

Air Quality Plan for the achievement of EU air quality limit values for nitrogen dioxide (NO₂) in Sheffield Urban Area (UK0007)

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1. Introduction

1.1. This document

This document is the Sheffield Urban Area (UK0007) air quality plan for the achievement of the EU air quality limit values for nitrogen dioxide (NO₂).

This plan presents the following information:

- General information regarding the Sheffield Urban Area agglomeration zone
- Details of NO₂ exceedance situation(s) within the Sheffield Urban Area agglomeration zone
- Details of local air quality measures that have been implemented, will be implemented or are being considered for implementation in this agglomeration zone.

This air quality plan for Sheffield Urban Area should be read in conjunction with the separate UK overview document and the list of UK and national measures that are available on the Defra website (<http://www.defra.gov.uk/environment/quality/air/air-quality/eu/>). The UK overview document sets out, amongst other things, the authorities responsible for delivering air quality improvements and the national measures that are applied in some or all UK zones. The measures presented in this plan and the accompanying UK overview and list of UK measures show how the UK will ensure that compliance with the NO₂ limit values is achieved as soon as possible.

This plan should also be read in conjunction with the supporting UK technical report (<http://www.defra.gov.uk/environment/quality/air/air-quality/eu/>), which presents information on assessment methods, input data and emissions inventories used in the analysis presented in this plan.

1.2. Context

Two NO₂ limit values for the protection of human health have been set in the Air Quality Directive (2008/50/EC). These are:

- The annual limit value: an annual mean concentration of no more than 40 µgm⁻³
- The hourly limit value: no more than 18 hourly exceedances of 200 µgm⁻³ in a calendar year

The Air Quality Directive stipulates that compliance with the NO₂ limit values will be achieved by 01/01/2010. However, where the limit values cannot be achieved by then, the Directive also allows Member States to postpone this attainment date until 01/01/2015 provided air quality plans are established demonstrating how the limit values will be met by this extended deadline.

1.3. Zone status

The assessment undertaken for the Sheffield Urban Area agglomeration zone indicates that the annual limit value is likely to be exceeded in 2010 but achieved by 2015 through introduction of the measures included in the baseline, a low emission zone (LEZ) scenario (if applied) and the non-quantifiable local measures outlined in this plan. Postponement of the compliance date to 2015 is sought for this limit value in this zone.

The assessment undertaken for the Sheffield Urban Area agglomeration zone indicates that the hourly limit value not exceeded in this agglomeration zone in 2008.

1.4. Plan structure

General administrative information regarding this agglomeration zone is presented in section 2.

Section 3 then presents the overall picture with respect to NO₂ levels in this agglomeration zone for the 2008 reference year of this air quality plan. This includes the declaration of exceedance situations

within the agglomeration zone and presentation of a detailed source apportionment for each exceedance situation.

An overview of the measures already taken and to be taken within the agglomeration zone both before and after 2010 is given in section 4.

Baseline modelled projections for 2010, 2015 and 2020 for each exceedance situation are presented in section 5. The baseline projections presented here include, where possible, the impact of measures that have already been taken and measures for which the relevant authority has made a firm commitment to take the measure(s). However, it has not been possible to quantify the impact of all measures. This section therefore also explains which measures have been quantified, and hence included in the model projections, and which measures have not been quantified.

Details of an LEZ scenario under consideration as part of our investigation of additional measures to achieve the NO₂ limit values is presented in section 6.

2. General Information about the Zone

2.1. Administrative information

Zone name: Sheffield Urban Area

Zone code: UK0007

Type of zone: agglomeration zone

Reference year: 2008

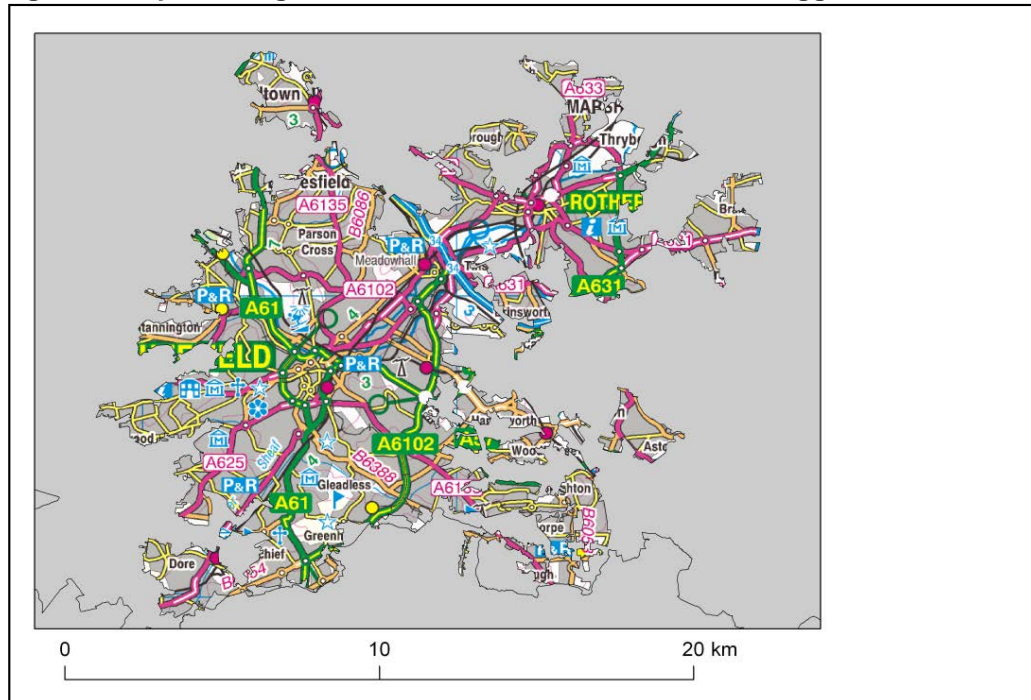
Extent of zone: Figure 1 shows the area covered by the Sheffield Urban Area agglomeration zone

Local Authorities within the agglomeration zone: Figure 2 shows the location of Local Authorities within the agglomeration zone. A list of these Local Authorities is also given below. The numbers in this list correspond to the numbers in Figure 2.

1. North East Derbyshire District Council
2. Rotherham Metropolitan Borough Council
3. Sheffield City Council

(Note: Local Authority boundaries do not necessarily coincide with zone boundaries. Hence Local Authorities may be listed within more than one zone plan.)

Figure 1. Map showing the extent of the Sheffield Urban Area agglomeration zone (UK0007).



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Figure 2. Map showing Local Authorities within the Sheffield Urban Area agglomeration zone (UK0007).



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2.2. Assessment details

Measurements

NO₂ measurements in this zone were available in 2008 from the following national network monitoring stations (NO₂ data capture for each station in 2008 shown in brackets):

- Sheffield Centre GB0615A (97.6%)
- Sheffield Tinsley GB0538A (34.4%)

Full details of monitoring stations within the Sheffield Urban Area agglomeration zone are available from <http://uk-air.defra.gov.uk/networks/network-info?view=aurn>.

Modelling

Modelling for the 2008 reference year has been carried out for the whole of the UK (see the UK technical report). This modelling covers the following extent within this zone:

- Total background area within zone (approx): 165 km²
- Total population within zone (approx): 521984 people
- Total road length where an assessment of NO₂ concentrations have been made: 160.3 km in 2008 (and similar lengths in previous years).

Zone maps

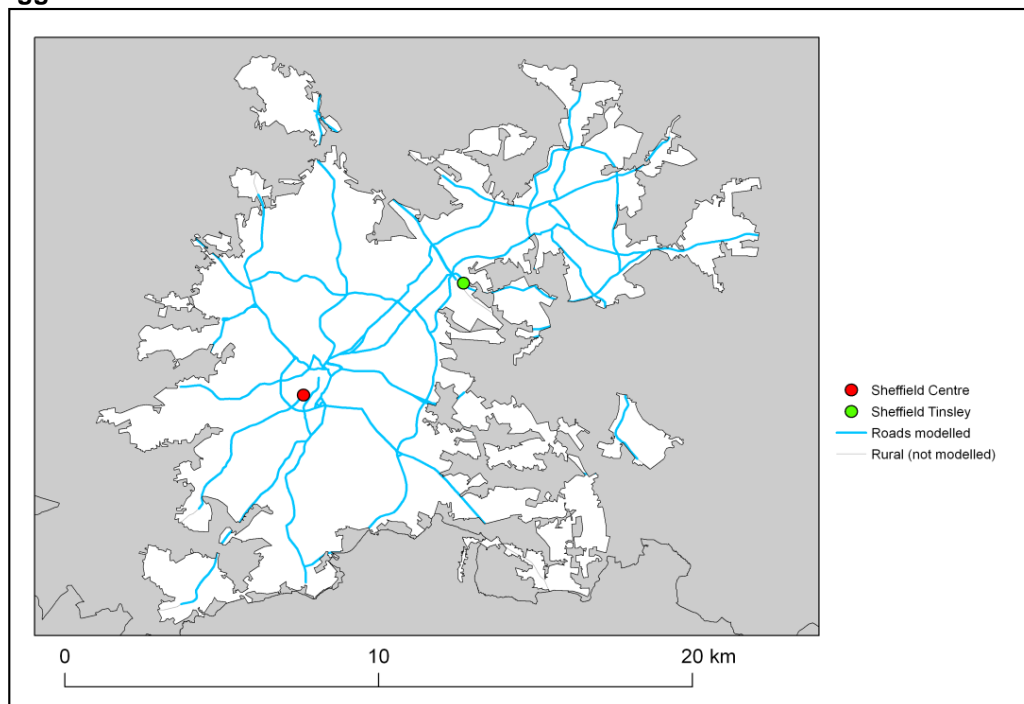
Figure 3 presents the location of the NO₂ monitoring stations within this zone for 2008 and the roads for which NO₂ concentrations have been modelled. NO₂ concentrations at background locations have been modelled across the entire zone at a 1 x 1 km² resolution.

2.3. Reporting Under European Directives

Since 2001 the UK has reported annually on air quality concentrations using a standard excel questionnaire (Decision 2004/461/EC). These questionnaires are available online from <http://cdr.eionet.europa.eu/gb/eu/annualair>

In addition, the UK has reported on air quality plans and programmes (Decision 2004/224/EC) on an annual basis depending on the reported concentrations in the previous year. Plans and programmes were first reported in this zone in 2003. Plans and programmes for 2003 and all other years for which they have been required are available from <http://cdr.eionet.europa.eu/gb/eu/aqpp>.

Figure 3. Map showing the location of the NO₂ monitoring sites with valid data in 2008 and roads where concentrations have been modelled within the Sheffield Urban Area (UK0007) agglomeration zone.



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3. Overall Picture for 2008 reference year

3.1. Introduction

There are two limit values for the protection of health for NO₂. These are:

- The annual limit value (annual mean concentration of no more than 40 µgm⁻³)
- The hourly limit value (no more than 18 hourly exceedances of 200 µgm⁻³ in a calendar year)

Within the Sheffield Urban Area agglomeration zone only the annual limit value was exceeded in 2008. Hence, one exceedance situation for this zone has been defined, NO₂_UK0007_Annual_1, which covers the exceedance of the annual limit value. This exceedance situation is described below.

For both NO₂ limit values, a margin of tolerance for 2008 and other years has been defined in the Air Quality Directive (2008/50/EC). Data comparing assessed concentrations at locations within this agglomeration zone with the 2008 margin of tolerance are presented in the annual reporting questionnaire for 2008 (<http://cdr.eionet.europa.eu/gb/eu/annualair>).

