



Shrewsbury & Atcham Borough Council

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Revised Air Quality Action Plan

Executive Summary

Shrewsbury and Atcham Borough Council's Environmental Health Service has produced this Action Plan following the Review and Assessment of Air Quality in its district as part of its duty under the Environment Act 1995.

The report follows on from the Stage III Assessment completed in 2000, Stage IV in August 2003, Detailed Assessment in July 2004 and further Detailed Assessment in March 2006. Work has continued following the declaration of 3 Air Quality Management Areas (AQMA) at Bayston Hill (AQMA 01), Heathgates Island (AQMA 2) and Frankwell/Smithfield Road (AQMA 03). This includes further modelling and monitoring, which has indicated that Nitrogen Dioxide (NO₂) levels in these areas are likely to rise unless action is taken. An Action Plan has therefore been drawn up investigating the various options available to tackle pollution levels, in particular from road traffic. The effects of these options are examined in detail, with the most effective package of measures (the Action Plan) chosen for implementation.

An in-depth study of this package takes place within this document, concluding that the Action Plan should result in a reduction in Nitrogen Dioxide levels and will work towards meeting National Air Quality Objective (NAQO) levels. The Council will continue to monitor the levels in all 3 AQMAs and around its district generally as part of its ongoing air quality management duties.

The measures in this Action Plan also work towards reducing levels of NO₂ in the enlarged Air Quality Management Area (03A) in the extended town centre, encompassing AQMA 03 Frankwell/Smithfield Road. This was declared in February 2006 for the predicted exceedence of the annual mean NO₂ NAQO and covers an area from English Bridge gyratory through High Street, Shoplatch and Barker Street and through Dogpole, St Mary's Street, Castle Street/Gates and Chester Street.

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1.0 INTRODUCTION

Shrewsbury and Atcham Borough Council (SABC) has a responsibility under Section 84(2) of the Environment Act 1995 to produce an Air Quality Action Plan. This must detail the steps to be taken to improve air quality in the three Air Quality Management Areas (AQMAs) which were designated in May 2003, one of which was subsequently enlarged in March 2006. The AQMAs cover most of Shrewsbury town centre encompassing Frankwell/Welsh Bridge/Smithfield Road and the English Bridge gyratory, Heathgates Island and part of Hereford Road (A49) in Bayston Hill as shown at figures 1-3. The document should detail specific options which can be implemented within a given time scale in order to reduce the annual mean Nitrogen Dioxide (NO₂) level at the façades of the adjoining properties where sensitive receptors are present, to below the National Air Quality Objective level of 40µg/m³ applying from year 2005. Approximately five hundred residential properties are potentially affected by levels above the annual mean NO₂ objective and are included in the AQMAs. Other nearby residential properties were not included, in order to avoid unnecessary potential blight.

Following designation of the original three AQMAs, further review and assessment of Air Quality has been carried out:-

1. **Stage IV Air Quality Review and Assessment – October 2003, prepared by Casella Stanger Consultants on behalf of SABC.**

The Stage IV Review and Assessment of Air Quality can be found at Appendix 1. This in principle forms a technical annex to the Action Plan and was completed as required within 12 months of the Air Quality Management Area's declaration. That Review follows on from the Stage I, II and III Assessments completed jointly by the six District and Unitary Authorities in Shropshire under their responsibilities designated by the Environment Act 1995.

It includes further monitoring and modelling as well as background technical data in order to re-evaluate and update the Stage III Report which, in SABC's case, resulted in the declaration of the three Air Quality Management Areas.

This work was carried out to supplement the technical information previously gathered e.g. update traffic-flow data and monitoring data and calculate how much of an improvement would be required to deliver the air quality objectives within the AQMAs.

The conclusions were that SABC were correct in designating three AQMAs, in that exceedences of the annual mean NO₂ objective 2005 were expected at the sensitive locations and hourly mean NO₂ exceedences may also occur at some locations. This modelling also suggested that it might be necessary to designate an additional AQMA as exceedences of the NO₂ objective were predicted at sensitive locations at Meole Brace.

The changes to the national emission factors were finalised too late to be incorporated into the dispersion modelling carried out for the Areas as part of the Stage 4 work. However, because they would affect calculations for the AQMAs, further modelling took place using these factors during the next round of Review and Assessment, the results of which have resulted in implications for the Frankwell / Smithfield Road AQMA. as discussed in Section 1.3 below. Any subsequent developments in review and assessment techniques will be taken on board in future updating work.

2. Updated Screening Assessment (2nd Round) – November 2003 – prepared by Casella Stanger Consultants, carried out on behalf of all the Shropshire district authorities and Telford and Wrekin Unitary Authority.

This indicated that detailed assessment should be carried out by SABC in respect of NO₂ from road traffic sources, PM₁₀ from Bayston Hill Quarry and jointly with Bridgnorth District Council and the Borough of Telford and Wrekin in respect of Sulphur Dioxide from Ironbridge Power Station. The detailed assessments of PM₁₀ and Sulphur Dioxide concluded that no breaches of the objectives were predicted and therefore that AQMAs were not required for those two pollutants.

3. Local Air Quality Management – Detailed Assessment (2nd Round) – July 2004, prepared by Casella Stanger Consultants on behalf of SABC.

Remodelling of predicted NO₂ levels from road traffic sources was carried out from one base model encompassing the previously separately modelled areas. Latest traffic-flow data, emissions factors and improved monitoring data were incorporated into this dispersion modelling to more accurately assess the impact of pollution sources on local receptors at identified hotspots.

The conclusions of this work were that predicted exceedences of the annual mean objective for NO₂ at year 2005:-

a. remained largely as previously predicted for AQMA (01) at Bayston Hill

and

b. applied to a much enlarged area of the Town Centre, encompassing existing AQMA (03).

NO₂ levels at the Heathgates AQMA (02) were predicted to be close to, but not exceeding, the National Air Quality Objective and it was therefore considered appropriate not to revoke that AQMA in order to maintain a precautionary approach in view of proposed major developments in North Shrewsbury. This precautionary approach was again endorsed by resolution of the Development Control and Environmental Protection Committee in September 2007

NO₂ levels at Meole Brace were predicted to be close to, but not exceeding the NAQO, such that it would not be appropriate to designate a new AQMA there at the present time.

The predicted annual mean NO₂ levels (from the latest Detailed Assessment Report) and the reductions required to meet the annual mean objective for 2005 of 40µg/m³ are set out in the following table.

AQMA NUMBER/LOCATION	Predicted 2005 Level	Required Reduction	% Reduction Required
01 Bayston Hill	36-44 µg/m ³	Up to 4 µg/m ³	Up to 9
02 Heathgates	36-40 µg/m ³	NIL	NIL
03 Frankwell/Smithfield Road	40-48 µg/m ³	Up to 8 µg/m ³	Up to 16.7
03A Extended Town Centre	36-51 µg/m ³	Up to 11 µg/m ³	Up to 21.6
NOTES: The above predictions cover a range of levels within different parts of the designated areas and take account of the error margins within ADMS-Roads dispersion model.			

The hourly objective for NO₂ of 200 µg/m³ (18 exceedences/year) may also be exceeded at some locations.

4. Local Air Quality Management - Further Assessment – March 2006, prepared by Bureau Veritas Consultants on behalf of SABC.

