9. AIR QUALITY

The Environment Act 1995 required Government to develop a National Air Quality Strategy. This strategy, originally published in 1997, set challenging health-based targets for eight main air pollutants. These are benzene; 1,3-butadiene; carbon monoxide; lead; nitrogen dioxide; ozone; fine particles (PM_{10}); and sulphur dioxide. The predominant source for many of these pollutants is road traffic, but industrial and domestic sources are also major contributors.

The National Air Quality Strategy has been under review since publication and revised versions were put out for public consultation in January and August 1999. The UK Government and devolved administrations published an Addendum to the Air Quality Strategy on 6 February 2003. The Addendum introduced tighter objectives for particles, benzene and carbon monoxide and a new objective for polycyclic aromatic hydrocarbons.

Local authorities are required to review and assess the Strategy's 2000 objectives for seven air pollutants together with the new ones for benzene and carbon monoxide prescribed in regulations.

In addition to the objectives set out in the Air Quality Regulations 2000, and the Air Quality (Amendment) Regulations 2002, the EU has set limit values in respect of nitrogen dioxide and benzene, to be achieved by 1st January 2010, as well as indicative limit values for PM_{10} also to be achieved by 2010. In addition there are separate national limit values for carbon monoxide, sulphur dioxide and lead, to be achieved by 2005.

The levels of emissions will continue to be monitored and a revised emissions inventory is currently being developed for the whole of the county.

9.1 ASSESSING AND MONITORING AIR QUALITY

The County Council's strategy for assessing, monitoring and managing air quality is detailed within the Nottinghamshire Air Quality Strategy which was developed in partnership with the district councils in the county, the City Council, County Council and the Health Protection Agency and the Environment Agency. The strategy is currently being reviewed to ensure its effectiveness in delivering air quality objectives throughout the Plan area and to improve the connection to climate change objectives. The Nottinghamshire Air Quality Strategy identifies the need to reduce air pollution by encouraging alternative travel modes and promoting sustainable development through the Local Transport Plan and development plan processes. The full strategy can be found at www.nottinghamcity.gov.uk/airstratgey.doc and is summarised below.

Air quality is expected to remain within national targets in all of the plan area and is expected to remain so during the life of this Plan. However, air quality issues are subject to continued assessment and monitoring and if issues arise there are existing mechanisms whereby they can be raised and tackled by a partnership approach. Further collaborative work is being undertaken between the authorities to explore the merits of pooled countywide air quality data linked to web access, to enable real time data analysis and growing educational opportunities which are arising.

A review and assessment of air quality is the first step in the Local Air Quality Management (LAQM) process. Part IV of the Environment Act 1995 requires each local authority to review air quality 'from time to time'. The National Air Quality Regulations 2000 and the Air Quality (Amendment) Regulations 2002 prescribe air quality objectives and the dates for meeting them. For each objective, local authorities have to consider present and future air quality and assess whether the objectives are likely to be achieved by the prescribed date.

Review and assessment is undertaken using a phased approach, initially conducting an 'Updating and Screening Assessment' (USA). This is based on a checklist approach to identify those matters that have changed since the first round of review and assessment was completed and which now require further assessment. A 'Detailed Assessment' is then undertaken where the USA indicates that an Air Quality Objective may be compromised.

Where objectives set for air quality are unlikely to be met, local authorities must issue orders designating these areas as Air Quality Management Areas (AQMAs). In these areas local authorities are required to draw up action plans to ensure air quality objectives are met. Action plans may include action to be taken both within and outside an AQMA and could extend beyond a single district council's area involving several councils working together, and where necessary the Highways Agency where trunk roads are involved. The action plans will also involve the setting of targets to ensure that the air quality objectives are met within agreed timescales.

Sites that are identified as borderline, or requiring further investigation, but do not require an AQMA to be declared, receive more regular monitoring to help predict future air quality levels. Such sites are also factored into the prioritisation of programmes of work, such as 'smarter choices' and integrated transport schemes to help improve air quality, and ensure that exceedences do not occur.

9.2 FUTURE MODELLING

Within Nottinghamshire the Atmospheric Dispersion Modelling System Urban 2 (ADMS), by Cambridge Environmental Research Consultants, is used by a number of authorities to model emissions from a variety of sources and to predict pollutant concentrations for future years.