3.2. Reference year: NO₂_UK0007_Annual_1

The NO₂_UK0007_Annual_1 exceedance situation covers all exceedances of the annual mean limit value in the Sheffield Urban Area agglomeration zone in 2008.

Compliance with the annual limit value in this exceedance situation has been assessed using a combination of air quality measurements and modelling. Table 1 presents measured annual mean concentrations at national network stations in this exceedance situation since the 1st Daughter Directive (1999/30/EC) came into force in 2001. This shows that there were no measured exceedances of the annual limit value in this zone in 2008. Table 2 summarises modelled annual mean NO₂ results in this exceedance situation for the same time period. This table shows that, in 2008, 58.2 km of road length was modelled to exceed the annual limit value. There were no modelled background exceedances of this limit value. Table 2 also shows that the maximum modelled annual mean NO₂ concentration in 2008 was 72.9 µgm⁻³. Maps showing the modelled annual mean NO₂ concentrations for 2008 at background and at roadside locations are presented in Figures 4 and 5 respectively. All modelled exceedances of the annual limit value are coloured orange or red in these maps.

The maximum measured concentration in the zone varies due to changes emissions and varying meteorology in different years. However, the models are also updated each year to take into account the most up-to-date science, so the modelled results for different years may not be directly comparable.

The modelling carried out for this exceedance situation has also been used to determine the annual mean NO_x source apportionment for all modelled locations, along with an indicative annual mean NO₂ source apportionment. Table 3 presents summary source apportionment information in this exceedance situation for 2008, including:

- The modelled NO_x and indicative NO₂ source apportionment for the section of road with the highest modelled NO₂ concentration in this exceedance situation in 2008. This is important information because it shows which sources need to be tackled at the point with the largest compliance gap in the exceedance situation. It is not possible to calculate an unambiguous source apportionment for annual mean NO₂ concentrations for the reasons discussed in the UK Technical Report. We have, however, developed a method to provide an indicative source apportionment for annual mean NO₂ concentrations for these air quality plans. This method involves calculating the maximum and minimum possible contribution from each source to the NO₂ concentration. The final source apportionment has been calculated as the average of the minimum and maximum contributions for each source, with the results normalised so that the contributions sum to the total modelled NO₂ concentration. Further information on the methods used for source apportionment are provided in the UK Technical Report.

- The maximum NO_x contribution from each source from across all the roads included in this exceedance situation in 2008. This is important information because it highlights all the key sources that need to be tackled within the exceedance situation in order to achieve compliance across the entire area of the exceedance situation.

Figure A1.1 in Annex 1 presents the annual mean NO_x source apportionment for each section of road within the NO_2 _UK0007_Annual_1 exceedance situation (i.e. the source apportionment for all exceeding roads only) in 2008. Roads have been grouped into motorways, trunk roads and primary road in this figure.

Table 1. Measured annual mean concentrations at national network stations in NO₂_UK0007_Annual_1 for 2001 onwards, µgm⁻³. (Data capture shown in brackets) (a)

Site name (EOI code)	2001	2002	2003	2004	2005	2006	2007	2008	2009
Rotherham Centre (GB0677A)	34 (95%)	34 (95%)	35 (97%)	35 (97%)	34 (93%)	37 (78%)	32 (67%)		
Sheffield Centre (GB0615A)	37 (97%)	34 (98%)	39 (95%)	31 (97%)	35 (66%)	36 (53%)	34 (95%)	30 (98%)	37 (94%)
Sheffield Tinsley (GB0538A)	45 (99%)	41 (97%)	46 (97%)	40 (96%)	32 (97%)	40 (99%)	35 (69%)	38 (34%)	34 (85%)

(a) Annual Mean Limit Value = 40 µgm⁻³

Table 2. Annual mean NO₂ model results in NO₂_UK0007_Annual_1 for 2001 onwards

	2001	2002	2003	2004	2005	2006	2007	2008	2009
Road length exceeding (km)	128.3	76.4	141.0	112.7	111.3	104.4	105.1	58.2	65.0
Background area exceeding (km ²)	38	0	9	2	3	0	0	0	1
Maximum modelled concentration (µgm ⁻³) (a)	65.6	64.4	76.4	68.6	72.8	67.9	72.0	72.9	67.9

(a) Annual Mean Limit Value = 40 µgm⁻³

Table 3. Source apportionment summary information for 2008 in NO₂_UK0007_Annual_1 (µgm⁻³).

Spatial scale	Component	Highest road link (a)		Maximum (b)
		NOx	NO2 (d)	NOx
Regional background sources (i.e. contributions from distant sources of > 30 km from the receptor)	Total	8.0	(c)	
	From within the UK	5.1	(c)	5.1
	From transboundary sources (includes shipping and other EU Member States)	2.9	(c)	2.9
Urban background sources (i.e. sources located within 0.3 - 30 km from the receptor)	Total	52.2	23.4	-
	From road traffic sources	19.9	15.2	27.2
	From industry (including heat and power generation)	9.7	(c)	30.6
	From agriculture	0.0	(c)	0.0
	From commercial/residential sources	15.7	(c)	17.1
	From shipping	0.0	(c)	0.0
	From off road mobile machinery	6.1	(c)	14.6
	From natural sources	0.0	(c)	0.0
	From transboundary sources	0.0	(c)	0.0
	From other urban background sources	0.8	(c)	3.6
Local sources (i.e. contributions from sources < 0.3 km from the receptor)	Total	130.5	49.4	-
	From cars	13.3	5.4	42.5
	From HGV rigid	6.8	2.8	26.5
	From HGV articulated	1.0	0.4	46.2
	From Buses	105.5	38.9	110.9
	From LGVs	3.9	1.9	13.2
	From motorcycles	0.0	0	0.2
Total (i.e. regional background + urban background + local components)		190.7	72.9	-

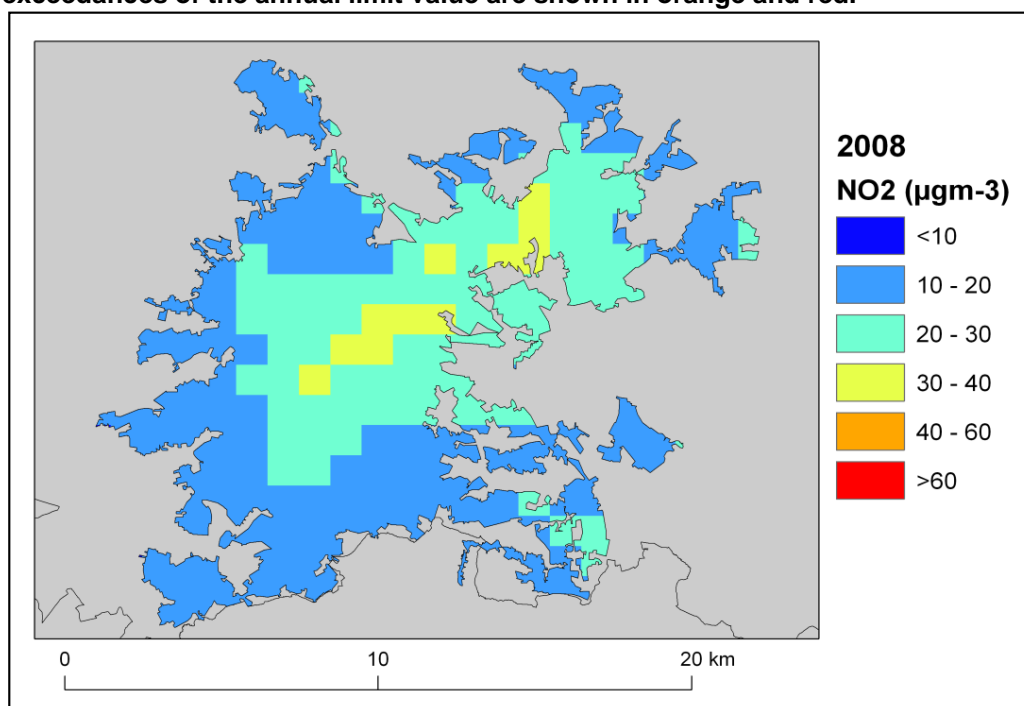
(a) The road with the highest modelled annual mean NO₂ concentration in this exceedance situation in 2008 is a section of the A621, traffic count point id 18447 (OS grid (m): 435610, 387250).

(b) This column gives the maximum contribution for each component from all the roads included in the exceedance situation.

(c) The combined modelled annual mean NO₂ concentration contribution for these components is 8.2 µgm⁻³. A more detailed NO₂ source apportionment is currently unavailable for these sectors.

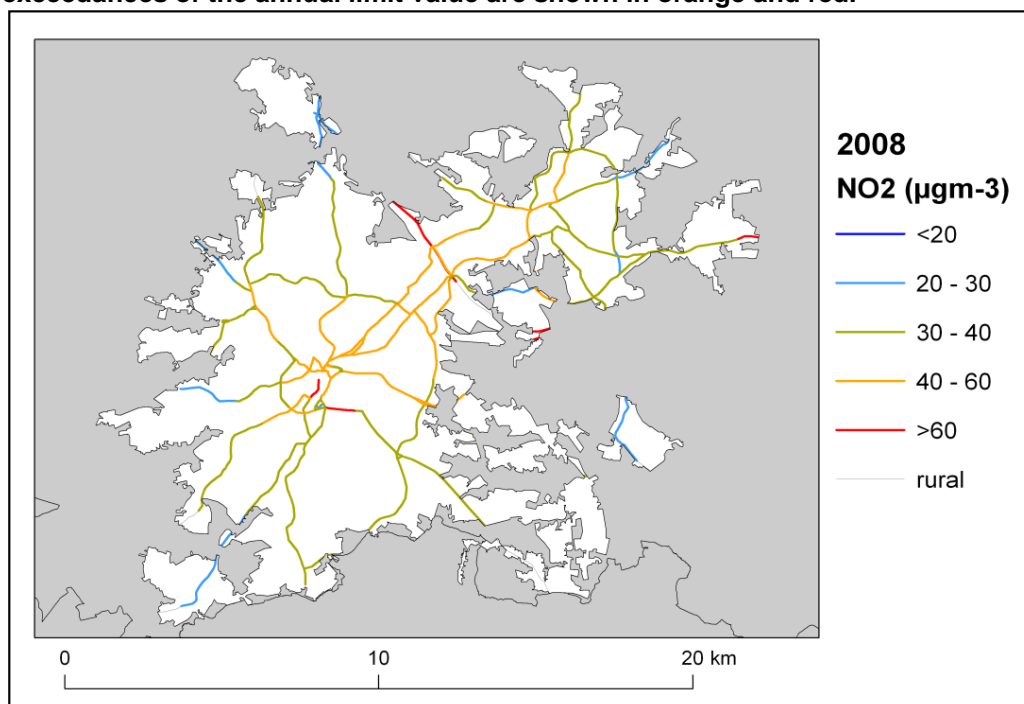
(d) Source apportionment for NO₂ is indicative, see UK Technical Report.

Figure 4. Map of modelled background annual mean NO₂ concentrations 2008. Modelled exceedances of the annual limit value are shown in orange and red.



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Figure 5. Map of modelled roadside annual mean NO₂ concentrations 2008. Modelled exceedances of the annual limit value are shown in orange and red.



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4. Measures

4.1. Introduction

This section (section 4) gives details of measures that address exceedances of the NO₂ limit values within Sheffield Urban Area agglomeration zone. This includes both measures that have already been taken and measures for which there is a firm commitment that they will be taken.

Section 5 then explains the extent to which it has been possible to incorporate the impacts of these measures into the baseline modelling carried out for this assessment.