Bureau Veritas was commissioned to provide a Further Assessment of air quality within the Shrewsbury Town Centre (extended) AQMA 03A and Heathgates AQMA 02 to provide further technical input into the Final Draft Air Quality Action Plan, which had been integrated into the 2nd Local Transport Plan 2006 - 2011 (LTP2) developed by Shropshire County Council (SCC). The information within the Further Assessment assists in the setting of appropriate baseline and targets for the air quality mandatory indicator LTP8 for the two AQMAs in the Shrewsbury urban area declared due to traffic emission sources on local roads for which SCC is responsible as the Highways Authority. The A49 Bayston Hill AQMA has been declared on the basis of trunk road emissions and is the responsibility of the Highways Agency, and as such is outside the remit of the LTP.

The Further Assessment – March 2006 Report can be found at Appendix 2 and in principle forms a further technical annex to the Action Plan. This Further Assessment also aims, through assessment of monitoring data and modelled predictions:

- to confirm the original assessment of air quality in the AQMA against the prescribed objectives;
- to calculate more accurately how much of an improvement in air quality would be needed to deliver the air quality objectives within the AQMA;
- to refine knowledge of the sources of pollution so that air quality action plan measures can be properly targeted;
- to provide quantification of air quality impacts of introducing particular air quality action plan measures through scenario testing.

This assists in targeting and focussing the measures, thereby ranking the most cost-effective approach to reducing air pollutant concentrations in the AQMAs.

Detailed dispersion modelling of NO_x was undertaken using the Cambridge Environmental Research Consultants (CERC) Ltd ADMS-Roads advanced gaussian air

dispersion model using the most recent annual average daily traffic flows (AADT) traffic data and speed data for Shrewsbury town centre provided by SCC and the latest pollutant monitoring data from SABC. Meteorological data from Shawbury meteorological station was also input into the model.

The report confirms the need for continued declaration of the Shrewsbury Town Centre AQMA for NO₂ annual mean Objective (40µg/m³), due to predicted exceedences of the Objective in the baseline year 2004. By 2010, the model predictions indicate that exceedences of the NO₂ annual mean Objective still occur, but are likely to be restricted to small parts of the Shrewsbury Town Centre AQMA, where there are street canyons and congestion issues e.g. Castle Foregate.

The impact assessment scenarios carried out included:

- Predicted NO₂ annual mean concentrations in 2010, with a sustained baseline of 2004 traffic growth;
- Source apportionment of buses and establishment of impacts of improved emissions proposed for Park and Ride fleet in the Town Centre;
- Traffic reduction scenarios, to quantify the reduction in traffic required to meet the Objective and EU Limit.

The results of this scenario testing are that traffic management measures to improve flows and reduce stop/start traffic movements and/or taking further action to improve the worst polluting vehicles in the fleet (buses/HGV) are likely to have more of an impact at Castle Foregate than an overall traffic reduction target. All other receptors modelled predict that the annual mean Objective/EU Limit will be met in 2010 without further traffic reduction measures.

In addition modelling was undertaken to provide NO_x source apportionment for receptors within AQMA 03A using emission factors for Cars, LDV, HDV and Bus vehicle classes, together with the corresponding percentage of the traffic flow. The percent contribution from each vehicle class could therefore be calculated. The HGV and bus class vehicles were found to be contributing disproportionately to NO₂ concentrations in the town centre; contributing over a half of NO₂ from road traffic, with buses contributing to up to a quarter of the total NO₂ annual mean concentrations (on average 13.9%). Targeting this vehicle class through improved bus emissions for Park and Ride buses (which form a significant proportion of the bus fleet through the Town Centre) will clearly be beneficial.

There are no predicted exceedences at the Heathgates Roundabout AQMA to warrant any further LTP2 measures e.g. through traffic reduction measures. However, the 'soft' measures progressed through this Action Plan to encourage modal shift will be equally beneficial at this location.

5. Updated Screening Assessment (3rd Round) – May 2006, prepared by Bureau Veritas Consultants on behalf of SABC.

The report examined the results of the latest monitoring of NO₂, any significant changes to the highway infrastructure or its usage, major new developments that had taken place or were planned in the borough and any relevant changes to industrial processes. It concluded that further detailed assessment of NO₂ outside the existing AQMAs was not required nor was detailed assessment in respect of the other pollutants of concern.

The original reports can be viewed and additional information on the AQMAs and air quality in general can be found on the Councils Air Quality web pages at

<http://www.shrewsbury.gov.uk/public/health/airquality/default.htm>.

Information can also be sought from the offices of Shrewsbury and Atcham Borough Council at the address below: -

Environmental Health Service
Shrewsbury and Atcham Borough Council
The Guildhall
Frankwell Quay
Shrewsbury
Shropshire
SY3 8HQ

Tel. 01743 281000

e-mail: environmental.health@shrewsbury.gov.uk

SABC has continued to carry out monitoring of NO₂ (and other pollutants) using its real time monitoring station located at Bayston Hill and a network of 45 NO_x diffusion tubes across primarily the urban area. The results from this monitoring have been used for validation of the modelling work described above and have assisted in providing confirmation of pollution 'hot spots'.

In the production of this Action Plan, SABC has attempted to involve all relevant parties and consultation with these groups and individuals has occurred throughout. The public have been kept informed of the process and comments and suggestions sought through the use of the local media, the production of an information leaflet and the holding of two specific public consultation events at Bayston Hill and Shrewsbury Town Centre. The Bayston Hill event received a reasonable response and the results of both exercises, where stakeholders were invited to vote for and comment on possible Action Plan options were reported on by Rural Resources who assisted the Council in managing the events. The report is shown at Appendix A. Public feedback was also obtained from The Shrewsbury Conference events held in October and November 2003.

More recently, questionnaires to gauge the extent of support for AQAP measures have been distributed at a number of events such as SCC's consultation on the North West Relief Road at The Pride Hill Shopping Centre and Shrewsbury Library between 21st May and 18th June 2005, SABC Green Festival at Shropshire Wildlife Trust on 2nd July 2005 and 7th July 2007, Teenage Kicks/Company of Cyclists at The Quarry on 28th August 2005, at Tesco's Store on 24th February 2006, at the Voluntary Emissions Testing event on 5 May 2006 and at the 'Shrewsbury's Traffic without a Tif' public meeting /presentations at the Shirehall on 14th November 2007. The questionnaire and the results of the analysis of responses are shown at Appendix E

Proposals for inclusion in this Plan were also raised at the Shrewsbury Conference event on 29th October 2007 and comments received from the general public between September and December 2007 were reproduced in full as part of the reports to SABC elected members.

Working groups of internal and external stakeholders have been involved in identifying and evaluating the Action Plan options and the details of membership of these groups, with the minutes of their latest meetings in October and November 2007 shown at Appendices B and C. In addition, the Environmental Wellbeing and Economic Wellbeing subgroups of the Shrewsbury and Atcham Partnership have been consulted on the content of this plan.

