



Liverpool City Council

Air Quality Action Plan for the City-Wide AQMA

Final

Report to Liverpool City Council

Restricted Commercial
ED45882

Draft Issue 2
January 2011


Title	Air Quality Action Plan for the City-Wide AQMA
Customer	Liverpool City Council
Customer reference	---
Confidentiality, copyright and reproduction	
File reference	
Reference number	ED45882

Dr Beth Conlan
AEA group
329 Harwell
Didcot
Oxfordshire
OX11 0QJ

t: 0870 190 6440

AEA is a business name of AEA Technology plc

AEA is certificated to ISO9001 and ISO14001

Author	Name	Beth Conlan & Scott Hamilton
Approved by	Name	Sean Christiansen
	Signature	
	Date	17/01/2011

Executive summary

The Environment Act 1995 places a statutory duty on all Local Authorities to review and assess air quality within their electoral boundaries. If, as a result of this review, any relevant area is identified as being not likely to achieve the air quality objectives as prescribed in the Air Quality Regulations then the Local Authority must designate the area as an Air Quality Management Area (AQMA). On designation of an AQMA the aforementioned Act then requires that an Air Quality Action Plan (AQAP) be produced, setting out the actions that the Local Authority intends to implement in order to work towards achievement of the air quality objective.

In 2003, Liverpool City Council (LCC) designated two AQMAs, one in the City Centre and a second at the M62 Rocket Junction. These two AQMAs were designated on the basis of identified exceedences of the nitrogen dioxide (NO₂) annual mean objective. The detailed and further assessments that resulted in the designations identified that the exceedences were as a result of road traffic pollution sources.

Following on from the two AQMA designations, LCC published an AQAP in 2007 and subsequent Review and Assessment work in the city identified wider areas of exceedence of the NO₂ annual mean, outside of the boundaries of the original AQMA. This resulted in the decision to designate a city wide AQMA in late 2008. The city wide designation requires the 2007 AQAP to be updated– and this document has been produced as the result of this update.

LCC works with a broad range of partners in an effort to attain improvements in air quality. The partnership includes the Local Highways authority, Merseytravel and Liverpool 2020 – all with key responsibilities for securing improvements to the city's transport network. As part of the update of the 2007 AQAP, LCC has also consulted widely with local organizations and the general public. This wider consultation has included an exercise in the form of a 'Citizens' Jury' which has played an important role in identifying and developing measures for inclusion within the AQAP update.

This updated AQAP confirms that the key sources of exceedences of the NO₂ annual mean objective arise from road transport and in particular from heavy duty vehicles. Evidence suggests that a 60% reduction in road transport oxides of nitrogen emissions (NO_x - which is a precursor to NO₂) is necessary to achieve the NO₂ annual mean objective. Buses account for 57% of the NO₂ from local roads in Liverpool. This would indicate that lower emission buses should be a priority consideration when attempting to improve air quality.

The AQAP considers various options to improve air quality within Liverpool. It recommends two principal direct measures for implementation, both of which are aimed at reducing levels of oxides of nitrogen emissions within the city wide AQMA. Supplementary softer measures are also recommended, aimed at encouraging sustainable travel more generally within the City. Furthermore, the updated AQAP sets out the framework of partnership working that must be achieved if the actions identified are to be effectively implemented, progressed and monitored.

At present, the actual reduction of oxides of nitrogen emissions in the citywide AQMA that could be delivered by this AQAP remains uncertain. To deliver a reduction of the scale required to achieve the annual mean NO₂ air quality objective value prior to 2015 is challenging. Indeed, additional measures not included here may be required.

It should be acknowledged that the AQAP is a continually evolving document, involving numerous partners, and as such monitoring and updating against progress is required each year.

The Liverpool city region is an economic and regional transport hub and as such it is important that the AQAP implements a sustainable approach to achieving the air quality objectives – recognising the needs and requirements of local businesses and community. The actions and measures identified within this plan will provide various additional benefits, beyond reduction of NO₂ concentrations, for the City of Liverpool - beyond the core objective of the plan. These benefits include:

- A reduction of other pollutants arising from transport such as particulate matter;
- A reduction in the emission of greenhouse gases thereby assisting with climate change policies
- A reduction in noise pollution arising from traffic
- A reduction in congestion
- Improvements to human health and associated reduction in health care costs

In compiling this Action Plan all relevant Government Guidance has been considered including Local Air Quality Management Policy Guidance [LAQM.PG (09)]. Additionally, previous review and assessment reports produced by the LCC have been called upon. The Action Plan has been subject to, and will undergo further, statutory and public consultation and be amended accordingly prior to formal adoption by the City Council.

For further information concerning this Action Plan, please contact:

Mr Paul Farrell
Environmental Protection Unit
Public Protection Business Unit
Regeneration
Liverpool City Council
Municipal Buildings
Dale Street
LIVERPOOL L2 2DH

Tel: 0151 225 6253

Email: pauld.farrell@liverpool.gov.uk

Table of contents

1	Introduction	1
1.1	Liverpool in Context	1
1.2	The importance of air quality	2
1.3	Future plans for Liverpool	4
2	Regulatory context, the role of the action plan and existing policy	5
2.1	Health effects of poor air quality	5
2.2	Principal Sources of Air Pollution in the City	6
2.3	The legislative framework for air quality	7
2.3.1	Local Air Quality Management.....	7
2.3.2	Integrating air quality and climate change policy.....	8
2.4	Regional Spatial Strategy for the North West.....	8
2.5	Multi Area Agreement for Transport	8
2.6	Local Area Agreement	9
2.7	Merseyside Local Transport Plan 2006-11	9
2.8	Supplementary Planning Document	11
3	Air Pollution in Liverpool.....	13
3.1	Current levels of Nitrogen Dioxide in the City.....	13
3.2	Areas exceeding the national air quality standard.....	16
3.3	Summary of actions taken already	20
3.3.1	Existing Measures in Place to Reduce Pollution in Liverpool.....	20
4	Transport Planning in Liverpool	22
4.1	Use of Transport Modes	22
4.2	Impact on air quality.....	26
4.2.1	Bus emissions.....	26
4.2.2	Congestion Emissions	26
4.3	Transport schemes that impact on air quality.....	29
4.3.1	City Centre Movement Strategy.....	29
4.3.2	Edge Lane Improvement Scheme	30
4.3.3	Hall Lane Strategic Gateway	31
4.4	Traffic Management Systems in Liverpool	31
4.4.1	Urban Traffic Management and Control (UTMC)	32
4.4.2	Comet	32
4.4.3	Variable Message Signs and Car Park Management System	33
4.4.4	Other systems.....	33
4.4.5	Recent traffic management developments in Liverpool	33
4.5	Merseyside Transport Partnership.....	34
4.5.1	Travel Plans	35
4.5.2	Planning Applications & Travel Plans	37

4.5.3	Walking	37
4.5.4	Cycling	38
4.5.5	Car Share.....	39
4.6	Preparation of LTP3.....	40
5	Consultation	42
5.1	Air Quality steering group	42
5.2	Initial Stakeholder Engagement.....	42
5.3	Citizens Panel	42
5.3.1	The aim of the Citizens Panel.....	42
5.3.2	Initial comments from the Panel on air quality.....	43
5.3.3	Panel recommended measures.....	45
6	Action Plan Measures.....	46
6.1	Detailed assessment of options.....	46
6.1.1	Assessment methods	46
6.1.2	Assessment results.....	46
6.2	Direct Measure 1: Buses	47
6.2.1	Statutory Quality Partnership schemes	47
6.2.2	Bus Lane Enforcement	48
6.2.3	Bus lane infrastructure	49
6.3	Direct Measure 2: Tackling Congestion.....	50
6.3.1	Linking SCOOT to air quality “Motes”	50
6.4	Supplementary Measures 1: Smarter Measures	51
6.5	Supplementary Measures 2: Information Dissemination.....	51
6.5.1	Air Quality Website	51
6.5.2	LiveAirtext Alert System.....	52
6.6	Summary list of measures	52
7	Next steps.....	61
7.1.1	What is the option?	1
7.1.2	What is being proposed?	1
7.1.3	Potential air quality impact.....	1
7.1.4	Implementation costs.....	3
7.1.5	Cost-effectiveness assessment.....	3
7.1.6	Potential co-environmental benefits	3
7.1.7	Potential risk factors	4
7.1.8	Potential social impacts	4
7.1.9	Potential economic impacts	4
7.1.10	Who is the appropriate authority for implementing an option?	4
7.1.11	How feasible is it to implement the option?	4
7.1.12	How acceptable are the options?	5

Appendices

Appendix 1: UK air quality standards and objectives

Appendix 2: Initial assessment of potential options to reduce emissions

Appendix 3: Assessment methods

Appendix 4: Cost Effectiveness of Measures

1 Introduction

This updated local Air Quality Action Plan (AQAP) sets out a work programme for the improvement of air quality within the city of Liverpool. The work programme is led by Liverpool City Council (LCC) but will be implemented in partnership with Merseytravel, Merseyside Transport Partnership, Liverpool First and Liverpool 2020. LCC has consulted the public and other statutory consultees on the content of this plan in advance of a final plan which is to be approved by the Cabinet Members of LCC and Central Government before being put into practice.

1.1 Liverpool in Context

Liverpool is the eighth largest city in the UK. The wider Liverpool city region is home to almost 2 million people, 70,000 businesses and sustains over 1 million jobs. Liverpool, itself, is the economic and transport centre of the region (see Figure 1.1). Its history, over recent decades is one of decline, poor infrastructure and a degraded physical environment with associated areas of social deprivation. However, since the late 1990's and especially in the last five years, the city has undergone major urban regeneration, received significant inward business investment and as a result the city centre in particular has been revitalised.

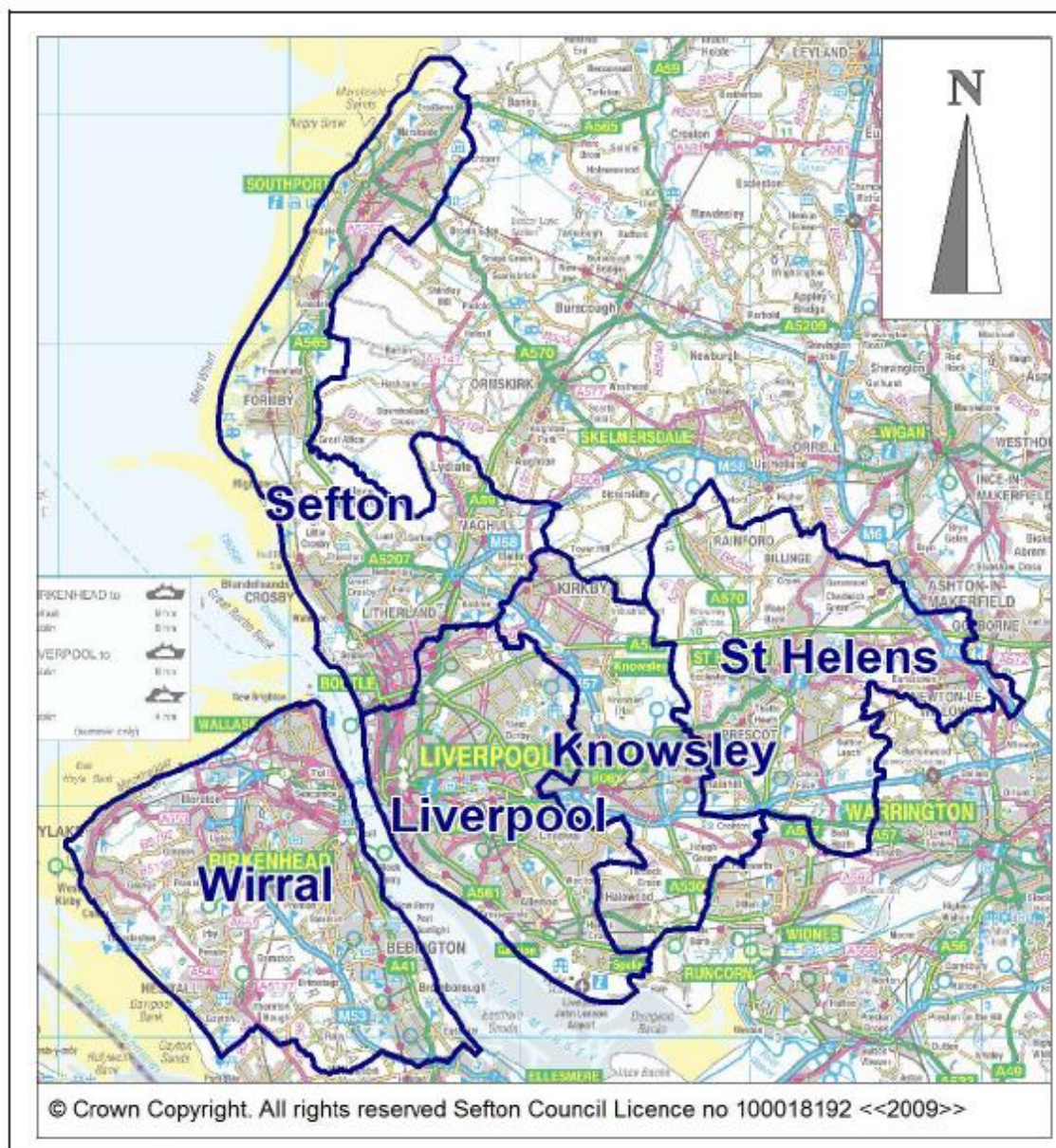
The city's designation as European Capital of Culture in 2008 provided further opportunity to continue this improvement and transform the city's image. This has been accompanied by an economic recovery. From 1998 to 2007, employment has increased by 12%. However, in relative terms, Liverpool's economic position remains relatively poor with its Gross Added Value per capita still below the national average. Indeed, during its long period of decline, Liverpool lost half of its population, and evidence of this decline remains today in many parts of the city.

In 2007, Liverpool was ranked the most deprived local authority area (see Figure 1.2) in England in the Indices of Deprivation (ID2007), and the second most deprived authority based on employment. Liverpool was also the most deprived local authority based on a measure of concentrated deprivation. There is often a close correlation between social deprivation and poor health, and in Liverpool this is certainly the case. It is a city with poor health compared to the England average¹. There are 30% more deaths in the city each year than the England average and life expectancy is over 3 years less than the England average². The major causes of premature death in Liverpool are cancer, cardio vascular disease and respiratory disease. These account for 76% of all deaths in Liverpool. In the UK, there are over 4 million asthma sufferers. Admissions to hospital for asthma and respiratory problems are highest in the North West and, within the North West, they are highest in Liverpool. In some years asthma admissions to hospital in Liverpool have been more than double the national average.

¹ Liverpool PCT strategic community plan 2009-2014

² Liverpool PCT strategic community plan 2009-2014

Figure 1.1 Liverpool in the wider Merseyside region



1.2 The importance of air quality

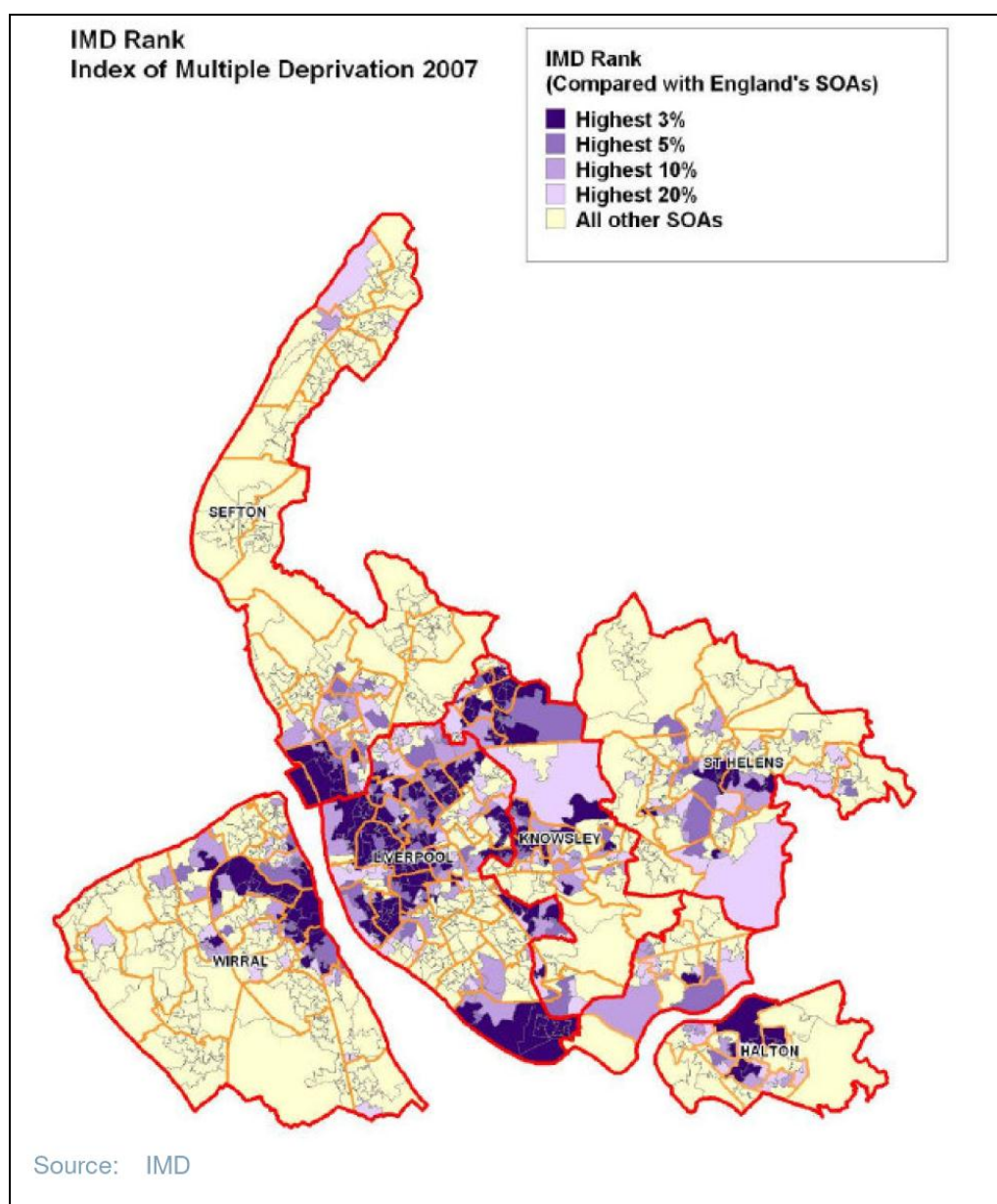
It is widely accepted that exposure to air pollutants, even to the historically low levels found in countries such as the UK, can damage health (Department of Health, 1995; Department of Health, 2006). It has suggested that inflammatory processes triggered by inhalation of pollutants may play important roles: either directly, leading to effects on the respiratory system, or indirectly, leading to effects on the cardiovascular system. Such effects are manifested through increased hospital admissions and daily deaths. Long-term exposure to pollutants, especially, particulate matter, has been shown to contribute to the progression of cardiovascular disease and a reduction in life expectancy³.

³ Committee on Medical Effects of Air Pollution. Long Term Exposure to Air Pollution: Effects on Mortality, 2009.

It is unlikely to be any coincidence that mapped levels of elevated air pollution concentrations, areas of social deprivation and cases of respiratory illness focus on the same geographic areas within the Liverpool City region⁴.

A recent report by the House of Commons Environmental Audit Commission compares the gains in life expectancy that could be realised by improving poor air quality (in particular reducing exposure from Particulate Matter 2.5 microns or less in diameter) within the gains arising from action on passive smoking and road accidents. Based on Department of Health data the Commission reported that gains in average life expectancy of 7-8 months could be achieved from reductions in air pollution, whereas eliminating passive smoking and road accidents only provides average gains of 1-3 months. Although the focus of this AQAP is NO₂, the measures contained will also reduce other pollutant concentrations with common sources including particulate matter concentrations.

Figure 1.2 Index of Multiple Deprivation rank of Merseyside's Super Output Areas compared to England's Super Output Area, 2007



⁴ LTP3 Evidence Base Review, Merseyside LTPSU, March 2010.

1.3 Future plans for Liverpool

Liverpool's Local Strategic Partnership, Liverpool First, set out in its Sustainable Community Strategy (2009) its ambitions to build Liverpool into a thriving international city by 2024. Part of this vision includes making the city into an environmentally sustainable and attractive place to live, so that the people of Liverpool are healthy and live in safe and secure neighbourhoods. In terms of the impact of this strategy on future levels of air pollution, the core aim of building a city which is connected by high quality transport and communication links is important. Successful transport and development control planning are critical to the lowering of air pollution levels from those that the city's residents are currently exposed to. Indeed, the emerging Local Development Framework, (the spatial development strategy for the City which contains planning policies for all land within the city) must carefully consider current air pollution concentrations and how its policies will impact on air pollution in the future.

During the last decade LCC has overseen rapid development, both in terms of building construction and transforming its economy attracting substantial investment from both private and public sector organisations, in its bid to become a thriving European City.

However, as has also been seen more broadly, the current recession has seen an increase in unemployment, indeed it is anticipated that the worldwide economic downturn will impact on Liverpool until 2012⁵. Therefore, transport connections become more important to enable access to employment opportunities when they arise across the city as transport movement is critical to any city's economic success.

To achieve the ambition of creating a thriving international city, there are crucial roles for the Port of Liverpool and the John Lennon international airport as they both form integral parts of the development of an excellent transport infrastructure. These developments are supported by the Mersey Ports Strategy, the Mersey Gateway and the Superport projects aiming to develop synergies between these modes of travel.

It should also be noted that improving connectivity in Liverpool is not only about improving transport links, but also about improving digital accessibility. There is a commitment to develop a Liverpool information communications strategy within the Greater Merseyside Digital Development Agency. Greater accessibility to the electronic information communications technology is likely to reduce vehicle trips (for instance by encouraging home working) and thereby reduce pollutant emissions.

To realise the City's ambitions in becoming a thriving international city, current and future air quality must be considered. This AQAP examines the current levels of air pollution within the city in the light of the wider UK national regulatory framework. The AQAP also reviews the success of measures already in place to improve air quality and then considers additional measures necessary to further reduce pollution concentrations and therefore enhance the environment of Liverpool.

⁵ Study by PION and Cambridge Econometrics

2 Regulatory context, the role of the action plan and existing policy

This chapter sets out a Local Authority's statutory duties in relation to Local Air Quality Management. It also considers current City Council strategy and policy that have a bearing on air quality within the City region.

2.1 Health effects of poor air quality

There are various sources of air pollution in the UK. These can include transport (mainly road transport), energy – generation and consumption, sources such as commercial / industrial premises as well as various natural sources. The U.K. Government has identified 8 key pollutants:

- Nitrogen Dioxide
- PM₁₀ & PM_{2.5} particulates
- Benzene
- 1,3 – butadiene
- Lead
- Sulphur Dioxide
- Carbon Monoxide
- Ozone

Whilst this AQAP is primarily aimed at reducing NO₂, the pollutant for which the city wide AQMA has been designated, the initiatives within the plan will have a positive effect on the reduction of other air pollutants, especially particulates. The three main transport pollutants and their health implications are as follows:

Nitrogen Oxides (NO_x): Road transport is responsible for approximately 50% of the emissions of NO_x in Britain. NO₂ is formed mainly as a result of oxidation of Nitric Oxide (NO) in the atmosphere, although growing evidence supports an increasingly significant fraction emitted directly by transport sources. NO₂ has been identified as having various adverse health effects particularly on the respiratory system both in asthmatics and non-asthmatics. Short term exposure to NO₂ can increase the likelihood of reaction to allergens, such as pollen, and has been known to exacerbate asthma. Children exposed to this pollutant may have increased risk of respiratory infections.