4.2. Source apportionment

It is important to understand which sources are responsible for causing the exceedance in order to most effectively tailor measures to address the NO₂ exceedance situation(s) described in section 3 above. This can be achieved by considering the source apportionment for the exceedance situation, also presented in section 3. A summary of what the source apportionment shows and the implications for which measures would therefore be appropriate is given here.

Local road traffic was the dominant source in this exceedance location in the reference year. The largest contribution was from buses at the location of maximum exceedance with a contribution of 105.5 $\mu\text{g m}^{-3}$ of NO_x out of a total of 190.7 $\mu\text{g m}^{-3}$ of NO_x. All vehicle types were important sources on the motorway roads with the highest concentrations in this exceedance situation. All vehicle types were important sources on the trunk roads with the highest concentrations. Buses, cars and rigid HGVs were important sources on the primary roads with the highest concentrations.

This indicates that appropriate measures should impact on local road traffic sources in this zone. Other measures may also be beneficial depending on the source apportionment for the urban background.

4.3. Measures

Measures potentially affecting NO₂ in this agglomeration zone have been taken and/or are planned at a range of administrative levels. These are:

- European Union
- National (i.e. England, Scotland, Wales, Northern Ireland or whole UK)
- Local (i.e. UK Local Authorities)

Details of European Union measures (e.g. euro standards, fuel quality directives, integrated pollution prevention and control) can be found on the European Commission's website (http://ec.europa.eu/environment/air/index_en.htm). Details of national measures are given in the UK overview document and list of UK and National measures.

Relevant Local Authority measures within this exceedance situation are listed in Table A2.1 (see Annex 2). Relevant Local Authority measures are considered to be those measures which directly target, or are in close geographical proximity to roads and/or background grid squares in exceedance of one or other of the NO₂ limit values. Other Local Authority measures may also have been taken in this zone, but they are not listed in this table. All the measures listed in Table A2.1 have been carried out, are in the process of being carried out or a firm commitment had been made to carry them out on the timetables listed at the point at which information on local measures was collected.

4.4. Measures timescales

Timescales for national measures are given in the UK overview document and list of UK and National measures.

Information on local measures was collected in autumn 2009. Hence, any Local Authority action plans and measures adopted by Local Authorities after this time have not been included in this air quality

plan. Many of the measures listed in Annex 2 will either have happened before autumn 2009 or have been planned for implementation before or during 2010. Others will be planned for after 2010. It should be noted that many of the measures taken before or during 2010 will continue to have a beneficial impact on air quality after the end of 2010.

Local Authorities report on progress with the implementation of their action plans annually and review action plan measures regularly. Where future Local Authority measures to improve air quality are under consideration these would be included in future local authority action plans and published by the local authority.

5. Baseline Model Projections

5.1. Overview of model projections

Baseline projections for 2010

Model projections for 2010, starting from the 2008 reference year described in section 3, have been calculated in order to determine whether compliance with the NO₂ limit values is likely to be achieved for each exceedance situation by the original deadline for compliance of 01/01/2010. Details of the methods used for the baseline emissions and concentration projections modelling are provided in the UK technical report.

For national measures, it has not been possible to quantify the impact of all measures on emissions and ambient concentrations. The impact for all quantifiable measures has been included in the baseline projections.

The impacts of the individual Local Authority measures have not been explicitly included in the baseline model projections. However, measures may have been included implicitly if they have influenced the traffic counts for 2007 (used as a basis for the compilation of the emission inventory) or in the traffic activity projections to 2010 and beyond (used to calculate the emission projections). It should be recognised that these measures will have a beneficial impact on air quality, even if it has not been possible to quantify this impact here.

A number of the local measures in Table A2.1 can be considered to be 'smarter choices' measures (see <http://www.dft.gov.uk/pgr/sustainable/smarterchoices/ctwwt/> for a detailed description of this type of measure). We have quantified the impact of this group of measures on a national scale within the projections. Details of how this has been done can be found in the UK technical report. Table A2.1 indicates which local measures we have considered to be 'smarter choices'.

Baseline projections for 2015

Model projections for 2015, starting from the 2008 reference year described above, have been calculated in order to determine whether compliance with the NO₂ limit values is likely to be achieved for each exceedance situation by the revised deadline for compliance of 01/01/2015 on the basis of EU-wide measures and the measures currently planned. This modelling is described in detail in the UK technical report. Many of the measures listed in annex 2 of this document and the supporting list of UK and national measures will continue or will continue to have an impact beyond the original deadline for compliance of 01/01/2010.

5.2. Baseline projections: NO₂_UK0007_Annual_1

Table 4 presents summary results for the baseline model projections for 2010, 2015 and 2020 for the NO₂_UK0007_Annual_1 exceedance situation. This shows that the maximum modelled annual mean NO₂ concentration predicted for 2010 in this exceedance situation is 64.6 µg m⁻³. By 2015, the maximum modelled annual mean NO₂ concentration is predicted to drop to 45.4 µg m⁻³. Hence, the model results suggest that compliance with the NO₂ annual limit value is unlikely to be achieved by 2015 under baseline conditions in this exceedance situation.

The projected modelled NO_x and indicative NO₂ annual mean source apportionments for 2010, 2015 and 2020 at the location with the biggest compliance gap in 2008 are presented in Table 5. The model results suggest that this location will continue to have the highest annual mean NO₂ concentration within this exceedance situation in 2010, 2015 and 2020. This source apportionment information is useful because it shows which sources need to be tackled at the point with the largest compliance gap in the exceedance situation.

Table 6 shows the maximum NO_x contribution from each source apportionment component from any road across the whole exceedance situation. This source apportionment information is useful because it highlights all the key sources that need to be tackled within the exceedance situation in order to achieve compliance across the entire area of the exceedance situation. It should be noted that this table only includes roads which continue to be in exceedance in the relevant year. Hence, for

example, the road with the largest contribution from cars in 2010 may no longer be included in the table in 2015 if the road is predicted to be compliant in 2015.

Figures 6 and 7 show maps of projected annual mean NO₂ concentrations in 2010, 2015 and 2020 at background and roadside locations respectively. Maps for 2008 are also presented here for reference.

It should be noted that the baseline projections presented here include the impacts of measures, where they can be quantified, that have already been or will be implemented.

Table 4. Annual mean NO₂ model results in NO₂_UK0007_Annual_1

	2008	2010	2015	2020
Road length exceeding (km)	58.2	38.9	1.7	0.0
Background area exceeding (km ²)	0	0	0	0
Maximum modelled concentration (µgm ⁻³) (a)	72.9	64.6	45.4	30.9

(a) Annual Mean Limit Value = 40 µgm⁻³

Table 5. Modelled source apportionment for 2010, 2015 and 2020 under baseline conditions for traffic count point 18447 on the A621 (the road section with the maximum modelled annual mean NO₂ concentration in 2008 in NO₂_UK0007_Annual_1. OS grid (m): 435610, 387250). 2008 results are also presented here for reference (units: µgm⁻³).

Spatial scale	Component	NOx				NO2 (indicative)			
		2008	2010	2015	2020	2008	2010	2015	2020
Regional background sources (i.e. contributions from distant sources of > 30 km from the receptor)	Total	8.0	6.9	5.9	4.8	(a)	(b)	(c)	(d)
	From within the UK	5.1	4.4	3.8	3.0	(a)	(b)	(c)	(d)
	From transboundary sources (includes shipping and other EU Member States)	2.9	2.5	2.2	1.7	(a)	(b)	(c)	(d)
Urban background sources (i.e. sources located within 0.3 - 30 km from the receptor)	Total	52.2	45.2	36.9	32.8	23.4	20.7	17.7	16.5
	From road traffic sources	19.9	14.3	9.4	7.1	15.2	14.6	13.5	13.2
	From industry (including heat and power generation)	9.7	8.6	8.3	8.0	(a)	(b)	(c)	(d)
	From agriculture	0.0	0.0	0.0	0.0	(a)	(b)	(c)	(d)
	From commercial/residential sources	15.7	15.8	15.5	15.0	(a)	(b)	(c)	(d)
	From shipping	0.0	0.0	0.0	0.0	(a)	(b)	(c)	(d)
	From off road mobile machinery	6.1	5.8	3.0	2.2	(a)	(b)	(c)	(d)
	From natural sources	0.0	0.0	0.0	0.0	(a)	(b)	(c)	(d)
	From transboundary sources	0.0	0.0	0.0	0.0	(a)	(b)	(c)	(d)
	From other urban background sources	0.8	0.7	0.7	0.6	(a)	(b)	(c)	(d)
Local sources (i.e. contributions from sources < 0.3 km from the receptor)	Total	130.5	113.8	67.6	32.2	49.4	43.9	27.7	14.3
	From cars	13.3	8.9	6.2	4.1	5.4	3.8	2.8	1.9
	From HGV rigid	6.8	6.0	3.1	1.1	2.8	2.5	1.3	0.5
	From HGV articulated	1.0	0.9	0.4	0.1	0.4	0.4	0.2	0.1
	From Buses	105.5	94.5	55.7	25.7	38.9	35.5	22.4	11.2
	From LGVs	3.9	3.4	2.1	1.2	1.9	1.7	1.1	0.6
	From motorcycles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total (i.e. regional background + urban background + local components)		190.7	165.8	110.4	69.8	72.9	64.6	45.4	30.9

(a) The total annual mean NO₂ contribution for all components labelled (a) in 2008 was modelled to be 8.2 µgm⁻³.

(b) The total annual mean NO₂ contribution for all components labelled (b) in 2010 is predicted to be 6.1 µgm⁻³.

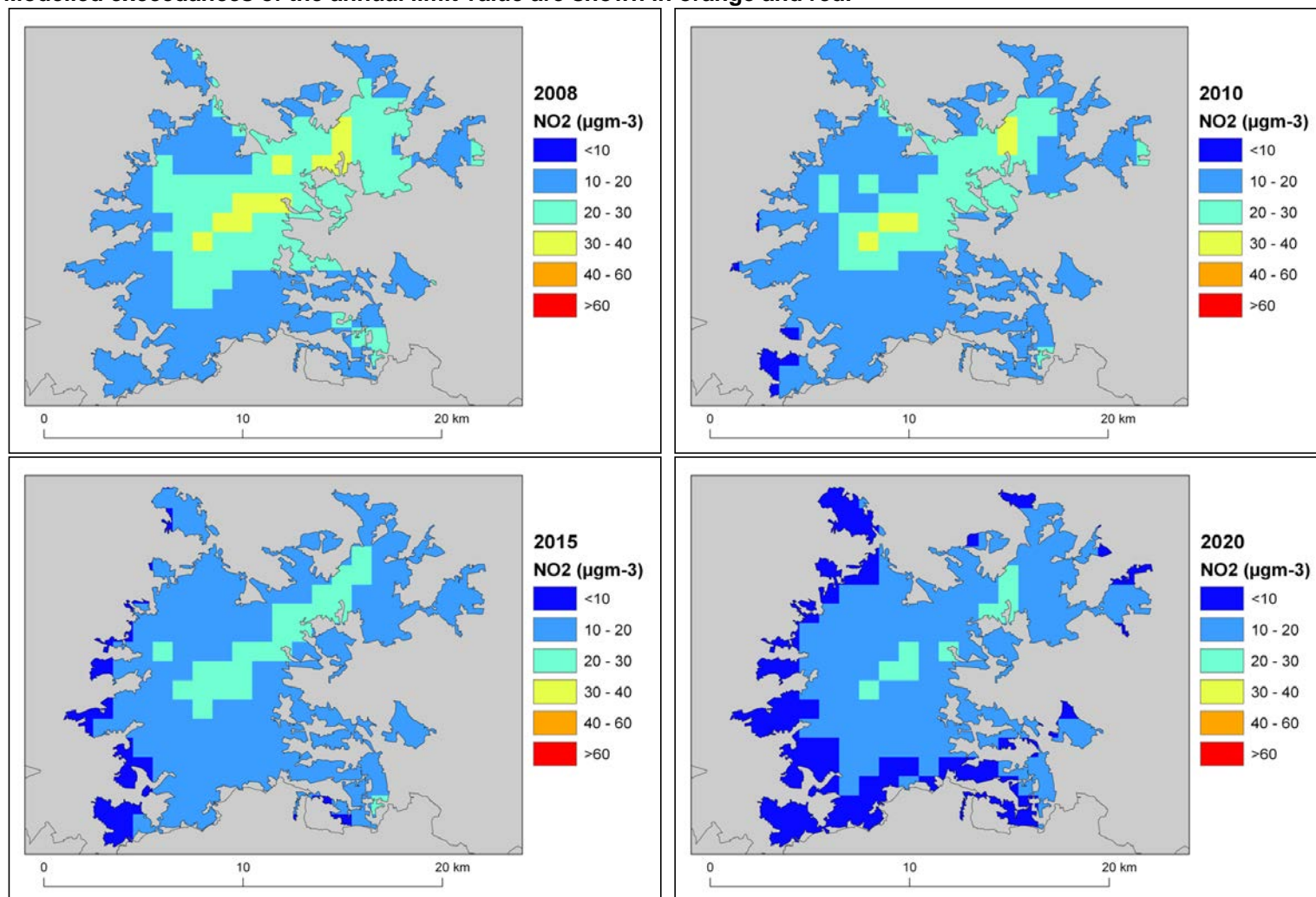
(c) The total annual mean NO₂ contribution for all components labelled (c) in 2015 is predicted to be 4.2 µgm⁻³.