This plan should also be seen in the context of the Revised Community Strategy for Shrewsbury and Atcham 2004 – 2012 - sections Env W 1 (page 30) and Env W 5 (pages 36 and 37) which can be accessed at

<http://www.shrewsbury.gov.uk/public/community/communitypartnership/community+strategy+2005+word+19-05-05.pdf> and the concept of 'Shrewsbury – striving to become a Borough of Environmental Excellence'. Links with relevant objectives on pages 33 and 34 in the Borough Council's Corporate and Performance Improvement Plan 2007-2008 can be accessed at <http://www.shrewsbury.gov.uk/public/publications/corporatepip/pip0708/corporate+and+performance+improvement+plan+2007-08.pdf>

The cause of the air quality exceedences in all 3 areas was attributed to the traffic levels in those areas. No significant contributions from industrial or point sources were identified in the Borough. The options investigated and carried through to this Action Plan are therefore those that will target traffic levels and emissions, as opposed to point sources. In view of this, the Transport Planning Section at Shropshire County Council were asked for their ideas and opinions to feed in to the overall Action Plan and many of the proposed options stemmed from their views and existing proposals in the Local Transport Plan 2000 - 05. Further work for the LTP2 has progressed options into measures that can now be taken forward by SCC in that plan and by SABC. The assistance given by SCC and all the other stakeholders is greatly appreciated.

Each option available to the Council has been considered not only for its ability to alleviate air pollution problems, but also its effects on the area's economic stability and the welfare of the local population - in other words the overall sustainability of each option has been considered. Both negative and positive direct and indirect effects have been detailed, with an attempt made to quantify the costs of each option.

The result of this plan will be the implementation of a package of measures from those described below, which are predicted to result in the greatest improvement in air quality in the three areas, while balancing the financial, economic and social costs and benefits. The work involved must be proportionate to the benefits achieved.

The chosen measures will not necessarily result in the NAQO being fully achieved, but will be proven to be working towards meeting the objective. A review of the options will take place in order to ensure they are actually being undertaken within the proposed timescale. Actions will not necessarily focus or be implemented in the three areas directly, but will involve a wider area around Shrewsbury and the Borough, with associated benefits for the Air Quality Management Areas.

2.0 ACTION PLAN MEASURES

An overview of the measures available to improve air quality in the Borough is given below. The responsibility for progressing these lies with various bodies and the lead roles as explained in the Key below are as shown. However, the implementation of each can be influenced by SABC.

Some of the measures are new ventures not yet commenced, while others may already be underway. The timescale/status as explained in the Key is indicated. The potential air quality impacts and costs are also noted against each option, as explained in the Key.

Despite the work done in the Stage IV Review and Assessment and the Further Assessment (2006), it is extremely difficult to equate the exact levels to which a specific measure could affect NO₂ in a given area. The decision was therefore made to use an appropriate qualitative scoring to show to what extent the air quality impact of each measure could affect the AQMAs.

Each measure is considered to lead to improvements to air quality (and therefore health); therefore only the other impacts have been specifically mentioned in the summary tables.

KEY TO OPTIONS TABLES (Below)

Lead Role Organisations

SABC EH	Shrewsbury and Atcham Borough Council Environmental Health
SABC ED	Shrewsbury and Atcham Borough Council Economic Development / Destination Shrewsbury
SABC ENG	Shrewsbury and Atcham Borough Council Engineering Services
SABC PR	Shrewsbury and Atcham Borough Council ParkRight
SABC SO	Shrewsbury and Atcham Borough Council Sustainability Officer
SABC CDO	Shrewsbury and Atcham Borough Council Com. Development Officer
SABC PA	Shrewsbury and Atcham Borough Council Public Amenities
SABC PP	Shrewsbury and Atcham Borough Council Planning Policy
SABC DC	Shrewsbury and Atcham Borough Council Development Control
SABC LIC	Shrewsbury and Atcham Borough Council Licensing
SCC	Shropshire County Council
SSDC	South Shropshire District Council
NSDC	North Shropshire District Council
BDC	Bridgnorth District Council
OBC	Oswestry Borough Council
BTW	Borough of Telford and Wrekin Unitary Authority
HA	Highways Agency
VOSA	Vehicle and Operator Services Agency
SRA	Strategic Rail Authority
NR	Network Rail
PCT	Primary Care Trust (NHS)

Time Scales/Status

Short Term	Commencing 2007/08
Medium Term	Before the end of 2008/09

Long Term Before the end of 2010/11
Ongoing Already underway, or planned to occur within the 2006-
2011 Local Transport Plan

Air Quality Impacts on AQMAs

Low Impact is likely to be low without other complimentary schemes
Medium Proposed measure is likely to affect air quality but not to a great
degree without complimentary schemes
High Impact is likely to affect air quality in the AQMA to a high degree
with or without complimentary schemes
Very High Impact is likely to be very high within the AQMA with or without
complimentary schemes

Cost

Low Low Cost to implement in isolation (Up to approx £5,000)
Medium Medium Cost to implement in isolation (approx £5,000 -
250,000)
High High Cost to implement in isolation (approx £250,000 -
£1,000,000)
Very High Very high cost (approx £1,000,000 plus)

2.1 Alternative Transport

Option	Timescale / Status	Local Transport Plan Programme Area	Applicable AQMA	Lead Roles	Other Impacts	Cost	Funding Provision	Potential Air Quality Impact
Public Transport Improvements								
Increased and Improved Public Transport Promotion and Information	Ongoing	10.3 Passenger Transport	All three	SCC SABC SO (links with Green Travel Plan)	Reduced congestion Increased patronage Higher profile for public transport	Low	From existing budgets	TC= Low H= Low B= Low
Upgrading of public transport infrastructure	Ongoing	10.3 Passenger Transport	All three	SCC	Reduced congestion Increased public transport patronage	High	From existing LTP2 budget	TC= Low H= Low B= Low
Expand the Shrewsbury Bus Quality partnerships (voluntary), with enhanced bus services	Ongoing	10.3 Passenger Transport	All three	SCC SABC ENG (Maintenance of bus stops) Arriva + Other operators	Reduced congestion Increased public transport patronage	Medium	From existing LTP2 budget Commercial contribution to be agreed	TC=Medium H=Medium B=Medium
Investigate use of Bus Contract subsidy to require operator improvements	Medium Term	10.3 Passenger Transport	All three	SCC	Reduced congestion Increased public transport patronage	Low to investigate	Would require additional revenue funding	TC= Medium H=Medium B=Medium
Improve existing Park & Ride (P&R) site facilities and services	Ongoing	10.3 Passenger Transport	Heathgate s and Town Centre	SCC SABC ED (promoting as part of Tourism Strategy)	Reduced congestion Reduced town centre parking Increased public transport patronage	High	SCC/SABC Possible short fall as expected Section 106 contribution currently unlikely to fund improved buses	TC= Medium H=Medium

