Air Quality Action Plan

Consultation Draft

Version 1.4

Pollution Control
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Executive Summary

E.1 As part of the Local Air Quality Management (LAQM) process, Walsall Metropolitan Borough Council have identified areas within Walsall that exceed, or are likely to exceed, the annual average and hourly national air quality objectives (AQOs) for nitrogen dioxide (NO_2).

E.2 Resulting from this, the Council declared the whole of its borough an air quality management area (AQMA) for the purpose of achieving NO_2 AQOs. Upon declaring an AQMA, the Council has a statutory duty to prepare an Air Quality Action Plan (AQAP) which sets outs measures designed to improve air quality within the AQMA.

E.3 This report describes an AQAP that has been produced incorporating the measures that are intended to be implemented.

E.4 A source apportionment study has been carried out in order to aid the targeting of measures within this Action Plan, which suggests that the most significant source of NO_2 emissions are associated with Heavy Goods Vehicles (HGVs) due to a combination of fuel type, engine size, and to some extent use of particulate traps in exhaust systems.

E.5 A detailed assessment has yet to be made of the costs and likely air quality benefit of the measures proposed, which is a matter for consideration once the AQAP is confirmed .

Consultation comments should be forwarded by no later than 31st March 2009 to :

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1.0 Introduction

1.1.1 The Environment Act 1995 Part IV introduced a new regime in the United Kingdom requiring local authorities to review air quality in their areas on an annual basis as part of a three year cycle of reporting to central government. This is to ensure that objectives are met relating to seven (of eight in total) key air pollutants as set out in the UK Air Quality Strategy[1].

1.1.2 The objectives specified in the Strategy[1] are fundamentally designed to protect human health and are assessed in areas of relevant exposure, namely where people are regularly exposed to, and may be affected by, air pollution. The pollutants for which air quality objectives have been set and which local authorities are obliged to assess relate to:

- 1,3 – Butadiene
- Benzene
- Carbon Dioxide, CO
- Lead, Pb
- Nitrogen Dioxide, NO_2
- Particles (PM_{10})
- Sulphur Dioxide, SO_2

1.1.3 A further objective relating to ozone is also included, although this is a long-range pollutant and is seen as a national, rather than a local problem that is to be dealt with by government.

1.1.4 As part of the three year cycle local authorities must produce an Updating and Screening Assessment (USA) for their areas. If the USA identifies places where air quality objectives are not likely to be met by a target date, it is then necessary for a Detailed Assessment to be undertaken for the given pollutant(s) and as required to declare an Air Quality Management Area (AQMA).

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1.1.5 Thereafter, a Stage 4 Further Assessment within 12 months of an AQMA declaration is required, and an AQAP has to be produced setting out how the local authority will work towards meeting air quality objectives.

1.1.6 In addition to this, local authorities also have to produce air quality Progress Reports in years when either a USA or Detailed Assessments are not compiled.

1.2 Local Issues in Walsall

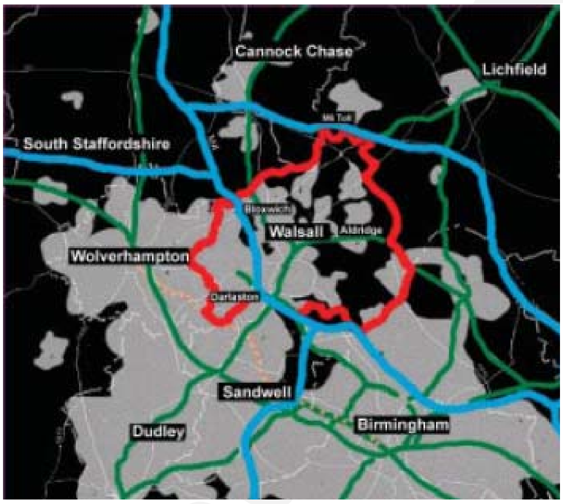
1.2.1 Walsall MBC is a relatively large urban local authority, with a population of c.253,000 spread over an area of approximately 10,250 hectares (equivalent to about 40 square miles). It has a relatively high population density of 24.4 persons per hectare, which is not evenly distributed, and consequently features high density populations in and around urban centres.

1.2.2 The borough town of Walsall is located centrally in the UK and is surrounded by six other local authorities, namely Lichfield District Council to the north; Birmingham City Council to the east and south east; Sandwell Metropolitan Borough Council to the south; Wolverhampton City Council to the west; and South Staffordshire Council and Cannock Chase District Council to the north west.

1.2.3 Walsall town centre is surrounded by a ring road incorporating five major radial roads. In addition, the heavily trafficked M6 motorway located to the west of the town centre runs north west to south east through the Borough.

1.2.4 Walsall MBC also has 22 significant industrial emissions sources, of which 13 are Part A1 installations regulated by the Environment Agency under Integrated Pollution Prevention and Control (IPPC) pursuant to the Environmental Permitting (England and Wales) Regulations 2007.

Figure 1 Regional Geography



1.3 Air Quality Review & Assessment in Walsall

1.3.1 In April 1999 Walsall Council published its First Stage review and assessment of air quality involving the identification of significant sources of air pollution within and surrounding the borough, reviewing the levels of air pollutants for which prescribed standards and objectives have been set, and estimating the likely future levels.