(d) The total annual mean NO₂ contribution for all components labelled (d) in 2020 is predicted to be 3.3 µgm⁻³.

Table 6. The maximum NO_x contribution from each source from across all the roads included in the exceedance situation on which exceedances remain in 2010, 2015 and 2020 under baseline conditions. Zeros indicate that there are no exceedances in the relevant year.

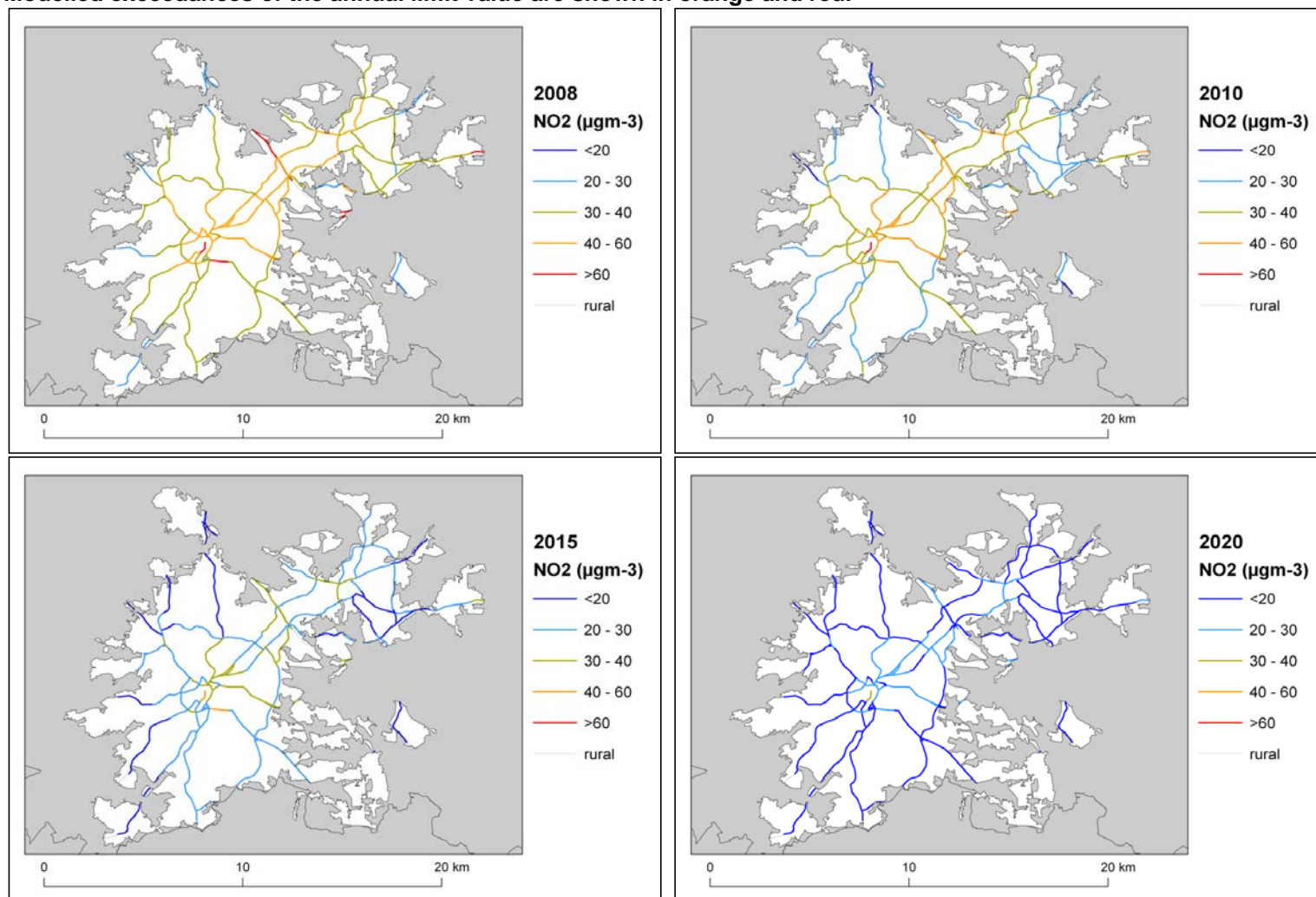
Spatial scale	Component	NO _x			
		2008	2010	2015	2020
Regional background sources (i.e. contributions from distant sources of > 30 km from the receptor)	From within the UK	5.1	4.4	3.8	0.0
	From transboundary sources (includes shipping and other EU Member States)	2.9	2.5	2.2	0.0
Urban background sources (i.e. sources located within 0.3 - 30 km from the receptor)	From road traffic sources	27.2	21.4	9.4	0.0
	From industry (including heat and power generation)	30.6	27.4	8.3	0.0
	From agriculture	0.0	0.0	0.0	0.0
	From commercial/residential sources	17.1	17.2	15.5	0.0
	From shipping	0.0	0.0	0.0	0.0
	From off road mobile machinery	14.6	13.7	3.0	0.0
	From natural sources	0.0	0.0	0.0	0.0
	From transboundary sources	0.0	0.0	0.0	0.0
	From other urban background sources	3.6	2.9	0.7	0.0
Local sources (i.e. contributions from sources < 0.3 km from the receptor)	From cars	42.5	28.5	9.8	0.0
	From HGV rigid	26.5	23.6	8.6	0.0
	From HGV articulated	46.2	40.2	1.2	0.0
	From Buses	110.9	99.3	55.7	0.0
	From LGVs	13.2	11.4	3.4	0.0
	From motorcycles	0.2	0.2	0.1	0.0

Figure 6. Background baseline projections of annual mean NO₂ concentrations in 2010, 2015 and 2020. 2008 is also included here for reference. Modelled exceedances of the annual limit value are shown in orange and red.



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Figure 7. Roadside baseline projections of annual mean NO₂ concentrations in 2010, 2015 and 2020. 2008 is also included here for reference. Modelled exceedances of the annual limit value are shown in orange and red.



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6. Projections including the impact of the low emissions zone (LEZ) scenario

6.1. Overview of model projections

Further model projections for 2015 and 2020 have also been calculated that include the impact of the LEZ scenario. This scenario is under consideration as part of our investigation of additional measures to achieve the NO₂ limit values. The scenario modelled here would require all HGVs and buses to meet at least Euro IV emission standards for NO_x and PM₁₀ in 2015 in order to travel on roads other than the strategic long distance road network within the selected Local Authority boundaries. More details of the work underway to explore the feasibility and costs of a national LEZ framework are provided in the UK overview document and a description of the modelling assumptions included in the LEZ scenario is available in the UK technical report.

The LEZ scenario has been modelled for this zone because initial screening work indicated that, should it be applied, it would be effective at either reducing the gap to or achieving compliance with the limit value. The model results for these projections are presented in this section.

Further work is underway to investigate the feasibility and practicality of a national framework for LEZ as an additional measure to reduce concentrations of NO₂. These investigations include:

- the likely effectiveness of any scheme at controlling air pollutant emissions and delivering increased compliance with European air quality standards within the timescales specified by the EU Ambient Air Quality Directive;
- the effectiveness and reliability of available NO_x abatement equipment, taking into account evidence on the performance of Euro standards;
- the cost and resource such a measure might place upon national and/or local government;
- administrative and enforcement considerations for the scheme and the implications of this for Government Executive Agencies;
- the likely take-up of the scheme by local authorities and others;
- how any scheme would relate to ongoing certification work at EU and UNECE level.

These investigations will continue over the coming months and decisions will be made following the investigation as to whether or not it is feasible to introduce a national LEZ Framework and the details of any scheme. Should a local authority decide to introduce an LEZ, final decisions on the nature and extent of such a measure would be for the local authority to make taking into account local circumstances and any national arrangements put in place. These might not reflect what has been modelled in the scenario.

The LEZ scenario examines the impact of a LEZ applied within the selected local authorities listed in the supporting technical report. The local authorities relevant to this zone are

- Rotherham Metropolitan Borough Council
- Sheffield City Council

The impact of the LEZ scenario on projected NO₂ concentrations in 2015 will be greatest in these local authorities. There are also expected to be smaller benefits in other areas as a result of the changes to the national HGV fleets required to ensure LEZ compliance within the LEZ locations. The impact of these fleet changes on projected NO₂ concentrations in 2015 have been assessed in all zones for which the baseline projections do not show compliance with the annual mean limit value in 2015.

6.2. LEZ scenario projections: NO₂_UK0007_Annual_1

Table 7 presents summary results for the LEZ scenario model projections for 2015 and 2020 for the NO₂_UK0007_Annual_1 exceedance situation. This shows that the maximum modelled annual mean NO₂ concentration predicted for 2015 for the LEZ scenario in this exceedance situation is 37.9 µgm⁻³. Hence, the model results suggest that compliance with the NO₂ annual limit value is likely to be achieved by 2015 for the LEZ scenario in this exceedance situation. Postponement of the compliance date to 2015 is sought for this limit value in this zone. The maximum modelled annual mean NO₂ concentration in 2020 is predicted to be 28.6 µgm⁻³.

The projected modelled NO_x and indicative NO₂ annual mean source apportionments for 2010, 2015 and 2020 at the location with the biggest compliance gap in 2008 are presented in Table 8. In 2010 and 2020, the model results suggest that this location will continue to have the highest annual mean NO₂ concentration within this exceedance situation. However, in 2015 the model indicates that the location with the highest annual mean NO₂ concentration within this exceedance situation will be elsewhere. Information regarding the new location with the highest NO₂ concentration, including the source apportionment is given in Table 9. The locations of maximum concentration in each year are given in the footnote to this table. This source apportionment information is useful because it shows which sources need to be tackled at the point with the largest compliance gap in the exceedance situation.

Table 10 shows the maximum NO_x contribution from each source apportionment component from any road across the whole exceedance situation. This source apportionment information is useful because it highlights all the key sources that need to be tackled within the exceedance situation in order to achieve compliance across the entire area of the exceedance situation. It should be noted that this table only includes roads that continue to be in exceedance in the relevant year. Hence, for example, the road with the largest contribution from cars in 2010 may no longer be included in the table in 2015 if the road is predicted to be compliant in 2015.