Option	Timescale / Status	Local Transport Plan Programme Area	Applicable AQMA	Lead Roles	Other Impacts	Cost	Funding Provision	Potential Air Quality Impact
Improvements to Bus Station	2008 onwards	10.3 Passenger Transport	All three	SCC SABC	Reduced congestion Increased public transport patronage	To be determined	SABC possibly offset by contribution from developer and SCC	TC = Low H = Low B = Low
Investigate integration of P&R with other bus services	Medium Term	10.3 Passenger Transport	Heathgate Town Centre	SCC SABC ENG	Reduced congestion Reduced town centre parking Increased public transport patronage	Low to Investigate Very High to Implement	Subject to TIF study and possible funding	TC = Medium H = Low
Improved frequency of rail services on Shrewsbury – S Wales line	Completed	10.3 Passenger Transport	Bayston Hill Town Centre	SRA NR Arriva SCC	Reduced congestion Increased public transport patronage	High	Commercially funded	TC = Low B = Medium
Investigate provision of new Parkway Rail Station at Preston Boats / A5	Very Long Term 2017	10.3 Passenger Transport	Town Centre	SRA NR Arriva SCC	Reduced congestion Increased public transport patronage	Low to Investigate Very High to implement	Subject to TIF study and possible funding	TC = Medium
Walking and Cycling Improvements								
Footway and footpath improvements (required by DC when identified as being necessary by SCC Highways (Town Centre enhancement works recently completed)	Medium Term	10.4 Pedestrian and Mobility	All three	SCC (Darwin and Pride Hill crossing enhancements SABC ENG (street lighting) SABC DC	Improved pedestrian safety; Improved general health; Reduced congestion.	High	From existing LTP2/SABC budgets and/or developer contributions	TC = Medium H = Low B = Low
Expand and integrate cycle network	Ongoing	10.5 Cycling and Motor Cycling	All three	SCC SABC PP – encouraged through Spatial	Reduced Congestion Better general health Increased safety of cyclists Provide realistic alternative to car travel through improved	High	From existing LTP2/SABC budgets, Sustrans	TC = Medium H = Medium B = Medium
New tracks: Windermere Road to Heathgates, Cartmel	Completed							

Option	Timescale / Status	Local Transport Plan Programme Area	Applicable AQMA	Lead Roles	Other Impacts	Cost	Funding Provision	Potential Air Quality Impact
Drive to Whitchurch Road and Shelton links completed, The Severnside Gap (Smithfield Rd and links)				Strategy	infrastructure		Connect2 and/or developer contributions	
Enhance level of cycle training offered at primary, secondary and adult level * including Go Ride project at Sports Village and Active Kids programme	Medium Term	10.6 School Travel	All three	SCC SABC SO * PCT	Reduced congestion Better general health Increased safety awareness	Low	From existing SCC/SABC budgets	TC= Low H= Low B= Low
Encouraging more Sustainable Travel								
Continued lobbying of National Government to set a fiscal framework which encourages greater use of more sustainable transport	Ongoing	N/A	All three	SABC & SCC	Reduced congestion General health improvements Greater awareness of issue	Low	From existing budgets	TC= Medium H=Medium B=Medium
Implement SABC green travel plan including acquisition of low emission pool car	Implemented and ongoing	10.7 Travel Behaviour	All three	SABC SO and PA	Reduced congestion General health improvements Greater awareness amongst employees Increased use of public transport / cycling / walking Operational constraints Leading by example	Low	From existing budgets	TC= Medium H= Low B= Low
Continue to Implement SCC Travel Plan and encourage other employers in Shrewsbury to implement Travel Plans	Ongoing	10.7 Travel Behaviour	All three	SCC Travel Plan Co-ordinator	Reduced congestion General health improvements Greater awareness amongst employees	Low	From existing budgets	TC= Low H= Low B= Low
Encourage Schools and other education establishments to implement Travel Plans and Implement Safer Routes to	Ongoing	10.6 School Travel	All three	SCC School Travel Plan Co-ordinator PCT	Reduced congestion health benefits Learning benefits 'New thinking' amongst younger	High	From DfT and DfES/DfT Travel Plan	TC = Medium H=Medium B=Medium

Option	Timescale / Status	Local Transport Plan Programme Area	Applicable AQMA	Lead Roles	Other Impacts	Cost	Funding Provision	Potential Air Quality Impact
School initiatives				SCC Safe Routes to School Officer	generations Provide realistic alternative to car travel through improved infrastructure		Grants Safer Routes from LTP2	
Undertake Targeted Travel Awareness initiatives and campaigns, including targeted individualised travel planning, Green Transport Week, TravelWise Week, Bike week	Ongoing	10.7 Travel Behaviour	All three	SABC SO SCC Travel Plan Co-ordinator	Reduced congestion General health benefits Increased green travel awareness	Low	From existing budgets	TC = Low H = Low B = Low
Demand Management Measures								
Develop Car Parking Strategy	Short Term	10.10 Parking and Congestion	All three	SABC PR SCC	Encourage use of Park and Ride and non town centre car parks Reduce congestion Shift to alternative modes Possibly reduced income due to increased concessionary travel	Medium	Income assists subsidy of park and Ride service	TC = High H = Medium B = Low

2.2 Road Network Alterations

Option	Timescale/ Status	Local Transport Plan Programme Area	Applicable AQMA	Lead Roles	Other Impacts	Cost	Funding Provision	Potential Air Quality Impact
Traffic Management Measures								
Review of signposting to identify AQMAS and alternative routes	Short Term Ongoing	10.7 Travel Behaviour	All three	SCC	Reduced congestion Direct polluting vehicles away from AQMAS	Medium	LTP2	TC = Low H = Low B = Low
SCOOT control (With Bus priority)	Medium Term	10.9 Environmental	Town Centre Heathgates	SCC	Reduced congestion Increased appeal of public transport	Medium	LTP2	TC = Medium H = Low

Option	Timescale/ Status	Local Transport Plan Programme Area	Applicable AQMA	Lead Roles	Other Impacts	Cost	Funding Provision	Potential Air Quality Impact
		Quality and Regenerati on						
Creation of a Gyrotory System at Bridge Street/St. Austin's Street.	Medium Term	10.9 Environmental Quality and Regeneration	Town Centre	SCC	Reduce congestion	Medium	From SABC / Developer contribution	TC= Medium
Investigate enhancement of Gyrotory System at Howard Street/Castle Foregate	Medium Term	10.9 Environmental Quality and Regeneration	Town Centre	SCC	Reduce congestion	Low to investigate Medium to implement	From existing budgets	TC= Medium
Investigate creation of a Gyrotory System at St Julians Friars	Medium Term	10.9 Environmental Quality and Regeneration	Town Centre	SCC	Reduce congestion	Low to investigate Medium to implement	From existing budgets	TC= Medium
Look at options for reducing traffic speeds and smoothing flow of traffic	Medium Term Old Heath HZ completed	10.9 Environmental Quality and Regeneration	All three	SCC (Home Zones and Safer Routes to School) SABC (lobbying)	Reduced congestion Shift to alternative modes Increased pedestrian safety Possible increased vehicle emissions through lower speeds	High	From existing budgets	TC= Medium H=Medium B=Medium
Review need for possible Restrictions on sizes and	Medium Term	10.9 Environmental	Town	SCC SABC	Reduced congestion More pedestrian friendly	Medium	Investigation costs	TC= Medium

Option	Timescale/ Status	Local Transport Plan Programme Area	Applicable AQMA	Lead Roles	Other Impacts	Cost	Funding Provision	Potential Air Quality Impact
better timing /restrictions on deliveries to town centre.		Central Quality and Regeneration	Centre Heathgates		Effect on town centre businesses		through LTP2 Funding	H=Low
Increased enforcement of waiting restrictions Introduced through ParkRight in 2006	Ongoing	10.10 Parking and Congestion	Town Centre Heathgates	SCC SABC PR	Reduce congestion Shift to alternative modes	Medium	Through Decriminalised Parking Enforcement	TC= Medium H = Low
Identification, mapping and signing of recommended freight routes	Ongoing	10.9 Environmental Quality and Regeneration	All three	SCC	Reduce congestion Reduce unnecessary HGV traffic	Medium	Through LTP2 existing budgets	TC = Low H = Low B = Low
Investigate options for further pedestrianisation of Shrewsbury town centre	Long Term	10.9 Environmental Quality and Regeneration	Town Centre	SCC	Pedestrian friendly Effect on town centre businesses Displaced traffic on adjoining roads particularly Town Walls and St John's Hill	Low to investigate High to implement	Investigation costs through LTP2	TC = High
New Road Schemes								
Make a decision on whether to pursue a North West Relief Road for Shrewsbury	Medium Term	10.1 and Appendix G	Frankwell Heathgates	SCC Route Supported by SABC but not toll charging	Reduce congestion	Very High	Investigation costs through LTP2	TC = V High H = High