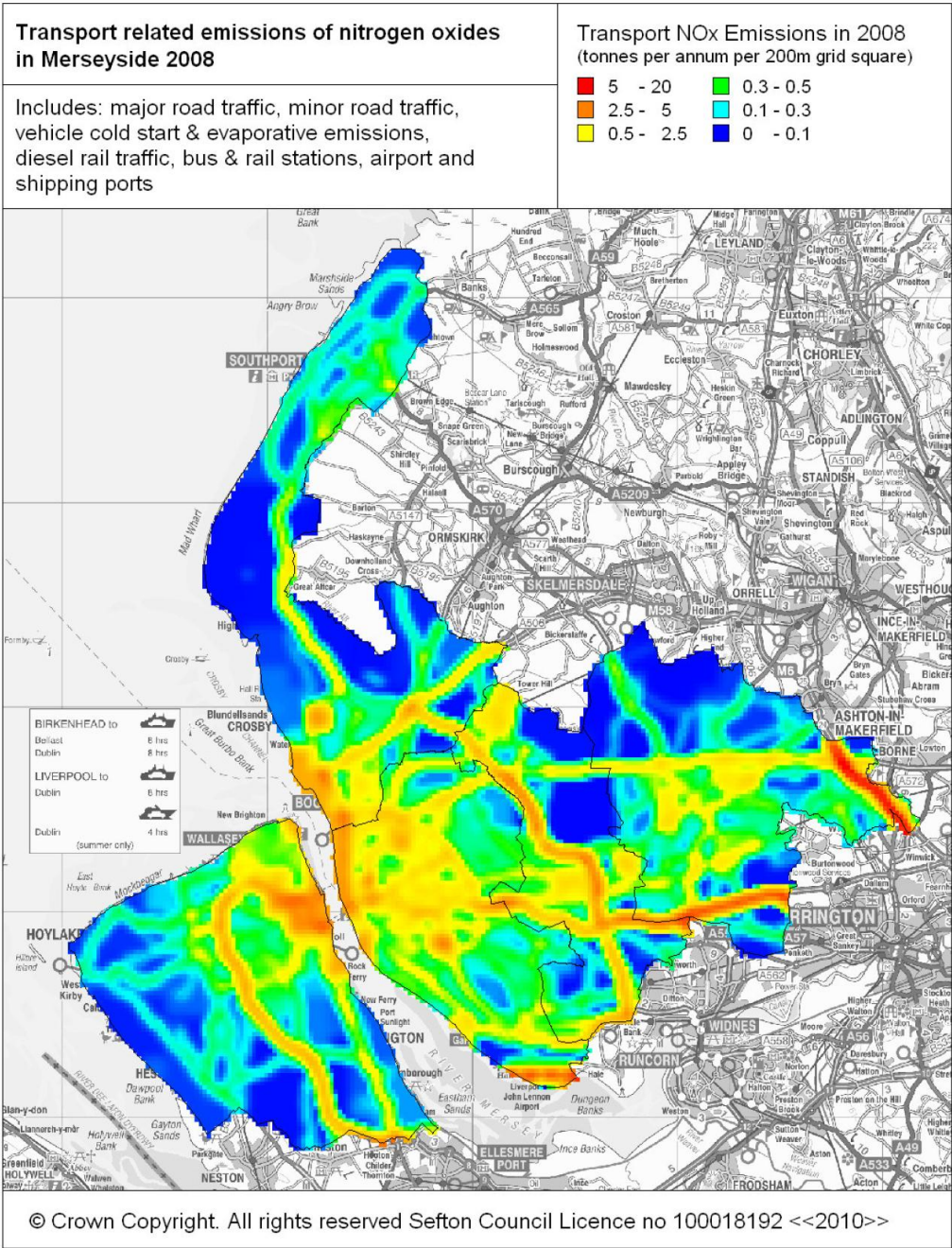
Particulates (PM₁₀ & PM_{2.5}) Particulates can be produced directly from combustion in engines and other processes, as well as from natural activities. They can also be caused by chemical reaction in the air. Particulates of less than 3 µm can pass deep into the lungs thus causing respiratory problems.

Carbon Monoxide (CO) Carbon monoxide is a colourless, tasteless gas, which is known to be poisonous and is the result of incomplete combustion. Inhaling small doses of this gas can result in a person becoming confused and having reduced co-ordination. It can also increase the likelihood of angina.

2.2 Principal Sources of Air Pollution in the City

NO₂ and NO are collectively known as Nitrogen Oxides (NO_x). Nitrogen Oxides, which are the main cause of poor air quality across the UK, are produced during all combustion processes in air, usually in the form of NO which subsequently reacts with ozone (O₃) to form NO₂. The predominant source of NO_x in Britain is road transport and it is thought that half of emissions in Europe originate from this source; certainly the highest concentrations of NO₂ are generally found close to busy roads in urban areas (see Figure 2.1). NO₂ pollution levels within the Liverpool City region follow a similar pattern with the majority of NO_x emissions being road transport related. Commercial, industrial and domestic sources also make a small contribution to background.

Figure 2.1 Transport related emissions of nitrogen oxides in Merseyside in 2008



In the UK, air pollution is currently estimated to reduce the life expectancy of every person by an average of 7-8 months with estimated equivalent health costs of up to £20 billion each year⁶. Air pollution also has a detrimental effect on our ecosystems and vegetation. On the basis of these statistics there are clearly significant benefits to be gained from improvements in air quality.

To protect the health of the population, the Government have set out a national air quality strategy which includes statutory air quality objectives for key air pollutants. The objectives are expressed as a maximum ambient concentration not to be exceeded, either without exception or for certain pollutants with a permitted number of exceedences within a specified timescale (see Appendix 1). The objectives have been set throughout the UK, and European Union, at levels that aim to protect society, in particular those most vulnerable from the harmful effects of breathing in polluted air.

In response, a number of measures have been introduced at an international and national level to reduce the impact that air pollution has on health. These include:

- Incremental reductions in emissions from vehicles and industry
- Climate Change programme policies
- Local Air Quality Management (see following section)

The UK government recognises the important role that Local Authorities have had and continue to have in helping to deliver the national air quality objectives. Action taken at a local level is an effective way of tackling localised air quality problems and therefore leading to an overall improvement in air quality at a national level.

2.3 The legislative framework for air quality

2.3.1 Local Air Quality Management

The Environment Act 1995 gives Local Authorities duties and responsibilities that are designed to secure improvements in air quality, particularly at the local level. These include the review and assessment of key pollutants in their area – through a series of rounds of assessment on a three year cycle. If it appears that any of the air quality objectives set by government is not likely to be achieved, and members of the public are being exposed to the pollution, the Local Authority must, by order, designate any part of its area so affected. The area designated is termed an Air Quality Management Area (AQMA). Once designated the Local Authority must then prepare and implement an Action Plan of measures with the aim to reduce air pollution levels within that AQMA.

A Review and Assessment round consists of Local Authorities initially undertaking an Updating and Screening Assessment (USA) and then carrying out the following stages if any air quality objective is found to be exceeded:

- A Detailed Assessment of those areas identified in the USA as potential AQMA's
- The designation of an AQMA
- A Further Assessment of air pollution in the AQMA
- Amendment if necessary of existing AQMA boundaries
- The production of an Air Quality Action Plan (AQAP)
- Annual Action Plan Progress Reports

The City Council designated a city wide AQMA in 2009 as a result of exceeding the air quality objective for annual mean NO₂ across various areas of the city. Previously, there were two smaller

⁶ UK National Air Quality Strategy, 2007.

AQMAs designated in Liverpool, one for the City Centre and a second in the area of the M62 Rocket Junction. An AQAP for these two areas was published in 2007. This report provides an update to the earlier AQAP to take account the extended citywide AQMA that will cover the enlarged Liverpool area.

2.3.2 Integrating air quality and climate change policy

Defra have recently published guidance on how to consider the combined effects of policies to improve air quality and address climate change through reducing carbon emissions. Broadly speaking, air pollutants and carbon emissions from greenhouse gases originate for the same sources, and the combined benefits of action are much more substantial, compared to the costs when policy for a low carbon economy and improving air quality are developed separately. For example, the uptake of ultra low carbon vehicles in urban areas where air quality is a priority is likely to result in significant health benefits. Therefore, Local Authorities are recommended to take a strategic approach, especially in their transport planning, to reduce carbon and air pollutant emissions.

2.4 Regional Spatial Strategy for the North West

The Regional Spatial Strategy (RSS) has been discontinued. However, the key themes that were set out in the RSS will be continued through other planning mechanisms, including the Local Transport Plan.

The consultation for the preferred strategy for the Third Local Transport Plan (LTP3) commenced in September 2010 and is due to run until the end of November 2010. Following the consultation period the strategy will be adopted and in place for 2011.

The goals outlined in the preferred strategy include:

- Provide and promote a clean and low carbon transport system
- Ensure the transport system promotes and enables improved health and wellbeing
- Ensure the transport system supports equality of travel opportunity by ensuring people can connect easily with employment, services and social activities
- Ensure the transport network supports the economic success of the city region by the efficient movement of people and goods
- Maintain our assets to a high standard

These goals intend to build on the key themes set out in the RSS. Key opportunities and targets will emerge from the LTP3 consultation process which will be adopted in 2011.

In addition, LCC, in partnership with other Merseyside Authorities and Merseytravel developed a Supplementary Planning Document for Transport which was adopted in 2008. This was entitled "Ensuring a Choice of Travel." Through the provision of consistent guidance to developers across Merseyside, it will enable the provision of a balanced transport infrastructure to provide access to employment, leisure, retail and other facilities for all the City's residents and visitors. It will also provide a framework for future investment in the City's strategic road and rail network where new development would create additional travel demand.

2.5 Multi Area Agreement for Transport

Partners across the Liverpool City region are committed to working together under a common set of goals set out in a Multi Area Agreement (MAA), to achieve economic prosperity and address key challenges. The Liverpool city region Multi Area Agreement⁷ sets out a vision to attain a transport

⁷ Liverpool city region Multi Area Agreement, June 2009

system commensurate with an international thriving city. In particular it sets out how transport policy is integrated into other policy agendas.

Proposals included in the MAA aim to improve the capacity and connectivity of the Liverpool City region transport system and to reduce road congestion within the city itself which is likely to result in decreased pollutant emissions. In addition, proposals to create a low carbon transport system by reducing emissions and addressing climate change will impact on air pollutant emissions. The Delivery of a Sustainable Transport System⁸ around a low carbon economy but also attaining air quality improvements is an approach which must be taken to achieve greatest health benefits for the city population. The MAA includes a commitment to utilise the Merseyside Atmospheric Emissions Inventory to evaluate transport options to achieve carbon and air pollutant emission reductions.

2.6 Local Area Agreement

Local Area Agreements (LAAs) are three year 'contracts' between government and Local Authorities that set out agreed key priorities for an area. The Liverpool LAA⁹ covers the period 2008-2011; however following April 2011 these targets are likely to be revised. Targets and indicators within the LAA that are relevant to this air quality action plan include:

- NI 167 Congestion – average journey time per mile during the morning peak. The target for 2010/11 is 5.1% improvement on the person miles growth index from a 2005/06 baseline.
- NI 175 Access to services and facilities by public transport, walking and cycling. The indicator for this is the % of all individuals 'at risk' within 20 minutes of the nearest strategic investment area by public transport and walking. The 2007 baseline was 63% and the target for 2010/11 is 66%. Separate targets are set for each individual strategic investment area.

2.7 Merseyside Local Transport Plan 2006-11

The second Local Transport Plan (LTP) for Merseyside covers the period from 2006-2011. It is a statutory document, and sets out proposals for improving transport in Merseyside over five years within the context of longer term strategy. The LTP is aligned with the Liverpool City Region Development Plan, as well as the national and regional strategies.

This Air Quality Action Plan will support the aims and objectives of the LTP which are:

- Provide the appropriate infrastructure to support social and economic growth and regeneration
- Provide access for all to ensure an inclusive society
- Manage demand to provide an efficient transport network
- Support a healthier community by ensuring transport actively improves health, does not impair quality of life and ensures the safety and security of all users
- Protects and enhances the environment
- Makes best use of existing resources and strives to ensure value for money at all times.

The vision for transport on Merseyside is: 'a fully integrated safe transport network for Merseyside which supports economic and social regeneration and ensures good access for all, and which is operated to the highest standards to protect the environment and ensure quality of life'. The long term

⁸ DaSTS Delivery of a Sustainable Transport System DfT, 2008

⁹ Liverpool 2024 a thriving international city. LAA 2008-2011. Liverpool First.

strategy is to support the continuing economic development of Merseyside by managing for growth in travel demand to ensure the efficient movement of goods and people.

The LTP aims to do this by:

- Continuous improvement in the capacity and efficiency of the transport network, based on the best means of delivering the safe movement of goods and people.
- Continuously improving the links between transport and land use and location choice in ways that support the efficient movement of people and goods.
- Creating a well connected region in terms of our links to neighbouring areas and beyond, and within the Merseyside and wider city region.
- Ensuring equality of travel opportunity for all, by setting out in the Access Plan a programme of action to ensure all members of the community have equal access to opportunities and services.
- Improving and enhancing the single integrated public transport (to be promoted as Transport Plus) network to make it affordable and accessible to all and enhancing capacity to support connectivity and alternatives to private car use.
- Managing demand for travel, by ensuring that the transport network operates efficiently in support of the area's continuing regeneration and minimizes the impact on the environment, contributes to addressing climate change and does not impact adversely on people's health.
- Creating a safe and secure travel environment by continuously reducing the level of accidents on the highway network and ensure personal security across all modes.

Certain aspects of the LTP interface with this updated AQAP directly and many of the measures outlined will be directly beneficial to air quality in Liverpool. In particular, the LTP takes account of predicted growth in road transportation and attempts to mitigate this through improving the quality and capacity of the public transport system and the introduction of demand management measures - such as limiting parking spaces in the City centre. This is predicted to increase the number of people travelling by bus and rail, whilst limiting car traffic to a 7% increase during the LTP period.

The main objectives and sub-measures which could potentially benefit air quality in the City are:

- **Objective 2- Accessibility and Social Inclusion-** outlines commitments to introducing Integrated Corridor Management, improving the quality of public transport fleets and operation of the network, increasing innovation in travel marketing and information, and improving walking and cycling facilities
- **Objective 3- Manage Demand-** includes the recent Supplementary Planning Document (SPD), parking management, public transport promotion, park and ride, smart choices, network management, intelligent transport systems, providing travel information
- **Objective 4- Healthier Communities-** includes an initiative to encourage walking and cycling for work and leisure and improve supporting infrastructure.
- **Objective 5- Protect and Enhance the Environment-** this objective is largely served by initiatives enabled by other objectives. Any measures which manage demand and enhance traffic management will offer environmental improvements.

2.8 Supplementary Planning Document

Liverpool City Council published “Ensuring a Choice of Travel Supplementary Planning Document” in 2008¹⁰. This document provides guidance to developers on access and transport requirements for new development across the wider Merseyside area – this document should have a clear influence on future air quality in Liverpool. The objectives of the SPD are:

- Ensure a reasonable choice of access by all modes of transport to new development
- Reduce the environmental impact of travel choices, by reducing pollution, and improving the local environment
- Improve road safety
- Promote healthier lifestyles by providing opportunities for people to walk or cycle for work or leisure purposes
- Reduce the level of traffic growth and congestion on the strategic and local road network
- Encourage opportunities to improve the quality of development proposals by better use of space through the provision of less car parking spaces where appropriate.

More specifically for Liverpool the SPD should also:

- Enable the provision of a balanced transport infrastructure which provides access to employment, leisure, retail and other facilities for all the city’s residents and visitors
- Provide a framework for future investment in the City’s strategic road and rail network where new development would create additional travel demand.

Clearly the SPD will be important for air quality in Liverpool as the document is intended to shape transportation provision around new development. The use of a set of transparent criteria which informs the evidence base required of developers ensures a consistent approach is used and, importantly, the appropriate investigations (for example a Transport Assessment or Air Quality Assessment) are carried out in a timely manner to suppose decision making.

Much of the SPD is aimed at improving the sustainability of transport in Liverpool, and certain measures contained therein have obvious beneficial implications for air quality in the city. These include:

- **Accessibility standards-** all new developments are required to demonstrate that they are accessible to all transport modes. This could influence modal shift away from private cars to public transport or walking/cycling with associated air quality benefits.
- **Parking standards-** these help developers identify the maximum parking provision allowed but also the minimum standards for cycling parking.
- **Transport Assessments (TA) and Transport Statements (TS)** - a set of criteria is provided for when a developer would have to complete a TA. The findings of a TA can be used to inform an air quality impact assessment and will be important when considering the potential effect of larger developments.

¹⁰ <http://www.liverpool.gov.uk/Images/tcm21-148384.pdf>

- **Travel plans-** advice is provided as to when a Travel Plan will be expected, along with guidance on preparing one. Travel Plans are a common focus of Air Quality Action Plans - they have potential to encourage modal shift, therefore reducing emissions. Plans may include the provision / involvement in Car Clubs.
- **Air quality-** criteria is provided where a developer can expect to be required to complete an air quality impact assessment for their proposal. Those requiring a TA or Environmental Impact Assessment (EIA) are automatically included, with other criteria relating to congestion, vehicle speed, parking spaces, lorry and coach parks, and residential developments.

Clearly the measures above are suitable candidates for inclusion in the AQAP even if the Council had not already published the SPD. The SPD offers several categories of measures that are common to or support those in this AQAP. The main initiatives invoked by the SPD with relevance to improving air quality in Liverpool are:

1. Accessibility assessments for public transport/ alternative modes
2. Parking standards assessments- (policy 3- T12, T14)
3. Promotion of cycling (policy 5-T6)
 - a. Adoption of cycling strategy
 - b. Improving condition of designated cycle routes in the city
 - c. Catering for cyclists needs in design of highway schemes, traffic management schemes, road safety schemes, road maintenance, provision of safe cycling routes through major developments
 - d. Improve road signage, road conditions, speed reduction measures on designated cycle routes and areas of high cycle usage
 - e. Ensure secure cycling facilities are provided at locations regularly visited by the public and require new developments to provide secure cycling facilities.
4. Develop, operate and promote a Car Club Scheme
5. Promote development, operation and monitoring of Travel Plans
 - a. Travel Plans for new developments (including monitoring arrangements)
 - b. Activity associated with Travel Plans at existing developments
 - c. Travel Plan Assessments

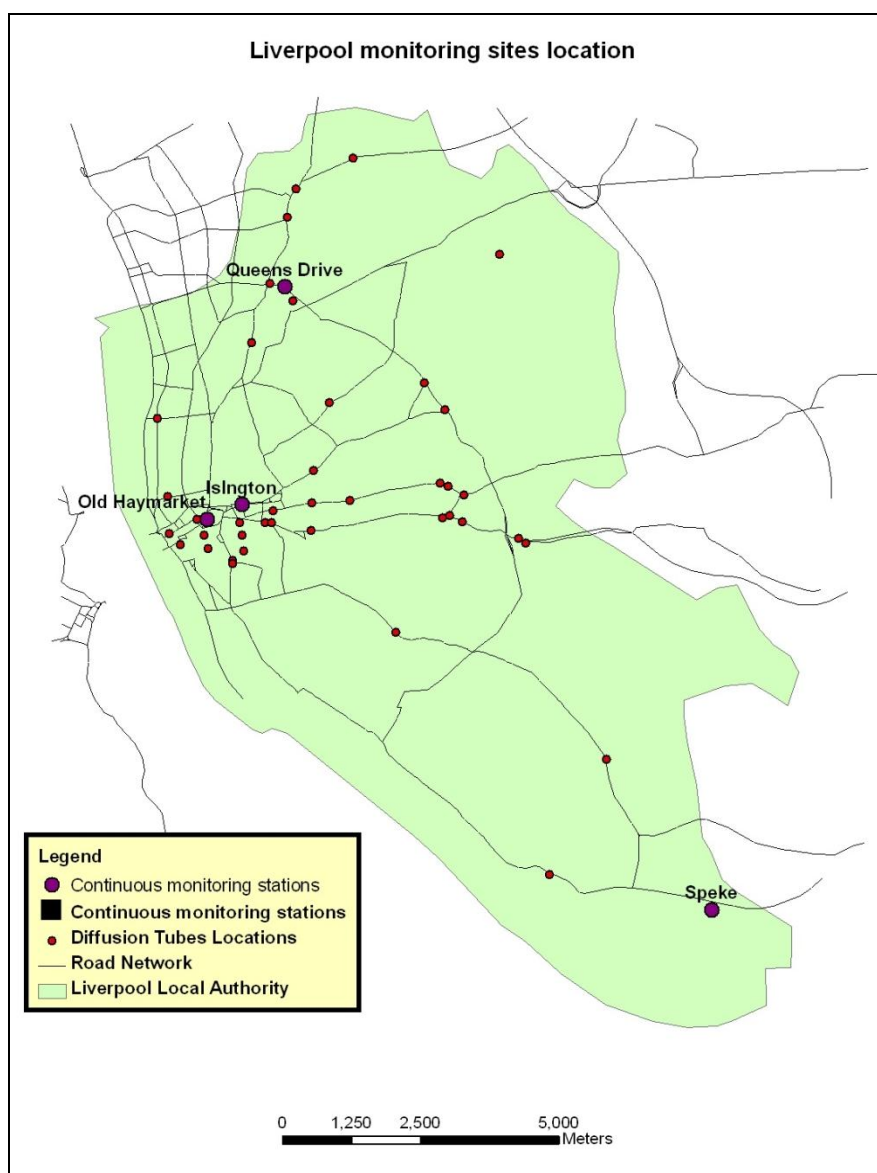
3 Air Pollution in Liverpool

3.1 Current levels of Nitrogen Dioxide in the City

Concentrations of NO₂ have been monitored throughout the city for many years, LCC has an excellent record of measurements developed using two distinct monitoring methodologies (automatic measurements and diffusion tube measurements), both of which are recommended within Government Guidance.

Currently there are four automatic monitoring locations and forty three passive diffusion tube (PDT) locations (see Figure 3.1). Figures 3.2 and 3.3 show the automatic monitoring stations at Queen's Drive and Old Haymarket.

Figure 3.1 Air quality monitoring locations throughout Liverpool



Between 1993 and 2002 Liverpool City Council operated an automatic monitoring location – Liverpool Centre - at St John's Gardens in the city centre (OS 334887 390638). The Liverpool Centre location formed part of the Automatic Urban and Rural Network (AURN) network. The data recorded at Liverpool Centre are included in this report to demonstrate trends in NO₂ concentrations (Figure 3.4) within the city.

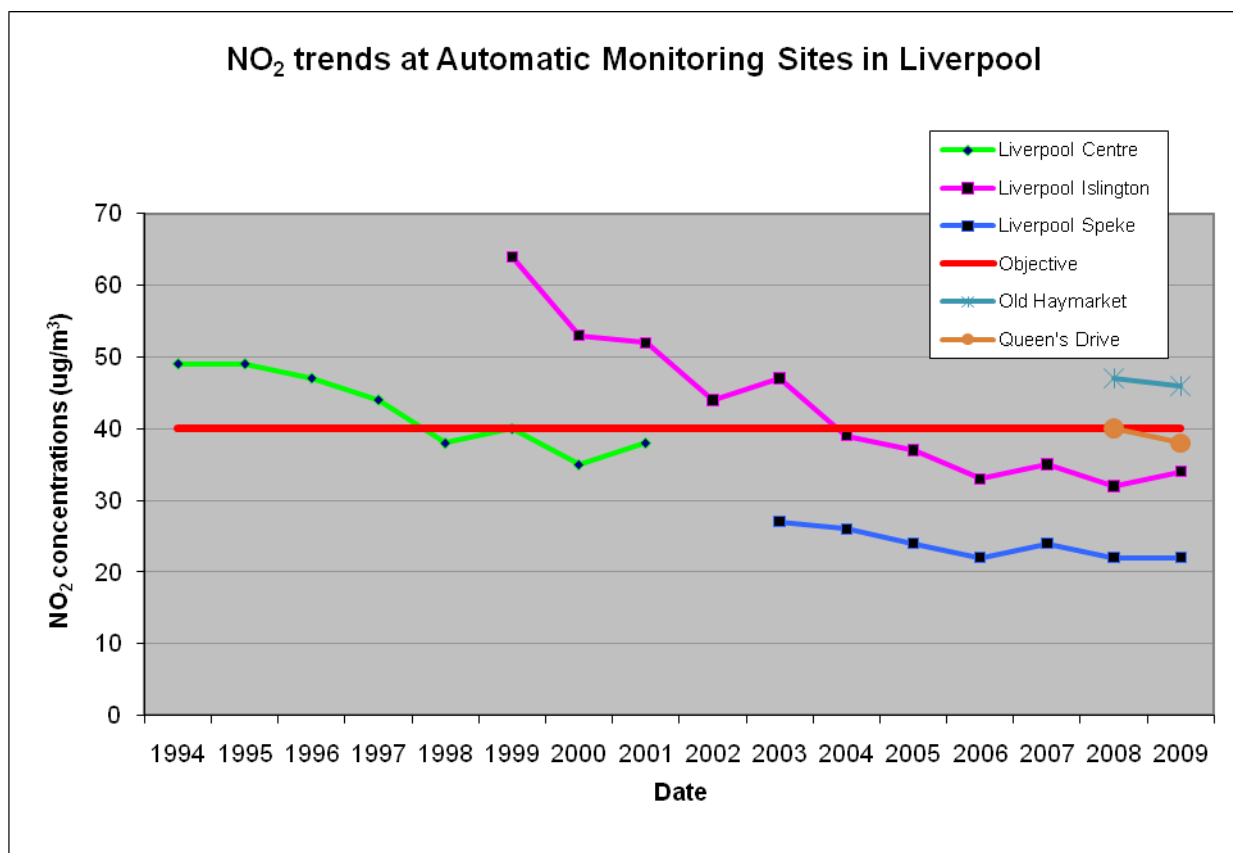
Figure 3.2 Automatic monitoring location at Queen's Drive, Liverpool



Figure 3.3 Automatic monitoring location at Old Haymarket, Liverpool



Figure 3.4 Annual average nitrogen dioxide concentrations recorded at automatic monitoring locations



Speke (an urban background site) and Islington (an urban roadside site) are the current monitoring locations within Liverpool that provide data suitable to investigate long term trends. The sites at Old Haymarket and Queen's Drive came into operation during 2008 and as such have less data available and are therefore of less relevance for the purposes of this document.