Figures 8 and 9 show maps of projected annual mean NO₂ concentrations for the LEZ scenario in 2015 and 2020 at background and roadside locations respectively. Maps for 2008 and baseline projections for 2010 are also presented here for reference.

Table 7. Annual mean NO₂ model results in NO₂_UK0007_Annual_1. 2015 and 2020 results are for the LEZ scenario. Results for 2008 and baseline projections for 2010 are also shown

	2008	2010	2015	2020
Road length exceeding (km)	58.2	38.9	0.0	0.0
Background area exceeding (km ²)	0	0	0	0
Maximum modelled concentration (µgm ⁻³) (a)	72.9	64.6	37.9	28.6

(a) Annual Mean Limit Value = 40 µgm⁻³

Table 8. Modelled source apportionment for 2015 and 2020 for the LEZ scenario for traffic count point 18447 on the A621 (the road section with the maximum modelled annual mean NO₂ concentration in 2008 in NO₂_UK0007_Annual_1 OS grid (m): 435610, 387250). 2008 and 2010 baseline projections results are also presented here for reference (units: µgm⁻³).

Spatial scale	Component	NOx				NO2 (indicative)			
		2008	2010	2015	2020	2008	2010	2015	2020
Regional background sources (i.e. contributions from distant sources of > 30 km from the receptor)	Total	8.0	6.9	5.9	4.8	(a)	(b)	(c)	(d)
	From within the UK	5.1	4.4	3.8	3.0	(a)	(b)	(c)	(d)
	From transboundary sources (includes shipping and other EU Member States)	2.9	2.5	2.2	1.7	(a)	(b)	(c)	(d)
Urban background sources (i.e. sources located within 0.3 - 30 km from the receptor)	Total	52.2	45.2	35.6	32.5	23.4	20.7	17.7	16.7
	From road traffic sources	19.9	14.3	8.1	6.8	15.2	14.6	14.0	13.5
	From industry (including heat and power generation)	9.7	8.6	8.3	8.0	(a)	(b)	(c)	(d)
	From agriculture	0.0	0.0	0.0	0.0	(a)	(b)	(c)	(d)
	From commercial/residential sources	15.7	15.8	15.5	15.0	(a)	(b)	(c)	(d)
	From shipping	0.0	0.0	0.0	0.0	(a)	(b)	(c)	(d)
	From off road mobile machinery	6.1	5.8	3.0	2.2	(a)	(b)	(c)	(d)
	From natural sources	0.0	0.0	0.0	0.0	(a)	(b)	(c)	(d)
	From transboundary sources	0.0	0.0	0.0	0.0	(a)	(b)	(c)	(d)
	From other urban background sources	0.8	0.7	0.7	0.6	(a)	(b)	(c)	(d)
Local sources (i.e. contributions from sources < 0.3 km from the receptor)	Total	130.5	113.8	43.9	26.3	49.4	43.9	19.0	11.9
	From cars	13.3	8.9	6.2	4.1	5.4	3.8	2.8	1.9
	From HGV rigid	6.8	6.0	2.4	1.1	2.8	2.5	1.0	0.5
	From HGV articulated	1.0	0.9	0.4	0.1	0.4	0.4	0.2	0.1
	From Buses	105.5	94.5	32.9	19.8	38.9	35.5	13.9	8.8
	From LGVs	3.9	3.4	2.1	1.2	1.9	1.7	1.1	0.6
	From motorcycles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total (i.e. regional background + urban background + local components)		190.7	165.8	85.4	63.6	72.9	64.6	36.6	28.6

(a) The total annual mean NO₂ contribution for all components labelled (a) in 2008 was modelled to be 8.2 µgm⁻³.

(b) The total annual mean NO₂ contribution for all components labelled (b) in 2010 is predicted to be 6.1 µgm⁻³.

(c) The total annual mean NO₂ contribution for all components labelled (c) in 2015 is predicted to be 3.7 µgm⁻³.

(d) The total annual mean NO₂ contribution for all components labelled (d) in 2020 is predicted to be 3.2 µgm⁻³.

Table 9. Modelled source apportionment for 2015 and 2020 for the LEZ scenario for traffic count point with the highest concentration in these years in NO₂_UK0007_Annual_1. (a) 2008 and 2010 baseline projections results are also presented here for reference (units: µgm⁻³).

Spatial scale	Component	NOx				NO2 (indicative)			
		2008	2010	2015	2020	2008	2010	2015	2020
Regional background sources (i.e. contributions from distant sources of > 30 km from the receptor)	Total	8.0	6.9	5.9	4.8	(b)	(c)	(d)	(e)
	From within the UK	5.1	4.4	3.7	3.0	(b)	(c)	(d)	(e)
	From transboundary sources (includes shipping and other EU Member States)	2.9	2.5	2.1	1.7	(b)	(c)	(d)	(e)
Urban background sources (i.e. sources located within 0.3 - 30 km from the receptor)	Total	52.2	45.2	26.5	32.5	23.4	20.7	14.4	16.7
	From road traffic sources	19.9	14.3	12.0	6.8	15.2	14.6	8.8	13.5
	From industry (including heat and power generation)	9.7	8.6	5.8	8.0	(b)	(c)	(d)	(e)
	From agriculture	0.0	0.0	0.0	0.0	(b)	(c)	(d)	(e)
	From commercial/residential sources	15.7	15.8	3.7	15.0	(b)	(c)	(d)	(e)
	From shipping	0.0	0.0	0.0	0.0	(b)	(c)	(d)	(e)
	From off road mobile machinery	6.1	5.8	2.4	2.2	(b)	(c)	(d)	(e)
	From natural sources	0.0	0.0	0.0	0.0	(b)	(c)	(d)	(e)
	From transboundary sources	0.0	0.0	0.0	0.0	(b)	(c)	(d)	(e)
Local sources (i.e. contributions from sources < 0.3 km from the receptor)	From other urban background sources	0.8	0.7	2.6	0.6	(b)	(c)	(d)	(e)
	Total	130.5	113.8	50.5	26.3	49.4	43.9	23.5	11.9
	From cars	13.3	8.9	16.6	4.1	5.4	3.8	8.1	1.9
	From HGV rigid	6.8	6.0	9.4	1.1	2.8	2.5	4.1	0.5
	From HGV articulated	1.0	0.9	15.3	0.1	0.4	0.4	6.7	0.1
	From Buses	105.5	94.5	2.8	19.8	38.9	35.5	1.2	8.8
	From LGVs	3.9	3.4	6.2	1.2	1.9	1.7	3.2	0.6
	From motorcycles	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0
	Total (i.e. regional background + urban background + local components)	190.7	165.8	82.8	63.6	72.9	64.6	37.9	28.6

(a) The road with the maximum annual mean NO₂ concentration in different years is as follows. 2008: A section of the A621 (count point id 18447). 2010: A section of the A621 (count point id 18447). 2015: A section of the A621 (count point id 18447). 2020: A section of the A621 (count point id 18447). (OS grid (m): 435610, 387250; 435610, 387250; 435610, 387250; 435610, 387250).

(b) The total annual mean NO₂ contribution for all components labelled (b) in 2008 was modelled to be 8.2 µgm⁻³.

(c) The total annual mean NO₂ contribution for all components labelled (c) in 2010 is predicted to be 6.1 µgm⁻³.

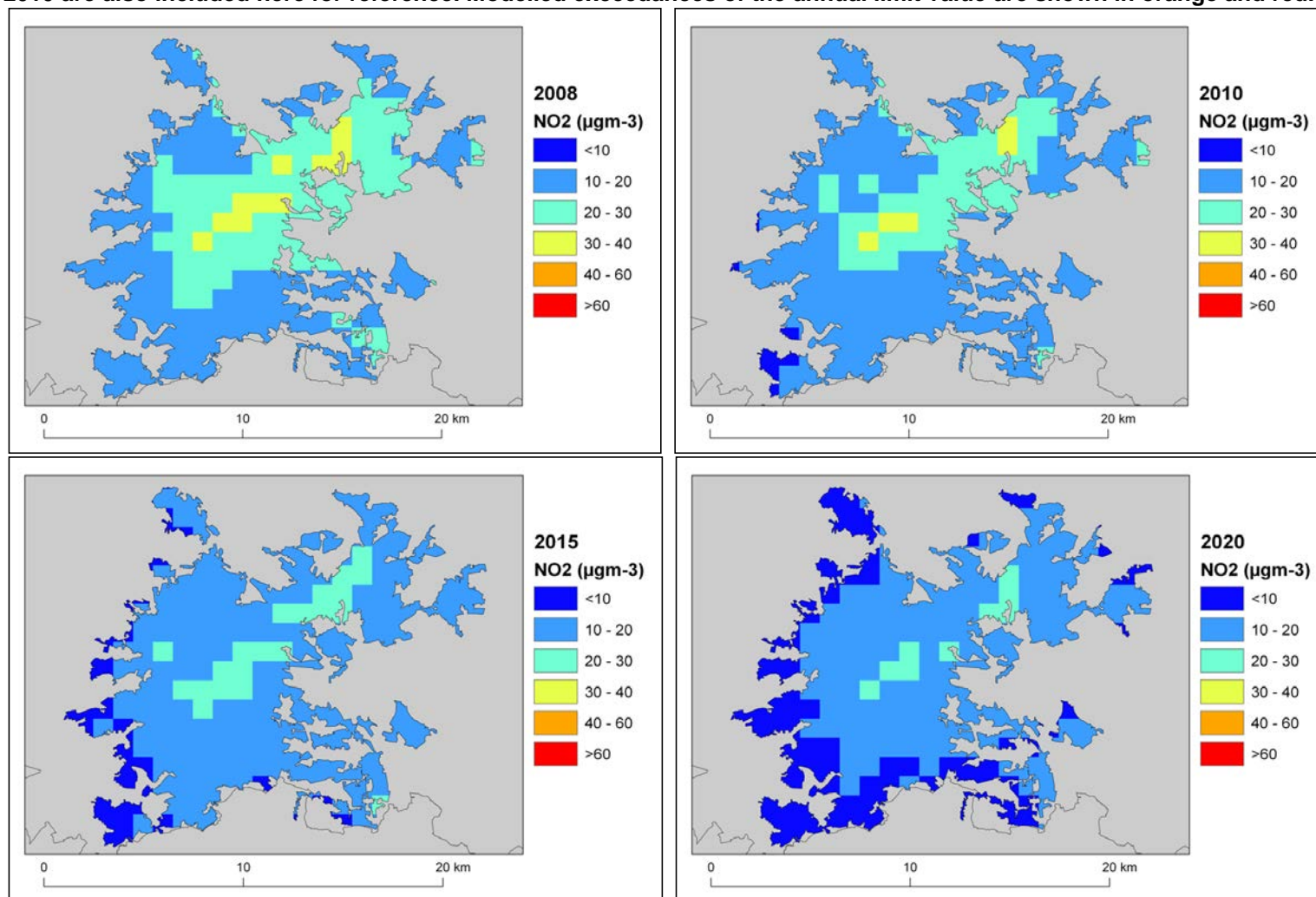
(d) The total annual mean NO₂ contribution for all components labelled (d) in 2015 is predicted to be 5.6 µgm⁻³.

(e) The total annual mean NO₂ contribution for all components labelled (e) in 2020 is predicted to be 3.2 µgm⁻³.

Table 10. The maximum NO_x contribution from each source from across all the roads included in the exceedance situation on which exceedances remain in 2010, 2015 and 2020 under baseline conditions. Zeros indicate that there are no exceedances in the relevant year.