2.3 Vehicle Emissions

Option	Timescale/ Status	Local Transport Plan Programme Area	Applicable AQMA	Lead Roles	Other Impacts	Cost	Funding Provision	Potential Air Quality Impact
Continued lobby of National Government to support greener fuels and provide financial assistance to convert existing/new vehicles and re-establish EST grants	Ongoing	N/A	All three	SCC SABC	Increase in alternative fuel vehicles on road Decrease in fuel cost Increased green fuel sales Increased awareness	Low	From existing budgets	TC= Medium H=Medium B=Medium
Pursue voluntary vehicle emissions testing in AQMAs	Ongoing (First Event May 2006)	N/A	All three	SCC SABC EH VOSA	Increased public awareness Cost and manpower Increased profile of VOSA	High	From existing budgets	TC= Medium H=Medium B=Medium
Review Licensing conditions to progressively reduce numbers of older, very high mileage Taxis and Private Hire Vehicles	Medium Term (Progressive Age Policy Introduced in 2006)	N/A	All three	SABC EH and LIC	Improved passenger safety Costs to operators	Low	From existing budgets	TC= Medium H = Low B = Low
Signing of waiting areas / taxi ranks / bus station / car parks instructing 'Turn Off Engine' Possible extension to queues at traffic lights	Medium Term Already applies to coaches on Frankwell	10.7 Travel Behaviour	Frankwell	SCC SABC ENG and PR	Increased public awareness Increased cold start emissions Reduced complaints of noise and fumes Customers discomfort if no bus/taxi heating/air conditioning on	Low	From existing budgets	TC = Low
Encourage alternative fuel provision (particularly gaseous) at forecourts through LAPP inspections (voluntary action)	Short Term	N/A	All three	SABC EH and DC	Increase in alternative fuel vehicles on road Decrease in fuel costs Increased green fuel sales Increased public awareness	Low	From existing budgets	TC = Low H = Low B = Low
General promotion of alternative fuels in vehicles	Medium Term	10.7 Travel Behaviour	All three	SCC SABC SO and EH	Increase in alternative fuel vehicles on road Decrease in fuel cost Increased green fuel sales Increased public awareness	Low	From existing budgets	TC= Medium H=Medium B=Medium

Investigate changing to Hybrid, CNG, Biodiesel or fitting Eminox CR traps to bus fleet serving Park & Ride, Town and Country services. Consider Euro 4 or better	Medium Term	10.7 Travel Behaviour	All three	SCC SABC Arriva Other Public Transport Operators	Lead by example	Low to investigate Medium to implement	Through increased P&R and commercial services subsidies	TC= Medium H = Low B = Low
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Option	Status	Local Transport Plan Objective	Applicable AQMA	Lead Roles	Impacts	Cost	Funding Provision	Air Quality Impact
Improve SCC & SABC vehicle fleet (CNG, Biodiesel or fit Eminox CR traps) (LPG mowers)	Ongoing Euro 4 specified in 2006 for new SABC contracts	10.7 Travel Behaviour	All three	SCC SABC PA	Lead by example Improved vehicle efficiency Better public perception	Medium	SABC & SCC - From existing budgets	TC = Low H = Low B = Low
Assess SCC & SABC tenders on environmental standards/sustainability of fleet (specify Euro 4 or future tighter standards)	Medium Term Euro 4 specified in 2006 for new SABC contracts	10.7 Travel Behaviour	All three	SCC SABC PA SABC SO	Lead by example Raises awareness amongst contractors	Medium	From existing budgets	TC = Low H = Low B = Low

2.4 Statutory Roles

Option	Status	Local Transport Plan Objective	Applicable AQMA	Lead Roles	Impacts	Cost	Funding Provision	Air Quality Impact
Use of Fixed Penalty Notices to enforce switch off of engines of parked vehicles (public, buses, taxis, HGVs)	Medium Term	N/A	All three	SABC EH and PR	Confrontational Costs of manpower / workload and Registration Reduced complaints of noise and fumes Increased public awareness Increased cold start emissions Customers discomfort if no bus/taxi heating/air-con on	Low	To be determined	TC = Low H = Low B = Low
Integration of Air Quality into land use policy (LDF) and decision making process through development of Supplemental Planning Guidance Assess implications of all major developments proposed in the Borough	Ongoing	N/A	All three	SABC PP & DC SABC EH	Prevention rather than cure Increased awareness of air quality issue amongst other departments .Joined up working	Low	From existing budgets	TC= Medium H= Medium B = Low
Use of LAPPC powers to minimise emissions of NOx from industrial processes	Ongoing	N/A	All three	SABC EH	Not appropriate for many processes Minor reduction of background NOx	Low	From existing budgets	TC = Low H = Low B = Low
Encourage alternative fuel provision (particularly gaseous) at forecourts associated with major developments through S106 Agreements	Short Term	N/A	All three	SABC DC	Increase in alternative fuel vehicles on road Decrease in fuel costs Increased green fuel sales Increased public awareness	Low	From existing budgets	TC= Low H = Low B = Low
Increased provision of air quality information to public	Medium Term	10.7 Travel Behaviour	All three	SCC SABC EH	Increased public general awareness	Low	Additional budgets required for web link software	TC= Low H= Low B= Low

2.5 Monitoring and Joint Working

Option	Status	Local Transport Plan Objective	Applicable AQMA	Lead Roles	Impacts	Cost	Funding Provision	Air Quality Impact
Continued monitoring of air quality and traffic data at three sites	Ongoing	10.10 Parking and Congestion	All three	SABC EH SCC	Provide comprehensive database of information Allow success rates to be evaluated	Medium	Defra grant aid for real time monitoring at TC	Low
Monitoring at other sites: air quality traffic data	Ongoing	10.10 Parking and Congestion	N/A	SABC EH SCC	Allows problem areas to be identified	Medium	From existing budgets	N/A
Continued cross boundary working with neighbouring authorities.	Ongoing	5.7 Partnership Working	All three	SCC SABC EH SSDC NSDC OBC BTW	Consistent cross boundary thinking and policy formulation	Low	From existing budgets	Low

3.0 DISCUSSION AND BACKGROUND ON THE AIR QUALITY MANAGEMENT MEASURES

3.1 Alternative Transport

Achieving a shift to more sustainable transport is a key aim of the current Local Transport Plan and there are programmes of measures contained within the plan to help achieve this aim. Implementation of the current plan should therefore have some positive impact on air quality at the AQMA's.

3.1.1 Public Transport Improvements

Current Provision

Bus Services currently operating at **Bayston Hill**:

	Rural	Urban
Service	453, 541, 544, 551	29, 25

- Nearest Park & Ride: Meole Brace – ineffective for Bayston Hill

Rail Services currently operating:

- Approx hourly service both N-S & S-N serving Church Stretton, Craven Arms, and half hourly to Ludlow and Leominster.
- Longer distance services to and from Cardiff & Newport approx 40 mins

Whilst Bayston Hill does not have its own station the main line serves the centres of Church Stretton, Craven Arms and Ludlow which are likely origins/destinations of much of the traffic passing through the AQMA at Bayston Hill.