At the automatic locations NO₂ concentrations are measured by ozone Chemiluminescence, a chemical reaction releasing light. The Speke and Queens Drive locations form part of Defra's AURN (Automatic Urban and Rural Network) and the network quality assurance and control procedures are implemented. Data from the other two sites are quality assured to the same standard as the national network stations within the national calibration club operated by AEA Technology.

The automatic station measurements are supplemented by a wide network of PDT locations. The current PDT network has been in place since LCC rationalised its tube network in July 2006. The city wide network consists of single tubes at twenty nine sites and triplicate tubes at a further fourteen sites. In addition, a Liverpool airport diffusion tube network deploys single tubes at ten locations in and around John Lennon Airport.

The diffusion tubes were prepared and analysed by Eurofins until April 2010. Since then this role has been undertaken by Gradko, and the preparation method uses 20% TEA (Triethanolamine) in water.

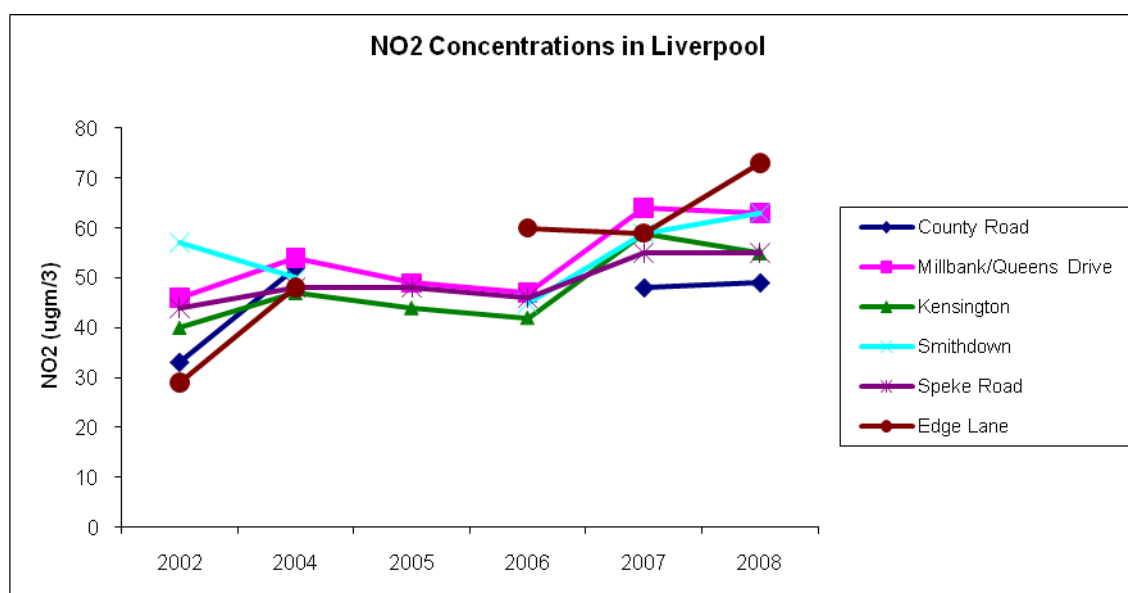
Three of the diffusion tubes are co-located with the Speke automatic monitoring location, with a further three co-located at the Islington automatic location.

Table 3-1 Automatic monitoring data

Monitoring Site	Period	Annual mean ($\mu\text{g m}^{-3}$)	Maximum ($\mu\text{g m}^{-3}$)	Data capture %
Islington	2009	34	204	99
Speke	2009	22	120	95
Old Haymarket	2009	46	563	94
Queen's Drive	2009	38	180	99

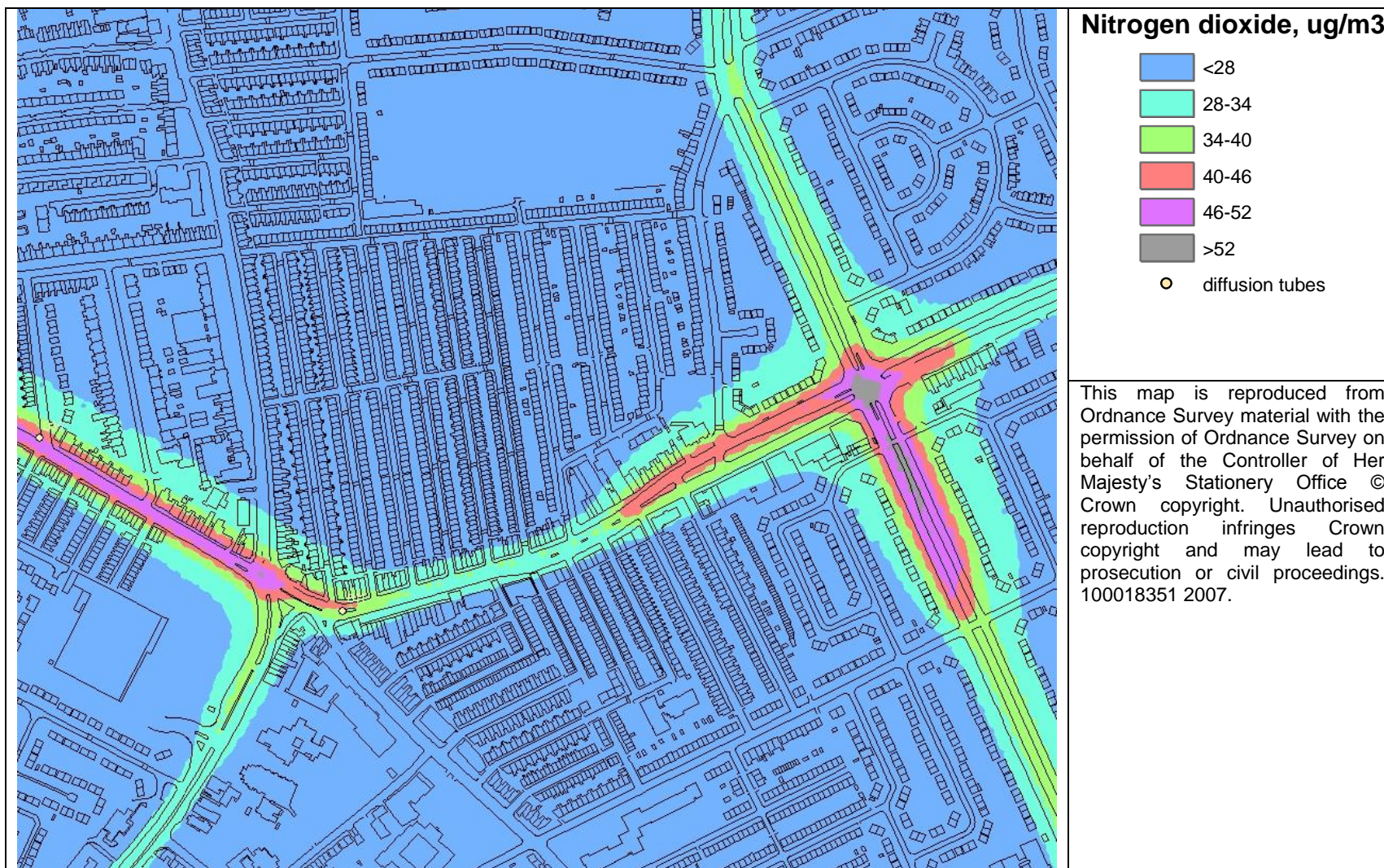
3.2 Areas exceeding the national air quality standard

Since the designation of the two AQMAs in 2003, concentrations of NO_2 measured at many of the forty three PDT locations across the city have increased. A few of these concentration trends are shown in Figure 3.5 below.

Figure 3.5 Annual average concentrations of Nitrogen dioxide at six sites across Liverpool

While concentrations have been generally increasing across the city, and higher concentrations have become more widespread, it is important to note that these measured areas of exceedence (the NO_2 annual mean objective is $40\mu\text{g m}^{-3}$) are still focused around road junctions. Away from road junctions, levels are significantly below the air quality objective. Typical concentrations and how these decrease from junctions are shown below in Figure 3.6.

Figure 3.6 Predicted nitrogen dioxide concentrations, junction of Queens Drive/ Prescott Road Junction, 2007

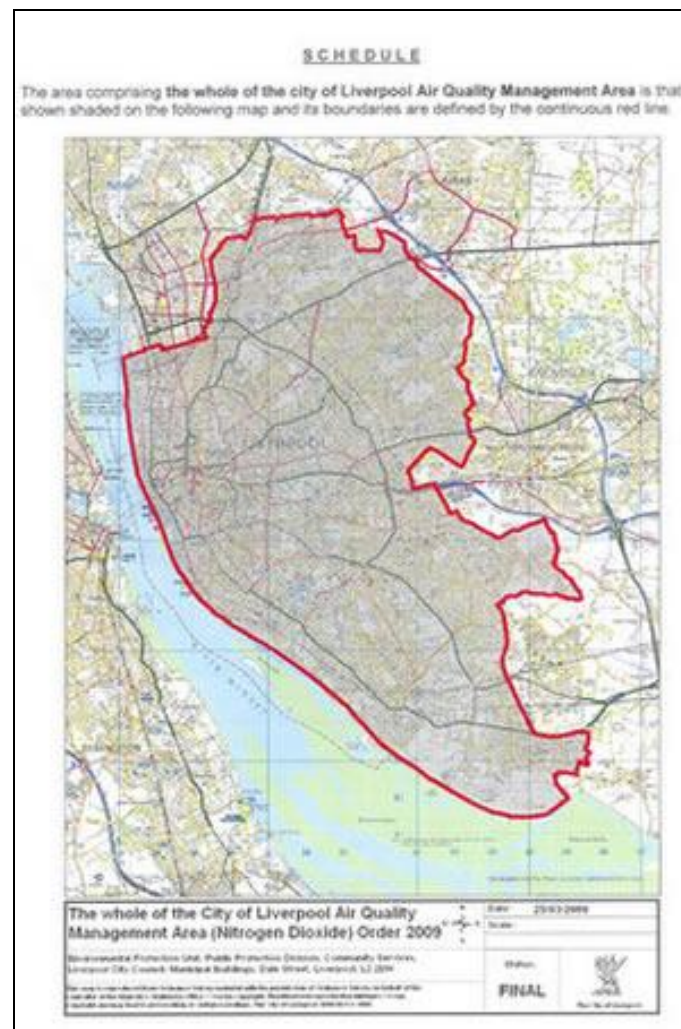


During 2007, evidence from the City's diffusion tube network demonstrated that concentrations of NO₂ were increasing and, at the following locations, concentrations were now above the annual mean air quality objective for NO₂. To comply with the statutory requirements under LAQM, LCC undertook a Detailed Assessment for the following areas:

- Junction of Edge Lane Drive and Jubilee Drive
- Junction of Wavertree Road/Durning Road
- High Street Picton Clock Roundabout
- Junction of Smithdown Road and Tunnel Road
- Junction of Utting Avenue and Queens Drive
- Junction of Deysbrook Lane and Croxteth Hall Lane

This study concluded that all of these areas were exceeding the NO₂ annual mean objective. Other areas were also being considered as threatening exceedence of the objective. As a result LCC reviewed the situation and decided that it would be more appropriate to designate a single AQMA covering the whole city (see Figure 3.7). Following consultation with key stakeholders, discussions with Beacon Councils and Defra, a city-wide AQMA was designated in April 2009.

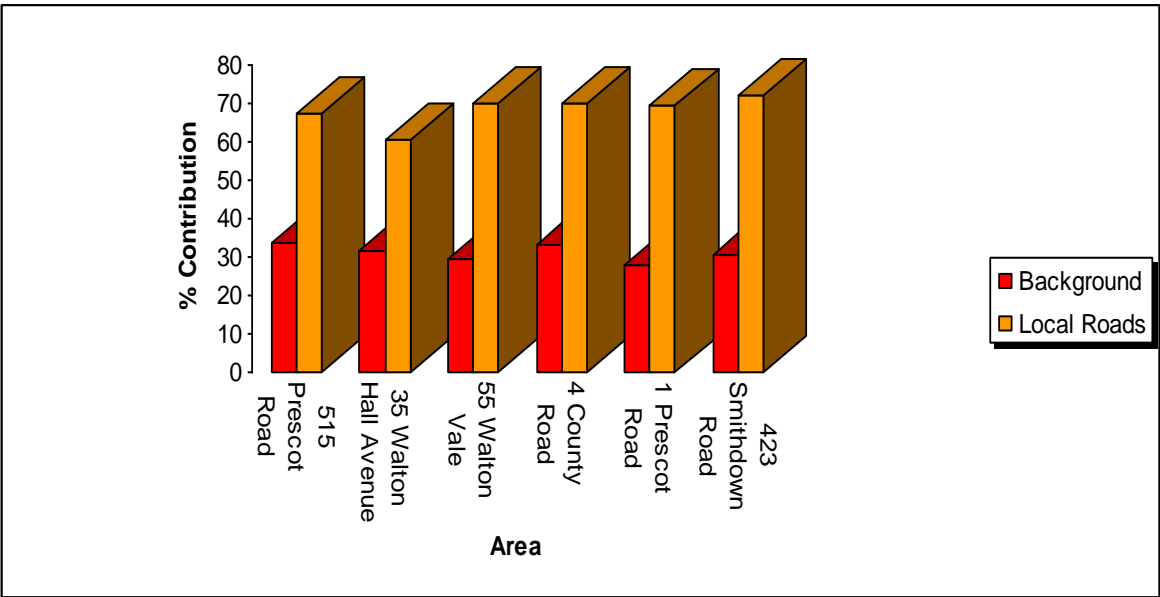
Figure 3.7 Liverpool City Wide AQMA



© Crown copyright. All rights reserved. DEFRA. Licence No. GD272361 2002

Following the designation of the City wide AQMA a Further Assessment was undertaken to determine the major sources of the NO₂ exceedences. A source apportionment study indicated that, for each of the receptor sites studied, local roads were found to contribute twice the NO_x emissions to those arising from background emissions (Figure 3.8).

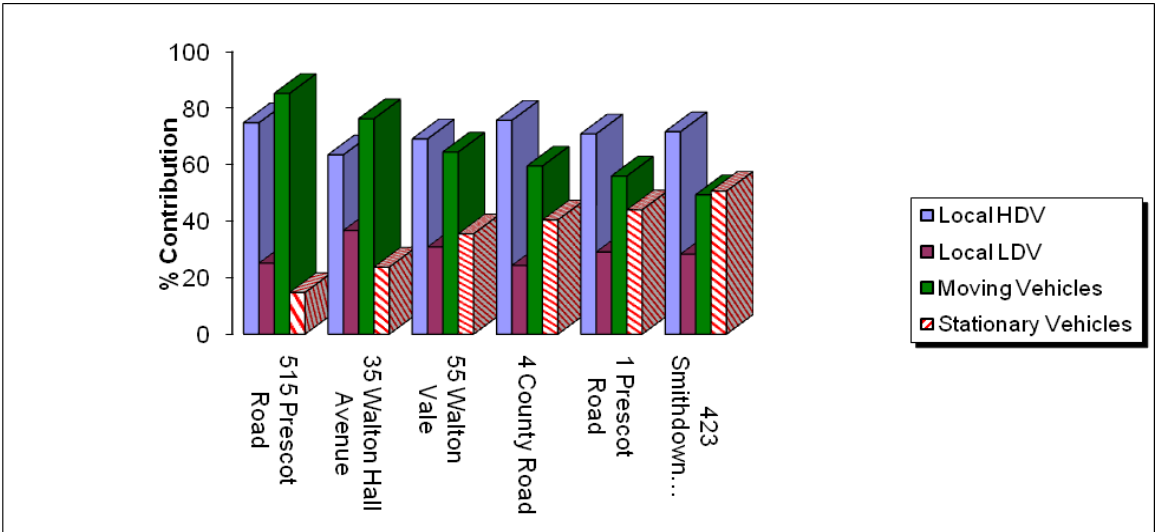
Figure 3.8 Percentage Contribution to oxides of nitrogen concentrations at exceedance areas



A further finding was that heavy duty vehicles made the largest contribution to the total oxides of nitrogen concentrations. Stationary vehicles in queues at traffic lights also made a substantial contribution (see Figure 3.9).

Average concentrations at these locations were found to be 60 $\mu\text{g}/\text{m}^3$ i.e. 20 $\mu\text{g}/\text{m}^3$ above the 40 $\mu\text{g}/\text{m}^3$ annual mean air quality objective. Therefore a 20 $\mu\text{g}/\text{m}^3$ reduction in NO_2 concentrations will be required to meet the air quality standards. A 10% reduction in traffic flows is expected to reduce NO_2 concentrations at these receptors by 1-2 $\mu\text{g}/\text{m}^3$, a 10% reduction in Heavy Duty Vehicles (including buses) will reduce concentrations by a further 1-2 $\mu\text{g}/\text{m}^3$, and other actions such as reducing the period of traffic queuing by 50%, or relocating stationary traffic away from the most exposed locations, have the potential to reduce NO_2 concentrations at the selected locations by between 1-4 $\mu\text{g}/\text{m}^3$. It is therefore apparent that achieving the air quality objective presents a very significant challenge.

Figure 3.9 Percentage contribution to oxides of nitrogen concentrations from local roads by different sources at exceedance areas



3.3 Summary of actions taken already

LCC published its first AQAP for the City Centre and Rocket Junction AQMAs in June 2007. LCC considered a broad range of options at these locations and consulted widely during the preparation of the Action Plan. A range of twenty three measures to reduce pollution concentrations was developed that were contained in the following six packages:

- Reduction of vehicle emissions;
- Traffic management;
- Alternative transport modes;
- Development planning;
- Dissemination of information;
- Working with and lobbying other agencies and central government.

Key actions identified in the Action Plan were intended to reduce traffic related emissions by 15% in the City Centre and to reduce traffic related emissions by almost 10% at specified locations within the previously designated AQMAs.

3.3.1 Existing Measures in Place to Reduce Pollution in Liverpool

Progress with the implementation of the twenty three measures included in the previous action plan has been reported each year between 2005 and 2008. The following highlights what progress has been made during the lifetime of the plan to date:

- A Voluntary Bus Quality Partnership established in July 2008 between the bus operators, LCC and Merseytravel. This set out the requirements to improve bus movements along three routes in the city.
- A bus layover was installed in June 2008 to reduce the number of buses circulating in the city; this has reduced emissions from buses within the city from the previous levels. This layover facility included an informal agreement between Merseytravel, LCC and the bus operators to switch off engines whilst idling. Future enforcement of vehicle engine idling has also been agreed within LCC.
- Park and Ride facilities now located at rail stations have seen an increase of 660 parking spaces and a 15% increase in rail passenger numbers since 2006. Land availability issues are likely to prevent further increase in park and ride facilities elsewhere.
- Liverpool City Council have developed, designed and implemented a Car Park Guidance System (CPGS) which incorporates the majority of large car parks in and around the city centre. The system splits the city in to separate zones which each contain their own car parks. Live information about the status of the car parks in each zone can be provided to motorists via Variable Message Signs (VMS). The VMS signs from the internal ring road inwards all show the number of vehicle spaces for the individual car parks. Drivers are directed to the specific car park along the shortest route possible from the internal ring road using the highest category of road possible. The signage around the city is based around the theory of maximum efficiency in the transport network taken from the CCMS policy framework time savings may reduce traffic congestion and can reduce vehicle emissions. At this time, there are no studies into the effectiveness of Liverpool's CPGS.
- The development of a Coach Strategy to identify sites for coach parking and subsequently reduce city traffic has been achieved.
- New direction signage for all classes of vehicle on primary routes has been installed. This forms part of the Freight Management Strategy and includes freight routes where appropriate.

- Walking and cycling initiatives include walk to school weeks, for example, where 38% of schools participated in May 2008.
- Variable Message Signage installed at thirty locations throughout the city. This aims to alert drivers to incidents to aid the management of the road network efficiently. This may be used in future to alert drivers of air quality and give simple tips to reduce pollution e.g. switching off engines when stationary.
- Installation and development of the Intelligent Transport System, SCOOT to reduce delays by around 15% and reduce emissions by 4%. Programme to further enhance using MOTES.
- Promotion and adoption of travel plans. Currently 96% of schools have adopted a travel plan but the expected modal shift from the car to more sustainable means has not occurred.
- Many projects within the long term City Centre Movement Strategy have been implemented including improving conditions for walking, cycling and public transport.
- The Transport Supplementary Planning Document has recently been published and is an adopted Council policy which links working practices in Development Control and Transport Planning departments.
- A car club was established 'Whizzgo' (now know as City Car Club) which had a high level of membership. The cars used were Citroen C1 which have lower levels of pollutant emission compared to standard vehicles. Unfortunately, the scheme has now closed owing to cars being vandalised.
- The coach strategy was developed and implemented.

However, in summary it is clear from the ongoing air quality measurements undertaken since 2005 using PDTs that despite these measures being implemented, air quality has continued to deteriorate in many parts of the city. This finding is not isolated to Liverpool; indeed it has been replicated in many other large cities across the UK. Whilst the reasoning for this is not fully understood, it is thought that the emissions levels from different forms of technology on vehicles are not well understood in the different environments in which they operate and as a result are not well represented in the modelling of air quality impacts and therefore future LAQM scenarios. However, in Liverpool, this is compounded by a growth in road traffic, decreasing bus patronage, low environmental standards for the majority of buses, and an increase in congestion.