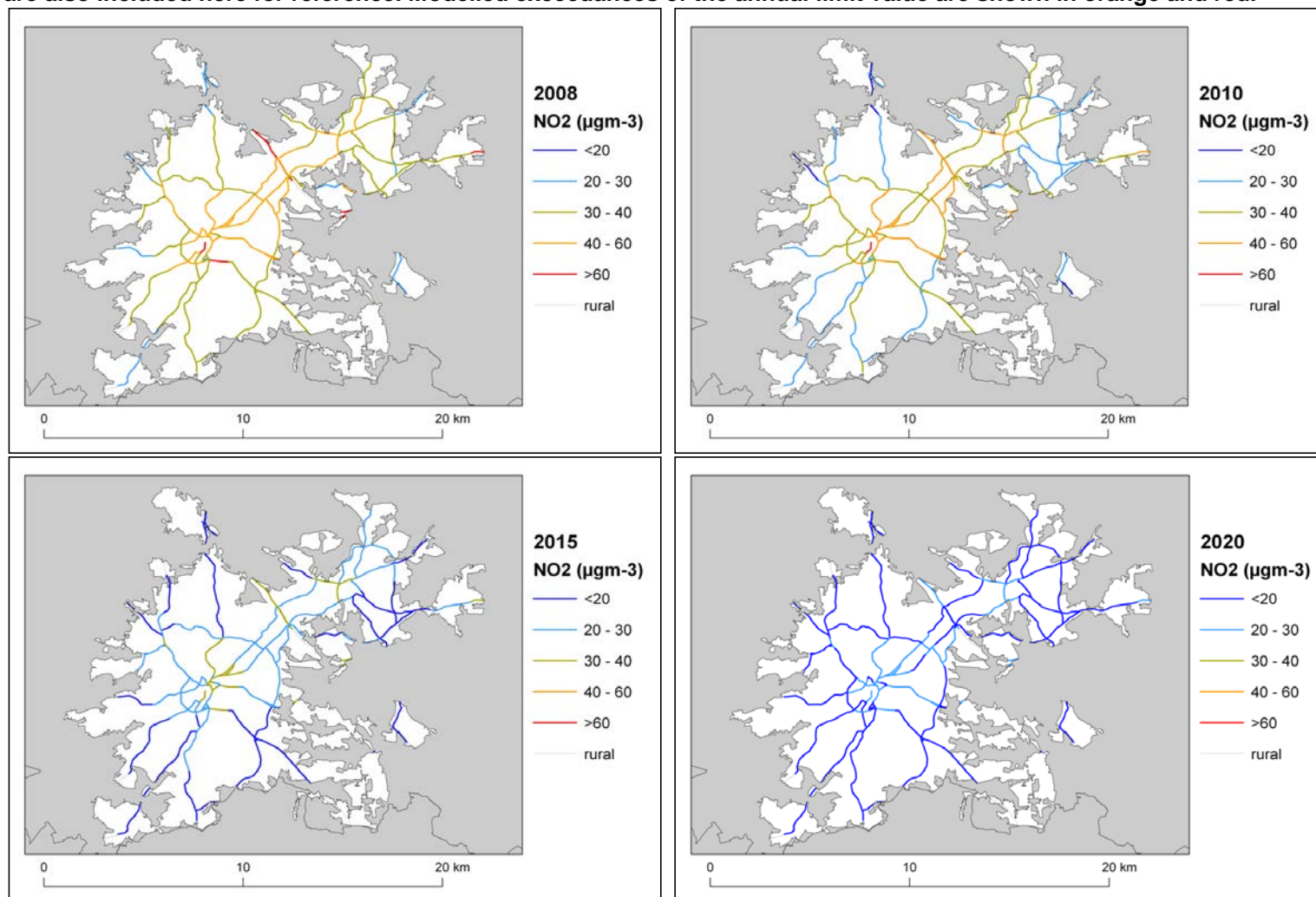
Spatial scale	Component	NO _x			
		2008	2010	2015	2020
Regional background sources (i.e. contributions from distant sources of > 30 km from the receptor)	From within the UK	5.1	4.4	0.0	0.0
	From transboundary sources (includes shipping and other EU Member States)	2.9	2.5	0.0	0.0
Urban background sources (i.e. sources located within 0.3 - 30 km from the receptor)	From road traffic sources	27.2	21.4	0.0	0.0
	From industry (including heat and power generation)	30.6	27.4	0.0	0.0
	From agriculture	0.0	0.0	0.0	0.0
	From commercial/residential sources	17.1	17.2	0.0	0.0
	From shipping	0.0	0.0	0.0	0.0
	From off road mobile machinery	14.6	13.7	0.0	0.0
	From natural sources	0.0	0.0	0.0	0.0
	From transboundary sources	0.0	0.0	0.0	0.0
	From other urban background sources	3.6	2.9	0.0	0.0
Local sources (i.e. contributions from sources < 0.3 km from the receptor)	From cars	42.5	28.5	0.0	0.0
	From HGV rigid	26.5	23.6	0.0	0.0
	From HGV articulated	46.2	40.2	0.0	0.0
	From Buses	110.9	99.3	0.0	0.0
	From LGVs	13.2	11.4	0.0	0.0
	From motorcycles	0.2	0.2	0.0	0.0

Figure 8. Background projections of annual mean NO₂ concentrations in 2015 and 2020 for the LEZ scenario. 2008 and baseline projections for 2010 are also included here for reference. Modelled exceedances of the annual limit value are shown in orange and red.



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Figure 9. Roadside projections of annual mean NO₂ concentrations in 2015 and 2020 for the LEZ scenario. 2008 and baseline projections for 2010 are also included here for reference. Modelled exceedances of the annual limit value are shown in orange and red.



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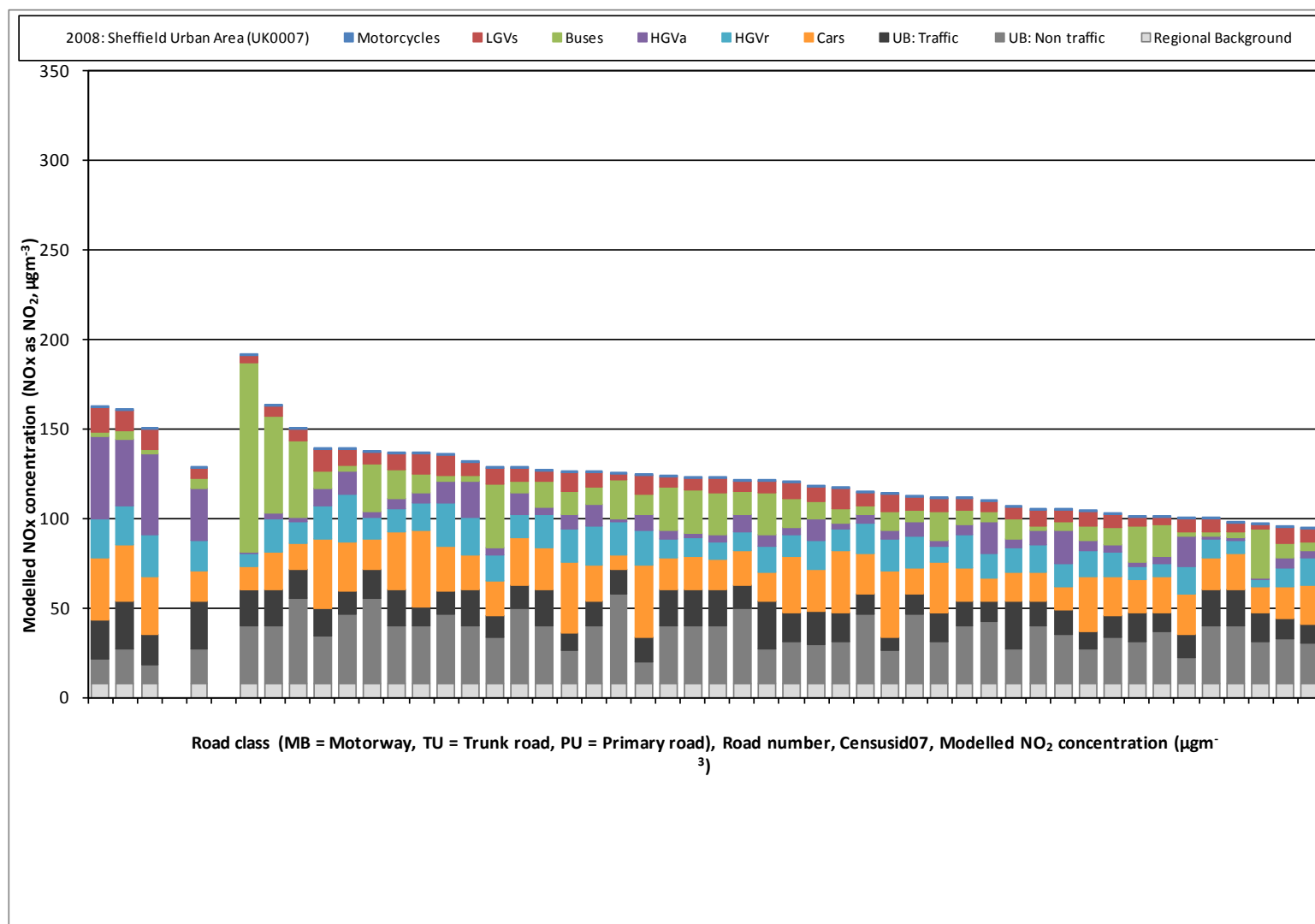
List of Annexes

Annex 1: Source apportionment graphs

Annex 2: Tables of measures

Annex 1: Source apportionment graphs

Figure A1.1 Annual mean roadside NO_x source apportionment plots for all roads exceeding the annual mean NO₂ limit value in 2008



Annex 2: Tables of measures

Table A2.1 Relevant Local Authority measures taken before or during 2010 within Sheffield Urban Area (UK0007)

LA (a)	Measure code (b)	Title	Description	Other information
Rotherham	Local_Rotherham_H1	Advancing / speeding up Quality Bus Partnership initiative	£2.5m was spent on developing and delivering 9 QBCs, forming the single largest aspect of the first South Yorkshire LTP Programme. Rotherham to M1 QBC – further work completed included new bus shelters. Rotherham to Dearne QBC: north bound-completed 2006. South bound – works programmed to commence 2007. A feasibility study is being carried out to determine the possibilities of a number of short right turn lanes on this route to reduce congestion. Rotherham-Thrybergh – Phase 1 completed 05/06. Phase 2 roundabout improvements due for completion May 2007.	<ul style="list-style-type: none"> • Type: Technical; Education/information • Sources affected: Transport • Spatial scale: local • Implementation date: 2006 • Reduction timescale: Medium/long term • Regulatory: No • Smarter Choices (c) : No • Reference (d): Local_zone7_Rotherham_AQActionplan_1
Rotherham	Local_Rotherham_E1	Major expansion of Park and Ride	South Yorkshire Vehicle Emission Testing ran from 2003-2004.	<ul style="list-style-type: none"> • Type: Technical; Education/information • Sources affected: Transport • Spatial scale: local • Implementation date: 2003 • Reduction timescale: Long term • Regulatory: No • Smarter Choices (c) : No • Reference (d): Local_zone7_Rotherham_AQActionplan_2
Rotherham	Local_Rotherham_E2	Strict enforcement of bus priority scheme	Strict enforcement of bus priority scheme	<ul style="list-style-type: none"> • Type: Economic/fiscal; Technical; Education/information • Sources affected: Transport • Spatial scale: local • Implementation date: 2006 • Reduction timescale: Long term • Regulatory: No • Smarter Choices (c) : No • Reference (d): Local_zone7_Rotherham_AQActionplan_2
Rotherham	Local_Rotherham_E3	Investigate further options for UTC etc	Assessed through further feasibility studies	<ul style="list-style-type: none"> • Type: Technical • Sources affected: Transport • Spatial scale: local • Implementation date: 2006 • Reduction timescale: Long term • Regulatory: No • Smarter Choices (c) : No • Reference (d): Local_zone7_Rotherham_AQActionplan_2