1.3.2 The First Stage confirmed that the air quality objectives for butadiene, benzene and carbon monoxide would be achieved by the required deadlines, and that a second and third stage review and assessment would be required in relation to lead, nitrogen dioxide, sulphur dioxide and PM_{10} to identify any existing or likely exceedances of air quality objectives by deadlines specified in the Air Quality Strategy This detailed investigation was intended to determine whether or not the Council would need to declare Air Quality Management Areas in accordance with the Environment Act 1995. The investigation utilised data obtained from computer modelling techniques, emission inventories, road traffic data and a results obtained from a network of air pollution monitoring stations located throughout Walsall and the West Midlands.

1.3.3 The combined Second and Third Stage Review & Assessment[2] required the council to provide further screening of pollutant concentrations with reference to AQOs and their associated compliance deadlines together with accurate detailed assessment of current and future air quality. The combined Assessment concluded that in Walsall the Government's air quality objectives would be met by the specified deadlines and that no air quality management areas would need to be declared. The report recognised however, that further work would be required before the next review and assessment was due in 2003 to overcome anomalies identified in relation to measured and modelled concentrations of certain pollutants (notably NO_2).

1.3.4 An addendum report[3] was subsequently produced specifically in regard to NO_2 which led to the declaration of five AQMAs in 2002 :

Areas 1	North of Junction 10, East of M6 Motorway, Beechdale.
Areas 2	Wolverhampton Road A454.
Areas 3	M6 Motorway Junction 9 / Bescot Road.
Area 4	Rushall.
Area 5	Lichfield Road, Walsall.

1.3.5 As part of continuing work on air quality it had been established that the Council's original AQMAs did not sufficiently reflect all locations where air quality objectives are/were, or are likely to be exceeded, and it was therefore necessary, in accordance with the Environment Act 1995 (As Amended) and guidance published by the DEFRA, to re-define these.

1.3.6 In August 2006 Walsall MBC revoked these AQMAs in order to consolidate the whole of its borough as an AQMA in relation to nitrogen dioxide. The Walsall Air Quality Management Area 2006 was declared on 31st August 2006, the extent of which is shown as bounded red in Figure 2.

1.3.7 DEFRA confirmed by letter dated 2nd September 2005 that they accepted the Councils findings and that there was a need to amend the AQMAs.

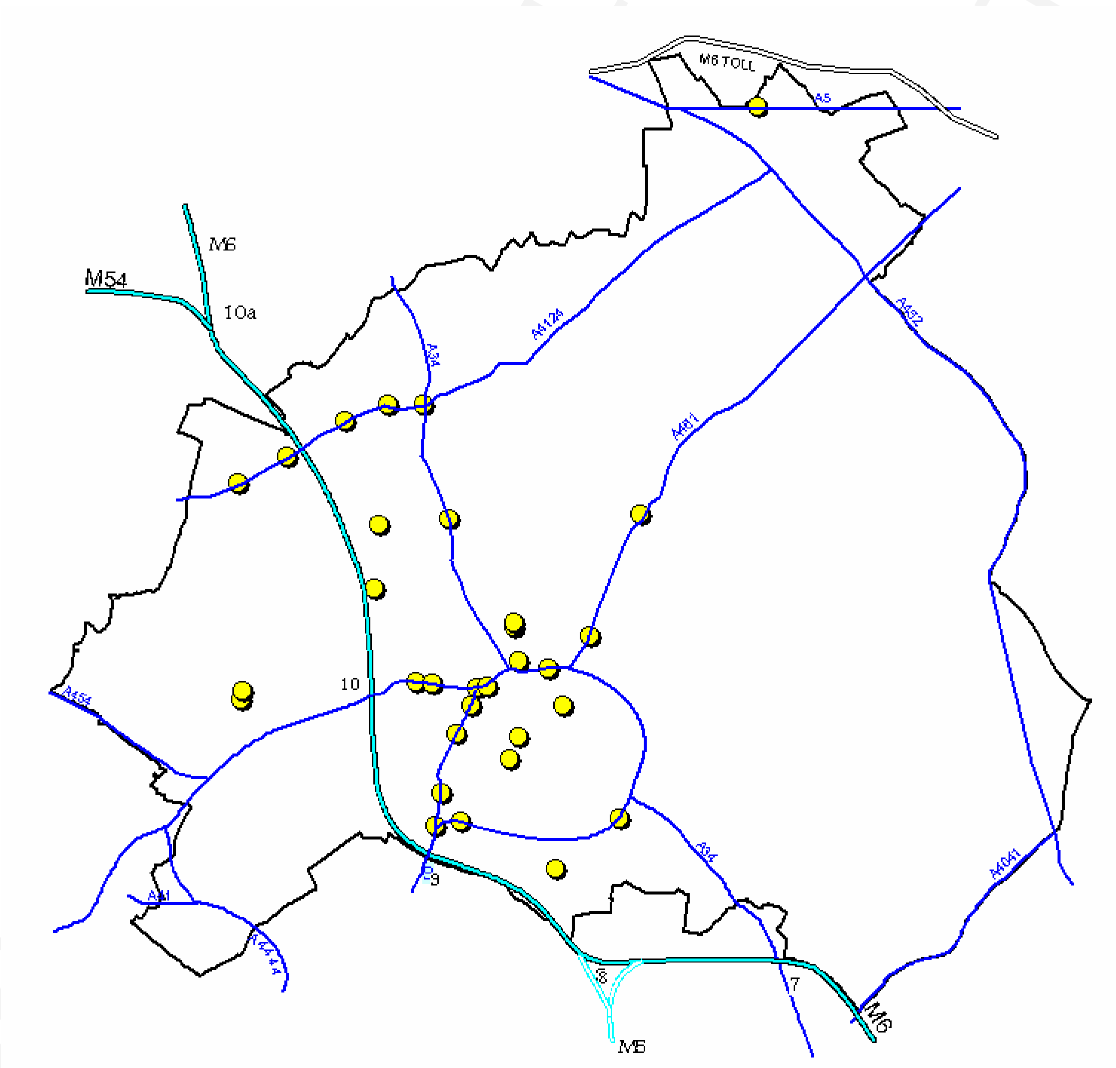
1.3.8 By declaring the whole borough an AQMA problems associated with road traffic and transportation can be dealt with in an integrated fashion across a broader geographical area which is important for strategic transport planning and the Local Transport Plan.