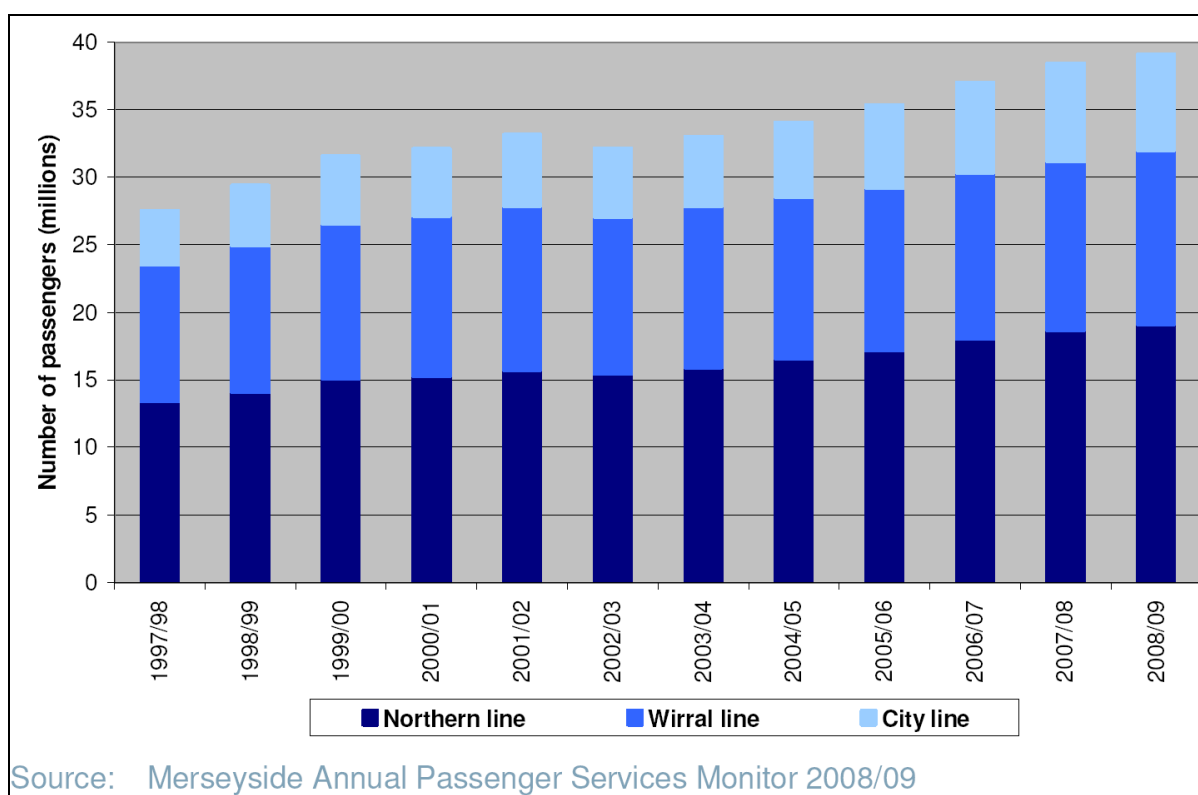
4 Transport Planning in Liverpool

The current Local Transport Plan (LTP2) covers the period 2006 – 2011. The LTPSU are now gathering evidence on travel behaviour in the region in preparation for consideration of further options within the next LTP (LTP3).

4.1 Use of Transport Modes

The rail network in the Liverpool city region is mainly electrified, making it an attractive mode of transport in terms of air quality and carbon reduction as they have zero emissions at the point of use. Since 1997, rail passenger numbers on the Merseyrail network have increased (Figure 4.1) by 42% although it is noted that growth in the wider Merseyside areas has been higher over this period (Merseyside LTP3 Evidence Base Review).

Figure 4.1 Merseyside rail patronage by line 1997 - 2009



Public use of buses is much greater than use of rail in Merseyside with three times more trips being made by this mode. As newer buses are generally less polluting, the bus fleet age is important to consider in determining the impact on air quality. As such the Bus operators across Merseyside have invested in new buses and hence increased the number of buses <1 year old from 5% to 15% of total fleet (180 out of fleet of 1200) during the latest three year period between 2007/08 and 2009/10.

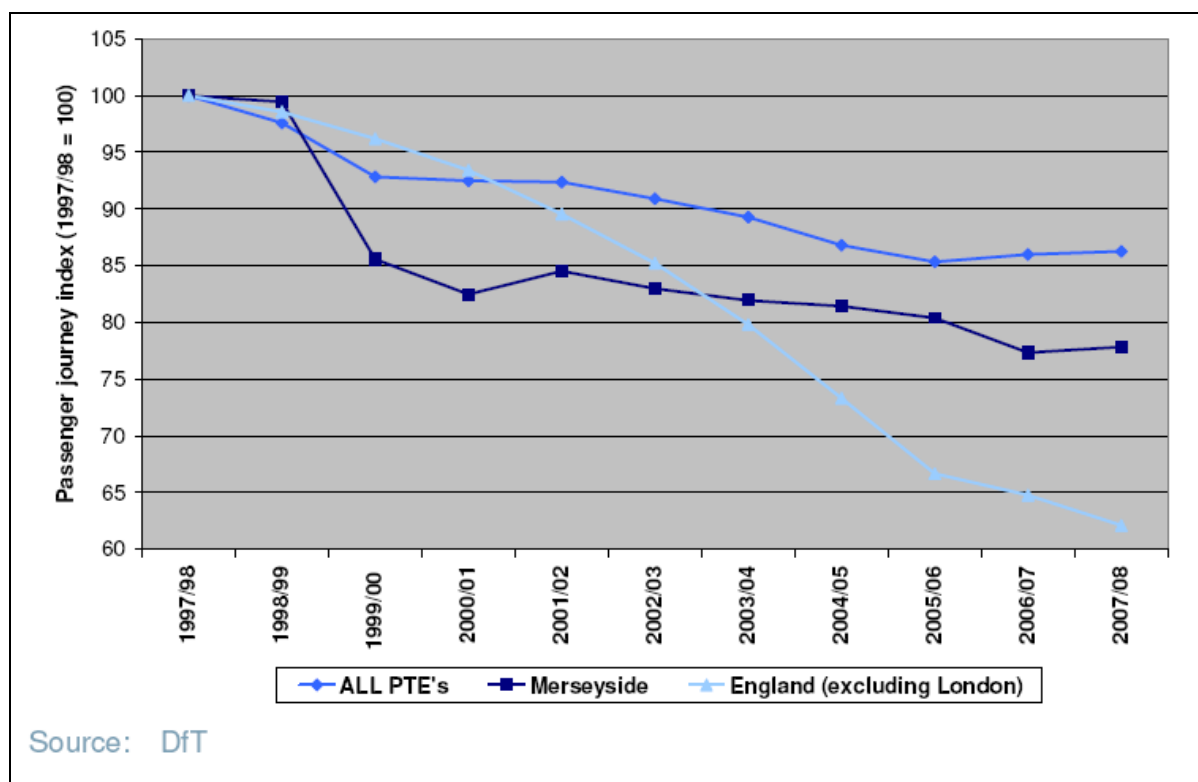
Stagecoach is in the process of investing £6 million in a fleet of 46 new buses. These buses are bigger, cleaner, fully accessible, more comfortable and more environmentally friendly, to “Euro 5” low-emission standards. However, more than half the bus fleet across Merseyside is >6 years old (650 out of 1200) and 400 buses are >11 years old. Further, the LTP3 Evidence Base Review reported that whilst the average age of the bus fleet across Merseyside has seen an overall decline since 1993, between 2000 and 2009 the average age of the bus fleet has increased from 7.1 years to 8.1 years. In LTP2 a yearly target was set for the environmental standard of buses in Merseyside to be Euro III or equivalent (European emission standards are set for the acceptable emission limits for vehicles – the higher the Euro number the lower the emissions). In 2009/10 the target of 63% was not met and it was reported by Merseytravel that only 48% of buses met this environmental standard. The target for the

end of LTP2 (2010/11) is for 70% of buses to meet this standard, and as such on evidence to date it seems unlikely that this will be achieved.

Section 4 sets out the evidence that Heavy Duty Vehicles, which include a significant proportion of buses, give rise to over 60% of NO_x emissions on main routes in the city, thus improvements in emission standards for these vehicles would be very beneficial in reducing air pollutant concentrations.

In addition, during the period of LTP2 to date, a reduction in bus patronage by 12% between 2005/06 and 2009/10 is observed. This compares with a target of a 1% increase in bus patronage during the lifetime of LTP2. Over the past decade bus patronage is reported to have declined by 20% in Merseyside - a trend replicated across other metropolitan areas (Figure 4.2). Furthermore, Merseytravel are in the process of updating their data regarding patronage in individual local authorities, but also along key bus corridors.

Figure 4.2 Bus journeys (indexed): England (excluding London), all PTE areas, and Merseyside comparison 1997-2008.

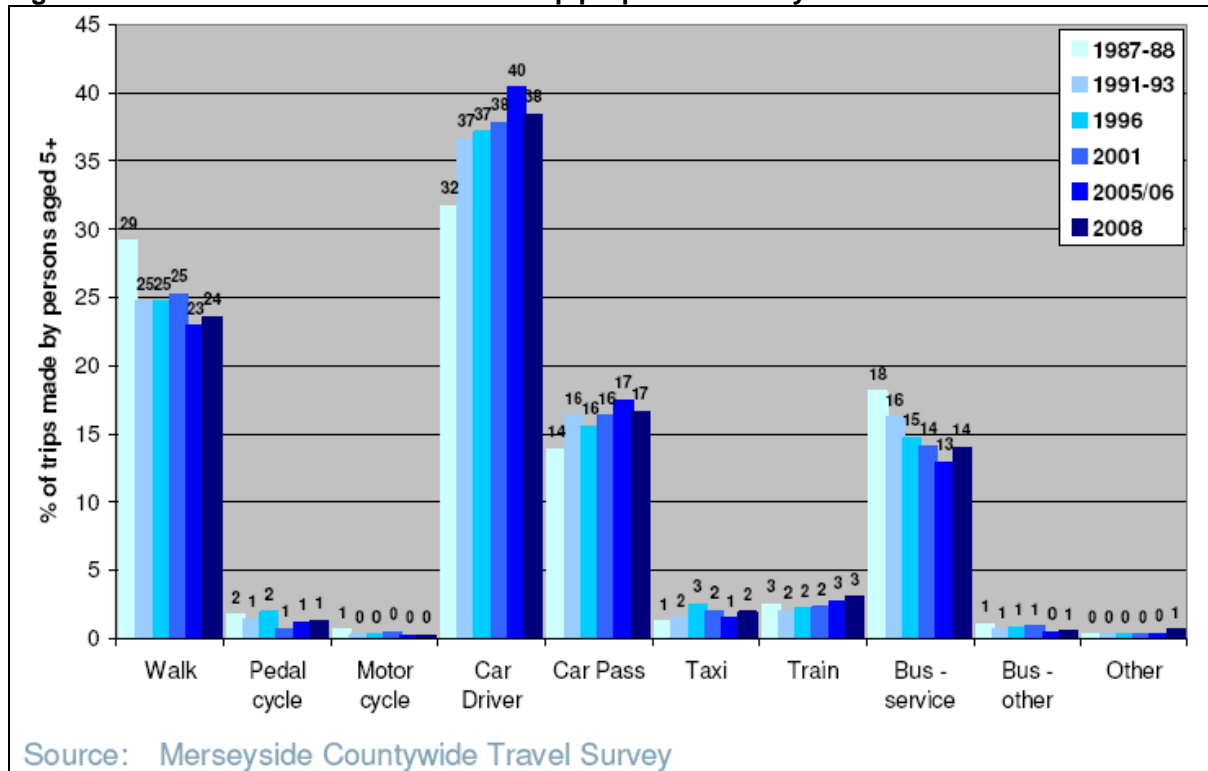


Source: Merseyside LTP3 Evidence Base Review

- Although bus patronage has declined, the past 2 years appear to have halted the decline which may in part be due to rising fuel costs and people changing modes of transport, Buses are also important in terms of modal choice in Merseyside. Whilst the car, both as driver and passenger, makes up the majority of mode share, with walking also important (
-
-

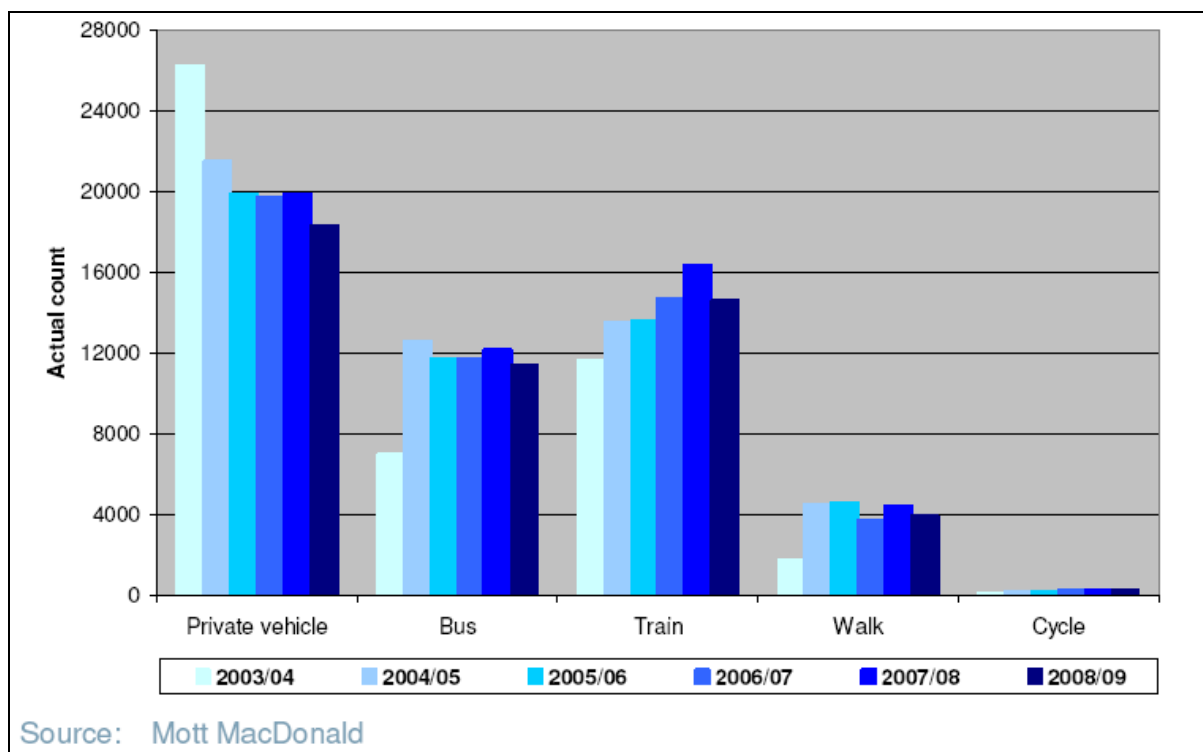
Figure 4.3). An increase in trip by car or light goods vehicles is seen since 1987, which is in part caused by the increase in LGVs for freight movement seen not only in Merseyside but throughout the UK.

Figure 4.3 Main mode of travel across all trip purposes: Merseyside 1987 – 2008.



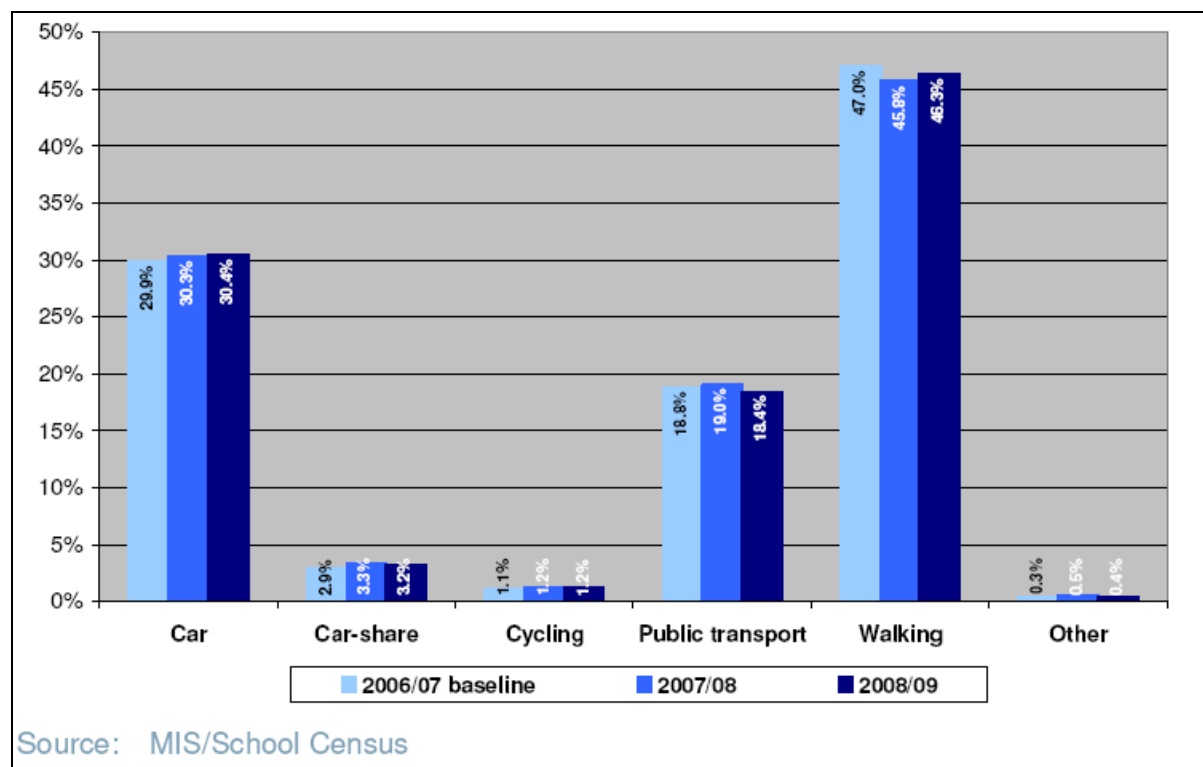
For trips made to the workplace and to school, a differing travel mode pattern is evident, private car being the dominant mode of travel into Liverpool city during the am peak, with the train being important (**Figure 4.4**).

Figure 4.4 Liverpool AM peak mode count 2003-09



The majority of pupil journeys to school in Merseyside are by walking (46%), followed by car (30%) and then public transport (18%). Whilst the number of school travel plans have increased, with now 77% of schools having a plan in place, the car mode share of journeys to school has increased since 2006 (Figure 4.5). The reduction target for 2010/11 in LTP2 is unlikely to be met.

Figure 4.5 Travel to school modal share: Merseyside 2006/07 – 2008/09

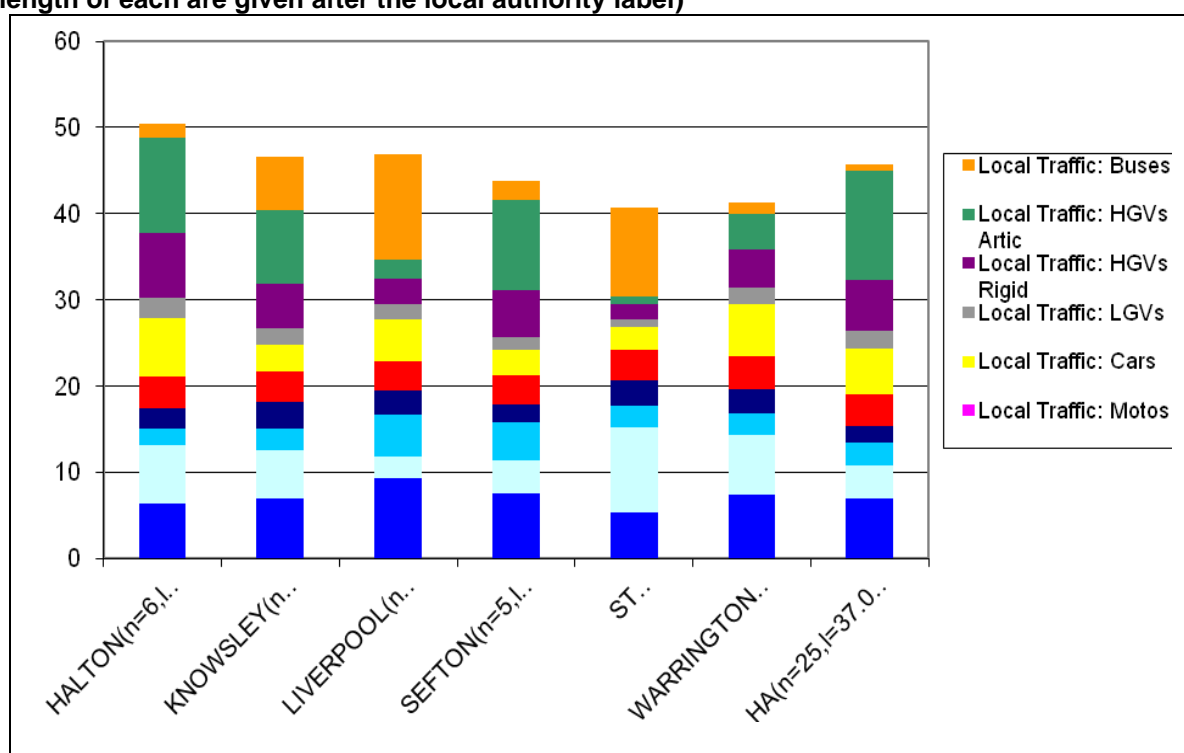


4.2 Impact on air quality

4.2.1 Bus emissions

Defra have considered the emissions from roads within the Merseyside region by examining data from the National Atmospheric Emissions Inventory. **Figure 4.6** shows that, in comparison to other authorities, Liverpool (and St Helens) has a high proportion of NO_x emissions from buses along the local road network. The contribution of NO₂ from buses to the total (roads plus background) average in Liverpool is 26%. Buses account for 57% of the NO₂ from local roads in Liverpool. This would indicate that lower emission buses should be a priority consideration when attempting to improve air quality.

Figure 4.6 Concentrations of NO₂ from roads within each Council area and from the Highways Agency controlled roads in Merseyside where exceedances are predicted. (The number and length of each are given after the local authority label)



4.2.2 Congestion Emissions

The Congestion Performance Fund is an incentive to urban authorities to exceed congestion targets rather than just meet them. This fund is awarded annually based on performance against agreed targets. Through the successful monitoring and meeting of targets, Merseyside has been awarded funding towards the delivery of schemes on the congestion routes.

Road congestion can make journeys less predictable, leaving people frustrated and it damages both the economy and the environment. Congestion issues in Liverpool are not as marked as other core cities around the United Kingdom. This is demonstrated by the base line person journey time in Merseyside which was set at 4 minutes 8 seconds per mile. The highest base line is in Greater Manchester (5 minutes per mile). Leicester, South Yorkshire and London also have higher journey base line journey times when compared with Merseyside.

In Merseyside, the data shows that in 2007/08 person journey time was reduced to 4 minutes and 2 seconds per mile. This is a reduction of 2.2% in person journey time and a reduction of 5% in person miles when compared with the base line.

(<http://www.dft.gov.uk/pgr/statistics/datatablespublications/roadtraffic/speedscongestion/congestionurbanroads>)

As part of the Public Service Agreement targets, changes in journey time are monitored and compared against agreed targets along key routes. Congestion is a key indicator of the performance of urban transport networks.

Congestion Target NI167 is an outcome based indicator which measures journey times over a period, which is then used as an evidence based approach to tackling congestion. It is not possible to compare the results of this for different areas of the country. The indicator is to solely track the performance of an individual authority's performance over time.

Emissions from road transport are to a large extent not only determined by the vehicle type and age, but also by speed. At speeds characteristic of traffic in city centres, vehicles produce greater emissions at low speed, rising to a worst case when stationary. There is significant uncertainty around vehicle emission factors at all speeds, and there are currently no agreed factors for stationary traffic. Despite this it is generally agreed that the highest emission patterns are associated with slow moving and queuing traffic.