LA (a)	Measure code (b)	Title	Description	Other information
Rotherham	Local_Rotherham_G1	South Yorkshire Car Club	Sheffield Car Club:The Sheffield Car Club, operated by WhizzGo, was launched in 2007.	<ul style="list-style-type: none"> • Type: Education/information • Sources affected: Transport • Spatial scale: local • Implementation date: 2007 • Reduction timescale: Short term • Regulatory: No • Smarter Choices (c) : Yes • Reference (d): Local_zone7_Rotherham_AQActionplan_2
Rotherham	Local_Rotherham_F1	South YorkshireCare4 air Campaign	A South Yorkshire media campaign. The campaign has now gained a commitment to funding from the South Yorkshire Second Local Transport Plan partners The South Yorkshire Care4air campaign has had success getting coverage in a range of local media.Major issues covered during 2006-07 are Eco-driving and web site development included a Young People's Section.	<ul style="list-style-type: none"> • Type: Education/information • Sources affected: Transport • Spatial scale: local • Implementation date: 2006 • Reduction timescale: Short term • Regulatory: No • Smarter Choices (c) : Yes • Reference (d): Local_zone7_Rotherham_AQActionplan_2
Rotherham	Local_Rotherham_G2	Travel Plans	Further work has been commissioned by the Highways Agency in partnership with the Local Authorities on the development of an Area Travel Plan for the Lower Don Valley. This includes Templeborough and Centurion Business Park, which has the potential to impact on to the M1 AQMA in Rotherham.	<ul style="list-style-type: none"> • Type: Education/information • Sources affected: Transport • Spatial scale: local • Implementation date: 2007 • Reduction timescale: Long term • Regulatory: No • Smarter Choices (c) : Yes • Reference (d): Local_zone7_Rotherham_AQActionplan_2
Rotherham	Local_Rotherham_E4	Planning and Air Quality Guidance	New air quality guidance developed as part of the Local Development Framework for Rotherham.	<ul style="list-style-type: none"> • Type: Technical; Education/information • Sources affected: Transport • Spatial scale: local • Implementation date: 2006 • Reduction timescale: Long term • Regulatory: No • Smarter Choices (c) : No • Reference (d): Local_zone7_Rotherham_AQActionplan_2
Rotherham	Local_Rotherham_E5	Assess proposed major schemes for air quality impact	Major schemes with the potential to impact on air quality within the M1 AQMA are assessed by Neighbourhood Services.On-going	<ul style="list-style-type: none"> • Type: Technical; Education/information • Sources affected: Transport • Spatial scale: local • Implementation date: 2008 • Reduction timescale: Long term • Regulatory: No

LA (a)	Measure code (b)	Title	Description	Other information
				<ul style="list-style-type: none"> • Smarter Choices (c) : No • Reference (d): Local_zone7_Rotherham_AQActionplan_2
Rotherham	Local_Rotherham_H2	Reducing Emissions from the M1 and Traffic Using the Motorway	The Highways Agency is working on proposals to widen the M1 motorway including the stretch from J32-J35 through Rotherham. Air Quality Assessment will be part of the work for the expected Public Enquiry. Mitigation measures could include speed restrictions. Ramp-metering has been introduced at some M1 junctions e.g. J34, within the M1 AQMA.	<ul style="list-style-type: none"> • Type: Technical; Education/information • Sources affected: Transport • Spatial scale: local • Implementation date: 2008 • Reduction timescale: Long term • Regulatory: No • Smarter Choices (c) : No • Reference (d): Local_zone7_Rotherham_AQActionplan_2
Rotherham	Local_Rotherham_H3	Vehicle emission testing	Awareness raising of air quality problems as a result of emissions from vehicles including vehicle emission testing. South Yorkshire Vehicle Emission Testing ran from 2003-2004.	<ul style="list-style-type: none"> • Type: Education/information • Sources affected: Transport • Spatial scale: local • Implementation date: 2003 • Reduction timescale: Short term • Regulatory: No • Smarter Choices (c) : No • Reference (d): Local_zone7_Rotherham_AQActionplan_2
Sheffield	Local_Sheffield_A1	Establish minimum emissions standards for Council vehicles entering AQMA	Set minimum emissions standards for own fleet, and for vehicles entering AQAZs (new measure). Majority of council fleet now under Kier Sheffield LLP. 1) Kier committed to improving the environment and reducing the amount of pollution from vehicle emissions 2) Kier have demonstrated their commitment by upgrading the existing fleet; currently 100% of their 500 vehicles are to Euro 3 standard or above 3) Future vehicle purchases will also meet with current government guidelines on vehicle emissions or be to a minimum Euro 4 level. 4) Kier is also seeking a commitment from their suppliers and contractors. SCC has invested in alternative fuelled vehicles such as LPG and hybrid electric powered vehicles. Transport Services are constantly researching the market with regards to environmentally friendly vehicles All new vehicles to be Euro4; Euro5 when available Work towards reducing the age profile of the SCC fleet Take part in Smart EV Project - battery powered Zero emission vehicles Take part in Sustainable Procurement task group	<ul style="list-style-type: none"> • Type: Technical • Sources affected: Transport • Spatial scale: local • Implementation date: 2007 • Reduction timescale: Long term • Regulatory: No • Smarter Choices (c) : No • Reference (d): Local_zone7_Sheffield_AQActionplan_1

LA (a)	Measure code (b)	Title	Description	Other information
Sheffield	Local_Sheffield_E1	Infrastructure developments	Two major infrastructure developments are planned / in hand through other plans / policies: The Sheffield Northern Inner Relief Road and the Halfpenny Bridge initiative. New 1.5 km dual carriageway between the Wicker and Penistone Road now open. Unnecessary through traffic can now pass around the city centre, which should improve air quality. Reduced likelihood of congestion should improve access to the city centre however you choose to travel. The Inner Relief Road has supported sustainable transport use by constructing 4,625m of cycle lane, 680m of pedestrian/cycle path and 11 toucan crossings.	<ul style="list-style-type: none"> • Type: Technical • Sources affected: Transport • Spatial scale: local • Implementation date: 2005 • Reduction timescale: Long term • Regulatory: No • Smarter Choices (c) : No • Reference (d): Local_zone7_Sheffield_AQActionplan_1
Sheffield	Local_Sheffield_H1	Signage	Plans are already being actioned to direct motorists to nearest car parks with spaces. The use of Variable Message Signing and other improved signage should provide tangible benefits in air quality and congestion terms. Improved techniques to manage traffic signal timings will also reduce congestion and stop/start flow and so achieve air quality improvements.	<ul style="list-style-type: none"> • Type: Technical; Education/information • Sources affected: Transport • Spatial scale: local • Implementation date: 2005 • Reduction timescale: Medium/long term • Regulatory: No • Smarter Choices (c) : No • Reference (d): Local_zone7_Sheffield_AQActionplan_1
Sheffield	Local_Sheffield_G1	School and business travel plans	Encourage school and business travel plans. Package of practical measures to encourage staff to choose alternatives to single occupancy car use, to reduce the environmental impact of travel and to reduce the need to undertake business travel. Modal shift and reduced business travel should contribute to the desired improvements in air quality. The Council Travel Plan is about how Sheffield City Council takes responsibility for the impact its own travel has and looks at how it can change it for the better. Package of practical measures to encourage parents and children to choose alternatives to using cars for transporting children to school, to reduce the environmental impact of travel.	<ul style="list-style-type: none"> • Type: Education/information • Sources affected: Transport • Spatial scale: local • Implementation date: 2008 • Reduction timescale: Long term • Regulatory: No • Smarter Choices (c) : Yes • Reference (d): Local_zone7_Sheffield_AQActionplan_1

LA (a)	Measure code (b)	Title	Description	Other information
Sheffield	Local_Sheffield_H2	Speed Controls	Reduction of speed on M1 proposed as an option. Reducing traffic speeds and volume on city centre roads to encourage more pedestrian movement.	<ul style="list-style-type: none"> • Type: Technical; Education/information • Sources affected: Transport • Spatial scale: local • Implementation date: 2007 • Reduction timescale: Medium term • Regulatory: No • Smarter Choices (c) : No • Reference (d): Local_zone7_Sheffield_AQActionplan_1
Sheffield	Local_Sheffield_H3	Awareness Raising	Encourage model shift through awareness raising. Campaigns collaborated to change attitudes to public transport use. Care4Air campaign has highlighted the fact that through walking, cycling or using public transport we can all do our bit to help improve air quality. Currently working on revised and updated website Highly successful 'Carbon Quids' promotional campaign, held as part of European Mobility Week. Promoting sustainable and alternative modes of transport	<ul style="list-style-type: none"> • Type: Education/information • Sources affected: Transport • Spatial scale: local • Implementation date: 2004 • Reduction timescale: Short term • Regulatory: No • Smarter Choices (c) : Yes • Reference (d): Local_zone7_Sheffield_AQActionplan_1
Sheffield	Local_Sheffield_E2	Quality Bus Corridor Programme	Quality Bus Corridor Programme. S10 Corridor QBC - Finished and operational - bus priority traffic signals and 24hr bus lane on A57 Western Bank. Sheaf Valley - Finished and operational - substantial scheme in Woodseats Bus priority signals and 24hr bus lane on A61. Now part of marketing and promotional campaign to raise awareness of improved routes. North Sheffield Better Buses - Spital Hill traffic management for bus priority. First Statutory Quality Partnership Scheme in England. Provision of high quality Euro 3 buses required. Now part of marketing and promotional campaign to raise awareness of improved routes.	<ul style="list-style-type: none"> • Type: Technical; Education/information • Sources affected: Transport • Spatial scale: local • Implementation date: 2005 • Reduction timescale: Long term • Regulatory: No • Smarter Choices (c) : Yes • Reference (d): Local_zone7_Sheffield_AQActionplan_1
Sheffield	Local_Sheffield_H4	Improved public transport	Improvement of passenger facilities. Improve journeys from Ecclesfield to the City centre.	<ul style="list-style-type: none"> • Type: Technical; Education/information • Sources affected: Transport • Spatial scale: local • Implementation date: 2008 • Reduction timescale: Long term • Regulatory: No • Smarter Choices (c) : No