ADMS-Urban is an advanced dispersion model. The model is used for predicting concentrations of pollutants for comparison with the Air Quality Objectives using data on road traffic volume, composition, flows and speeds, industrial and domestic sources, background pollutant data and meteorology.

Detailed modelling of the impact on air quality of LTP measures is carried out for any areas where an AQMA is identified as potentially needed following an USA.

The timetable for future air quality reviews is detailed in the table below.

Report required	Date required	Required by whom
Updating and Screening Assessment (USA)	April 2006	All authorities
Detailed assessment or progress report	April 2007	Authorities that have identified detailed assessment required in 2006 USA report
Progress report	April 2008	All authorities
Updating and Screening Assessment (USA)	April 2009	All authorities
Detailed assessment or progress report	April 2010	Authorities that have identified detailed assessment required in 2009 USA report

Table 9.1 Timetable for air quality reviews

9.3 CLEANER VEHICLES

Due to technological improvements and stricter emission control standards, new vehicles are generally much cleaner than the vehicles they replace. It is therefore expected that over time the quantity of emissions for a given number of vehicles will reduce.

Through working in partnership with transport operators the County Council will encourage the take up of cleaner vehicles. Through investment by bus operators 75% of the bus fleet in Nottinghamshire is less than 10 years old, and 69% of the the fleet use low emission engines - Euro 1, 2 or 3 standard.

The TransACT scheme provides funding and training for businesses to produce a site specific travel plan and funds measures for implementation. Cleaner vehicles for use as pool cars and fleet vehicles are also promoted as part of travel plans that are developed both internally within the Authority as well as with employers and businesses throughout the county. The Council is

working in partnership specifically with district councils and primary care trusts to further develop this work within their organisations. The Council also acts as promoters and signposts for national advice and grants schemes.

Recent indications that vehicles running on diesel fuel may have a higher climate warming potential than those on petrol, despite lower carbon dioxide emissions, will be reviewed as more information is available.

9.4 LINKS WITH CONGESTION AND ACCESSIBILITY

The emission reduction benefits from cleaner vehicles will, however, only be realised if the growth in the total volume of traffic and the levels of congestion are contained. The air quality shared priority therefore shares close links with the congestion and accessibility shared priorities. Consequently, introducing measures to tackle the problems of congestion and accessibility, as well as meeting the Council's obligation under the network management duty, will contribute towards achieving local air quality objectives, both directly and indirectly.

Measures and schemes to tackle congestion will strongly contribute to improving local air quality, as road traffic is identified to be a primary source of pollution. The strategy for tackling congestion focuses principally upon influencing travel demand, the provision of attractive, quality alternatives to driving and by better management of the flow of traffic within the Plan area. The key policies and measures to be introduced to modify transport supply and demand and form the basis of the Plan strategy to tackle congestion are set out in Chapter 8.

The areas of intervention to deliver accessibility are developed in Chapter 5, and will also contribute to reducing congestion, and thereby improving air quality. Key aspects of the strategy that will particularly contribute to better air quality are contained in the County Council's bus strategy which includes coverage and access to public transport services, along with the development of walking and cycling networks and Rights of Way Improvement Plans.

The types of integrated transport measures and specific schemes to be delivered over the next five years that will contribute to ensuring air quality objectives continue to be met across the Plan area are identified within table 12.5 of Chapter 12, Five year programme.

9.5 CLIMATE CHANGE

Climate change is one of the most important issues facing the world today, and reducing emissions of greenhouse gases is a global challenge for every developed country. Over the coming decades the need to tackle climate change is likely to become even more urgent. The Government, in the 2003 Energy White Paper, has adopted a UK target of achieving a 20% reduction in carbon dioxide emissions by 2010 from 1990 levels, and a longer term goal of reducing emissions by 60% by 2050. In addition, the Nottinghamshire Agenda 21 Forum has set local targets for the transport sector to meet a reduction of 20% in CO_2 by 2010, based on 1990 levels.