To tackle congestion of local roads in the Liverpool city region eleven congestion corridors were identified in LTP2 all of which are strategic routes. Congestion was measured as an average per person journey time per mile and targets were set for each corridor. It was recognised that a growth in traffic was likely but to help offset this, and improve congestion, a number of individual schemes for each corridor was planned including junction improvements, UTM traffic management, bus and personalised journey planning. The eleven corridors are set out below:

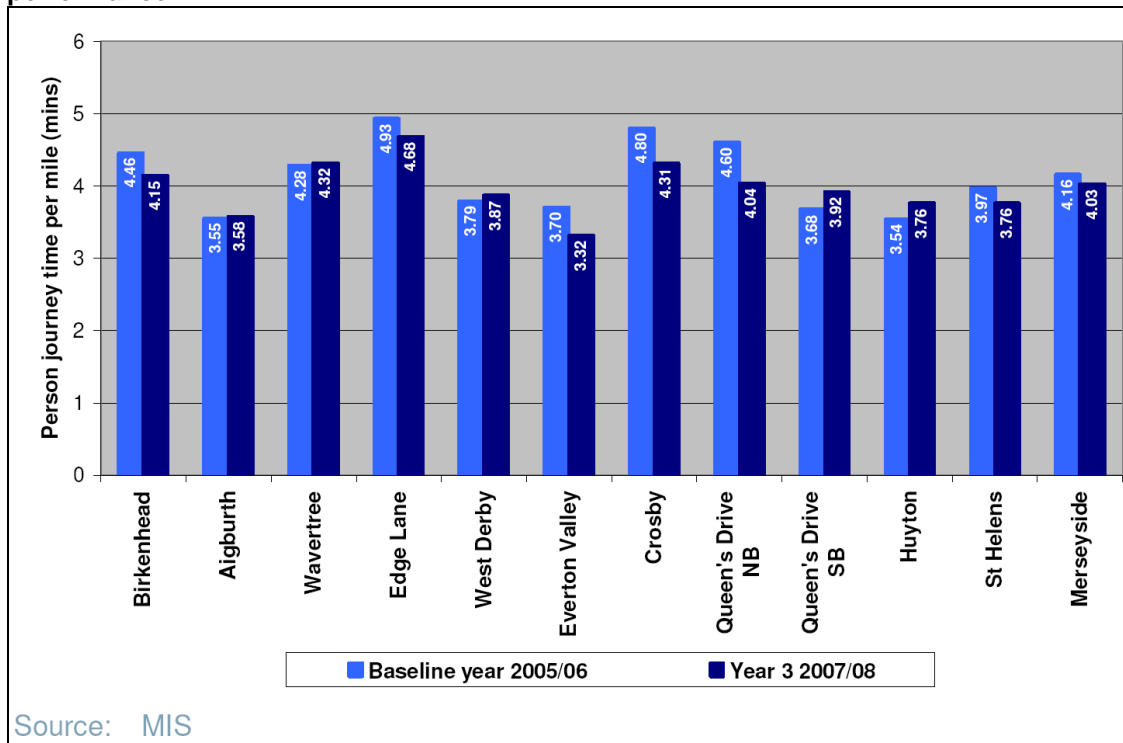
Route	Route Name	Route Location
1	Birkenhead	Along A552 from east of Junction 3 of the M53 motorway to roundabout at Birkenhead Central
2	Aigburth	From Grassendale area of Liverpool runs along Aigburth Road/Park Road (A561) towards city centre
3	Wavertree	Begins at Childwall 5-ways, runs along Childwall Road, High Street and Picton Road towards city centre
4	Edge Lane	A5080 Roby/Bowring Park Road parallel to M62, merging into primary route to the city centre
5	West Derby	Begins at Muirhead Av/ West Derby roundabout along west Derby Road to the City centre
6	Everton Valley	Starts at Queens Drive Walton towards city centre along A580/A5089. At the end of the route Walton Breck Road, Walton Road merge into Kirkdale Road near the city centre
7	Crosby	From Crosby village running south to Waterloo and Seaforth to A5036 Seaforth flyover to the entrance for the Port of Liverpool
8	Queens Drive Northbound	Starts at junction of Menlove Av and travels north to Edge Lane. Intersected by B5178 Childwall Road and continues to meet Edge Lane Drive A5080
9	Queens Drive Southbound	Same route as route 8 but travel south starting at Edge Lane and ending at Menlove Av
10	Huyton	A 2.8km section of the Tarbock Road
11	St Helens	St Helens Town Centre

Within the LTP2 progress report 2008/09, it is stated that all the LTP indicators relating to congestion are on track. This has been achieved through a number of integrated packages which form the congestion management strategy. This includes capacity improvement and demand management measures designed to control the growth in congestion. LCC has appointed a Traffic Manager to fulfil their Network Management Duties as set out under the Network Management Plan.

Performance against the congestion target is good but that performance is measured on recognising that delay will increase (due to traffic growth) but it is important to curtail that growth to an acceptable level (

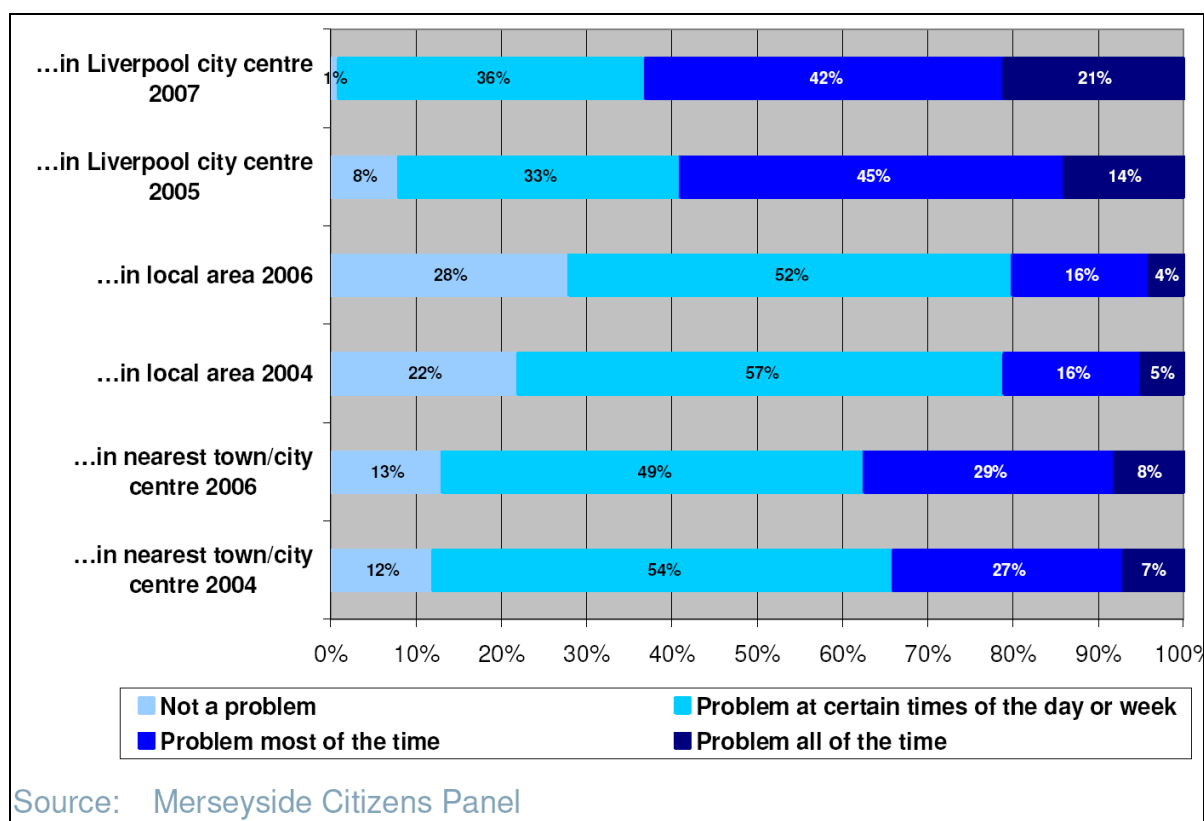
Figure 4.7).

Figure 4.7 Merseyside congestion indicator corridors: baseline data and year 3 performance



In addition, it was reported that increasingly the public's perception of congestion was negative. In 2007 63% of respondents said that congestion in Liverpool City Centre is a problem 'most of the time' or 'all of the time' (Figure 4.8).

Figure 4.8 Perceptions of Merseyside traffic congestion 2004 -07 including Liverpool city centre traffic congestion in 2005 compared to 2007



The congestion corridors do not have sufficient air quality monitoring along their routes to demonstrate with any accuracy what the air quality benefit has been from measures already introduced to reduce congestion. Edge Lane (Corridor 4) has three PDT monitoring locations which highlight significant variation in measurements between years thus no clear trend emerges and it is unclear from this evidence as to whether emissions and / or ambient concentrations have reduced. West Derby (Corridor 5) has a single PDT monitoring location and again, the measurements show considerable variability between years.

A clear action from these findings is that the PDT monitoring network in the city would benefit from a further review and some realignment with these eleven congestion corridors (focusing on relevant exposure) to enable the air quality impact of local policy to be better captured in future - particularly where (as is the case with congestion corridors) interventions are targeted at quite specific locations in the city.

4.3 Transport schemes that impact on air quality

4.3.1 City Centre Movement Strategy

The City Council has been working on a £73 million programme to improve the roads, streets and public spaces in Liverpool City Centre since 2005. The aim is to make the environment better for pedestrians, cars and public transport, and to create a friendly city centre that is safe, clean and attractive. Improved rail and bus facilities also helped to make the city more attractive for business, shopping, tourism and leisure, bringing benefits to the economy of the city area.

Much of the work has now been completed. This includes schemes such as:

- Greater Williamson Square
- the Cavern Quarter
- Covent Garden Quarter
- Church Street / Lord Street / Whitechapel
- Hope Street
- Hunter Street / Byrom Street

- Renshaw Street / Berry Street
- Tithebarn Street / Chapel Street
- East Moorfields / Hewitts Place / Vernon Street.
- Lime Street / Skelthorne Street

Other improvements include the University Square off Brownlow Hill/Mount Pleasant and the prestige Pier Head have recently been completed along with the new £18.5m extension to the Leeds-Liverpool canal.

Derby Square and further improvements to The Strand are currently underway, whilst one of the largest schemes - the Hall Lane Strategic Gateway - is currently under construction.

Further phases of the strategy will take place up to 2011 in the Knowledge Quarter around the University, the Baltic Triangle area, Castle Street and the Dale Street/Victoria Street area. Work in these areas will be mainly improvements to the public realm.

As part of the City Centre Movement Strategy new bus lanes have been introduced since 2005, improved bus stops and passenger information systems have also been introduced. The underground Merseyrail network has also received substantial investment over the past five years.

4.3.2 Edge Lane Improvement Scheme

One of the main gateway routes into the city centre, Edge Lane - is undergoing a £65m improvement scheme which will transform the route from the M62 to the city centre by road widening to remove congested hotspots and help regenerate the city centre. The scheme includes highway improvements, as well as the provision of over 550 new housing units, over 1,000,000 square feet of new and refurbished commercial and retail floor space and community facilities.

The Edge Lane Project, which also involves making the whole length of Edge Lane a dual carriageway will also reduce congestion along the length of the corridor, improve local services and enhance the local environment by planting over 100 new trees. The new urban boulevard will also create a modern gateway to Liverpool, whilst maintaining the architectural heritage of the area.

The first two sections are now complete. Edge Lane Central and Edge Lane Drive (the existing dual carriageway sections of Edge Lane to the east of Edge Lane West as far as M62) were completed during 2007/8. These provide access to new retail, housing, leisure, business and light industrial sites, including a new entrance junction for the £50million Liverpool Innovation Park (an extension of the existing Wavertree Technology Park).

The final phase, Edge Lane West (from Botanic Road to Hall Lane) will include:

- up to 280 new homes
- new and improved retail facilities
- new employment floor space
- a new state-of-the-art health centre
- a new access and much improved setting for Kensington Primary School and the Life Bank
- changing the line of the road to make it an urban boulevard
- safe pedestrian crossing points
- a much safer and improved environment for pedestrians and motorists.

The scheme had, until recently, been delayed by objections to the Compulsory Purchase Orders (CPO) on 371 properties acquired by the Homes and Communities Agency (previously known as English Partnerships) in October 2008. Following a High Court hearing at the end of March 2009, the challenge to the confirmed CPO was dismissed. This has allowed work on the scheme to progress.

4.3.3 Hall Lane Strategic Gateway

Hall Lane Strategic Gateway, under construction, is intended to provide an improved traffic route for vehicles entering Liverpool from the east and will take traffic out of the residential areas. The scheme has a wider role to play in the regeneration of the City. The area affected by the scheme is on the eastern edge of Liverpool City Centre and lies generally between the grounds of the Royal Liverpool University Hospital (RLUH) and the campus of the Liverpool University (LU) to the west and the residential areas of Kensington and Edge Hill to the east. It is bounded in the north by the merge of Erskine Street and Low Hill where they turn westbound towards the City Centre and, in the south by the east-west road Oxford Street.

Hall Lane is a two way single carriageway road throughout. It has a single traffic lane in each direction except on the approach to the traffic signal controlled junctions at each end. On the east side of it is the Kensington Fields residential area, a large area of terraced Victorian housing now the subject of a major regeneration initiative. This involves the retention and improvement of the terraced properties that line the east side of Hall Lane and the streets of the 'Kensington Triangle' behind. Terraced properties on the edge of this area front onto, and are served for parking and access through lay-bys on Hall Lane.

For much of the working day Hall Lane is lined with slow moving traffic queuing back from the traffic signal controlled junction with Kensington / Prescott Street. Traffic passes straight ahead through this junction to gain access to the dual carriageway at Low Hill and then Erskine Street /Islington.

Hall Lane and Edge Lane cater for a limited number of bus services; this is in part due to the designation of the Hall Lane / Edge Lane corridor as a "Strategic Route with Priority for Freight". Even so within the scheme area there are two of the City's key public transport corridors, the Wavertree Road (17 routes) and Kensington (11 routes) corridors. Within the current Local Transport Plan these two corridors are designated "Strategic Routes with Priority for Public Transport".

The scheme provides improved facilities for all modes of transport, whilst, at the same time, enhancing the environment of a significant part of the Kensington New Deal area and Edge Hill Conservation Area. It also offers a new and improved gateway to the City Centre on its main routes of entry. The principal element of the scheme is the provision of a new highway on a north-south axis, connecting the Kensington / Low Hill junction with Grove Street. This is coupled with the replacement of the gyratory consisting of Mount Vernon, North View, Towerlands Street and Irvine Street with a new carriageway to provide for two-way traffic. In addition, the Scheme includes the closing off of Hall Lane at its junctions with Edge Lane and Kensington / Prescott Street, and Towerlands Street at its junction with Edge Lane, as well as rationalising the access to the Royal Liverpool University Hospital (RLUH) on West Derby Street.

The Scheme has been subject to an air quality assessment undertaken by WS Atkins. The results of this air quality assessment demonstrated that the scheme would lead to an improvement in air quality for 2,276 properties and deterioration at 1,391 properties for NO₂ concentrations. As for PM₁₀ concentration, there will be an improvement at 2,377 properties and deterioration at 1,290 properties. The overall assessment score shows reductions for both the NO₂ and PM₁₀ concentrations indicating that there will be an overall improvement in air quality. However it should be noted that the assessment has been carried out using a basic methodology (compared to the modelling techniques used for LAQM) that does not take full account of potential localised exceedences of the air quality objectives.

4.4 Traffic Management Systems in Liverpool

Liverpool City Council's Urban Traffic Management and Control (UTMC) systems are operated by 2020 Liverpool Ltd (a joint venture between LCC and Mouchel) from a control centre in the city. The UTMC operates a number of "expert" traffic management systems provided by Siemens Transport Solutions.

UTMC is an Intelligent Transport System (ITS) platform that allows for the integration of individual traffic management and control tools through the exchange of information between them via a

common database. Such systems have been widely deployed across the UK and offer authorities the opportunity to monitor and manage congestion which can in turn be central to managing air quality. The system in operation in Liverpool is based on technology provided by Siemens Transport Solutions and is regularly updated to ensure that the latest features are implemented.

There are currently several traffic management technologies operating in tandem in Liverpool

4.4.1 Urban Traffic Management and Control (UTMC)

The Urban traffic management system which controls the majority of the traffic signals in Liverpool is the SCOOT system which controls the majority of the traffic signals in the city. SCOOT (Split, Cycle-time and Offset Optimisation Technique) is an adaptive system which responds automatically to traffic fluctuations. It takes away the need for signal plans which are expensive to prepare and keep up to date. SCOOT has proved to be an effective and efficient tool for managing traffic on signalised road networks.

In urban areas where traffic signals are close together, the co-ordination of adjacent signals is important and gives great benefits to road users. Linking traffic signals along a single route so that vehicles get a green signal at each junction in turn is relatively simple. The co-ordinating of signals over a network of conflicting routes is much more difficult.

The first generation of these types of systems monitored traffic flows continuously and triggered the most appropriate plan from a database. Second generation systems used current traffic counts to update historical data and produce new plans. However, this often led to frequent plan changing which caused disruption and often sub-optimal plan changes.

In the late 1970s, the Transport Research Laboratory (TRL) developed a methodology to overcome these problems. An online computer continuously monitored traffic flows over the whole network and made a series of frequent small adjustments to signal timings to reduce delays and improve traffic flow. This was the basis of SCOOT.

SCOOT systems can be installed and validated to varying degrees, from basic to being fully customised. Customising SCOOT leads to significant benefits over a basic system and is much more effective at managing congestion and reducing delays. This has a beneficial impact on emissions as traffic is kept moving more freely and generally at speeds that produce lower emissions compared to queuing traffic.

4.4.2 Comet

Running alongside SCOOT in Liverpool is the Comet system, also developed by Siemens. Comet is a database which stores information generated by SCOOT such as traffic flow and congestion levels. Comet offers the opportunity to assess data in real time allowing the system to take action when certain situations arise- for instance unusually high congestion from football matches (an obvious application in Liverpool, and one that has already freed up police officers from traffic control duties).

The combination of these circumstances and the action taken by the system is called a “strategy” which can be implemented automatically or manually. Strategies can be developed for hundreds of scenarios and can therefore be a flexible, locally specific way of managing traffic. The strategy can, for example, impose diversion routes or activate Variable Messaging Signs (VMS) to inform drivers of congestion issues, or implement special stage sequences at traffic signals affected by congestion.

The ability to develop strategies based on local circumstances is a very powerful aspect of the system and could, for example, allow air pollution levels to inform traffic management. LCC are strongly supportive of investigating the development of such a “pollution responsive” system for Liverpool- and indeed this measure forms a central focus of this action plan.

4.4.3 Variable Message Signs and Car Park Management System

The network of VMS and certain car parks in the city are controlled by Siespace which is supplied by Siemens. The system allows the signs to be updated manually to reflect local circumstances, or following a timetable, or automatically by the Comet system when unforeseen circumstances arise. These can include roadworks, closures or emergency situations.

The system also displays information on available car parking in the city, thereby reducing the amount of cars driving around the city looking for spaces, which benefits congestion.

4.4.4 Other systems

In addition a Journey Time Monitoring System (JTMS) based on data collected by a network of cameras is in operation, and can invoke appropriate Comet strategies where unusual changes occur. A web interface system called eMerge works with Comet to provide travel information on a Google Maps interface. This information can be used for personal travel planning which could encourage modal shift.

4.4.5 Recent traffic management developments in Liverpool

The systems currently operating in Liverpool are already advanced, which have been made possible by significant investment from Liverpool City Council and the efforts of 2020Liverpool Ltd. Since SCOOT was implemented in 2008 much of this effort has been focused around customising the systems so that they are locally “tuned” and comprise strategies to cope with circumstances specific to Liverpool.

The focus of efforts to date has surrounded key junctions with known congestion issues, for example:

- Queens Drive/ East Prescott Road
- Queens Drive/ Walton Hall Avenue
- Queens Drive/ Bowring Park Road (M62 and Edge Lane)
- The Strand (Waterfront)
- Walton Vale
- Scotland Road/ Everton Valley
- Rice Lane/Hornby Road

The improvements have resulted in significant reductions in congestion at these junctions though it is difficult to say how this has impacted on air quality as monitoring is not carried out at all of these locations.

Figure 4.9 and Figure 4.10 show percentage congestion at the junction of Queens Drive and East Prescott Road before and after SCOOT customisation. There is a clear reduction in congestion which should have had a beneficial impact on air quality (though there is insufficient monitoring in place around the junction to quantify this).

Figure 4.9 Congestion at Queens Drive/East Prescott Road before SCOOT optimisation

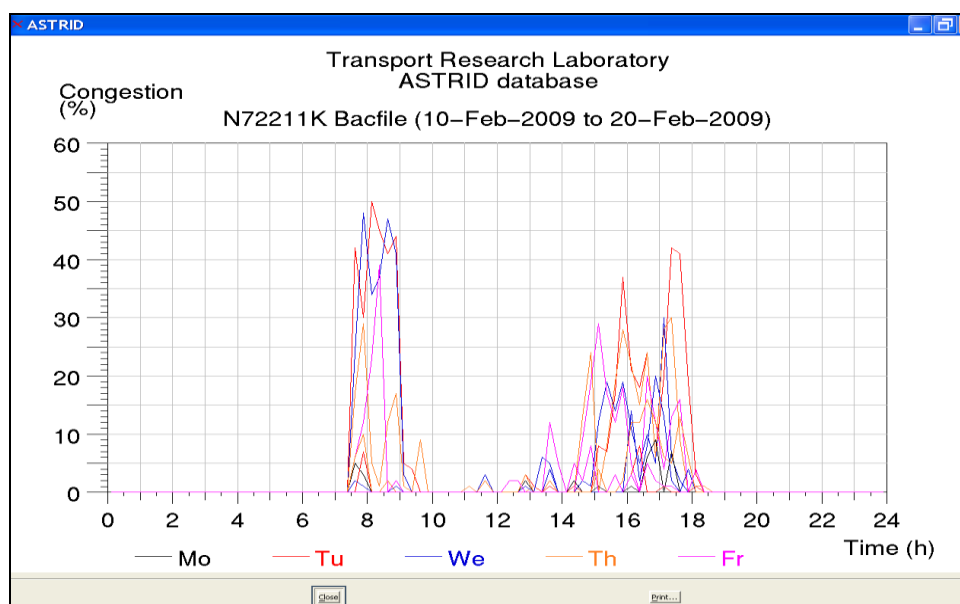
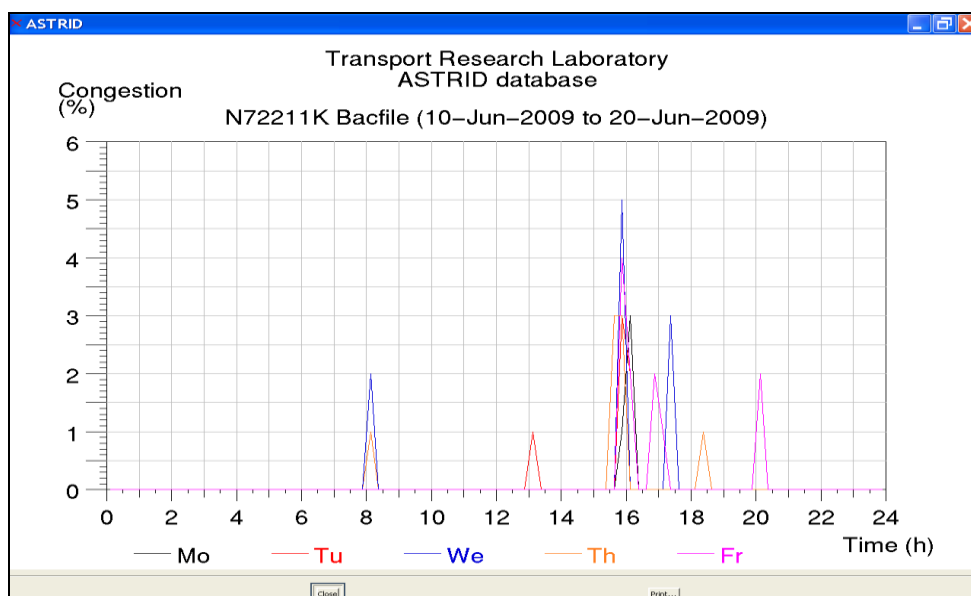


Figure 4.10 Congestion at Queens Drive/East Prescott Road after SCOOT optimisation



Further information on how SCOOT can be used to increase the improvement in air quality is presented in section 6.3

4.5 Merseyside Transport Partnership

The Merseyside Transport Partnership (MTP) consists of Knowsley, Liverpool, Sefton, St Helens, and Wirral, Councils and Merseytravel. MTP produce the five year Local Transport Plan (LTP) which runs from 2006 to 2011 and is a £230m delivery programme of transport investment and service improvements. The aim of the LTP is to give Merseyside a safer, sustainable, efficient and integrated transport network, accessible to all.

TravelWise is the partnership's campaign to help people on Merseyside make sustainable transport choices - public transport, walking, cycling and using cars wisely. The Support Unit coordinates LTP activity on behalf of the MTP. The TravelWise campaign promotes a range of measures that have the potential to improve air quality in Liverpool by encouraging sustainable transport choices.

The work of the MTP has been nationally recognised with the group receiving a Beacon Award, which recognises excellence in local government. The Beacon Awards were set up to encourage best

practice in service delivery across local government. Themes are selected for each round by government ministers. The themes represent issues which are important in the day-to-day lives of the public and reflect key government priorities.

Beacon status is awarded to those authorities who can show a clear vision, excellent services and the enthusiasm to innovate. Awards are made by government ministers based on recommendations made by an independent advisory panel. It is highly competitive and the winners show a high level of excellence and improvement, compared to other groups that take part.

LCC as part of Merseyside Transport Partnership (Merseytravel and Knowsley, Liverpool, Sefton, St Helens, Wirral and Halton councils form the Merseyside Transport Partnership) received Beacon status in 2008 for improving accessibility and has won many other awards for its work in this area. LCC also received a highly commended certificate at the National Transport Awards 2008 for work with Liverpool Primary Care Trust on improving transport links to local GP surgeries in the city.