Figure 2 Walsall Air Quality Management Area 2006

1.4 Areas of Exceedance

1.4.1 An Updating & Screening Assessment undertaken by Walsall MBC in 2006[4] identified 32 road junctions where annual mean concentrations of NO_2 were predicted to be above the 40 µg/m^3 objective. The locations of these junctions are shown in yellow in Figure 3 below.

Figure 3 Road junctions where annual NO_2 objective is or has been predicted to be exceeded



1.4 West Midlands Local Transport Plan

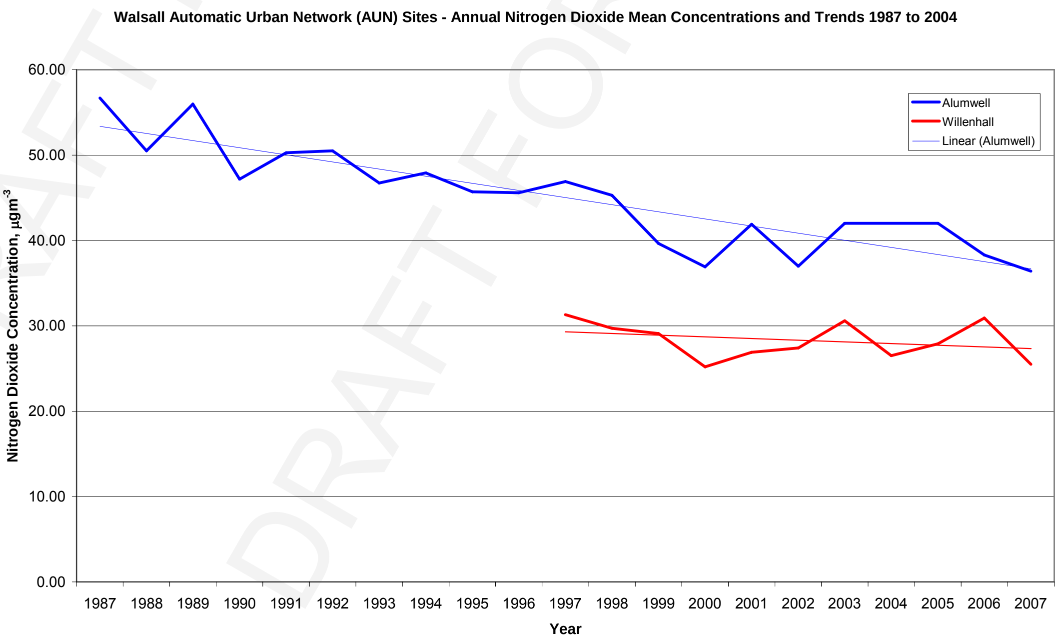
1.4.1 The West Midlands Local Transport Plan (WMLTP) includes an Air

Quality Strategy Statement which sets an air quality target related to a decrease in average NO_2 levels where NO_2 exceeds the national objective. Whilst the general trend in NO_2 levels for the past two decades has shown a decline in levels, in more recent years annual averages have also shown increases above the annual air quality objective.

1.4.2 As one of the four shared transport priority themes, it was a mandatory requirement for the 2005 LTP to contain a target on air quality. The target chosen for the West Midlands Metropolitan Area is “Reduce the average level of NO2 by 1% between 2004/5 and 2010/11 in the areas where NO_2 exceeds the national objective”.

1.4.3 In terms of a justification for this target, levels of NO_2 had been seen to generally rise in established areas of exceedance (poor air quality) since the year 2000. This rise was especially dramatic in 2003 which resulted in many more areas of exceedance recorded throughout the UK. In the West Midlands most of the increases experienced in 2003 reduced during 2004 to levels similar to those recorded in 2002. Given the general rising trend, its was considered challenging to reduce levels of NO_2 by 2011.

Figure 4 Walsall Automatic Urban Network (AUN) Sites – Annual NO_2 Mean Concentrations and Trends 1987 to 2007



1.5 The Air Quality Action Planning Process in Walsall

1.6.1 Action planning is an essential part of the local air quality management process, providing a practical opportunity for improving air quality in areas where review and assessment has shown that national measures will be insufficient to meet one or more of the air quality objectives. An air quality action plan should include the following:

- Quantification of the source contributions to the predicted exceedances of the limit values. This allows the action plan measures to be effectively targeted;
- Evidence that all available options have been considered on the grounds of cost and feasibility;
- How the council will use its powers and also work together with others in pursuit of the relevant air quality objectives;
- Clear timescales within which the authority and other organisations propose to implement the measures contained in the plan;
- Quantification of the expected impacts of the proposed measures and, where possible, an indication as to whether these will be sufficient to meet the objectives; and
- How the local authority intends to monitor and evaluate the effectiveness of the plan.

1.6.2 These principles have been incorporated in development of the AQAP for Walsall. It is essential that the implementation of the AQAP is closely monitored, and that it is incorporated into other strategic and corporate functions to maximise improvements in air quality.