Road transport is a major and growing contributor to UK carbon dioxide emissions, making up around one quarter of total emissions. Nitrogen dioxide, which also results from vehicle use, is another potent greenhouse gas. To reduce these emissions to levels sufficient to meet the stated national targets a combination of making vehicles more fuel efficient, development of alternative fuel technology and reducing congestion and reducing overall traffic volumes will all be required.

The Authority will contribute to achieving the target through the policies and strategies contained in this LTP. The measures set out to tackle congestion (see Chapter 8), bus strategy elements, walking, cycling and rights of way measures that reduce car use along with complementary education and awareness measures through travel plans and publicity materials will all contribute to managing road traffic levels and improving vehicular flow consequently reducing CO_2 emissions

within the Plan area. Whilst it is unlikely that these measures will be sufficient to cause an actual reduction in the levels of CO_2 emissions they are as much as the Authority feels is realistic in the current political climate and with the likely levels of funding available.

In addition the Authority has signed up to the Nottingham Declaration on Climate Change. This requires the Council to set meaningful targets for CO_2 emission reduction from both own internal activities, plus those where it can influence emissions from the wider community.

9.6 STRATEGIC ENVIRONMENTAL ASSESSMENT

It is a legal requirement for local authorities to undertake a Strategic Environmental Assessment (SEA) of a wide range of plans and programmes, including LTPs.

The objective of the European SEA Directive (2001) and associated UK Regulations (July 2004) is to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans with a view to promoting sustainable development.

The SEA of the North Nottinghamshire LTP has been carried out in accordance with DEFRA and DfT guidance, which integrates the SEA with the New Approach to Appraisal (NATA) framework. Local air quality, climatic factors and other environmental impacts of the Plan's measures are all considered and appraised in the SEA.

The process and timetable adopted for undertaking the SEA are set out below:

Step	Timescale
Scoping report issued for consultation to statutory consultation bodies	July 2005
Provisional LTP submitted to DfT	July 2005
Deadline for comments on Scoping Report	16 Sept 2005
Detailed LTP policy appraisal	Sept/Oct 2005
Draft Environmental Report published, and used for 6 week public consultation alongside the Provisional LTP	25 Nov 2005
Deadline for comments on Environmental Report/Provisional LTP	6 Jan 2006
LTP revised according to DfT assessment and the outcome of the public consultation and SEA consultation	Jan/Feb 2006
Environmental impacts of revised LTP reassessed	Feb 2006
Final LTP and Environment Report submitted to DfT	March 2006

Table 9.2 SEA process and timetable

The final Environmental Report is published as a separate document. However the main outcomes are set out below:

SEA aims		Summary of predicted significant impacts
1	Promote social inclusion	Positive impact – the emphasis within the plan on improving accessibility and public transport will have a particularly beneficial impact on socially excluded groups, who are often more reliant on public transport than others. The improvements in road crossings will specifically assist those in a wheelchair, whilst the new Public Transport Interchange at Mansfield would be a major benefit on those reliant on public transport.
2	Promote accessibility to essential services	The LTP will have a very positive impact on accessibility, particularly by improving bus, cycling and pedestrian facilities, and by improving road crossings for wheelchair users. This is to be expected as accessibility is on of the primary objectives of the plan. Mansfield Public Transport Interchange would be a major benefit. Roadworks associated with maintenance may cause short term problems