More recently, the Council as part of the Merseyside Transport Partnership won a Sustainable Transport Award at the 2009 Local Government Chronicle and Health Service Journal Sustainable Communities Award for the Let's Get Moving campaign.

4.5.1 Travel Plans

A travel plan is a package of measures produced to encourage people to use different modes of transport as an alternative to single-occupancy car-use as they travel to work, travel around their community or embark upon leisure or recreational trips.

TravelWise promotes travel planning through a number of initiatives which aim to get people to choose alternative modes to the private car when making journeys for work, leisure or education in Merseyside. Encouraging people to use more sustainable modes of transport is central to improving air quality in urban areas and therefore the activities of TravelWise in this important area are crucial to this plan. The measures around travel planning are seen as long term in nature as they involve a significant shift in behaviour which can only occur over time, with the right educational tools and resources as support.

A Travel plan could include car sharing schemes; a commitment to improve cycling facilities; strategies to encourage walking; interest free loans for public transport tickets or restricted car parking allocations. Travel plans can offer real benefits, not only to organisations and their employees, but also to the surrounding neighbourhood and natural and built environments that make up the wider local community

Over 100 businesses are now involved in Travel Plans, to support this TravelWise have developed the Wise Moves Membership service to help make travel planning simpler. This service includes an on-line survey, which can help with targeting the travel plan to make the most impact and monitor results.

To assist organisations, TravelWise have produced a Travel Plan Pack for use as a resource for those looking to develop and implement their own Travel Plan. It is appropriate to all types of organisations - private sector companies, hospitals, colleges, residential developments, tourist/leisure sites and speculative/multi-occupied developments.

The travel planning initiatives cover a number of areas, namely Travel Plans for:

- Residents
- Tourism and Leisure
- Workplaces
- New Developments

New Residential Development Travel Plans

A residential Travel Plan is a package of measures designed to reduce the number and length of car trips generated by a residential development, while supporting more sustainable forms of travel and

reducing the overall need to travel. An effective plan helps to tackle increasing congestion, rising pollution and improve accessibility.

The Government's Sustainable Communities Plan - a major programme for improving new and regenerated communities and housing across the country - acknowledges that Travel Plans are an important tool in delivering accessible communities. Communities need to be well connected with facilities to encourage safe walking and cycling, the provision of good public transport and easy access to high quality services. They should also help reduce pressure of additional traffic on surrounding roads, while creating more attractive and liveable neighbourhoods.

The requirement for residential travel plans is also emphasised in the recently published Supplementary Planning Document which specifies how these should operate and minimum standards for how they are devised.

Tourism & Leisure Travel Plans

As the aim of tourism and leisure sites is to attract visitors, they can become major generators of traffic within an area. A visitor Travel Plan has a different emphasis than one designed for employees. Although employees are normally included in the Travel Plan, the main aim is to encourage visitors to travel by more sustainable modes of public transport such as cycling, walking and car share. An effective plan will help to reduce the amount of car travel generated by visits to your site. In turn, this can help decrease congestion and therefore air pollution.

Workplace Travel Plans

Journeys to and from work generate a significant proportion traffic at peak times. Travel Plans can help organisations to address some of the issues staff face getting to work each day and TravelWise offers help with developing work place plans, advising on reducing the demand for parking, improving traffic congestion and road safety and facilitating access to better public transport travel subsidies and discounts. Use of more sustainable modes of travel can also improve the health of commuters.

To further support organisations in their development and implementation of Travel Plans, TravelWise have established the Wise Moves Membership services. Signing up to Wise Moves is free and gives access to many benefits, including marketing and promotional resources to help organisations launch their Travel Plan, discounts at cycling stores across the area and access to an on-line staff travel survey, bespoke to the organisation's needs.

Wise Moves Network

Implementing a travel plan can help address several transport issues: commuting, business travel, fleet management, business deliveries and transport contracts. The Wise Moves Network has been developed in response to feedback from organisations about how best to help make Travel Planning simple.

Membership gives organisations exclusive access to:-

- Free on-line travel survey, bespoke to your needs
- TravelWise Merseyside brand new marketing materials
- Eligibility for the TravelWise Grant Scheme offering up to £2,000 in 2009
- Free Travel Plan Forums
- Postcode mapping service
- Personalised journey planning service
- TravelWise discounts (e.g. cycle discount scheme)
- Discounted price welcome / recruitment packs
- Annual marketing plan and free resources
- Additional support package

Membership of the Wise Moves Network is free if the organisation submits basic travel mode data before the end of March of your first year of membership. Travel mode data can be gathered through our a survey which TravelWise will set up and manage, through a survey of your own, or derived from existing data sets you may already have on hand.

4.5.2 Planning Applications & Travel Plans

Travel Plans are increasingly being requested by Local Planning Authorities as part of the planning process.

Policy Background

Planning Policy Guidance Note 13: Transport

This note was issued by the Government in 2001 and sets out the objectives to integrate planning and transport at the national, regional, strategic and local level and to promote more sustainable transport choices both for carrying people and for moving freight.

It stated that 'Travel Plans should be submitted alongside planning applications for all major developments and also for smaller developments which are likely to generate significant amounts of travel where there are already local traffic problems.

On a local level, the Supplementary Planning Document (SPD) has been developed by the five Merseyside local authorities. It is being progressed through each of their Local Development Frameworks (LDF) to ensure a consistent approach across Merseyside to securing sustainable access to new developments. The document explains how developers can make sure their development satisfies policies contained in the local development documents and paves a way for developing travel plans in advance of planning applications in order to assist in smoother processing of that application. Where a development is speculative in nature and the future occupants are undetermined, interim or umbrella travel plans should be submitted.

The main objective of the SPD is to 'ensure a reasonable choice of access by all modes to a new development.' This document is part of the overall transport strategy as set out in the Merseyside Local Transport Plan (MLTP). LCC has already adopted the SPD.

Travel Plan Preparation for Developers

Early preparation of a Travel plan in advance of submitting a planning application for a development can assist in the smooth processing of that application. Travel plan requirements may differ, depending on the scale, land use and end use of the development. At present early consultation with the Local Authority Planning Department in conjunction with TravelWise Merseyside is recommended to discuss specific access and transport requirements as well as minimum criteria for travel plans.

The Merseyside wide adoption of the SPD provides a uniform one stop shop for assessing these requirements and although the type of travel plan submitted for new developments will depend upon the type of development and final end use the SPD will define key points of inclusion. TravelWise is currently developing an on-line tool that will allow developers to rate their travel plans against assessment criteria prior to submitting them with planning applications. This will aid developers by allowing them to check that their travel plans meet the minimum standards ahead of time and thus avoid the possibility of having them, and consequently their planning applications rejected as a result.

4.5.3 Walking

The Merseyside Local Transport Plan partners are working to make walking around Merseyside easier and more enjoyable. This includes improvements to public spaces and pavements as well as signposts and better provision for disabled people. More information about TravelWise walking plans is available in the Pedestrian Strategy. As part of the programme to encourage walking TravelWise organise an annual event, the "Walk to Work Week". There have been numerous public realm improvements in and around the city centre with the aim of creating an attractive environment which is safe, clean and accessible by all. These include developments around Derby Square, Dale Street, Lime Street, Brownlow Hill and Old Hall Street.

The Active Travel Strategy aims to encourage more people to walk and cycle more often and more safely. This will form part of the LTP and will help to ensure local transport policies maximise the health benefits that walking and cycling can bring.

In addition, The Merseyside Rights of Way Improvement Plan (ROWIP) is a ten-year strategic plan for improving local rights of way for all types of users that was adopted by Liverpool City Council and its Merseyside Partners in 2008. The Rights of Way Improvement Plan is recognized by the LTP as an important part of improving accessibility, congestion, air quality and sustainable transport. Progress reports are required to highlight the contributions made in delivering the LTP objectives. The 2008/09 progress report shows that the plan was able to implement a number of small schemes designed to benefit walkers and cyclists.

Walking to School

TravelWise school surveys show that a vast majority of children would prefer to walk or cycle to school given the choice, as opposed to travelling by car. Their reasons vary from getting exercise, spending valuable time with their parents or their friends, helping the environment, but most of all because walking is fun. In Merseyside TravelWise organise two Walk to School Weeks each year.

4.5.4 Cycling

The Liverpool Primary Care Trust (PCT) and LCC have signed a formal agreement at Merseyside Transport Partnership (MTP)'s annual conference in 2009, setting out their commitment to increasing cycling levels in the city creating the "Cycling Alliance". The alliance aims to improve quality of life and create a healthy, low carbon city for the future.

The City partners now hope that others will join the alliance so that Merseyside councils and PCTs can work with businesses, universities and cultural and sporting agencies to bring renewed commitment to cycling.

The agreement sets out to generate a 10% increase in trips made by bike before the end of March 2011, compared to journeys in 2006 (though it should be remembered that cycling is still a minor mode in Liverpool so this increase will not have any tangible air quality benefits). Working together, MTP (through the TravelWise programme), Liverpool PCT and LCC aim to secure support from more than 100 organisations over the remainder of Year of the Environment and during the city's Year of Health and Wellbeing 2010.

On-road cycle training is offered to all schools in Merseyside. Aimed at Year 5 and 6 pupils, level 2 national standard Bikeability training equips them with important skills to help them cycle on quiet roads. More advanced level 3 training is available for secondary school pupils, for longer journeys and handling traffic and junctions.

In addition to coordinating the Liverpool Cycle Forum, the City Council meets with organisations such as the major hospitals and universities to coordinate promotion of cycling initiatives. This is in addition to the TravelWise programme which supports organisations in implementing their travel plans across Merseyside. Cycle audits must now be completed and submitted for approval for all developments in and around the city. This is to ensure that cyclists are not excluded when designing and constructing new transport or public realm improvements.

The Liverpool Cycle Forum meets four times a year to talk about the cycling issues in Liverpool. A frequently raised issue in the forum is cycle hire around the city. In addition a City Centre Feasibility Study is being investigated and a brief has been issued to see how cyclists can be managed around the city centre.

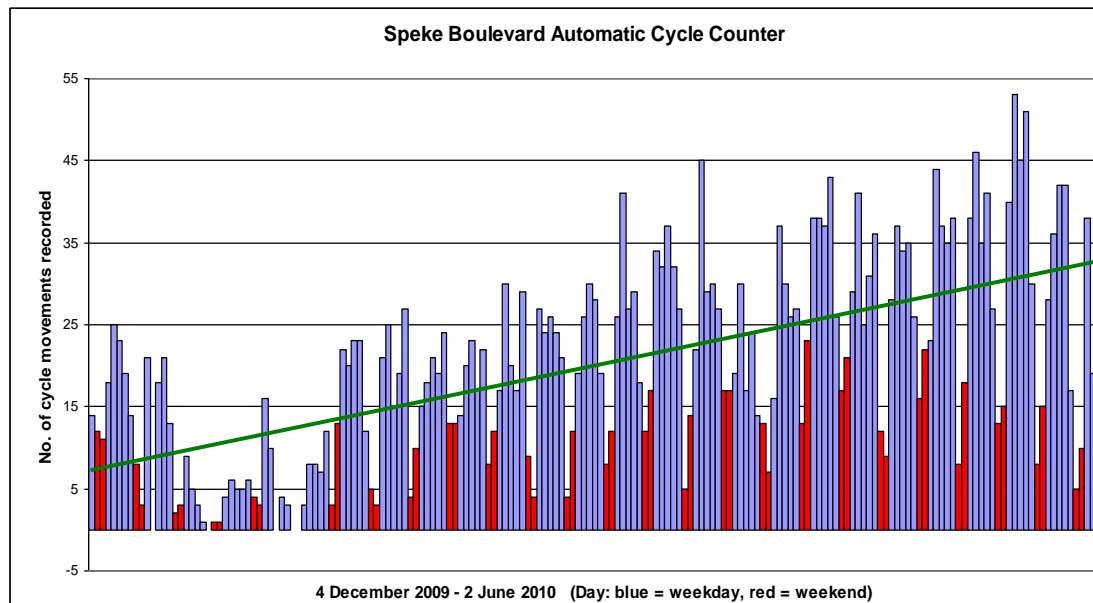
Cycle Speke - Project update September 2010

The project aims to identify and tackle barriers to cycling to encourage more local people to cycle more and cycle more often. The project works in partnership with schools, local community groups, workplaces and organisations to promote cycling through the provision of activities, improved facilities and information.

Cycle Speke is supported by the European Regional Development Fund Action Area 2.3 Access to Gateways. The project started in June 2009 and is due to end in December 2010.

Monitored cycle levels are also monitored within the project:

- Manual cycle counts – showing a significant increase in recorded cycle trips of an average (both mean and median) of approximately 60% against baseline data collected in autumn 2009.
- Automatic cycle counts – showing steady rise in recorded cycle trips (see below)



Overall, the Cycle Speke project has proved successful in encouraging more local people to cycle more.

To assist with the promotion of cycling as a sustainable mode of travel, a training scheme has been set up for riders of all abilities and ages. This has been set up in partnership between TravelWise and Liverpool NHS Primary Care trust. Bikeability is another scheme which sets out to give children and parents skills to cycle on all types of routes. The benefits of cycling as a sustainable mode of transport include better health and fitness and less congestion on the urban transport network. Sustrans also have a training initiative called Bike It which aims to increase cycling as a mode of transport.

4.5.5 Car Share

Car sharing refers to two or more people, making similar journeys, travelling together in the same car. It means fewer cars on the road and therefore reduces congestion, lowers emissions and can save the occupants money.

The Merseyside Car Share Scheme has been set up where drivers can register their details, where they are travelling to and from, and the scheme will automatically find matches. It is free to register on to find someone to share your journey with. Once the driver has signed up they are sent an email listing people who are on the database who may be able to share a journey. The driver then decides who, if anyone, to contact.

In addition to providing a guide to help promote car share, free resources are also available to Wise Moves members.

4.6 Preparation of LTP3

A new Local Transport Plan is required under the Local Transport Act 2008 and will commence in April 2011. The format will be different to the current one i.e. LTP2 in that there will be two parts to LTP3. Firstly there will be a Strategic Plan which sets out the long term strategy until 2024 and secondly, there will be Implementation Plans which set out the detail of how the strategy will be delivered across the first three years of LTP3. Merseytravel will have sole responsibility for LTP3 in consultation with LCC. It is also clear that the budget allocations for LTP3 will be reduced compared to LTP2 and it is as yet unclear how large this differential will be. Following the election of the new Coalition government, a Comprehensive Spending Review is scheduled for October 2010. With the national budget deficit, there are likely to be further cuts to funding as a result of these changes. At present, it is difficult to say with any certainty what the outcome of the spending review will be for local government, but it is likely to involve spending cuts and efficiency savings across all departments.

The Government has set out five new national priorities for transport which are:

- Addressing climate change, by the reduction of carbon emissions from transport
- Supporting economic regeneration by aiding competitiveness and productivity
- Ensuring equal opportunities for all
- Protecting health, safety and security
- Promoting quality of life and the natural environment.

Air quality is impacted by these priorities and therefore the update of the air quality action plan needs to consider the options for inclusion in LTP3, alongside the desire to achieve economic growth and create an overall low carbon culture.

Consultation is currently underway on issues for discussion for the third LTP. A detailed transport model has been developed for the Liverpool City region where trends in the economy and transport can be predicted over the short term to 2014 and over the longer term to 2024. This indicates that traffic, particularly from Light Goods Vehicles (LGVs) is likely to significantly increase, both in the number of trips made and the vehicle km travelled. Journey times during morning peak hour to the centre of Liverpool are also likely to increase by 2024. The 18% increase in LGVs is likely to result from the manner in which freight is redistributed using regional warehouses and hubs, and this reflects the increase in internet based shopping.

A set of six local goals and priorities have been included within LTP3 as follows:

Goal 1 – Ensure the transport system supports the priorities of the Liverpool City Region and its Local Strategic Partnerships

Goal 2 – Provide and promote a clean and low carbon transport system

- Traffic
- Modal Shift
- Public Transport
- Fleet Vehicles
- Freight
- Land Use Planning
- Network Maintenance and Management

Goal 3 – Ensure the transport system promotes and enables improved health well being

- Cycling and Walking
- Road Safety
- Health/Inequality

Goal 4 – Ensure the transport system supports equality of travel opportunity by ensuring people can connect easily with employment, services and social activities

- Access to Employment
- Access to Healthcare
- Access to Education
- Fares, information and ticketing
- Taxis and Community Transport
- Public Transport
- Public Transport
- Joint working to address common objectives

Goal 5 – Ensure the Transport System supports the Economic success of the Liverpool City Region by the efficient movement of people and goods.

- Public Transport
- Goods
- Cycling
- Maintenance
- Traffic
- Travelwise

Goal 6 - Maintain our Assets to a high standard

- Complete Asset Management Register
- Produce effective asset management programme, one of which is to “actively improve air quality”. It is anticipated that this updated air quality action plan will assist in attaining that priority.

5 Consultation

5.1 Air Quality steering group

The Liverpool Air Quality Action Plan Steering Group was formed in 2004 during the preparation of the first air quality action plan which was published in 2007. This group is made up of a broad cross section of individuals and organisations actively involved in the City Council's activities. In the intervening years the group have met regularly to review progress on implementing the measures set out in the original Action Plan.

The development of this revised and updated Action Plan began with an inception meeting, which was attended by a number of Local Authority officers. These officers have guided and consulted on the development of the Action Plan. In this way the Action Plan has been influenced by their local knowledge and area of responsibility and their understanding of the network of partners and individuals who together must engage for the measures to have a realistic chance of implementation.

5.2 Initial Stakeholder Engagement

LCC have undertaken an initial stakeholder engagement with a number of key individuals and organisations to evaluate progress against existing measures implemented through the original Action Plan and to obtain recommendations for the development of options for the updated city wide Air Quality Action Plan presented here list stakeholders organisations here. These options, together with the options previously considered in the original action plan, were then consulted on more widely through the use of a citizen's jury.

5.3 Citizens Panel

5.3.1 The aim of the Citizens Panel

LCC hosted a Citizens Panel in November 2009. The purpose of the Citizens Panel was to act as a decision- advisory tool, ensuring that the views and perceptions of a cross section of the public was included within the plans development. A citizens Panel is modelled on the idea of criminal proceedings where chosen members of the public hear evidence, ask questions and seek clarification and eventual provides a view (a verdict). The purpose of the session was to involve members of the public in a structured way in order that they could contribute to the Councils future plans to address local air quality management issues in Liverpool.

During the session evidence was presented to the panel across the following areas:

- Air Quality in the UK
- Health impacts of air pollution
- Local air quality in Liverpool

Expert witnesses presented the information to the Panel and measures were discussed that are available to reduce emissions and thus drive improvement on air quality within the city. The Panel members were asked to consider the evidence and provide a direction for LCC as follows:

1. How important is good air quality in Liverpool?
2. Based on the evidence what sources should the Council focus on with respect to pollutant emissions in Liverpool?
3. How should this focus be directed?

Nine citizens were randomly (using statistics) selected to make up the panel in order to provide a broad and representative panel of Liverpool citizens – a mix of different wards in different wards of the city, and demographic groups.

5.3.2 Initial comments from the Panel on air quality

The morning session provided an opportunity to hear the Panel members' views, provide a chance for them to raise any initial concerns and perceptions that they had on the state of air quality in Liverpool. A general discussion was facilitated around the very broad question of Air Quality and how it relates to each of the Panel members.

The discussion included, and provoked, a wide ranging set of thoughts and comments key themes and comments are summarised below:

- **Unreliable Public Transport**

"People just won't use it ... I'm not waiting around in the cold for the next bus! Half the time it doesn't turn up! And have you seen how much it costs?!"

- **Congestion in the City**

Specific issues were raised with respect to Queens Drive. *"It's full of elderly buses and old lorries".* Comments were made on the need for greater control of maintenance standards. *"Any vehicle that is not maintained should be taken off the roads"*

A juror stated that *"the Liverpool Daily Post had claimed that Queens Drive residents live in one of the 15 worst roads for Air Quality in the area ... I would not want to sit behind these buses, poor maintenance. I suffer from asthma"*

There were discussions around Liverpool FC's proposed Stanley Park new stadium development *"such a big stadium, it will lead to all sorts of congestion issues – not just during construction, also the capacity is increasing by 30,000".*

And

"Even at the moment with the current Anfield stadium match day parking restrictions mean nothing ... what's a £30 fine! Nobody cares, four in a car share the fine between them as part of the day out".

And

"... What about the buses? They stay all match with engines running with their exhaust pipe at the height of a baby's pram".

And

"Is pollution being properly monitored on match day?"

Jurors felt a tram system should be encouraged. There was a general 'awareness', based on stories reported by BBC North West, that Mersey Tram is being planned between LCC and the neighbouring Knowsley Borough Council. The question was raised *"Do tram routes make more congestion?"* and *"would they reduce bus routes?"* also *"as they are electric they require coal to be burnt elsewhere."*

- **Idling Buses**

Perception of old buses in some areas and also poor vehicle maintenance raising questions about how maintenance standards are enforced. *"Why doesn't Liverpool City Council take control of buses, traffic flows and better timing and frequency of buses?"*

Also

“... What about eco friendly fuel? Southport uses clean fuels on buses” however other Jury members were concerned that *“trams are electric and therefore cause pollution elsewhere ... What we need is clean coal to provide the electricity first!”* and several Panel members advocated nuclear as a low carbon source.

- **High Asthma Rates and high poor health record in the area**

It was stated that Liverpool *“has always been bad for bronchitis, the North West has the highest rates for hospitalisation / asthma.”*

- **Planning as a tool to create a better place to live**

A brief discussion ensued on the benefits of Green space. Doric park was cited as a good example and the comment was made that green space generates *“a lot of oxygen during the day”* and that *“... too many times housing is put up with no green space”*.

Liverpool airport was mentioned. *“Aircraft cause pollution – we see a lot more planes than we used to and since the expansion of John Lennon airport they sometimes come in far too low I have phoned the airport and told them! The lower they come in then the greater the pollution – can the Council address this directly with the airport?”*

Several of the Panel members commented that they thought it wasn't always down to the Council ... *“What about national level policy! The Council make decisions on planning, for instance refusing a new supermarket site ... and then it's overruled by the government anyway! So I think it's joining up everything in the planning system that is needed.”*

- **The council's role**

Panel members commented that, *“The council should learn from what works elsewhere”*.

Several members of the Panel made a definite connection between carbon / climate issues and Air Quality. One member of the Jury advocated the use of car sharing to minimise single occupancy.

Discussion took place on links between PCT and LCC. *“Year of Environment needs more marketing in the city!”*

Several members of the Panel raised the issue of promoting bikes within the city *“a great way of commuting”* it was pointed out that Liverpool One already provides free bike parking.

School catchment areas were discussed – a view was given that people were forced to use cars as most school children don't go to the nearest school and it was felt public transport didn't offer a credible alternative. A suggested action to improve Air Quality was to *“send children to their nearest school”*.

Education in Schools should be promoted- suggested topics included:

- *“How your lungs work!”*
- *“Provide trips to places with fresh air so children know the difference!”*

5.3.3 Panel recommended measures

Following the presentation of the evidence, and various sessions setting out options available to improve air quality, the Panel members deliberated measures and went through a facilitated prioritisation exercise. Further expert evidence and clarification was provided as required with the Panel afforded the opportunity to 'call' experts for further information and 'cross examination' questioning experience of success and efficiency of measures from other areas.

The summary of the Panel's position, setting out measures it felt it would like to see pursued within the updated Liverpool City Council Air Quality Action Plan were:

I. Measures supported by all members of the Jury

- Newer and fewer buses
- LCC to lead by example by having a vehicle fleet, with lower emissions
- Taxi fleets to have low emissions
- Cost controls for specific demographic groups to encourage the use of public transport – no point providing clean buses if they were then unaffordable
- More effective ongoing monitoring of the buses from a maintenance, up keep and efficiency perspective

II. Measures supported by the majority of the Panel (For : Against)

- Increased use of speed controls in the city (7:2)
- Institutional travel planning (6:3) – there was a feel this should be encouraged for Schools and large businesses.
- Investigation, promotion of Park & Ride schemes (6:3)
- Improved Traffic Management better signal control (5:4)
- General effort to 'green the city' through planting trees (all for)

6 Action Plan Measures

In developing the original action plan in 2005, consideration was given to a full range of relevant options (Appendix 2). These have been reviewed to ascertain if they are still deemed appropriate to keep in the updated plan or equally have any additional measures been identified that need including in terms of air quality impact, feasible and cost-effective compared to others.

