.1. Owing to its responsibilities under the Environment Act 1995, Leeds City Council (LCC) has carried out considerable air quality monitoring and assessment work to characterise conditions in its administrative area over the past nine years.

1.2. Following an assessment in 2000 LCC designated two Air Quality Management Orders (AQMOs), which cover a number of residential areas. The first Order was made in response to predicted exceedences of the annual mean air quality objective for nitrogen dioxide (NO_2) at seven discrete residential areas, which were declared Air Quality Management Areas (AQMAs). The second Order was made in response to predicted exceedences of the daily mean and annual mean air quality objectives for fine particulates (PM_{10}) at one residential area, also declared an AQMA. In all cases the exceedences of the objectives were primarily due to road traffic emissions and therefore the AQMAs are located near to busy roads and in particular road junctions where traffic is likely to be congested. Concentrations of other pollutants such as sulphur dioxide, carbon monoxide, benzene, 1,3-butadiene and lead have been concluded to be below the air quality objectives at all relevant locations. A map showing the locations of the AQMAs are presented in this Appendix.

1.3. The findings of the most recent air quality work undertaken by LCC were presented in a progress report in 2008. The report has identified that the first AQMA Order for NO_2 may need to be revised to include additional areas of exceedence. In addition, air quality monitoring data has indicated that the second AQMA Order for PM_{10} may be removed as concentrations have remained below the relevant objectives for a significant period of time. A report is expected in 2009 which will confirm whether the declared AQMAs will change.

1.4. LCC monitors NO_2 and/or PM_{10} concentrations using fourteen continuous analysers within Leeds. Monitoring of NO_2 is also carried out using diffusion tubes at sixty three locations representing major road arterial routes leading into and out of the city centre, in the vicinity of properties within the AQMAs and other areas of concern.

1.5. The most recent monitoring data for NO_2 indicates that, at background monitoring sites, concentrations are generally below or well below the relevant air quality objectives. This indicates that the NO_2 objectives continue to be met at the majority of locations across Leeds. However, a number of monitoring locations near to busy roads indicate that the NO_2 objectives are being exceeded at several small locations in central Leeds, including in areas outside of the existing

AQMAs. For PM_{10}, both urban background and roadside monitoring sites meet the air quality objectives indicating that concentrations for this pollutant are likely to remain below the objectives at all locations across the city.

Impact of Do Minimum

1.6. The description of the baseline conditions described above indicates that NO_2 concentrations within Leeds are above the air quality objectives at some roadside locations. A review by LCC of the most recent monitoring data from 2008 also indicates that the concentration of NO_2 is increasing at some roadside locations despite predicted decreases in the National Atmospheric Emission Inventory (NAEI) background (i.e. non-road traffic related) concentrations of NO_2 across the UK. This indicates that emissions from road traffic in Leeds may be likely to continue to cause exceedences of the air quality objectives in the future. Concentrations of other pollutants, such as PM_{10}, are likely to remain below the objectives.

Impact of Preferred Scheme

1.7. A quantitative assessment of the effects of the Preferred Scheme on local air quality was carried out. The overall predicted effects for the Preferred Scheme are assessed as **moderate beneficial.**

1.8. The assessment has been carried out following WebTAG guidance identifying changes in concentrations of nitrogen dioxide (NO_2) and particulate matter (PM_{10}) at properties up to 200 metres from the road centreline. Roads to be assessed have been selected in accordance with the Design Manual for Roads and Bridges (DMRB) and that are common to both the ‘do minimum’ and ‘do something’ scenarios.

1.9. The WebTAG scores from the assessment presented in paragraph 1.15 indicate that the Preferred Scheme would create improvements in air quality compared to the baseline.

Impact of Next Best Alternative

1.10. A qualitative assessment of effects on local air quality has been carried out as traffic data are unavailable. Effects from the Next Best Alternative are expected to be broadly similar to those predicted for the Preferred Scheme. However, modal shift encouraged by the Next Best Alternative may not be as large as the Preferred Scheme. The overall effects for the Next Best Alternative are described as **slight beneficial.**

1.11. It would be expected that the Next Best Alternative would create improvements in air quality similar to those in the Preferred Scheme. However, when the bus is not powered by its batteries and utilising its diesel generator air quality has the potential to be worse compared to the Preferred Scheme. When using the diesel generator emissions of

NO_x and PM_{10} would be released leading to a potential degradation of air quality along the proposed route.

Impact of Lower Cost Alternative

1.12. A qualitative assessment of effects on local air quality has been carried out as traffic data are unavailable. Effects from the Lower Cost Alternative are expected to be broadly similar to those predicted for the Preferred Scheme. However, modal shift encouraged by the Lower Cost Alternative may not be as large as the Preferred Scheme. The overall effects for the Low Cost Alternative are assessed as **slight beneficial**.

1.13. It would be expected that the Lower Cost Alternative would create improvements in air quality similar to those in the Preferred Scheme. The Lower Cost Alternative plans to use diesel powered buses which cause emissions of NO_x and PM_{10} at roadside locations along the whole length of the proposed route. Therefore, air quality has the potential to be worse in the Lower Cost Alternative compared to the Preferred Scheme and Next Best Alternative.