SEA aims		Summary of predicted significant impacts
3	Reduce the adverse effects of congestion on people	The impact of the LTP on congestion will be mixed. In the short term actions to improve bus priority, safety schemes and roadworks caused by maintenance may have negative impacts. However these will be compensated by the positive impacts of better traffic management, junction improvements, and reduced accidents. In the longer term the improvements to alternatives to the private car will encourage modal shift which will act to reduce congestion.
4	Support employment and business competitiveness	The LTP measures will have a positive impact on business competitiveness and employment. In the sort term there will be benefits in the form of improved access to jobs and workforces. There may be some local congestion issues associated with bus priority measures, safety schemes , but in the longer term actions to reduce congestion will help reduce business costs. All three major schemes are predicted to have significant benefits for employment and business competitiveness.
5	Reduce crime and fear of crime associated with transport	There will be a small positive impact on crime levels – the programme includes measures such as better waiting environments, CCTV and lighting. Mansfield public transport interchange will bring particular benefits. Conversely some bus shelters can act as a focal point for anti-social behaviour. There is a conflict between increased lighting for personal security, and reducing energy consumption and conserving rural character/night skies. However on balance personal security is considered in this case to be the key issue.
6	Support access and enjoyment of the countryside	Overall the LTP will play a positive role in improving access to the countryside, by improving public transport, and by investing some resources in rural cycleway schemes.
7	Reduce road accidents	Overall the impact of the LTP on safety is highly positive. This reflects the fact that safety is one of the plan's key objectives. All three major schemes are expected to bring significant safety improvements. The main possible negative impact would be any short term increases in accidents involving cyclist caused by greater levels of cycling, even though the specific cycling measures in the LTP are designed to make cycling easier and safer. The research on the issue of cyclist safety is inconclusive.
8	Reduce levels of transport related noise in particular in areas of high sensitivity	Overall the noise impacts of LTP measures will be localised and small. There will however be significant benefits from the Kelham bypass scheme. The main negative impact is the effect of maintenance and other construction of road-based measures.
9	Improve health by promoting exercise through cycling and walking	The LTP will have positive impacts on health by promoting exercise through cycling and walking
10	Reduce greenhouse gas emissions from transport and the use of fossil fuels	The impact of LTP measures on carbon emissions and climate change will be positive compared to likely trends if there were no LTP investment. However there are still predicted to be increasing levels of traffic, and therefore increasing emissions, within the lifetime of the plan, and to this extent the impact of the plan is negative. Both bypass schemes may lead to increases in CO_2 emissions.
11	Maintain and improve air quality across all areas	The overall impact of the LTP is likely to be small but positive in the longer -term.
12	Avoid damage to areas of significant biodiversity interest, and exploit opportunities to enhance biodiversity wherever possible	The impact of the LTP on biodiversity is likely to be very limited, except in the case of the Pleasley and Kelham bypasses. For both these schemes there are potential losses. Although these may be compensated in part by new habitat creation, nevertheless this needs to be a matter of close attention at the detailed assessment stage.
13	Avoid damage to areas of significant landscape quality, and exploit opportunities to enhance local distinctiveness wherever possible	Overall the impact of the LTP on landscape character and quality in rural areas is likely to be significant in the impact it can have by making the countryside feel more suburban. Kelham and Pleasley bypasses will both have slightly adverse effects, though these can be mitigated with appropriate landscape schemes and design.
14	Avoid damage to the character and quality of urban areas, and seek opportunities to improve local environmental quality in towns and villages	The impact of LTP schemes on the character and quality of urban areas depends primarily on the detailed design of the proposals. Mansfield Public Transport Interchange will have a particularly positive impact on the centre of Mansfield by replacing a run-down bus station with a new "landmark" structure. Both bypass schemes will benefit the urban areas they bypass.

SEA aims		Summary of predicted significant impacts
15	Minimise water run-off and contamination from transport infrastructure	The impact of the LTP on water environment in general is limited. However both Kelham and Pleasley bypasses will slightly improve water quality, but present an increased are of hard surfacing which will decrease infiltration.
16	Avoid damage to areas and features of significant cultural heritage interest, and exploit opportunities for enhancement wherever possible	The impact of LTP measures on the historic and cultural environment is very largely dependent on the specific location of proposals, and on their detailed design. Signage and other roadside infrastructure may in particular damage the settings of historical buildings in certain localities. Mansfield Public Transport Interchange will have a negative impact on the setting of an adjacent Grade II listed viaduct, but it is hoped this impact can be minimised through sensitive design.
17	Minimise use of non-renewable resources and increase recycling	The proposed LTP measures will involve the use of significant amounts of raw materials, including aggregates, cement, sand, stone and bitumen-based products. There will also be significant waste from road planings and other maintenance works. All of the three major schemes, and particularly the two bypasses, will involve the generation of waste and the use of raw construction materials. The use of fossil fuels is influenced by the LTP, and is expected to increase rather than decrease in the LTP period.