2. Source Apportionment

2.1.1 In order to effectively target the measures within any AQAP, relative contributions of different source types (typically traffic, industrial and background sources) need to be determined. The results from this can then be used to help assess the effectiveness of different control options and which of one or more source types need to be addressed.

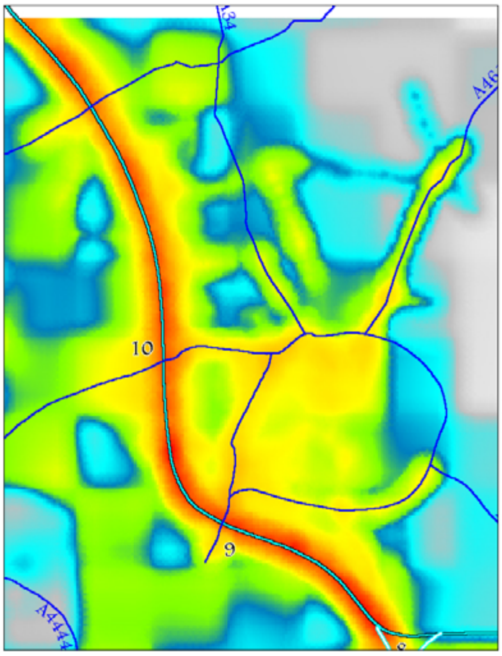
2.1.2 Nitrogen dioxide can arise as a primary emission from road traffic and from the emission of nitric oxide (NO) reacting to produce NO_2; collectively, emission are referred to as total oxide of nitrogen, NO_x.

2.1.3 Motor vehicles emissions consist predominantly of NO which is converted to NO_2. The rate at which NO_2 is formed from NO is proportional to the ambient temperature and the availability of other reactants involved in the process, including ozone and hydrocarbons. Whenever high levels of total oxides are present, the conversion of NO to NO_2 is limited if other chemical species are not present. Consequently, during summer months chemical reactions are much faster so that at low pollutant concentrations more than 80% of the total NO_x might consist of NO_2. Conversely, in the winter chemical reactions are much slower so that at high pollutant concentrations in particular only 20% the total NO_x consist of NO_2. The overall effect of the atmospheric chemistry is to have a reserve of NO in the atmosphere and therefore a reduction in the levels of total NO_x does not produce a proportionate reduction in the levels of NO_2.

2.1.4 This effect is demonstrated by pollutant levels recorded over the past decade. In the early 1990s maximum hourly concentrations of NO_x of an order 1500 μg/m^3 were associated with approximately 200 μg/m^3 of NO_2. Recently, maximum levels of total NO_x have fallen to around 800 μg/m^3, however these are still associated with maximum hourly levels of NO_2 about 150 μg/m^3. The corresponding average levels of total NO_x in the 1990s of the order 180 μg/m^3 were associate with 50 μg/m^3 of NO_2, but although the average levels of total NO_x have fallen to around 130 μg/m^3, these are still related to levels of NO_2 of between 45 to 50 µg/m^3. Archive information indicates that the concentrations of total NO_x may have to be reduced to between 50 to 60 to achieve concentrations of NO_2 that are consistently below 40 µg/m^3, which is a major reduction compounded by the variable climatic conditions now encountered in the UK. Should the climate become warmer and more unsettled, rates of conversion of NO to NO_2 could increase, and in-turn levels of NO_2 near to busy roads may similarly increase even as total concentrations of NO_x continue to fall.

2.1.5 A source apportionment study has thus been undertaken in order to determine the relative contribution of different sources at receptors within each of the areas of exceedance identified in the council's USA[4] and Stage 4 Assessment[5] reports.. As the road transportation sector is the major contributor to the emissions of NO_2 these can be examined by using known and predicted traffic flows, together with vehicle fleet compositions to form the basis for modelling pollutant levels, targeting. Key areas of exceedance (or likely exceedance) of air quality objectives are illustrated in Figure 5.

Figure 5 Areas of NO_2 Exceedance – Walsall Road Network



Predicted NO_2 Concentration /µg/m^3	
	≥ 60
	50 – 59
	45 – 49
	40 – 44
	35 – 39
	30 – 34
	< 30

2.2 Source Apportionment Methodology

2.2.1 The source apportionment study has been undertaken using the ADMS-Urban dispersion model following the modelling methodology described in the council's Stage 4 Assessment[5].

2.2.2 Traffic data used in the model has been obtained from the Mott MacDonald Group Ltd. internet-based geographic information system called SPECTRUM. Traffic flows are in the form of automatic permanent counts, automatic programmed counts, or ad-hoc counts for which a grid reference is provided to enable locations to be readily identified. Traffic counts for the period 2003 to 2006 inclusive were retrieved from:

http://www.strat-e-gis.co.uk/SPECTRUM_interface.asp

2.2.3 This data has been used in preference to PRISM traffic data for the West Midlands Conurbation as Mott MacDonald confirmed that PRISM is a transport model utilised for forecasting data for the future. The development of PRISM is understood to have been based upon SPECTRUM data, and hence the two are complimentary. Therefore, when looking at traffic flows retrospectively it is appropriate that SPECTRUM is used, whereas for future years (e.g. 2011 and 2021) PRISM would be employed.

2.2.4 Furthermore, comparison of SPECTRUM and PRISM data sets identified a significant difference in the volume of traffic reported. The Council is of the opinion that SPECTRUM data, which is a database of observed vehicle movements, provides an inherently more accurate representation of both the vehicle numbers and split between vehicle classes.