1. LOCAL AIR QUALITY: Worksheet

1.1. Methodology

An assessment of the local air quality objective for the three options known as the 'preferred option', 'next best alternative' and 'lower cost alternative' has been undertaken using a combined quantitative and qualitative approach.

Assessment of the 'preferred option' has been carried quantitatively using traffic data for the scheme provided by SDG, the results of which are shown in the two tables below. The assessment has been carried out following WebTAG guidance identifying changes in concentrations of nitrogen dioxide (NO_2) and particulate matter (PM_{10}) at properties up to 200 metres from the road centreline. Roads to be assessed have been selected in accordance with the Design Manual for Roads and Bridges (DMRB) and that are common to both the 'do minimum' and 'do something' scenarios.

Assessment of the 'next best alternative' and 'lower cost alternative' has been carried out qualitatively as traffic data for these scenarios were unavailable at the time of reporting. It is intended that further more detailed assessment will be undertaken as part of the Environmental Impact Assessment, when more extensive traffic data should be made available.

1.2. Preferred Option - NGT 2016 – NO_2

NO_2, SUMMARY OF ROUTES: The aggregated table	0–50m (i)	50-100m (ii)	100-150m (iii)	150-200m (iv)	0-200m (v=i+ii+iii+iv)
Total properties across all routes (min)	15767	14364	12988	9952	53071
Total properties across all routes (some)	15767	14359	12992	9953	53071
Do-minimum NO_2 assessment across all routes	334376	270505	235641	1018911	Total assessment NO_2 (I): 1018911
Do-something NO_2 assessment across all routes	333077	270023	235557	178363	Total assessment NO_2 (II): 1017020
NET TOTAL ASSESSMENT FOR NO_2, all routes (II-I)					-1891
Number of properties with an improvement					27621
Number of properties with no change					1031
Number of properties with a deterioration					26404

Reference sources: Traffic data provided by SDG. Emissions calculated using DMRB model 1.03c

Quantitative measures: 27621 properties will experience improvement, 26404 will experience deterioration

Assessment Scores: 3 links predicted to have an improvement (>2 µg/m^3), 3 links predicted to have a deterioration (>2 µg/m^3)

Qualitative Comments: No exceedences of the air quality objectives predicted.

1.3. Preferred Option - NGT 2016 – PM10

PM10, SUMMARY OF ROUTES: The aggregated table	0–50m (i)	50-100m (ii)	100-150m (iii)	150-200m (iv)	0-200m (v=i+ii+iii+iv)
Total properties across all routes (min)	15767	14364	12988	9952	53071
Total properties across all routes (some)	15767	14359	12992	9953	53071
Do-minimum PM10 assessment across all routes	274139	241903	216616	165486	Total assessment PM_{10} (I): 898144
Do-something PM10 assessment across all routes	274125	241770	216663	165496	Total assessment PM_{10} (II): 898054
NET TOTAL ASSESSMENT FOR PM_{10}, all routes (II-I)					-91
Number of properties with an improvement					28076
Number of properties with no change					1031
Number of properties with a deterioration					25949

Reference sources: Traffic data provided by SDG. Emissions calculated using DMRB model 1.03c

Qualitative measures: 28076 properties will experience improvement, 25949 will experience deterioration

Assessment Scores: 1 link predicted to have an improvement (>1 µg/m^3), 2 links predicted to have a deterioration (>1 µg/m^3)

Qualitative comments: No exceedences of the air quality objectives predicted.

1.4. Next Best Alternative

A qualitative assessment of effects on local air quality has been carried out as traffic data are unavailable. Effects from the 'next best alternative' are expected to be broadly similar to those predicted for the 'preferred option'. However, modal shift encouraged by the 'next best alternative' may not be as large as the 'preferred option'.

It would be expected that the 'next best alternative' would create improvements in air quality similar to those in the 'preferred option'. However, when the hybrid bus is not powered by its batteries and utilising its diesel generator air quality has the potential to be worse compared to the 'preferred option'. When using the diesel generator emissions of nitrogen oxides (NO_x) and particulate matter (PM_{10}) would be released leading to a potential degradation of air quality along the proposed route.

1.5. Low Cost Alternative

A qualitative assessment of effects on local air quality has been carried out as traffic data are unavailable. Effects from the 'lower cost alternative' are expected to be broadly similar to those predicted for the 'preferred option'. However, modal shift encouraged by the 'lower cost alternative' is unlikely to be as large as the 'preferred option'.

It would be expected that the 'lower cost alternative' would create improvements in air quality similar to those in the 'preferred option' as a result of the modal shift. However, the 'lower cost alternative' is based on the use of diesel powered buses which will cause emissions of NO_x and PM_{10} for the whole length of the proposed route. Therefore, air quality has the potential to be worse in the 'lower cost alternative' compared to the 'preferred option' and 'next best alternative'.