Bus Services currently operating at **Heathgates**:

	Rural	Urban
Service	511,510,513,519,523,524,E1, X5	20,22,27,29,79,75

- Nearest Park & Ride: Harlescott – potential high air quality impact for Heathgates, particularly if increased use can be delivered

Bus Services currently operating at **Town Centre**:

	Rural	Urban
Service	448,562,565,571,575,D74	20, 22, 27, 29, 70, 75

- Nearest Park & Ride: Oxon – potentially high impacts for the Town Centre particularly if increased use can be delivered

Improvements

A number of improvements to public transport services are already underway.

Improvements to bus information, promotion and infrastructure – including the extension of the real time information system, and better interchange facilities will all to a certain extent help encourage modal shift to bus. The expansion of the Shrewsbury Bus Quality Partnership whereby operators agree to provide a set standard of service in return for improved infrastructure should also have a significant impact.

Park & Ride facilities are already available at Harlescott, Oxon and Meole Brace. The Borough Council currently funds Park & Ride at a level of £14800/year (at 2006/07) However, The proposed P&R fare and on-street parking increases from April 2008 are expected to bring the net cost of P&R for the Borough Council down to around £105,000 per year over the next two years (as a 50% share of the subsidy for SABC).

Funding has been reviewed with the intention to ensure that in the future, only buses satisfying appropriate emissions standards would provide these services. Enhancement of these existing park and ride facilities and services would have a fairly significant impact on the AQMA's at Heathgates and the Town Centre. However, costs quoted by the operator for upgrading these services for the remaining two years of the existing P&R contract indicated that the subsidy would need to be significantly increased above the expected £105,000 per year at 2007/08. The additional cost, based on a minimum Euro 3 (Euro 5 for two of the three services) would be £160,000 per year, whilst upgrading the third service (already Euro 3 at present) would result in a total increased subsidy of £240,000 per year. The indications from SCC are that they are unlikely to be able to support such increased subsidies for the remainder of the contract. Accordingly. SABC's Cabinet resolved at their meeting on 10th March 2008 (Minute 46/08), not to increase the subsidy and that the proposals be deferred for consideration by the new unitary council for Shropshire following it's formation in April 2009.

An improved frequency rail service on the Shrewsbury to South Wales Line came into effect from 2005, this should help provide a more realistic alternative to the car for people travelling from South Shropshire to Shrewsbury, with a small impact on relieving air quality at Bayston Hill.

Initial investigations have been carried out into the provision of a Rail Halt at Harlescott. This improvement would have some effect on relieving traffic and improving air quality in the Town Centre and at Heathgates. Further work will be needed.

3.1.2 Walking & Cycling Improvements

A key pillar of the Local Transport Plan is to develop and integrate a network of routes designed for walking and cycling, especially aimed at reducing the need to travel short distances by car. Such distances could easily be covered by walking or cycling in most areas and thus prevent damaging emissions to the environment which would otherwise occur, particularly in the first few miles of the vehicle journey.

Existing Cycle Routes:

- Bayston Hill - Pulley Lane (advisory on road) feeding Hereford Road (designated off road) – Meole Brace Park and Ride - Shrewsbury town centre
- Heathgates - Good links to town centre from NCN, Sundorne Rd & Telford Way, plus
- Town Centre - None directly although Shelton Road and Woodfield Road linking to NCN nearby.

Improvements

- A number of improvements to walking and cycling facilities have been implemented, are currently underway or planned. These include pedestrian improvements in the Porthill area to encourage more trips into the town centre to be made by foot (completed); and a contraflow cycle route at Meadow Place, with plans for extension to Raven Meadows. Furthermore, as the Big Lottery Fund has awarded substantial funding for Sustrans Connect2, the Shrewsbury Severn Gap project will now be delivering a safe, enhanced walking and cycling route along Smithfield Road. These measures should have some impact on relieving traffic and air quality at the Town Centre.
- At Heathgates, additional cycle routes have been completed for Windermere Road to Heathgates and Cartmel Drive to Whitchurch Road.
- At Bayston Hill negotiations are ongoing with the Highways Agency regarding improvement of cycle facilities alongside the A49.

3.1.3 Encouraging more sustainable transport

There is increasing recognition of the role of “soft” measures in encouraging modal shift. The County and Borough Councils are working on a number of fronts to encourage greater use of sustainable transport, including the implementation of Travel Plans for their work sites, encouragement of other major employers to develop travel plans, school travel plans and targeted travel awareness campaigns.

There is a significant programme to encourage schools to develop school travel plans, linked with the provision of safer routes to school. School travel plans have already been developed for ten primary schools and two secondary schools in Shrewsbury, with Woodfield Infants and St. George’s Junior Schools both utilising ‘walking buses’ and new cycle shelters provided at Meole Brace and Wakeman Schools. Work in this area is still expanding and is likely to have a medium impact on the AQMA’s.

Shropshire county Council will be undertaking targeted individualised travel planning initiatives with Town Centre Employees which should have a positive impact on the Town Centre AQMA. Soft measures currently employed by the Borough Council include promotion by Leisure Services of the Active Kids programme of cycle training at the Sports Village and by the Sustainability Officer, of the Go Ride Scheme at Coleham Primary School and Travelwise, Bike to Work and Green Transport weeks.

Many of the above measures also link with the Shropshire Partnership / Primary Care Trust's work on 'Strategies for improving health through preventing and reducing obesity'.

3.1.4 Demand Management Measures

The greatest benefits, in terms of traffic reduction and air quality improvement, would be seen by combining the above measures to improve facilities and encourage more sustainable transport with demand management measures. However, such measures need to be considered very carefully due to their potentially negative economic impacts.

In the short term a review of the current Town Centre car park strategy has been undertaken by the Borough, with the aim of improving the management of vehicle parking so that edge of town and Park and Ride facilities are more attractive options for motorists than town centre parking. Thus helping to alleviate traffic and air pollution in the town centre. Proposals to develop a Car Parking Strategy to include differential car parking charges to provide incentives for 'green' vehicles were considered by SABC's Development Control and Environmental Protection Committee in January 2008, but a decision made that this approach be put in abeyance for future consideration by the new unitary council for Shropshire (Minute 01/08). In the longer term, investigations into workplace charging, which has proved successful elsewhere, could be considered as a way of having potentially very high impacts on reducing traffic and improving air quality in the AQMA's.

3.2 Road Network Alterations

3.2.1 Traffic Management

A number of traffic management measures have been implemented since production of the draft version of this Plan e.g. redesign of the road layout at Heathgates roundabout to better cater for pedestrians and cyclists and reduce vehicle emissions. Others are ongoing, or could be considered for helping to improve air quality:

Review of sign posting and development of a freight map are ongoing. Scoot control on traffic signals is a medium term proposal. Better enforcement of waiting restrictions following the decriminalisation of parking enforcement is currently being achieved through ParkRight.

Traffic management measures to reduce traffic speed and discourage through traffic and/or smooth out traffic flows to improve air quality will also be investigated at each site.