2.2.5 The traffic counts contained in SPECTRUM do not have any associated speeds. Thus, in order to model traffic emissions within ADMS Urban, conservative estimates of road traffic speeds have been made based on officer judgement in conjunction with local knowledge and vehicle speed limits

2.2.6 An additional module will be added to SPECTRUM in February 2007 which will extend its functionality to deliver CJAMS (Congestion and Journey-time Acquisition and Monitoring System), which has been developed since 2002 and is now used across England by the Department of Transport as the primary source of data for the urban network. CJAMS is also used by the Highways Agency as a major source of data on the inter urban network, notably where other sources of data are either unavailable or unreliable.

2.2.7 Notwithstanding traffic is the main consideration, the relative contribution of the following sources have been considered:

- Background sources;
- Road transport sources;
- Industrial sources; and
- Commercial / domestic sources.

2.2.8 Annual average concentrations of NO_x attributable to each of the sources described above have been predicted at receptors where exceedences of the annual NO_2 objective were predicted within the council's USA[4], as described below in Table 1.

Table 1 Source Apportionment Study Receptors

Ref.	Road Junction / Location	Receptor Co-ordinates		Modelled NO_2 ($\mu g/m^3$)	Description
		X	Y		
A	Hollyhedge Lane Wolverhampton Road Pleck Road	400486	298735	52.2	Busy Road Junction
B	Bescot Road Wallows Lane	400001	296852	42.7	Busy Road Junction
C	Old Pleck Road Wednesbury Road Darlaston Road	400064	297328	45.9	Busy Road Junction
D	Wolverhampton Road Alumwell Road	399829	298790	47.2	Busy Road Junction

Ref.	Road Junction / Location	Receptor Co-ordinates		Modelled NO_2 (µg/m^3)	Description
		X	Y		
E	Pleck Road Bridgeman Street Moat Road	400507	298504	44.8	Busy Road Junction
F	Pleck Road Rollingmill Street Ida Road	400256	298126	45.1	Busy Road Junction
G	Lower Rushall Street Ablewell Street Upper Rushall Street Bridge Street	401696	298472	47.8	Busy Road Junction
H	Bloxwich Lane Cavendish Road Bentley Lane	399148	300079	47.8	Busy Road Junction
I	Stafford Street Proffitt Street	401024	299527	41.0	Busy Road Junction
J	Stafford Street Day Street	401092	299090	49.8	Busy Road Junction
K	Lichfield Road Mellish Road Buchanan Avenue	401994	299397	52.0	Busy Road Junction
L	Broad Lane Bell Lane Sandbank Sneyd Lane	399339	302538	47.3	Busy Road Junction
M	Stafford Road Lichfield Road High Street Bell Lane	399829	302553	40.1	Busy Road Junction
N	Bloxwich Road Stafford Street Hospital Street	401024	299593	48.0	Busy Road Junction
O	Bradford Street Vicarage Place Wednesbury Road	401106	298066	51.3	Busy Road Junction
P	Cresswell Crescent Sneyd Lane	398779	302298	42.8	Busy Road Junction
Q	Lichfield Road Daw End Lane Station Road	402715	301066	41.5	Busy Road Junction
R	West Bromwich Street	401343	297540	36.5	Narrow Congested Street
S	Wednesbury Road	400353	297330	37.9	Narrow Congested Street
T	High Street, Bloxwich	399801	302128	43.3	Narrow Congested Street
U	Birmingham Road	402500	297350	30.6	Narrow Congested Street

2.3 Source Apportionment Results

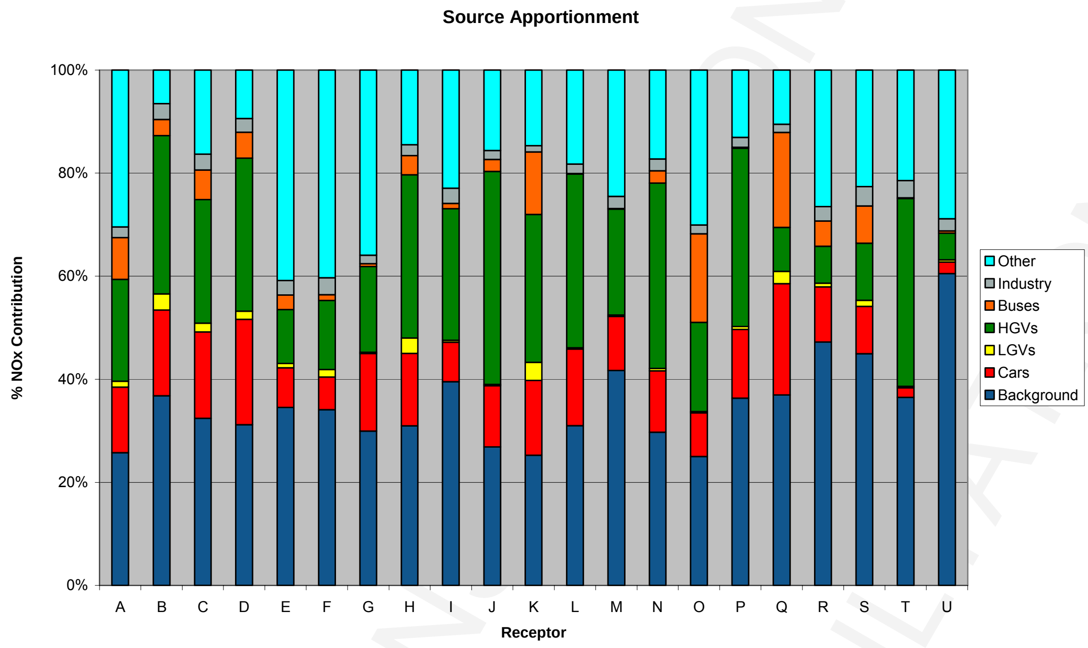
2.3.1 The results of the source apportionment study are shown in Table 2 and illustrated in Figure 6. Generic vehicle splits are approximate as :