Table 9.3 Environmental impacts of the LTP

Changes to the LTP as a result of the SEA process

Development of the LTP, and the assessment of the Plan's environmental impacts through the SEA process, has been an iterative process. Results of the assessment having been fed through into revised versions of the Plan, which have subsequently been reassessed.

The main strategic influence of the SEA on the writing of the LTP was through the options appraisal which formed part of the original scoping and Environmental Report. This considered the respective environmental impacts of the following four options:

Option 1 Existing situation (what would happen if there was none of the investment set out in the LTP).

Option 2 Preferred LTP option (the option finally chosen)

Option 3 'Capacity growth' option (an option which would involve greater emphasis on road schemes to increase capacity as a way to tackle congestion and promote regeneration)

Option 4 'Car-constraint' option (greater emphasis on improving accessibility and tackling carbon dioxide emissions, health issues and local environmental quality by constraining car use and promoting public transport, cycling and walking)

In assessing these options, it was found that:

- Option 1 will result in a deterioration of environmental conditions primarily due to a general increase in road traffic levels.
- Option 2, the preferred LTP option, is anticipated to tackle congestion hotspots and encourage more sustainable travel. Overall the measures contained are expected to have a positive environmental impact, although traffic levels are still predicted to increase. There may be biodiversity, landscape and historic cultural heritage impacts, dependent on design.

- Option 3 provides benefits over and above the preferred LTP option by reducing congestion in the short-term, and helping economic regeneration. Conversely it would do little to improve accessibility, particularly for those without a car. It would also lead to a greater increase in traffic levels, and therefore a faster increase in greenhouse gas emissions, air quality and noise, and would do little to promote health and exercise.

- Option 4 by contrast scores highly in relation to social inclusion, tackling accessibility, and promoting exercise. In addition it is also positive in reducing greenhouse emissions, air quality and noise. However, it may increase congestion in the short- term, and may hold back local regeneration.

Overall, on balance, this has led to option 2 being preferred.

The draft Environmental Report published for consultation in November 2005 also contained the main measures proposed for improving the environmental effects of the chosen LTP option - i.e. the mitigation proposals. These are a further outcome of the SEA process in terms of its effect on the LTP, and are set out in Table 9.4.

SEA objective		Summary of mitigation proposals
1	Promote social inclusion	The most important issue is to ensure that all facilities are designed with the needs of the disabled in mind. It is also important to consider the needs of those who cannot read or understand English when proving information and publicity
2	Promote accessibility to essential services	All transport schemes should consider accessibility, and should be closely informed by the accessibility planning process. Efforts need to be made to minimise the disruption caused by roadworks.
3	Reduce the adverse effects of congestion on people	Wherever possible improvements for buses, cycling and walking should be made without taking out road capacity for other users. However this will not always be possible. Efforts should be made to minimise the impacts of roadworks by promoting alternative routes. Night working would reduce the effects of roadworks on congestion, but would conflict with noise reduction objectives and would cost more, leading to lower levels of maintenance.
4	Support employment and business competitiveness	Mitigation measures should concentrate on ensuring that the congestion impacts of new public transport measures are minimised, and in reducing the congestion impacts of road maintenance and local safety schemes
5	Reduce crime and fear of crime associated with transport	Ensure that crime and personal safety feature in all bus infrastructure investments. Renewable energy sources (such as solar panels on bus shelters) can be used to reduce carbon emissions.
6	Support access and enjoyment of the countryside	The accessibility planning process should consider the demand for access to rural areas for recreational purpose.
7	Reduce road accidents	All significant transport schemes should be audited for their impacts on safety, particularly cyclists and walkers. Awareness raising should be used to counter any negative impacts caused by increased numbers of cyclists.
8	Reduce levels of transport related noise in particular in areas of high sensitivity	The noise impacts of roadworks can be reduced by a ban on night-time working. However this conflicts with reducing the congestion impacts of roadworks, safety considerations, and the cost of implementation which increase at night. The current policy is to consider each scheme on a case by case basis to get the best balance between these competing objectives, and this is likely to continue. Noise reduction measures should be employed on specific schemes where possible.
9	Improve health by promoting exercise through cycling and walking	Physical activity should be emphasised in smarter choices programmes
10	Reduce greenhouse gas emissions from transport and the use of fossil fuels	Reducing the level of car use is considered to be influenced primarily by national policy on fuel duty, and therefore to a considerable extent outside the scope of the LTP.