6.1 Detailed assessment of options

The sub-options identified as having potential in the earlier assessment were developed by the members of the steering group into a list of detailed options. According to government guidance, these options should be assessed against a wide range of criteria in order to identify the most suitable ones to adopt in the Action Plan.

6.1.1 Assessment methods

The criteria against which options were assessed were:

- Could the option be defined with a clear view on how it aims to improve air quality
- Identifying the appropriate agency / authority for implementing the option
- Whether it is feasible
- Whether stakeholders would find it acceptable
- Potential air quality benefits
- Potential costs
- Overall cost-effectiveness
- Other environmental benefits, risk factors, social impacts and economic impacts of a measure

Details on the methods used in the assessment are presented in Appendix 3.

6.1.2 Assessment results

Results of the assessment are presented as Appendix 4.

Based on the overall assessment for each option an assessment has been made on whether the option is a priority for the draft revision of the Action Plan or not. It is a complex matter trying to decide on priorities from such a wide range of criteria. However, for the purpose of the action plan, the steering group put particular weight on those options, which are deemed feasible in the short term, and which provide good potential AQ benefits (with appropriate consideration of cost-effectiveness and the wider environmental benefits or risks).

Those options defined as a priority have been taken forward as a measure for the updated Action Plan. Those options not deemed a priority are not considered further at this time but have the potential to be reconsidered in future if it is necessary to revise the Action Plan further.

In summary the outcome of the assessment is that the options to be prioritised as measures in the Action Plan fall into two categories:

1. Direct Measures - aimed reducing high emissions from buses and tackling congestion
2. Supplementary Measures - aimed at integrating air quality into all relevant areas of decision making within LCC and its partner organisations.

6.2 Direct Measure 1: Buses

A large proportion of NO_x emissions are derived from buses in the city, therefore a primary focus within this Action Plan is given to general improvement in buses and investigating bus movements in and around the city.

6.2.1 Statutory Quality Partnership schemes

The Local Transport Act 2008 provides operators and local transport authorities' new powers and options for improving local bus services. This Act has significantly enhanced the scope for far-reaching, comprehensive and effective voluntary and statutory quality partnerships with the aim to improve local bus services. Key obstacles such as competition rules have been significantly relaxed. Bus quality partnerships are agreements between local transport authority bus planners and local bus operators.

In partnership with the Local Authorities of Merseyside, and the Bus Operators, Merseytravel are developing Statutory Quality Partnership (SQP) Schemes for buses on five routes across the city region.

All bus companies wishing to operate on these routes will have to adhere to strict guidelines covering:

- Vehicle standards
- Ticketing
- Information and Marketing
- Punctuality and Reliability
- Driver/Driving standards
- Customer Service
- Service Stability
- Infrastructure investment and maintenance (Highways and bus stops)
- Monitoring and Enforcement

Each scheme will have its own set of standards, underpinned by a generic Framework Agreement which will render the schemes legally binding to all who wish to operate along the routes in question. At the moment this standard would be that buses have to be Euro III or better to be used on the chosen routes for the SQP scheme.

One such scheme will be on the Liverpool - Page Moss - St Helens corridor (Route 10), and work on developing this scheme is at an advanced stage. It is intended that once the Scheme Standards and Framework Agreement are finalised, formal consultation can begin early in 2010.

A second scheme on Route 14 Croxteth to City Centre is also under negotiation. The measures being considered on the two Liverpool schemes relate principally to better enforcement of existing parking restrictions and bus lanes, together with considerable action around key traffic signal junctions to introduce bus priority through the relevant junctions via enhanced phasing, selective vehicle detection and, in some instances new signals.

The air quality benefit of a Statutory Quality Partnership Scheme for buses is difficult to quantify without the final agreement being in place. However, there will be undoubted reduction in emissions from this significant source for the city.

6.2.2 Bus Lane Enforcement

Bus lane enforcement is part of a wide ranging programme of measures to improve the reliability and punctuality of public transport, reduce congestion and pollution.

Keeping bus lanes free will reduce delays and keep traffic moving through the city, enabling buses to run to a more accurate time scale. This will encourage commuters to be more environmentally friendly and use public transport.

Improvement of bus journey time is essential to both achieve patronage growth and retain existing passengers. Improvement takes two forms: reduction of journey time and reduction of variability of journey time. Where the journey time is attractive compared with other modes, predictability of journey time is considered by bus users as more important than the journey time itself. Non users require both an attractive journey time and one that can be achieved on a consistent basis in order for them to consider modal shift to bus.

One way to improve journey times and simultaneously improve air quality more effectively is by enforcing bus lane use. The main air quality concern regarding buses is the high emission levels from buses stop/starting due to illegal parking in the bus lanes throughout the city. This behaviour is reported as prevalent, and increases congestion while the bus moves out of the bus lane to avoid the parked vehicle. Enforcement must be visible and consistent in order for it to be a deterrent to illegal behaviour.

There are a variety of options for enforcement available to LCC to reduce this practice. Enforcement officers can be very effective by providing a visible deterrent. These officers are currently employed by the local authority with a responsibility for parking enforcement, but their powers are limited to action against breaches of parking and loading regulations and exclude (for instance) action against those parking in a dangerous location, which remain the responsibility of the police.

Figure 6.1 Common usage of bus lane by non approved vehicles



Figure 6.2 Example of bus forced out of the bus lane by illegal parked car



Figure 6.3 Example of bus lane congestion by non approved vehicles



Street cameras can be used to monitor illegal use of bus lanes and traffic signal infringements. Cameras also act as a deterrent in themselves, provided that they are prominently identified. One of the simplest and most cost effective means of deterrence is through clear and unambiguous road signs, prominently deployed so as not to confuse car drivers. CCTV is useful in guiding enforcement officers to areas where there are localised problems through radio communications from the UTM base. It has been reported elsewhere¹¹ that intensive enforcement projects over several days or weeks in a problem area can have significant impact on reducing the levels of illegal activity, but these exercises need to be repeated at regular intervals to prevent the onset of complacency.

6.2.3 Bus lane infrastructure

Key traffic signal junctions to introduce bus priority through the relevant junctions via enhanced phasing, selective vehicle detection and, in some instances new signals will be implemented under the new Statutory Quality Partnership Schemes. Bus emissions are significantly higher than those from a car, and emissions under stop-start driving conditions are also significantly higher than those from vehicles driven more smoothly. Measures to enhance a smoother driving condition for buses will be effective in reducing emissions.

¹¹ www.buspartnership.com

Figure 6.4 Example of no bus priority at traffic lights



Measuring the performance of all corridors helps highlight both the outcome from infrastructure schemes and also clearly indicates those corridors encountering the greatest problems, which then helps prioritise future investment in improvement measures.

6.3 Direct Measure 2: Tackling Congestion

6.3.1 Linking SCOOT to air quality “Motes”

The SCOOT system in Liverpool (see information in section 4.3.4) is subject to continual customisation and this will continue, though to date the drivers for improvements have been priorities other than air quality. Recent developments in technology mean that there is potential to gather air quality data in real time, and have this data inform the strategies that are implemented by the SCOOT system.

The real time air quality data technology has been developed by the MESSAGE consortium made up of several leading U.K. Universities and is currently being trialled in several local authorities. In basic terms, this technology involves deploying a number of solid state pollution sensors (Motes) at key locations which feed pollution data back to the existing traffic control systems, allowing them to develop scenarios that are implemented when pollution reaches unacceptable levels. Obviously this technology is very new and its comprehensive air quality benefits are yet to be proven but LCC/Liverpool 2020 UTM team are of the opinion that it is very promising and as such may deliver real benefits to air quality.

Mote networks provide monitoring of air quality every minute (near real time) and are sufficiently small and lightweight to enable them to be fixed to existing street furniture. Motes are of a modular construction, so that sensors (for up to six pollutants including NO₂) can be installed to suit local circumstances. The information collected every minute is transmitted by either line of sight radio, or GPRS, to a computer that analyses and stores the results.

A network of Motes offers an opportunity to relate air quality variables in a small spatial area with traffic flow / congestion data available through the SCOOT system. The SCOOT system can then be programmed to reduce traffic flows below 85% saturation based on air quality concentrations.

As part of this Action Plan LCC intend to trial this technology at two locations in the City to assess its ability to improve air quality. If the trials are successful, and air quality around the junctions has been demonstrably improved, then the technology can be considered for wider application across the City.

Two locations have been chosen for the trial which will run for 18 to 24 months (subject to confirmed funding availability through the Defra Air Quality grant 2010/11):

- 1. Islington from its junction with Low Hill down to Hunter Street beyond St Anne Street**
- 2. High Street Wavertree from the junction of Childwall Road / Mill Lane / Lance Lane and Picton Road at its junction with Macdonald Street / Larkfield View**

A Mote will be co-located with the Islington automatic monitoring location to enable comparison between the measurement techniques of the MOTE and the automatic station measuring the same pollutants and to provide traceability to national metrology standards. The Motes will be arranged such that there will be seven spaced 50 metres apart from each other in N,S,E and W directions from a central gateway. This will be done at the same time as the Wavertree High Street MOTE trial.

The work will be collaboration between the University consortium, LCC's Environmental Protection Unit and Liverpool 2020 Ltd. The outline programme is outlined below:

Phase 1: Calibration of Motes monitors 2010 – 2011

LCC Environmental Protection Unit would like to pilot a trial installation of Motes to compare the air quality data collected by the existing automatic monitoring station at Islington for an initial period of one year, before applying the data collected to the Urban Traffic Management and Control system. The trial could therefore consist of installing a Motes unit adjacent to the automatic monitor and on the same sample inlet cage as the automatic stations ambient inlet. After a year of data collection, on an hourly basis to allow comparison between the current real time system and Motes units, the accuracy and reliability of the new equipment will be assessed.

Phase 2: Assessment of combined Motes and UTMC impact on air quality 2011 - 2012

If proven comparable to current monitoring equipment, then Motes will be used to provide an input to the Council's SCOOT/UTMC system and ascertain if changing conditions for traffic flow lead to a reduction in concentrations of NO₂ in the trial areas.

6.4 Supplementary Measures 1: Smarter Measures

Smarter measures to increase sustainable travel in Liverpool and the surrounding regions have been described in section 4.5. A long term TravelWise programme has been in place in Liverpool for some years and plans to enhance and encourage sustainable travel are already in place through LTP2. Although, these are unlikely to have a significant impact on air quality in the short term there is no doubt that an increase of such sustainable travel including walking and cycling will in the longer term not only decrease emissions but enhance the health and quality of life of participants. Travel plans are in place in the majority of schools in the region but they need regular monitoring and reviewing to ensure that they are being used. Travel plans for businesses and new developments are also in place, which also need regular monitoring and reviewing. Targets and indicators to track the performance of smarter measure implementation were developed for LTP2 and are included in this Action Plan.

6.5 Supplementary Measures 2: Information Dissemination

Whilst providing information on air quality in Liverpool will not directly reduce emissions, it is considered important from an educational viewpoint to enable the people of Liverpool to make informed choices. There are a variety of media by which air quality information is circulated. The City Council have developed an air quality website 'LiveAir' as part of www.liverpool.gov.uk. This site is accessible from the council homepage.

6.5.1 Air Quality Website

The current Live Air website contains information on current levels of air pollution as measured at the four automatic air monitoring locations around the city. The measured concentrations are compared

against the UK Pollution Index which provides basic health advice that sensitive individuals may wish to consider at various levels of pollution. The site also provides generic information on the pollutants of concern, their health impact, the legislative framework to control these and the efforts being made within the city to improve air quality.

Work is currently underway to update and improve the website. This has a focus on providing an educational web-page - material is being developed to inform the younger generation about the importance of air quality. The intention is that the new pages use eye-catching imagery to represent air quality issues. This will include Liverpool's latest air pollution levels and it will link the issue and challenge of air pollution together through an interactive quiz that the user can participate in.

6.5.2 LiveAirtext Alert System

An alert system to warn people when there is the likelihood of significant air pollution has been launched in Liverpool. LCC has worked with Liverpool Primary Care Trust (PCT), Cambridge Environmental Research Consultants (CERC) and Breathe Easy Liverpool on the 'LiveAir Text' scheme.

For an initial six month period between April and September 2010, members of the public within a targeted group with severe breathing conditions, such as chronic bronchitis, emphysema and asthma, will be contacted with alerts when moderate, high or very high levels of air pollution are predicted. End users have been put forward by Breathe Easy Liverpool, which is part of the British Lung Foundation and works to help people with breathing related diseases, and Ellergreen Medical centre. In addition, two schools – Barlows Primary School in Fazakerley and St Christopher's Primary school in Speke – are working with the parents of pupils who suffer from asthma so that they too will get the alerts.

The remainder of the city's one hundred and eighty schools will be informed through the LCC "EdNet" information system. The system will use email, text message or voice mails to remind users of the system to take their medication with them if they go outdoors on a day predicted to have elevated air pollution levels.

The daily information from the initial six month period will also be placed on the LiveAir pages of the city council's website. The system will generate alerts when weather conditions, combined with traffic levels, are forecast to produce high levels of pollution that could be severe enough to affect people with respiratory conditions. It is envisaged that one potential benefit of the system will be a reduction in the number of people with respiratory issues being admitted to hospital during an air pollution event.

The air pollution forecasting system that underpins the Live Airtext Alerts uses a combination of air quality monitoring data, modelling techniques and the experience of expert advisors to accurately forecast air pollution episodes, and to notify vulnerable members of the public and interested healthcare professionals of the local air quality. The forecasts are generated by analysis of two automatically measured air pollutants namely particulate matter (PM₁₀) and Ozone, which are both known to exacerbate symptoms in individuals with pre-existing cardiovascular and respiratory diseases.

6.6 Summary list of measures

LCC have been working on a variety of measures that contribute to improved air quality in Liverpool since 2005 – many incorporated into the council's original Action Plan. However, analysis presented in this report suggests that these measures have been insufficient to resolve the air quality problems within the city. Indeed in many areas the air pollution levels, as demonstrated by the PDT measurements, have become worse. Consequently, LCC has designated a city wide AQMA.

Therefore LCC are seeking to implement appropriate additional measures to make further progress towards meeting the air quality objectives. This section presents the measures assessed as being the most appropriate at this time and therefore the areas to prioritise.

The measures identified via assessment as priorities, and therefore included within this draft of the updated Action Plan can be understood to fall into two categories:

1. Direct Measures - aimed at reducing high emissions from buses and tackling congestion
2. Supplementary Measures - Supplementary measures aimed at integrating air quality into all relevant areas of decision making within Liverpool City Council and its partner organisations.

Both of the direct measures in the updated plan are the ones that LCC propose to adopt and implement in pursuit of the air quality standards within the Liverpool city wide AQMA. Detailed information on the cost effectiveness of each of the measures is presented in Appendix 4.

The emission reduction which this Action Plan aims to deliver is uncertain. This can be estimated with more certainty when the details on the Statutory Bus Quality Partnerships (SBQP) are fully finalised, which is expected in summer 2010. A reduction on the scale that is required to lead to the achievement of the annual mean NO₂ air quality standard (40µg/m³) throughout the AQMA is very challenging, but it is anticipated that improvement will be achieved in the corridors where direct measures are being implemented. Additional national measures are thought to be required to further drive down concentration levels below the NO₂ annual mean air quality objective value. The City Council will continue to review and assess air quality to monitor this situation.

Throughout the period that the plan is implemented Liverpool City Council will:

- Continue to monitor and review air quality to assess whether the AQMA should be revised or revoked
- Produce an annual progress report that sets out new information on air quality in the City and which highlights progress made with implementing the action plan
- Continue to work closely with Merseytravel and Liverpool 2020 in implementing the action plan measures and in assessing whether the plan needs to be revised in the light of the findings from air quality review and assessments.

This update of the Action Plan is:

- Focused – road transport is the dominant source of emissions in the City Wide AQMA and queuing vehicles and HDVs are particularly significant sources.
- Proportionate – the plan puts most emphasis on reducing queuing from all vehicles and contains specific measures to attempt to address HDV emissions.
- Realistic – the measures in the plan have been assessed as being the more feasible, acceptable and cost-effective among many options.
- Strategic – key measures to be implemented include improving the city's capacity to manage air quality in order to avoid worsening air quality and to make progress towards the air quality standards.
- Sustainable – we believe that the plan can contribute to the councils community aims to reduce CO₂ emissions, improve quality of life (by improved health) and not compromise the local economy.

These measures are presented in the table below.

DIRECT MEASURES										
Category	No.	Measure	Focus	Lead authority	Policy linkages	Planning phase	Implementation phase	Indicator	Target annual emission reduction in AQMA	Estimated completion date
Emission reductions from buses and cars	1.1	Statutory Bus Quality Partnership (SQBP)	Five corridors will come under the SBQP, but the first one will be Route 10. Legally binding conditions will apply to bus operators, Merseytravel and LCC	LCC/Merseytravel	LTP2, LTP3	2010	2010 - 2013	Number of Statutory BQP	Once the corridors are fully compliant, expected emission reduction has the potential to be large. An estimate will be provided on release of the detail within the BQP	SBQP likely to become permanent, and likely to be reviewed and updated periodically
	1.2	Improve Euro Standard Buses	The Euro Standard for new buses will be a condition within the SBQP	LCC/Merseytravel	LTP2, LTP3	2010	2010 - 2013	% of compliant buses on the corridors	Emission reduction will be within that estimated above	As above
	1.3	Signal enhancement	Signal enhancement at junctions along bus corridors to include enhanced phasing, selective vehicle detection and in some cases new signals	LCC/Merseytravel	LTP2, LTP3	2010	2010 - 2013	Number of junctions upgraded	Emission reduction will be within that estimated above	As above
	1.4	Enforcement of vehicle idling regulations	80 Council officers will enforce the vehicle idling regulations focusing on buses and taxis. Monthly progress will be provided.	LCC Environmental Protection	LTP2 AQ indicator Possibly LTP3 depending on how AQ is included	2010	2010-2013	Number of enforcement interventions	Depends on scale of enforcement activity, but could reduce NOx concentrations be a few micrograms at areas where idling is a problem.	2013, potential to become permanent
Traffic Management	2.1	Trial of MESSAGE	A trial will be carried out (subject to	LCC Environmental Protection	LTP3	2010-11	2011-13	Congestion data from trail junctions	The system is untested in	2013 with potential to

Liverpool City Council Air Quality Action Plan

		system	<p>funding) to assess using real time Mote sensor systems to feed air pollution data into Liverpool's traffic management systems. The systems will use this information to develop strategies to manage congestion and avoid peaks in concentrations.</p> <p>The trial will be done at two locations (Islington and Wavertree) and could be expanded further if it is successful and if funding is available.</p>	<p>LCC Highways Management</p> <p>Liverpool 2020</p> <p>MESSAGE Consortium</p>				<p>Air quality monitoring data from trial locations</p>	<p>Liverpool but evidence suggests it could reduce concentrations of NOx by several micrograms.</p>	<p>implement more widely if successful</p>
	2.2	<p>Continual development of UTMC/SCOOT systems</p>	<p>Maximise efficiency of network utilisation and therefore manage congestion by upgrading systems on an ongoing basis.</p> <p>For example optimisation location of SCOOT loops, new communications systems allowing real time data gathering, improved roadwork handling, optimising junction staging, revalidation of existing junctions with improved software.</p>	<p>LCC Highways Management</p> <p>Liverpool 2020</p>	<p>LTP2</p> <p>LTP3</p>	<p>Ongoing</p>	<p>Ongoing for life of SCOOT systems</p>	<p>Congestion data from key junctions</p> <p>Air quality monitoring around key junctions and in congested corridors</p>	<p>Will vary by location and type of improvement.</p> <p>Some interventions will only help stabilise concentrations, some could reduce concentrations by several micrograms of NOx at some locations.</p>	<p>The systems will be continually upgraded.</p>

2.3	Day to day operation of UTM/SCOOT centre	<p>High levels of investment has led to significant work being done in the past few years and Liverpool's advanced systems are preventing congestion and therefore reducing polluting emissions now.</p> <p>The centre will continue to offer protection to current levels of air quality, and where possible will implement measures aimed at improving it.</p>	LCC Highways Management Liverpool 2020	LTP2/CDP LTP3	Ongoing	Ongoing for foreseeable future	<p>Congestion data from key junctions</p> <p>Air quality monitoring around key junctions and in congested corridors</p>	May not directly improve air quality outside of the interventions listed above, but is central to preventing air quality from getting appreciably worse in Liverpool in the context of growing traffic levels.	Ongoing – operation of the facility is permanent
-----	--	--	---	------------------	---------	--------------------------------	---	--	--

SUPPLEMENTARY MEASURES										
Category	No.	Measure	Focus	Lead authority	Policy linkages	Plannin g phase	Implementation phase	Indicator	Target annual emission reduction in AQMA	Estimated completion date
Smart measures	3.1	Travel Plans in: 1) Workplaces 2) Schools 3) New developments	<p>TravelWise offer advice to organisations in Liverpool on implementing Travel Plans.</p> <p>To support the more than 100 businesses now involved in Travel Plans, TravelWise have developed the Wise Moves Membership services to help make Travel Planning simpler.</p> <p>The recent Transport SPD also specifies the need for Travel Plans in new developments and requires monitoring.</p> <p>Activity data will be sought each year to assess the level of participation in Travel Plans in workplaces.</p>	MTP/TravelWise	LTP2/CDP LTP3 SPD	Already in operation	2010-ongoing	<p>Number of organisations/individual s actively engaged in travel planning.</p> <p>Activity metrics such as trips avoided, or number of people actively participating</p> <p>Number of developments with Travel Plans and outcomes of plan monitoring.</p>	It is not possible to quantify for a city wide AQMA as data will first have to be generated for the city wide activity of current and future Travel Plans, not merely the number that have been developed.	This is a long term measure and is likely to be permanent.
	3.2	Walking	The Merseyside Local Transport Plan partners are working to make walking around Merseyside easier and more	MTP/TravelWise	LTP2/CDP LTP3 SPD	Already in operation	2010-ongoing	<p>Improvements to existing infrastructure and facilities</p> <p>Number of new developments adhering to walking aspects of</p>	It is not possible to quantify for a city wide AQMA as data will first have to be generated for city wide mode shifts to	This is a long term measure and is likely to be permanent.

			<p>enjoyable. This includes improvements to public spaces and pavements as well as signposts and better provision for disabled people.</p> <p>A Walk to Work Week, and two Walk to School Weeks are also run each year.</p> <p>The recent Transport SPD also seeks accessibility to walking routes and facilities for new developments.</p>					<p>SPD and associated activity data</p> <p>Participation data for annual walking events</p>	walking.	
	3.3	Cycling	<p>An agreement between Liverpool Primary Care Trust and Merseyside Transport Partnership sets out to generate a 10% increase in trips made by bike before the end of March 2011, compared to journeys in 2006.</p> <p>Working together, MTP (through the TravelWise programme), Liverpool PCT and Liverpool City Council aim to secure support from more than 100 organisations over the remainder of Year of the Environment and</p>	MTP/TravelWise	LTP2/CDP LTP3 SPD	Already in operation	2010-ongoing	<p>Improvements to existing infrastructure and facilities</p> <p>Number of new developments adhering to cycling aspects of SPD and associated activity data</p> <p>Activity data from the Cycling Alliance to support mode shift estimates</p> <p>Number of school children trained in cycling proficiency</p> <p>In the short term-progress towards the 10% increase target</p>	The share of journeys taken by bicycle is still very small in Liverpool, and a 10% increase will not impact measurably on ambient air quality, though some estimate of emission savings could be undertaken when robust activity data is available.	This is a long term measure and initiatives to support cycling are likely to be permanent though how these operate may change with time.