	%
Pre Euro Diesel	0.9
Euro 1 Diesel	3.4
Euro 2/3 Diesel	18.1
Pre Euro Petrol	9.5
Euro 1 Petrol	10.3
Euro 2/3 Petrol	43.1
Light Goods Vehicles	10.3
Heavy Goods Vehicles	3.4
Buses	1.0

Table 2 Source Apportionment Study Results - NO_X

Ref	% Contribution to Annual Average NO_X Concentration			
	Background	Road Transport	Industry	Commercial & Domestic
A	26	42	2	30
B	37	54	3	7
C	32	48	3	16
D	31	57	3	9
E	35	22	3	41
F	34	22	3	40
G	30	32	2	36
H	31	52	2	14
I	40	35	3	23
J	27	56	2	16
K	25	59	1	15
L	31	49	2	18
M	42	31	2	25
N	30	51	2	17
O	25	43	2	30
P	36	49	2	13
Q	37	51	2	11
R	47	23	3	27
S	45	29	4	23
T	36	39	3	21
U	60	8	2	29

Figure 6 Source Apportionment Results – NO_x Contribution



2.3.2 The results indicate that NO_2 concentrations at locations predicted to exceed the annual NO_2 objective within Walsall are significantly affected by background, road transport and commercial & domestic sources, whereas industrial sources are not predicted to significantly contribute to NO_x concentrations within any of the areas of exceedance identified.

2.3.3 Background sources typically contribute approximately 30% of NO_X concentrations, road transport 50% and commercial and domestic sources 20%.

2.3.4 Emissions from road transport have been further disaggregated in order to determine the relevant contribution of different vehicle types as shown below in Table 3.

Table 3 Source Apportionment Study Results – NO_2

Ref	% Contribution to Annual Average NO_2 Concentration			
	Cars	**LGVs**	**HGVs**	**Buses**
A	13	1	20	8
B	17	3	31	3
C	17	2	24	6
D	20	2	30	5
E	8	1	10	3
F	6	1	13	1
G	15	< 1	17	1
H	14	3	32	4
I	8	< 1	26	1
J	12	< 1	41	2
K	15	4	29	12
L	15	< 1	34	< 1
M	10	< 1	21	< 1
N	12	< 1	36	2
O	8	< 1	17	17
P	13	1	35	< 1
Q	22	2	9	18
R	11	1	7	5
S	9	1	11	7
T	2	< 1	36	< 1
U	2	< 1	5	< 1

2.4 Conclusions

2.4.1 The results indicate that NO_2 concentrations within areas predicted to exceed the annual air quality objective are predominantly affected by emissions form road transport and to a lesser extent by emissions from commercial and domestic sources. It is therefore considered that any air quality action plan must obviously concentrate on reducing emissions from road transport sources.

2.4.2 Emissions of NO_2 from road transport are significantly affected by emissions from HGVs and to a lesser extent by cars. LGVs tend not to contribute extensively to NO_X emissions, whilst buses have a significant contribution at three locations. These two main sources which should be targeted in order to most effectively reduce NO_x concentrations.

2.4.3 The impact of St. Paul's bus station located in Walsall town centre has not been explicitly addressed in this context. This has previously been identified as problematic[6] and will require specific consideration. It is therefore intended to include this within the AQAP framework as required following completion of an extended Stage 4 Assessment[5].

3. Required Level of Reduction in Nitrogen Dioxide

3.1.1 Before identifying the options available to improve air quality it is important to determine the overall level of improvement required. This can be calculated in micrograms per cubic metre concentration ($\mu g/m^3$) as the difference between the total predicted concentration and the relevant AQO and expressed in terms of concentration units or as a percentage.

3.1.2 For the purposes of AQAP the level of reduction required has been established for each of the receptors considered within this assessment. The relevant reduction in annual average NO_x concentrations that is required to meet the annual NO_2 air quality objective has been determined, and expressed in terms of percentage, as shown in Table 4. This assessment has been based upon the assumption that a NO_X concentration of 80 $\mu g/m^3$ equates to an NO_2 concentration of 40 $\mu g/m^3$. The percentage reduction in NO_X emissions from just road transport that is required to meet the NO_2 objective has also been determined.

Table 4 Indicated Level of Reduction in NO_X Required

Ref	% Reduction in NO_X Emissions Required to meet Annual NO_2 Objective	
	Total NO_X Emissions	Road Transport NO_X Emissions
A	39	93
B	13	24
C	23	48
D	26	46
E	18	83
F	19	85
G	29	89
H	26	51
I	6	18
J	36	65
K	40	68
L	26	54
M	1	3
N	29	58
O	41	94
P	14	28
Q	12	24
R	< 1	< 1
S	< 1	< 1
T	13	35
U	< 1	< 1

3.1.3 It is seen that relatively large reductions in NO_X concentrations are required in order to meet the annual NO_2 objective at the receptors under consideration. It is considered that background concentrations, emissions from domestic and commercial sources and vehicle emissions of NO_X will inherently reduce in the future due to increased efficiency, improved technology and tighter pollution control. Nonetheless, it is considered that further measures to reduce NO_X concentrations will be required in order to meet the annual NO_2 objective.