SEA objective		Summary of mitigation proposals
11	Maintain and improve air quality across all areas	Where possible influence should be applied on bus operators to adopt low emission vehicles.
12	Avoid damage to areas of significant biodiversity interest, and exploit opportunities to enhance biodiversity wherever possible	In all cases detailed design can be used to minimise impacts. There are also opportunities to enhance biodiversity through the positive management of roadside verges. "Sustainable Urban Drainage Schemes" have a positive impact on biodiversity by reducing waterborne pollution.
13	Avoid damage to areas of significant landscape quality, and exploit opportunities to enhance local distinctiveness wherever possible	The main mitigation is to ensure that design standards are sensitive to the rural location, and through landscaping and appropriate design of the two bypass schemes. Use of low spillage lighting in sensitive locations will help reduce light pollution.
14	Avoid damage to the character and quality of urban areas, and seek opportunities to improve local environmental quality in towns and villages	Design standards should reflect local character, particularly in areas of high value such as conservation areas.
15	Minimise water run-off and contamination from transport infrastructure	Sustainable urban drainage schemes (SUDS) can alleviate water pollution and run-of problems, but are likely to be feasible only in major new developments.
16	Avoid damage to areas and features of significant cultural heritage interest, and exploit opportunities for enhancement wherever possible	Careful design and location of highways measures.
17	Minimise use of non-renewable resources and increase recycling	The use of recycled materials should be maximised to reduce waste and the quantity of raw materials required.

Table 9.4 Summary of SEA mitigation proposals

The options appraisal, predicted impacts and mitigation proposals were all set out in the draft Environmental Report, which was published in November 2005 and subject to consultation with the statutory consultation bodies (English Nature, English Heritage, the Countryside Agency and the Environment Agency) alongside other stakeholders. This consultation provided further information which has been used in the development of the final LTP and the Environment Report respectively. Table 9.5 sets out the main comments made in this consultation, and the changes that have happened as result.

Consultee	Main comments	LTP/SEA response
English Heritage	Overall felt report was clearly presented and offered only minor comments.	Noted
	Settings should be included in the definition of the SEA indicator on historic cultural heritage	Environmental Report amended accordingly
	Detailed comments over baseline data and monitoring	Environmental Report amended accordingly
	Historic buildings should be included in transport asset management plan	To be considered as part of ongoing development of asset management plan
	Positive suggestions relating to Kelham bypass scheme	To be incorporated in further development and appraisal of scheme
English Nature	Support SEA objective on biodiversity	Noted
	Prefer option 4	Preferred option not to be changed – SEA demonstrates Option 2 has best overall benefits
	Disagree that option 3 will have only minor impact on air quality and quality of life	Option appraisal has been redone and impact on air quality and CO2 emissions designated as major impact
	Emphasise benefit of sustainable drainage schemes on wildlife	Noted
	Address airborne and waterborne pollution in baseline data	To be noted in final Environmental Report and built into monitoring reports when data becomes available
Countryside Agency	Overall applauded SEA on the thoroughness on landscape and access issues	Noted
	Concern over lack of baseline data, particularly on landscape character	Recognised problem to be acknowledged in final Environmental Report and addressed in monitoring of SEA
	Impressed by indicators, but suggested additional ones	Current list of SEA indicators to be retained, but additional indicators to be monitored outside LTP/SEA
	Suggested need to incorporate landscape character in assessment of impacts	Will feature in subsequent assessment of specific proposals
	Additional mitigation measures proposed	Additional measures will all be considered in specific projects
Environment Agency	Series of detailed comments over practical mitigation measures, e.g. relating to contaminated land, waste management and materials	Noted – most of these practices in place, but will be considered in scheme delivery
	Support use of sustainable urban drainage schemes, and seek consultation on water drainage proposals of specific schemes	Noted
	Supports emphasis in SEA on impact of hard surfacing on flood risk	Noted

Table 9.5 Consultation impacts

The impact of the LTP on the environment, as predicted in the SEA, will be monitored over the lifetime of the plan as required in the SEA Regulations.