The pedestrianisation of further areas of the Town Centre has been considered for some time and was subject to detailed consultation of a wide range of stakeholders by Shropshire County Council in 2001/02. Similarly a Town Centre Public Transport Study looking at new Bus Station arrangements was carried out in 2002/03, but no decision had been made. However, as the TIF bid is not proceeding it is unlikely that further pedestrianisation will be a realistic proposition unless carried out in the context of the possible new gyratory systems mentioned below and subject to alternative provision for funding. Furthermore, SABC's Development Control and Environmental Protection Committee decided in January 2008 not to support proposals for a trial closure of up to

one year of High Street and Shoplatch at the present time on the basis that investigating options for further pedestrianisation should consider all town centre traffic issues (Minute 01/08).

Creation of new gyratory systems at St Julians Friars/Wyle Cop and Bridge Street/St Austins Street are currently being considered, the latter having potential for circulation by Oxon Park and Ride buses so as to reduce cross town traffic.

3.2.2 New Road Schemes

Two by-passes/link road schemes, which would affect the AQMAs to differing degrees, have been discussed in the past.

The Shrewsbury North West Relief Road could have very significant impacts on the Town Centre AQMA and some lesser impacts at Heathgates. This link road currently has a safe guarded route in the Local Plan and although the TIF bid by SCC is no longer proceeding, SCC are looking at other ways of pursuing such a scheme, Prospects of regional funding for this scheme will be reviewed in 2008. The possibility of linking the scheme with a flood alleviation project will also be progressed. In addition alternative solutions to reducing traffic through the Town Centre, as previously mentioned will be investigated.

A possible bypass for Bayston Hill has been discussed in the past however no route is safe guarded, and such a route is unlikely to provide sufficient benefits overall to justify the expenditure by the HA.

3.3 Vehicle Emissions and Statutory Roles

Indirect actions available include:

- Encouraging the provision of alternative fuels at filling stations using Section 106 Agreements through planning procedures and during inspections carried out for Local Authority Pollution Prevention Control.
- Continued monitoring of pollutants, regular updating the review and assessment process and cross boundary working with neighbouring District Councils as well as Shropshire County Council.

Direct actions available include:

- Voluntary emissions testing within the AQMAs in conjunction with the work already undertaken by VOSA. An event held in 2006 is planned to be repeated from time to time in the future. This approach is preferred to powers available to Local Authorities for compulsory testing which has been found by other Authorities to be confrontational and not cost effective.
- Signing of car parks / waiting areas requiring engines of static vehicles to be switched off and enforcement using Fixed Penalty Notices by ParkRight and other authorised officers, either under Regulations or Traffic Regulation Orders, will assist both directly and by raising public awareness

- Improvements to County and Borough Council fleets by upgrading to the latest technology through corporate tendering processes and retrofitting existing vehicles. Currently 8 of the Borough Council's 10 refuse vehicle currently in use are Euro 4 compliant, the remaining 2 are scheduled for replacement to that standard in the near future. Euro 4 standard or better will be specified when permanent replacement of the Council's 5 kerbside vehicles takes place in 2008.
- The use by Borough Council Service Managers of a Best Value Sustainable Development Impact framework (Appendix G) to review the way in which services can be delivered. This includes having regard to avoiding 'creating air pollution', 'attempt to minimise the use of petrol cars' and 'protect health through clean environments'.
- Improvements to the emissions standards for Buses, excluding Park and Ride, by contractual arrangements, (see 3.1.1 above) and representations to the Traffic Commissioners will be pursued.
- Continued review of policy and licensing conditions to improve emissions standards of hackney carriages/private hire vehicles

3.3.1 Planning Policy and Development Control

Generally, local policy has not changed in such a way as to influence the declarations. However, there have in practice been alterations to local policy following the introduction of the AQMAs. For example, all major new development in or having the potential to affect the areas, will now be screened at the planning stage for possible air quality and traffic impacts. In particular, there are a number of proposals in north Shrewsbury, which may affect the Heathgates AQMA. Similarly, any proposals to introduce sensitive receptors into the AQMAs will be carefully assessed.

The finalisation of The Local Development Framework, as a replacement for the Borough Local Plan, provides another opportunity for Air Quality Management to influence land use planning. In particular the proposed Town Centre Action Plan, to replace the existing Town Centre Strategy, will be directly influenced by the proposals in this Action Plan.

Such policies have implications regarding land use, meaning air quality considerations will need to be taken into account by developers, schools and businesses regarding scale of and type of development and travel options.

Similarly, there are implications for the Borough Council in respect of the siting of the new Council Offices near to the Town Centre AQMA and for other projects such as the Theatre Severn. Green Travel Plans have been developed and will be implemented to help mitigate any adverse effects of these developments.

All these implications are incorporated into the action plan as appropriate.

3.4 Monitoring and Joint Working

Options for ongoing monitoring of AQMA's and other areas are set out in table 2.5. These measures are an integral part of the Council's ongoing air quality management duties and are also essential to gauging the effectiveness of this plan.

4.0 IMPROVEMENTS REQUIRED AND POSSIBLE SOLUTIONS

As described earlier, the principal cause of the Nitrogen Dioxide exceedences is the level of traffic using the three areas, which is exacerbated in the case of Bayston Hill by the narrowness of the carriageway / footpath and its canyon design in part.

A package of measures is required in order to produce the required reduction in Nitrogen Dioxide levels. One single action will not result in a reduction large enough to bring levels down to below the objective level.

It would obviously not be cost effective or practical to change the physical structure of the streets in the Town Centre (unless pedestrianisation renders some areas traffic free) and Bayston Hill and so alterations to traffic flow, make-up and emissions must be employed. Realignment at the Heathgates island has been carried out to smooth traffic flows. Compulsory Purchase and demolition of the houses directly affected at Bayston Hill has been considered, but discounted due to the costs involved and displacement of the occupants.

Some possible options will not be feasible at this time on grounds of cost-effectiveness and overall benefit to air quality. For example, this will include the use of powers which enable Council Officers to stop vehicles and carry out emission testing in AQMA's (obviously very time consuming and expensive in terms of manpower and equipment, not to mention confrontational, also VOSA already carry out this function).

The main objective of the Action Plan is to reduce the number of vehicles and thus emissions in the AQMAs. However, buses, HGVs and some older very high mileage taxis/private hire vehicles can give a disproportionately high contribution to the NO_x levels experienced in the areas. The options considered will tackle all forms of transport, but the aim is to concentrate on the modes which are most polluting and of the highest volume, whilst seeking to improve data on vehicle makeup so that longer term measures can be focussed on these.

As well as the targeting of the roads in the AQMAs, the associated feeder roads and surrounding area will be included in any work.