3.1.4 To inform this process, and to further develop the AQAP, the West Midlands Emissions Data Base has been updated for 2007 which will be used by the council to carry out a repeat and extended Stage 4 Assessment. The results of this will be utilised to improve source apportionment and enable more closely focussed discrete actions to improve air quality.

4. Proposed Actions

4.1.1 The Council has no direct control over background concentrations of NO_x and relatively little control over domestic and commercial emissions. It is considered that the most effective measures in reducing NO_X emissions, and thereby annual average NO_2 concentrations, are likely to be those that concentrate in reducing emissions from road transport.

4.1.2 The following measures have been considered when specifying specific actions to be taken to reduce exposure of sensitive receptors to road transport emissions:

- Improving the road network to reduce congestion;
- Real-time traffic flow monitoring systems to assess / mitigate traffic congestion using the West Midlands Urban Traffic Control scheme;
- Assessment of short-term air quality via use of real-time urban traffic control software based on vehicle counts and vehicle types;
- Improving public transport to reduce traffic volumes;
- Reducing air pollution from industrial, commercial and residential areas;
- Changing levels of travel demand;
- Promotion of alternative methods of transport and transport initiatives; and
- Reduction of vehicle emissions at a national and inter-national level.
- Bus lane sharing for HGVs.
- Provision of information to road user via traffic/vehicle management systems.

Table 5 Proposed Actions

Table A2 Walsall NO2 Diffusion Tube Network - Wolverhampton Road	**(A454) Data**			
Table A2 Walsall NO2 Diffusion Tube Network - Wolverhampton Road				
Table A2 Walsall NO2 Diffusion Tube Network - Wolverhampton Road	**(A454) Data**			
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Table A2 Walsall NO2 Diffusion Tube Network - Wolverhampton Road	**(A454) Data**			
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Key: Priority 1 = High Priority 2 = Medium Priority 3 = Low Priority Cost Benefit: Low = £?k Med = £?k High = £?k

4.1.3 A preliminary assessment has also been undertaken of likely improvements in air quality as a result of reduced congestion and reduced HGV emissions. The results of which are shown below in Table 6. As the degree by which congestion could be reduced as a result of the various schemes detailed above is difficult to predict, the effect of reducing emissions of queuing traffic by 50% has been assessed. Likewise the degree by which HGV movements could be reduced is similarly difficult to predicted, therefore emissions from HGVs have also been reduced by 50%. These reductions are considered likely to be extremely optimistic and have been assessed to show the scale of improvement which could be achieved, which can only be attained via implementation of combinations of specified measures herein.

Table 6 Predicted Change in NO_2 Concentration

Ref	Assuming 50% Reduction in Emissions from Queuing Traffic		Assuming 50% Reduction in Emissions from HGVs	
	Predicted NO_2 Concentration ($\mu g/m^3$)	Reduction in NO_2 Concentration ($\mu g/m^3$)	Predicted NO_2 Concentration ($\mu g/m^3$)	Reduction in NO_2 Concentration ($\mu g/m^3$)
A	51.7	-0.5	50.6	-1.6
B	42.6	-0.1	43.7	1.0
C	45.3	-0.6	44.0	-1.9
D	47.2	0.0	47.0	-0.2
E	44.9	0.1	44.6	-0.2
F	45.3	0.2	44.5	-0.6
G	46.5	-1.3	46.1	-1.7
H	47.8	0.0	44.8	-3.0
I	39.7	-1.3	38.8	-2.2
J	46.9	-2.9	45.3	-4.5
K	51.8	-0.2	48.9	-3.1
L	44.6	-2.7	43.8	-3.5
M	38.6	-1.5	38.2	-1.9
N	45.6	-2.4	43.9	-4.1
O	49.1	-2.2	49.4	-1.9
P	40.6	-2.2	40.5	-2.3
Q	40.7	-0.8	40.9	-0.6
R	36.6	0.1	36.4	-0.1
S	38.2	0.3	37.9	0.0
T	40.9	-2.4	39.2	-4.1
U	30.7	0.1	30.6	0.0

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4.1.4 It can be seen that the reduction in NO_2 concentrations as a result of reducing emissions from HGVs is greater than that afforded by reducing emissions from queuing traffic. It should be noted however, that even with either of these improvements the annual NO_2 objective is still predicted to be exceeded at most receptors in 2006.

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5. Action Plan Steering Group

5.1 An Action Plan Steering Group will be developed in order to further progress the measures detailed herein. A core Steering Group is to be established within the council that will engage in consultation with:

- Neighbourhood Services Traffic Management (Walsall MBC);
- Transportation Forward Planning (Walsall MBC);
- Planning and Building Control (Walsall MBC);
- Regeneration Services – Delivery and Development (Walsall MBC);
- Regeneration Services– Strategic Regeneration (Walsall MBC);
- Policy Services (Walsall MBC);
- Pollution Control (Walsall MBC);
- Neighbourhood Partnerships & Programmes (Walsall MBC);
- Walsall Town Centre Management;
- CENTRO;
- Department for Transport;
- The Environmental Agency;
- The Highways Agency;
- Walsall Teaching Primary Care Trust;
- Neighbouring local authorities;
- Regional Pollution Groupings.
- Education Services;

6. References / Bibliography

1. The Air Quality Strategy for England, Scotland, Wales and Northern Ireland. DEFRA July 2007

2. Air Quality in Walsall. Report of the Third Stage Review and Assessment of Air Quality, Walsall Metropolitan Borough Council, December 2000.

3. Air Quality in Walsall. Report of the Third Stage Review and Assessment of Air Quality in – Nitrogen Dioxide Addendum. April 2002.