LA (a)	Measure code (b)	Title	Description	Other information
Sheffield	Local_Sheffield_G2	Improved Public Transport	Improvement of reliability. The North Sheffield Better Buses project is already delivering increased use of public transport along this route, particularly in Ecclesfield, Fir Vale and Sheffield Lane Top. Bus priority measures have now been installed along the whole route and are now being tuned to maximise their effectiveness. This will benefit local residents as well as the 260,000 passengers that travel through the area every week.	<ul style="list-style-type: none"> • Reference (d): Local_zone7_Sheffield_AQActionplan_1 • Type: Technical; Education/information • Sources affected: Transport • Spatial scale: local • Implementation date: 2008 • Reduction timescale: Long term • Regulatory: No • Smarter Choices (c) : No • Reference (d): Local_zone7_Sheffield_AQActionplan_1
Sheffield	Local_Sheffield_E3	Expand Park & Ride provision	Expand Park & Ride provision. Since the last update a new tram based Park & Ride site has been developed at Malin Bridge and the existing Middlewood Park & Ride facility has been extended to double it's capacity. SCC, SYPTE and the other 3 South Yorkshire Districts have an approved South Yorkshire Park and Ride Strategy, which was developed to grow provision within the County in an organised and co-ordinated way. The Strategy was adopted by the Passenger Transport Authority and partnership work is continuing to put together a work programme of new sites in the County, including a number of possible sites in Sheffield. The route of the bus service from the existing site at the Tesco store on Abbeydale Road has been changed to now serve the University and Hospital areas where there is increasing pressure on parking. The Major Scheme Business cases which are being developed for submission to the DfT are inclusive of Park & Ride sites and so will contribute to the P&R Strategy.	<ul style="list-style-type: none"> • Type: Technical; Education/information • Sources affected: Transport • Spatial scale: local • Implementation date: 2008 • Reduction timescale: Long term • Regulatory: No • Smarter Choices (c) : No • Reference (d): Local_zone7_Sheffield_AQActionplan_1
Sheffield	Local_Sheffield_F1	Variable message signs	VMS signs already in place / being actioned. This Plan proposes additional traffic control measures (without being specific), and suggest VMS signing for access / egress to / from M1	<ul style="list-style-type: none"> • Type: Technical; Education/information • Sources affected: Transport • Spatial scale: local • Implementation date: 2008 • Reduction timescale: Medium term • Regulatory: No • Smarter Choices (c) : No • Reference (d): Local_zone7_Sheffield_AQActionplan_1

LA (a)	Measure code (b)	Title	Description	Other information
Sheffield	Local_Sheffield_G3	Promoting Walking	<p>To encourage walking a number of initiatives have been promoted</p> <p>1)Reducing traffic speeds and volume on city centre roads to encourage more pedestrian movement</p> <p>2)Creation of high quality public spaces such as the pedestrian link from the station to the city centre</p> <p>3)Increasing number of 'at grade' pedestrian crossings</p> <p>4)Developing a Walking Strategy</p> <p>5)Ensure walking routes are included in new residential developments eg. Cut throughs to public transport routes</p> <p>6)Introduction of audit to cover needs for disabled people, walking and cycling for transport and highway schemes</p> <p>7)Development of Upper Don Valley Walking and Cycling Route</p> <p>8)Sheffield Healthy Walks - continuing programme of walks of varying lengths across the city</p> <p>9)Round health walks (2km) being developed in the city centre, targeting city centre employees.</p> <p>10)Festival 'Walk Sheffield' (30th May - 8th June 2008) supported by SCC with a week of events to encourage more walking</p> <p>11)SCC has adopted the Public Rights of Way Improvement Plan to which funding has been allotted</p>	<ul style="list-style-type: none"> • Type: Education/information • Sources affected: Transport • Spatial scale: local • Implementation date: 2008 • Reduction timescale: Short term • Regulatory: No • Smarter Choices (c) : Yes • Reference (d): Local_zone7_Sheffield_AQActionplan_1
Sheffield	Local_Sheffield_G4	Promoting cycling	<p>Promotion & Education</p> <p>1)Continuing provision of free cycle training-increasing confidence in cyclists so increasing the amount of cycling</p> <p>3)Sport, Community & Recreation rangers have undergone cycle leader training giving a new resource for training & promotion</p> <p>4)Cycling information has been collated into a 'Sheffield Travel Pack' and a mailing list of interested members of the public has been created.</p>	<ul style="list-style-type: none"> • Type: Education/information • Sources affected: Transport • Spatial scale: local • Implementation date: 2009 • Reduction timescale: Short term • Regulatory: No • Smarter Choices (c) : Yes • Reference (d): Local_zone7_Sheffield_AQActionplan_1

LA (a)	Measure code (b)	Title	Description	Other information
			<p>5)One-stop-shop for cycling information created on Council website Cycling Infrastructure</p> <p>1)Experiment in improving conspicuity of signing and lining of existing routes aimed at University students new to the area</p> <p>2)Numerous toucan crossings around the city</p> <p>3)Segregated pedestrian/cycle route along Riverside Exchange and new puffin crossing linking new residential development with the north of the city.</p> <p>4)SCC developed 2.5km of cycle route on disused railway between Meadowhall and Ecclesfield</p> <p>5)Remodelling of Eyre St. dual carriageways to include on and off road cycle facilities leading to 790% increase in cyclists per day</p> <p>6)Inclusion of cycle routes through the new housing developments on the sites of Middlewood and Lodgemoor Hospitals</p> <p>7)Cycle lanes implemented as part of resurfacing schemes e.g. Bramall La.</p> <p>8) Northern Inner Relief Road has comprehensive cycle facilities included such as 5km cycle lanes and advanced stop lines</p> <p>9)On-going program of improved cycle parking funded by LTP has seen 100% increase in cycle parking in the City Centre Developments</p> <p>1)Continue to work towards a joined up network of cycle routes</p> <p>2)Upper Don Valley walking and cycling route</p> <p>3)Off road cycle route on Penistone Road</p> <p>4)Improve working with companies with travel plans to encourage cycling</p> <p>5)Area wide improvements to cycle routes in Housing Market Renewal Areas</p> <p>6)Increase and formalise cycle audit</p>	
Sheffield	Local_Sheffield_E4	a) South Yorkshire Intelligent Transport System (ITS)	<p>SCC is the lead partner in InnovITS project-working towards improving control of road traffic and providing better travel information to allow travellers to make intelligent choices about mode, route and time of travel. This will lead to better air quality and less noise pollution through modal shift to public transport and reduced congestion. This project will also provide the</p>	<ul style="list-style-type: none"> • Type: Technical; Education/information • Sources affected: Transport • Spatial scale: local • Implementation date: 2008 • Reduction timescale: Long term • Regulatory: No • Smarter Choices (c) : No

LA (a)	Measure code (b)	Title	Description	Other information
			information base from which to develop and demonstrate specific tools that can be deployed in the traffic environment to allow closed loop control of the traffic against specific quality of environment parameters	<ul style="list-style-type: none"> • Reference (d): Local_zone7_Sheffield_AQActionplan_1
Sheffield	Local_Sheffield_H5	Green Parking Scheme	A scheme which allows the owners of environmentally friendly cars (not powered solely by petrol or diesel) to park for free after the payment of a £10 registration fee. The scheme is due for a major re-working in 2008 to, perhaps, being based on DVLA CO ₂ Emissions Banding	<ul style="list-style-type: none"> • Type: Technical; Education/information • Sources affected: Transport • Spatial scale: local • Implementation date: 2004 • Reduction timescale: Medium term • Regulatory: No • Smarter Choices (c) : No • Reference (d): Local_zone7_Sheffield_AQActionplan_1
Sheffield	Local_Sheffield_A2	Sheffield Community Transport	SCT have installed a bio-diesel tank to enable refuelling of their mini-bus fleet with a 10% ethically sourced blend of bio-diesel, helping reduce emissions and cutting greenhouse gases	<ul style="list-style-type: none"> • Type: Technical; Education/information • Sources affected: Transport • Spatial scale: local • Implementation date: 2006 • Reduction timescale: Medium term • Regulatory: No • Smarter Choices (c) : No • Reference (d): Local_zone7_Sheffield_AQActionplan_1
Sheffield	Local_Sheffield_B1	Actions to reduce emissions from Industry	SCC working within the LAPPC regime, and working closely with the Environment Agency to ensure industrial air pollution is minimised. Action being taken to increase inspection rates around 'part B' processes.	<ul style="list-style-type: none"> • Type: Technical • Sources affected: Industry including heating and power production • Spatial scale: local • Implementation date: 2008 • Reduction timescale: Long term • Regulatory: Yes • Smarter Choices (c) : No • Reference (d): Local_zone7_Sheffield_AQActionplan_1
Sheffield	Local_Sheffield_H6	Car Club	Car Club operated by WhizzGo has been operating successfully in Sheffield for the past year with a higher than anticipated uptake by 179 members b)17% of members have reduced their car ownership, with 40% of those cars being 8-9 years old. A further 24% of members have deferred buying a new car. This accounts for a reduction of 70 cars on the roads of Sheffield c)Customer's gave positive feedback, with 91% rating the Car Club as good or excellent, 97% gave positive	<ul style="list-style-type: none"> • Type: Education/information • Sources affected: Transport • Spatial scale: local • Implementation date: 2007 • Reduction timescale: Medium term • Regulatory: No • Smarter Choices (c) : Yes • Reference (d): Local_zone7_Sheffield_AQActionplan_1

LA (a)	Measure code (b)	Title	Description	Other information
			<p>feedback about the availability of cars and 96% about the ease of use. The positive results ensured WhizzGo maintained Carplus accreditation</p> <p>d)Developments for the second year will focus on planned and specific marketing, with the increased visibility of the WhizzGo brand throughout Sheffield and a stronger presence in the heart of the City</p> <p>e)WhizzGo is committed to providing low emission vehicles, and their current fleet endeavours to utilise a 30% blend of recycled biodiesel</p> <p>f)Work with estate agents and letting agents to encourage new residents to consider joining the Car Club</p>	
Sheffield	Local_Sheffield_H7	Green Roofs	Green roof forum was set up in Sheffield to promote their benefits with regards to climate change and air quality	<ul style="list-style-type: none"> • Type: Education/information • Sources affected: Commercial and residential sources • Spatial scale: local • Implementation date: 2006 • Reduction timescale: Medium term • Regulatory: No • Smarter Choices (c) : No • Reference (d): Local_zone7_Sheffield_AQActionplan_1
Sheffield	Local_Sheffield_E5	Land Use Planning	Section 106 agreements and Supplementary Planning Documents are being used to control or offset air pollution prior to developments taking place. Every planning application that reaches set trigger points is now required to undertake an air quality assessment and must produce a travel plan. A recent example being a new supermarket that is providing Electric Vehicle recharging points, subsidising bus passes, fitting particulate traps to delivery vehicles, introducing a car share scheme and producing an Employee Travel Plan.	<ul style="list-style-type: none"> • Type: Technical; Education/information • Sources affected: Transport • Spatial scale: local • Implementation date: 2007 • Reduction timescale: Long term • Regulatory: No • Smarter Choices (c) : Yes • Reference (d): Local_zone7_Sheffield_AQActionplan_1
Sheffield	Local_Sheffield_B2	District Heating	The heat created by the combustion process in the Energy Recovery Facility is used to create steam which is used in power generation for sale to the National Grid, and is turned into hot water to provide heat and hot water for 130 buildings connected to the district heating network. Connection to the system reduces air pollution and CO ₂ emissions by removing the need for individual boilers. The Housing Market Renewal Programme for Sheffield will promote energy	<ul style="list-style-type: none"> • Type: Technical; Education/information • Sources affected: Commercial and residential sources • Spatial scale: local • Implementation date: 2008 • Reduction timescale: Long term • Regulatory: No • Smarter Choices (c) : No • Reference (d): Local_zone7_Sheffield_AQActionplan_1

LA (a)	Measure code (b)	Title	Description	Other information
			efficiency and alternative energy use and smaller scale district heating schemes, including micro CHP.	

(a) Name of responsible Local Authority.

(b) The Letter in the measure code indicates the main source sector that will be affected by the measure. Letters are assigned as follows: A - measures to reduce emissions from mobile sources, B - measures to reduce emissions from stationary sources, C - fuels and petrol stations, D - Economic incentives to reduce emissions (e.g. congestion charging, controlled parking zones), E - measures related to traffic planning/redesigning infrastructure, F - information/educational measures, G - change of transport mode (e.g. scheme to encourage people out of cars and onto bikes), H - Other.

(c) Measures have been classified as 'smarter choices' or not based on expert judgement

(d) References available for download from: [http://uk-air.defra.gov.uk/library/NO₂ten/](http://uk-air.defra.gov.uk/library/NO2ten/)