5.0 SUMMARY OF ACTIONS TO BE EMPLOYED

The measures to be implemented were shown in detail in Section 2 and discussed in Section 3. The key actions proposed to be investigated or undertaken in order to tackle the air quality problems are summarised below on a site by site basis:

5.1 Bayston Hill

- Bus information, infrastructure and service improvements via Bus Quality Partnership
- Improved rail services
- Enhanced cycle facilities and cycle training
- School and workplace travel plans
- Targeted travel awareness initiatives/campaigns
- Review of licensing policy and conditions to improve emissions standards for hackney carriages/private hire vehicles
- Improved Traffic Management Measures implemented by the Highways Agency at Dobbies Roundabout.
- Promotion of alternative fuels and leading by example through bus services, Council's own fleets and tendered services
- Integration of air quality into land use planning

5.2 Heathgates

- Bus information, infrastructure and service improvements via Bus Quality Partnership
- Improvements to facilities and services, and promotion of Harlescott Park and Ride
- Enhanced cycle facilities and cycle training
- School and workplace travel plans
- Targeted travel awareness initiatives/campaigns
- Delivery of North West Relief Road
- Town centre parking strategy review
- Review of licensing policy and conditions to improve emissions standards for hackney carriages /private hire vehicles
- Promotion of alternative fuels and leading by example through bus services, Council's own fleets and tendered services
- Integration of air quality into land use planning

5.3 Town Centre

- Bus information, infrastructure and service improvements via Bus Quality Partnership and review of subsidy of commercial services to improve emissions standards for buses operating in the town centre.
- Improvements to facilities and services and promotion of all existing Park and Ride facilities
- Pedestrian Improvements on routes into the Town Centre
- Enhanced cycle facilities and cycle training
- School and workplace travel plans
- Targeted travel awareness initiatives/campaigns
- Town centre parking strategy review
- Review of licensing policy and conditions to improve emissions standards for hackney carriages /private hire vehicles
- Delivery of North West Relief Road

- New gyratory system at Bridge Street/St. Austin's Street and investigate provision of new gyratory system at St Julian's Friars.
- Investigate improvements to gyratory system at Howard Street/Castle Foregate
- Look at options for reducing traffic speeds
- Investigation of SCOOT control (computer controlled linking of traffic signals / pedestrian crossings & bus priority)
- Investigation of additional pedestrianisation within town centre in the long term.
- Produce freight map to discourage through town journeys
- Increased parking enforcement through ParkRight, controlled parking zones, increased enforcement of 'no waiting' zones and investigate whether delivery restrictions are appropriate.
- Promotion of alternative fuels, improved emissions standards and leading by example through bus services, council's own fleet and tendered services
- Integration of air quality into land use planning

The combined effect of the measures proposed to be implemented, together with national increases in cleaner, more efficient vehicles will result in lower emissions and less congestion due to lower levels of traffic on the roads of the Borough

Alongside this, the Borough Council's Environmental Health Service will continue to use its statutory powers to make use of Local Authority Pollution Control in order to regulate the emissions to air from local industry so as to minimise background NOx levels.

Regular updates on air quality in the area will be produced and made available to the public via the Internet and the local media. The Council could consider looking at in-house policies regarding Work Place Charging, and will continue to deliver Work Travel Plans, improved fleet maintenance and a more effective car user scheme.

It has proved more practical and effective at this point principally to utilise those measures already planned or underway and augmented by relatively low cost options. However, should these measures not result in the predicted drop in Nitrogen Dioxide levels; the remaining options will again be reviewed. The draft air quality action plan on which this final version is based was integrated into the new Local Transport Plan 2006-2011 (LTP2) for Shropshire submitted to government July 2005. The effectiveness of measures in this final plan will be reviewed as part of reporting on LTP2 as well as in future Local Air Quality Progress Reports from Shrewsbury and Atcham Borough Council.

The principal cost of implementing LPT2 will be borne by Shropshire County Council.

Work within and by the Borough Council will have to be funded by its present budgeting system.

6.0 MONITORING AND EVALUATION

The measures ongoing or planned in LPT2 may not sufficiently reduce Nitrogen Dioxide concentrations at the Bayston Hill and Town Centre AQMAs to below the NAQ Objective. The Action Plan has therefore incorporated other measures, which may assist in further reducing the concentrations.

In order to evaluate the effectiveness of the Action Plan the Borough Council will continue to monitor Nitrogen Dioxide levels in the Borough with the use of a real-time Air Quality Monitoring Station (AQMS) measuring NOx/NO₂ planned for deployment in the town centre and the network of diffusion tubes. The diffusion tube locations have been revised in order to better target the areas of concern. Co-location of tubes with the AQMS will be put in place to assist data validation. This monitoring will show whether the required reduction in levels is occurring and whether the objective level is likely to be met.

Future stages of Review and Assessment of Air Quality will be undertaken in accordance with the timetable required by DEFRA's Statutory LAQM Guidance to Local Authorities and this will again show the trend in pollutant levels. This will make use of the new emission factors and any updated objectives for the pollutants produced by the Government.

Each action identified by this Plan will be reviewed in future Progress Reports and Reviews and Assessment in order to evaluate its success and to ensure it is actually being undertaken. If it appears that the reduction in NO₂ will not be sufficient then this Action Plan will be reviewed and possible further measures revisited and implemented.

Progress in implementing key features of this plan will be reported on through the Council's Performance Improvement Plan.

The County Council's evaluation of progressing the LTP will also be utilised for its analysis of traffic flows, public transport use, modal share of journeys into town and so on. It will in turn use Borough Council figures for air quality to monitor the Plan's effectiveness.

The process will also continue to seek the views of the Stakeholder Groups, other consultees and the public in order to gauge effectiveness and suitability of measures being employed.

6.1 Possible 'Effectiveness' Indicators

Indicator	Measure	Use
Traffic flow	Vehicles per time period	Reduced flow = reduced air pollution??
Journey time	Lengths of journey / distance	Reduced short journeys = lower air pollution
Vehicle occupancy	Number of persons / car	Fewer vehicles = lower air pollution
Queue Length	Vehicles in queues	Lower queues = lower air pollution
Road density	Vehicles per given area / mile	Fewer vehicles = lower air pollution
Vehicle mix	Proportion of vehicles of given age Proportion of vehicles of given fuel type Proportion of vehicle type	Indicates shift to more efficient vehicles

Fleet mix	Proportion of vehicles of given age Proportion of vehicles of given fuel type Proportion of vehicle type	Indicates shift to more efficient vehicles
Fuel sales	Proportion of fuel sold Changes in amounts of fuel sold Number of LPG stations	Indicative of changes in total emissions from road vehicles
Monitored Pollution levels	NOx, and NO ₂	Indicates changes in pollution concentrations
Public transport patronage	Numbers of people and revenue from bus, trains etc	Higher patronage = public transport becoming more attractive
Number of travel plans in given area	Number of companies/schools with travel plans	Indicates potential to reduce car trips
Modal split of journeys into Shrewsbury Town Centre	Number of people travelling by different modes into River loop	More car based travel = more pollution
Number of cycle trips	No. of cycle trips at 20 count site in Shrewsbury	Increased cycle usage is likely to help deter increases in car use

7.0 CONCLUSIONS

Adoption and implementation of this Action Plan incorporating appropriate objectives in the Local Transport Plan, additional specific measures and use of statutory powers held by the Borough Council, will work towards reducing Nitrogen Dioxide levels to meet the Government Objective annual mean level of 40 µg/m³.

Monitoring will continue throughout the Borough in order to confirm this.

Further Review and Assessment has taken place in order to make use of the new emission factors, monitoring and traffic data and confirms the findings that Shrewsbury and Atcham Borough Council was correct to declare Air Quality Management Areas (AQMA) for Bayston Hill, Heathgates and Frankwell/Smithfield Road in 2003 and to extend the latter to encompass most of the Town Centre in 2006. Although there is an improving situation with regard to Bayston Hill and Heathgates, such that it would be possible at the present time to revoke the AQMA designation for the latter, a precautionary approach will be maintained at all three areas and the measures within this plan applied as appropriate.

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9.0 APPENDICES:

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 - A. Rural Resources Report - Air Quality Action Plan Consultation Programme.
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- G. SABC Best Value Sustainable Development Impact Checklist