4. Walsall Council Air Quality Review and Assessment. Updating & Screening Assessment 2006.

5. Walsall Metropolitan Borough Council. Stage 4 Review & Assessment of Air Quality (1st Round). May 2005.

6. Walsall Metropolitan Borough Council. Detailed Assessment of Air Quality. Nitrogen Dioxide – St. Paul's Bus Station. June 2006.

Further information concerning air quality in Walsall can be viewed at:

http://www.walsall.gov.uk/index/environment/pollution/air_quality.htm

Appendix 1

Air Quality Monitoring in Walsall

Extracts from Updating and Screening Assessment 2006

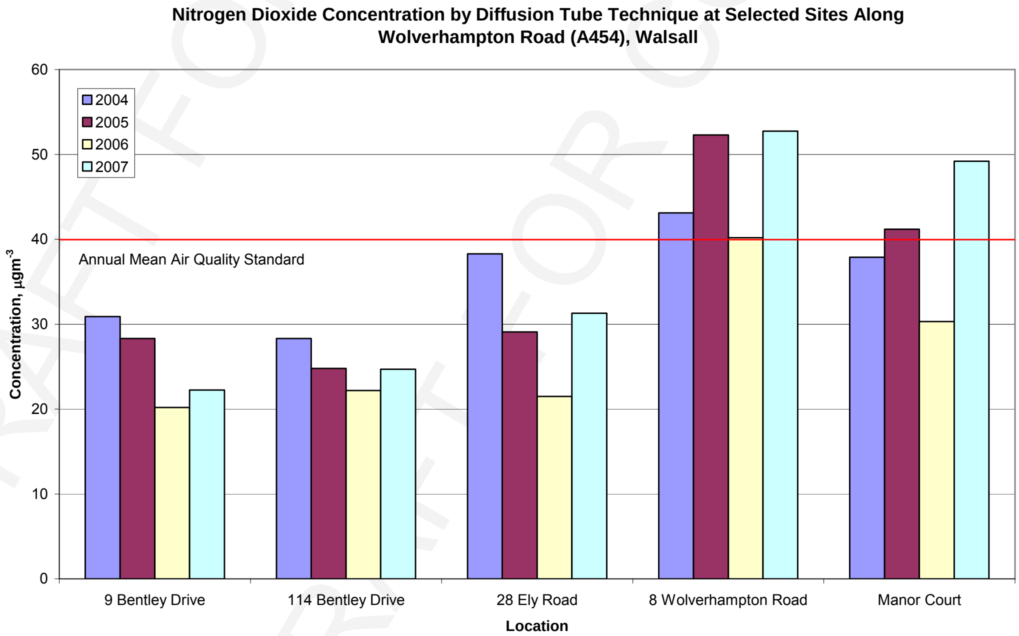
Table A1 Concentrations of Nitrogen Dioxide from the Automatic Monitoring Stations in Walsall

Year	Site	Annual Mean (μgm-3)	No. of Hourly Exceedances	% Data Capture
2003	Walsall, Alumwell	42	0	>90
	Walsall, Willenhall	30	0	>90
2004	Walsall, Alumwell	42	1	>90
	Walsall, Willenhall	27	0	>90
	Wolverhampton Road	37.6	0	>90
	Bescot Road	40.9	0	>90
2005	Walsall, Alumwell	42	3	>90
	Walsall, Willenhall	n/a	0	<90
	Wolverhampton Road	40.5	0	>90
	Bescot Road	47.4	2	>90
2006	Walsall, Alumwell	36	0	>90
	Walsall, Willenhall	30	0	<90
	Wolverhampton Road	43.2	0	>90
	Bescot Road	47.9	0	>90
2007	Walsall, Alumwell	36.4	0	>90
	Walsall, Willenhall	31.08	0	>90
	Wolverhampton Road		Data currently unavailable#	
	Bescot Road	50.6	3	>90
	St. Paul's Bus Station	56.4	0	<80

Table A2 Walsall NO2 Diffusion Tube Network - Wolverhampton Road (A454) Data

	2004 Concentration (μgm^{-3})	**2005 Concentration (μgm^{-3})**	**2006 Concentration (μgm^{-3})**	**2007 Concentration (μgm^{-3})**
9 Bentley Drive Grid Ref: 400002, 299146	30.9	24.8	20.2	22.2
114 Bentley Drive Grid Ref: 399882, 298870	28.3	29.1	22.2	24.7
28 Ely Road Grid Ref: 399616, 298181	38.3	52.3	21.5	31.3
8 Wolverhampton Road Grid Ref: 399919, 298795	43.1	41.2	40.2	52.7
Manor Court Grid Ref: 400220, 298731	37.9	41.2	30.3	49.2

Figure A1 Nitrogen Dioxide Concentrations Measured by Diffusion Tube Technique at Selected Sites Along Wolverhampton Road (A454), Walsall



Note: Original site locations for Alumwell and Willenhall Automatic Monitoring Stations were determined on behalf of DEFRA as part the National Air Quality Monitoring Network, having regard to the M6 motorway corridor. Locations for other Automatic Monitoring Stations were selected on the basis of the Stage 4 Review & Assessment of Air Quality (1st Round). May 2005 to reflect areas of consistently poor air quality.

NO_2 diffusion tube sites relate to the National NO_2 Diffusion Tube Survey operated by DEFRA. This formally ceased in 2005, though survey work continues to build on the existing database of information and since the A454 between J10 M6 motorway and Walsall Town Centre has historically experienced high levels of NO_2.

Additional air quality monitoring data can be found at

http://www.walsall.gov.uk/index/environment/pollution/air_quality.htm