Liverpool City Council Air Quality Action Plan

			<p>during the city's Year of Health and Wellbeing 2010.</p> <p>In addition, the Transport SPD sets standards for new developments with regard to accessibility to cycling routes and facilities.</p> <p>Cycling training is also offered in schools</p>							
Education/ Awareness	4.1	Enhanced design of Live Air website	To redesign the website including a strong educational element to the site to increase usage and public awareness	LCC	Sustainability Strategy	2010	2010	Relaunch of site, number of hits on the site per month	This is likely to have negligible impact in the short term but over the longer term it will encourage sustainable travel options	Ongoing
	4.2	Air Alert health and Air Quality system	Launch of an Air Alert system, whereby registered members receive a text when pollution levels are high	LCC/PCT		2010	2010	Launch of the service, number of registered members	Aim is to provide a health warning to susceptible people when pollution is high. No impact on reducing emissions	Ongoing
Other	5.1	Enhance design of air quality monitoring network	There are currently several schemes in operation in the City aimed at reducing congestion but the current monitoring network is not optimised to track the air quality effects of these policies- particularly for the corridors specified in	LCC Environmental Protection	LTP2/CDP LTP3 depending on how air quality is considered	2011	2011-2016 (LTP3 period)	Monitoring data from key corridors and junctions	No reduction will be invoked directly but a better understanding of policy effects on air quality would be gained.	2016

			<p>the LTP2 Congestion Delivery Plan.</p> <p>If SCOOT enhancements are ongoing there could be a need to place additional monitoring around the junctions to supplement the congestion reduction metrics generated by the UTM.</p> <p>Depending on the air quality provisions and spatial focus of LTP3 it may be appropriate to revisit the locations of monitoring to reflect implementation of congestion reducing measures.</p>							
--	--	--	--	--	--	--	--	--	--	--

7 Next steps

The updated Action Plan presented here includes the measures that the Air Quality Steering Group is proposing as being the most appropriate at this time to make progress towards the NO₂ annual mean air quality objective value. However, the updated plan must be presented for consultation to statutory consultees including the Department for Environment Food and Rural Affairs (Defra) but also the community of Liverpool.

At the end of the consultation period members of the Steering Group will collate and consider the comments received on the updated Action Plan. Potentially these comments will either influence the form and measures of the plan or would be addressed in a response attached to the plan in an Appendix.

Once consultation comments have been addressed the Steering Group will submit the plan for final approval to the Council Cabinet and Defra and LCC will then adopt it as the policy of the Council.

LCC will then proceed to implement the measures in the plan and to report annually on progress being made. Depending on progress and trends in monitored air quality it may be appropriate to periodically review and potentially revise the air quality action plan to ensure it is still fit for purpose. It is likely that following the option evaluation for LTP3, the action plan will require updating to align with those policies.

Appendices

Appendix 1: UK air quality standards and objectives

Appendix 2: Initial assessment of potential options to reduce emissions

Appendix 3: Assessment methods

Appendix 4: Cost Effectiveness of Measures

Appendix 1

UK air quality standards and objectives

Objectives included in the Air Quality Regulations 2000 and (Amendment) Regulations 2002 for the purpose of Local Air Quality Management

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene			
All authorities	16.25 µg/m ³	running annual mean	31.12.2003
Authorities in England and Wales only	5.00 µg/m ³	annual mean	31.12.2010
Authorities in open areas and coastal areas should be cleaner as air changes more frequently and Northern Ireland only	3.25 µg/m ³	running annual mean	31.12.2010
1,3-Butadiene	2.25 µg/m ³	running annual mean	31.12.2003
Carbon monoxide			
Authorities in England, Wales and Northern Ireland only	10.0 mg/m ³	maximum daily running 8-hour mean	31.12.2003
Authorities in Scotland only	10.0 mg/m ³	running 8-hour mean	31.12.2003
Lead	0.5 µg/m ³ 0.25 µg/m ³	annual mean annual mean	31.12.2004 31.12.2008
Nitrogen dioxide^b	200 µg/m ³ not to be exceeded more than 18 times a year 40 µg/m ³	1 hour mean annual mean	31.12.2005 31.12.2005
Particles (PM₁₀) (gravimetric)^c	50 µg/m ³ not to be exceeded more than 35 times a year 40 µg/m ³	24 hour mean annual mean	31.12.2004 31.12.2004
Authorities in Scotland only ^d	50 µg/m ³ not to be exceeded more than 7 times a year 18 µg/m ³	24 hour mean annual mean	31.12.2010 31.12.2010
Sulphur dioxide	350 µg/m ³ not to be exceeded more than 24 times a year 125 µg/m ³ not to be exceeded more than 3 times a year 266 µg/m ³ not to be exceeded more than 35 times a year	1 hour mean 24 hour mean 15 minute mean	31.12.2004 31.12.2004 31.12.2005

b. The objectives for nitrogen dioxide are provisional.

c. Measured using the European gravimetric transfer standard sampler or equivalent.

d. These 2010 Air Quality Objectives for PM₁₀ apply in Scotland only, as set out in the Air Quality (Scotland) Amendment Regulations 2002.

Additional national particles objectives for England, Wales and Greater London (see table below) are not currently included in Regulations for the purpose of LAQM. The Government and the Welsh Assembly Government however intends that the new particles objectives will be included in Regulations as soon as practicable after the review of the EU's first air quality daughter directive. Whilst authorities have no obligation to review and assess against them, they may find it helpful to do so, in order to assist with longer-term planning, and the assessment of development proposals in their local areas.

Proposed new particles objectives for England, Wales and Greater London (not included in Regulations)

Region	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
London	50 µg/m ³ not to be exceeded more than 10 times a year	24 hour mean	31.12.2010
London	23 µg/m ³	annual mean	31.12.2010
London	20 µg/m ³	annual mean	31.12.2015
Rest of England and Wales	50 µg/m ³ not to be exceeded more than 7 times a year	24 hour mean	31.12.2010
Rest of England and Wales	20 µg/m ³	annual mean	31.12.2010

Efforts to achieve these objectives should be focussed on locations where members of the public are likely to be exposed over the averaging period of the objective. The table below summarises the locations where these objectives should and should not apply.

Typical locations where the objectives should and should not apply			
Averaging Period	Pollutants	Objectives <i>should</i> apply at ...	Objectives <i>should not</i> generally apply at ...
Annual mean	1,3 Butadiene Benzene Lead Nitrogen dioxide PM ₁₀	All background locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, libraries etc.	Building facades of offices or other places of work where members of the public do not have regular access. Gardens of residential properties. Kerbside sites (as opposed to locations at the building facade), or any other location where public exposure is expected to be short term
24 hour mean and 8-hour mean	Carbon monoxide PM ₁₀ Sulphur dioxide	All locations where the annual mean objective would apply. Gardens of residential properties.	Kerbside sites (as opposed to locations at the building facade), or any other location where public exposure is expected to be short term.
1 hour mean	Nitrogen dioxide Sulphur dioxide	All locations where the annual mean and 24 and 8-hour mean objectives apply. Kerbside sites (e.g. pavements of busy shopping streets). Those parts of car parks and railway stations etc. which are not fully enclosed. Any outdoor locations to which the public might reasonably be expected to have access.	Kerbside sites where the public would not be expected to have regular access.
15 minute mean	Sulphur dioxide	All locations where members of the public might reasonably be exposed for a period of 15 minutes or longer.	

Details of Automatic Monitoring Sites in Liverpool

Site Name	Site Type	OS Grid Ref	Pollutants Monitored	In AQMA ?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Worst-case Location ?
Liverpool Islington	Roadside	X 335394 Y 390956	NO _x , O ₃	Y	N (20 m)	5 m	Y
Liverpool Old Haymarket	Kerbside	X 334762 Y 390686	NO _x PM ₁₀	Y	N (0m)	<1 m	Y
Liverpool Queen's Drive	Roadside	X 336164 Y 394906	NO _x PM ₁₀	Y	Y (10 m)	5 m	Y
Liverpool Speke	Urban Background	X 343884 Y 383601	NO _x , CO, O ₃ , SO ₂ , PM ₁₀ , PM _{2.5} , PAH, VOC	Y	Y	10 m	N

Appendix 2

Initial assessment of potential options to reduce emissions

Table 2 Typology and initial assessment of potential options to reduce emissions in the Liverpool city wide AQMA				
Type	Description	General Notes	Steering group comments	Sub –options considered by the steering group
1	Strategic actions	<p>The underlying reason why most AQMAs have been designated in the UK is the massive increase in road transport activity over decades and the fact that this activity is very largely unregulated. The freedom to travel has created local environmental stress in urban areas and global stress due to its contribution to climate change.</p> <p>A local long-term strategy is required for an overall reduction in pollutant and greenhouse gas emissions. Such a strategy might include:</p> <ul style="list-style-type: none"> • Building the capacity to better assess and manage the environmental impacts from road transport • Specific commitments or targets within local development and transport planning policy to significantly reduce the impacts of new development 	<p>Strategic measures to manage the current and potential future air quality problems are considered to be an extremely important strand of the draft action plan and will be considered further.</p> <p>These strategies will also potentially allow AQ issues to be considered alongside CO₂ issues within local transport and development planning.</p>	<p>The steering group has considered sub-options aiming at:</p> <ul style="list-style-type: none"> ○ Further developing the capacity to assess the air quality and other impacts from road transport measures ○ Developing LCC transport planning policies to appropriately deal with the Liverpool air quality issues alongside other shared priorities ○ Continue to develop LCC development planning policy so that development will try not to cause air quality standards to be exceeded at other locations.

Table 2 Typology and initial assessment of potential options to reduce emissions in the Liverpool city wide AQMA				
Type	Description	General Notes	Steering group comments	Sub –options considered by the steering group
2	Move receptors away from the AQMA	Receptors are the people exposed to adverse pollutant levels in the AQMAs. If they were no longer resident in the AQMAs then there would be less pressure to do anything further to reduce pollution in the AQMA. Note that this option therefore makes no effort to reduce emissions in any way. In this situation there is a danger that traffic activity will continue to increase and new locations will need to be designated as AQMA.	The number of residences affected by the AQMA is significant and there is a desire to increase economic activity in the city so there is no support for any options that involve moving those people exposed to poor air quality in the AQMA. These options will not be considered any further.	None
3	Move sources away from the AQMA	The source is road transport. Construction of new roads or road improvements could divert traffic away from the roads in the AQMA. Less traffic on these roads results in lower pollution levels in the AQMA. However, the opportunity to build such roads is frequently absent. In cases where such roads can be built, care needs to be exercised that the locations where the new roads are built do not become AQMAs in turn. Note that this option moves emissions from one location to another with no requirement to reduce them. Overall emissions may be increased by such actions.	The AQMA in LCC covers all of the council area including the city centre so moving vehicles away from the AQMA has only limited feasibility relating to diverting freight to the Mersey ports away from the city centre. A freight strategy is in place.	Improvement of the public realm is sought and where appropriate areas of the city may be pedestrianised, although this was not feasible on the congested corridor junctions
4	Optimise how sources move through the AQMA	Changes in how the roads in the AQMA are signed or otherwise managed could reduce emissions from road transport a) by diverting some traffic onto better routes for them or b) by reducing the amount of time that traffic is stationary with engines idling.	There are many potential options for changing road layouts, etc in Liverpool and none of these were rejected at the initial stage.	The steering group has considered sub-options aiming at: <ul style="list-style-type: none"> ○ Improving signage to guide traffic ○ Influencing the speed of traffic ○ Adjusting junction signals to change flow Other changes to road layout
5	Reduce emissions from sources by technical means	The majority of vehicles using roads in the AQMA are conventional petrol or diesel powered vehicles with a range of ages. There are many technical options to convert such vehicles into	Unit emissions from heavy-duty vehicles (HDVs) can potentially be reduced to a large degree by technology (i.e. replacement vehicles or fitting abatement equipment).	Options considered included influencing emissions from: <ul style="list-style-type: none"> ○ Buses via quality agreements or other

Table 2 Typology and initial assessment of potential options to reduce emissions in the Liverpool city wide AQMA				
Type	Description	General Notes	Steering group comments	Sub –options considered by the steering group
		ones using cleaner engine and fuel technology. By accelerating the uptake of these technologies the emissions in the AQMA would be reduced. Note that technology does not always work in a positive sense for all emissions. They sometimes trade benefits for one pollutant against disbenefits for another one.	Buses and heavy goods vehicles are a large contributor to emissions in Liverpool. Realistic options for achieving this have been considered further.	means <ul style="list-style-type: none"> ○ Taxis via licensing conditions ○ HGVs via a low emission zone ○ Cars via differentiating parking charges
6	Reduce emissions from sources by reducing the demand for travel or achieving better travel choices	An important way to reduce emissions from transport is to reduce the number of journeys made through the AQMA. This could be achieved either through avoiding making some journeys or by ensuring that these journeys are made via a less polluting form of transport. The success of such measures depends on policies that influence how people make travel choices. Note that there is increasing emphasis placed on such policies and that they work holistically by reducing emissions of all pollutants and greenhouse gases.	This approach is already an important part of LCC transport policies so that no options were rejected at the initial stage.	The steering group has considered the following sub-options: <ul style="list-style-type: none"> ○ Vehicle restrictions ○ Car parking provision ○ Public transport provision ○ Personal and institutional travel planning
7	Other options	It may not be feasible that the City Council is able to implement measures that achieve the air quality standard for NO ₂ on their own. In this case they may inform the government that further national or regional measures are required that are outside of their influence.	The AQ issue in Liverpool is widespread and the NO ₂ standard is being significantly exceeded. Therefore, at the moment LCC considers that the combination of local action and the ongoing benefits for national policies to reduce vehicle emissions over time will probably not be sufficient to achieve the AQ standard throughout Liverpool. Therefore, LCC supports the government's ongoing AQ strategy but considers that additional measures are very likely to be required in their case. This conclusion is subject to the outcome of future review and assessment undertaken by LCC.	None

Appendix 3

Assessment methods

A wide range of options during the initial assessment were identified. These have been assessed in more detail against a range of criteria. The following paragraphs outline how the assessment has been made.

7.1.1 What is the option?

The stakeholders listed the potential options and made comments on the potential effects, pros and cons associated with the option. The information given here along with the source apportionment information in chapter 3 is the basis of the assessment.

7.1.2 What is being proposed?

The options are defined in specific terms where possible. For the detailed assessment each option has been defined in sufficient detail to understand the change from the current situation that is being proposed.

Typically the proposal is either to change the traffic in the AQMA. The effects on traffic in these locations are defined as 'fewer vehicles' or 'fewer vehicles queuing' or 'lower emitting vehicles'. In other cases the focus is considered to be 'strategic' i.e. developing those options may not have direct impacts on the problem but improve LCC's capacity to make the correct decision on managing air quality in the AQMA and across the Liverpool city region.

7.1.3 Potential air quality impact

This is a key assessment in that the AQAP must focus on prioritising options that improve air quality most effectively. The assessment is complex in that the detailed assessment of any given option could normally be subject to a study of its own requiring significant resources.

Ideally, a traffic model for Liverpool would be developed to a stage where it would be possible to quantitatively assess the potential air quality impacts of any given options. However, while a new transport model has been developed, when linked to the Merseyside Atmospheric Emissions Inventory this option appraisal should be possible. For now though, a semi-quantitative assessment relying on a level of judgement has been adopted. The method used is described below.

1. The description of the option and the proposed change to be brought about by the option is used alongside the source apportionment analysis (chapter 3 of this report) to define what proportion of road transport emissions would potentially be affected by the option.
2. A view is then expressed on how much of the traffic would actually be changed by the option
3. The proportion of emissions potentially affected by the option and the view on how far they could be changed by the option are combined to express a view on how much transport emissions may be reduced in the AQMA due to the option.
4. A view is then expressed on how significant this change in emissions would be in terms of making progress towards the air quality standard in the AQMA.

These four stages are described in more detail below. A worked example is presented at the end to illustrate how these stages fit together.

1 What proportion of emissions would be affected by the option?

The option descriptions, comments, focus of the option and source apportionment have been used to define how much of the contribution to the AQ issue in Liverpool that this option potentially addresses.

2 Realistically how much of the traffic would change due to the option?

Beyond the potential influence there must be a consideration of the realistic impact of the proposed option. Road closure would obviously remove all traffic emissions and hence realistically remove 100% of all local road transport emissions. However, this may be acceptable in very few cases. Options of the kind listed for Liverpool are mainly more modest in ambition. For example, there are many options to improve flow through Liverpool by various means. Such non-regulatory interventions are likely to have limited impact since the road-users will still be left to decide whether to use the roads or not.

The level of realistic change has been defined as being:

- Zero – basically changing no traffic
- Very small – changing around 1-2% of traffic
- Small – changing 2-5% of traffic
- Moderate – changing 5-10% of traffic
- Large – changing more than 10% of traffic

3 Therefore what level of reduction in emissions might result from the option?

The product of the two percentages from steps 1 and 2 above provides an overall assessment of the amount of local transport emissions in Liverpool that may realistically be reduced by the option.

4 How significant might the air quality improvement be as a result?

The source apportionment and review and assessment information presented in this report indicates that an average of 60% reduction in local emissions at receptors in Liverpool are required based on 2007 figures to achieve the air quality standard.

In this context even a 1-2% reduction in emission can be seen as a worthwhile step towards achieving the AQ standard in the AQMA. LCC could potentially implement several measures with this level of influence to achieve an overall 10% reduction in emissions.

For the purpose of the AQ assessment the result of the realistic intervention has been assessed as having a potentially:

- Zero local AQ benefit if the realistic intervention is 0% or worse
- Small local AQ benefit if the realistic intervention is 1%
- Medium local AQ benefit if the realistic intervention is 2-5%
- Large local AQ benefit if the realistic intervention is >5%

The result of the assessment is to define the potential AQ benefit of an option (in terms of making progress towards the air quality standard in the AQMA) as ranging from zero to relatively large.

Worked Example
Option: Traffic light signal priority improvement for buses at Edge Lane
What change is therefore proposed?: To achieve lower emissions from buses queuing with their engines idling within the AQMA.
What proportion of emissions would be affected by the option?: Source apportionment suggests that around 30% of emissions in the AQMA come from queuing HDVs (mainly buses on route 10).
Realistically how much of the traffic would change due to the option?: It is assessed that all bus movements along the route may change as a result of the option – a large share
Therefore what level of reduction in emissions might result from the option?: From a conservative view if 75% of queuing traffic changes are realised due to the option then 75% of the 30% of total emissions from traffic queuing may be reduced. That is, the option may deliver a 22% reduction in traffic emissions in the AQMA.
How significant might the air quality improvement be as a result?: Since a total of a 60% reduction in emissions is required to achieve the AQ standard in the AQMA, a 22% reduction is considered to be a high improvement in air quality.

7.1.4 Implementation costs

The potential implementation costs of each option are assessed as follows:

- Cost neutral
- Low costs (up to £20k annually e.g. for small surveys or campaigns or other options using current resources)
- Medium costs (up to £200k annually e.g. for small traffic management schemes)
- High costs (above £200k annually e.g. for new infrastructure)

The assessed costs attempt to include the costs to vehicle operators as well as to the LCC.

7.1.5 Cost-effectiveness assessment

The effectiveness of each measure in improving air quality is compared to the implementation costs in the following matrix:

AQ benefit \ Cost		Score	Zero	Low	Medium	High
Score		0	1	2	3	
Neutral	4	0	4	8	12	
Low	3	0	3	6	9	
Medium	2	0	2	4	6	
High	1	0	1	2	3	

In this table the assessed implementation costs and potential AQ impacts have been given a weighted score. The product of the weighted scores for each option is calculated. The results can be interpreted as follows:

- If the product is high (8 or more) then the measure is more cost-effective (significant impacts for the cost involved) and perhaps favourably cost-effective.
- If the product is medium (between 3-7) then the measure is in the medium range of cost-effectiveness
- If the product is low (2 or less) then the measure is less cost-effective (small impacts for the cost involved) and perhaps unacceptably poor in cost-effectiveness terms.

The final cost-effectiveness value is sensitive to changes in the assumptions of how effective a measure might be in reducing emissions and how costly it is.

Note that a score of 4 for one option and a score of 8 for another does not necessarily mean that the former option is exactly two times more cost-effective. This method only estimates the *relative* cost-effectiveness of options rather than their *absolute* values. The method is useful during discussions of the relative priority of different options.

7.1.6 Potential co-environmental benefits

In this assessment other environmental benefits are highlighted.

- Other pollutants: The likely effect on local PM₁₀ concentration is assessed as being an overall reduction or a local reduction perhaps with emissions being relocated elsewhere.
- Greenhouse gases: The likely effect on greenhouse gas emissions is assessed as being an overall reduction or a local reduction perhaps with emissions being relocated elsewhere.

Without detailed information on the true impacts of the options these assessments rely on judgement.

7.1.7 Potential risk factors

In this assessment risk factors are highlighted. These may be looked at more closely within a Strategic Environmental Assessment of any option that was implemented. At this stage it is simply highlighted whether it is likely that the option would:

- relocate emissions and hence lead to worsening AQ elsewhere
- require a change in land use
- place limits on pace of development or their costs

Without detailed information on the true impacts of the options these assessments rely on judgement.

7.1.8 Potential social impacts

Potential social impacts are highlighted. These may need to be examined more closely when developing the options further. At this stage it is simply highlighted whether it is likely that the option would potentially:

- Provide health benefits in terms of lower exposure to pollutants or increased mobility
- Increase road safety
- Improve accessibility

Without detailed information on the true impacts of the options these assessments rely on judgement.

7.1.9 Potential economic impacts

Potential economic impacts are highlighted. These may need to be examined more closely when developing the options further. At this stage it is simply highlighted whether it is likely that the option would potentially:

- Improve sustainable development or accessibility in Liverpool
- Reduce or increase overall travel time
- Impact on deliveries to Woodbridge
- Impact on operator costs and potentially pass these through to passengers or clients
- Require significant re-adjustment to the scheme

Without detailed information on the true impacts of the options these assessments rely on judgement.

7.1.10 Who is the appropriate authority for implementing an option?

A single authority would be responsible for leading on developing and implementing action plan measures or in attempting to influence other agencies to take such action. Each option has been identified as being within the responsibility of the following authorities:

1. Liverpool City Council (LCC) further subdivided into:
 - a. Development planning (DP) via Planning Policies (as yet to be defined)
 - b. Environmental Protection (EP)
2. Merseytravel via the Local Transport Plan (LTP)

7.1.11 How feasible is it to implement the option?

Each option has been assessed for its feasibility against three simple criteria. These are whether the authority has:

- The executive powers under existing legislation to implement and enforce a measure. Alternatively the authority has an existing mechanism to influence other agencies to implement a measure.
- Secured funding for the measure or a straightforward route for securing funding

- Characterised the potential positive and negative impacts of the measure with sufficient evidence or confidence to make a decision to implement the measure

The table below sets out the criteria adopted for defining the option as being feasible over the short, medium or long term or as being unfeasible. Each option is assessed against each criterion. The final feasibility is defined according to which of the three assessments results in the longest of the four possible terms. For example, an option for which powers are clear and for which impacts are well characterised but for which funding will be difficult to obtain would be assessed as feasible over the long term.

Feasible in the:	Authority has the powers	Funding secured	Potential positive and negative impacts are well characterised
Short term (1-2 years)	Yes, clearly defined and already exercised	Yes potentially straightforward	Yes
Medium term (3-6 years)	Yes but novel or with an element of uncertainty	Yes with forward planning	Not without further study
Long term (>6 years)	Highly uncertain	No or extremely difficult	Not without further study
Unfeasible	No	Will never attract funding	Hard to characterise and with high risks

7.1.12 How acceptable are the options?

A preliminary judgement is expressed on how acceptable each option might be to stakeholders.

- The option is considered potentially acceptable if: the option is unlikely to compel people to change behaviour or increase their costs significantly or at least some level of behaviour change or personal costs are required but the scheme is overall consistent with community policies
- The option is considered potentially unacceptable if: unacceptably intrusive changes in behaviour or large personal costs would be incurred.

Final judgements on acceptability will necessarily rest with the elected council members.

Appendix 4

Cost Effectiveness of Measures

The following tables present the results of the cost effectiveness assessments

DIRECT MEASURES							
Category	No.	Measure	Focus	AQ Impact	Cost	Cost Effectiveness	Prioritised Rank
Emission reductions from buses and cars	1.1	Statutory Bus Quality Partnership	Five corridors will come under the BQP, but the first one will be Route 10. Legally binding conditions will apply to bus operators, Merseytravel and LCC	High Most impact will be along the bus route corridors, particularly at previously congested junctions	Medium Costs will be borne by all parties, but will bring efficiencies	6	1
	1.2	Improve Euro Standard Buses	The Euro Standard for new buses will be a condition within the SBQP	High Higher euro standards for buses will improve not only NOx but PM emissions	Medium The costs will be borne by the bus operators, but this will be implemented as part of their replacement of vehicle programme	6	6
	1.3	Signal enhancement	Signal enhancement at junctions along bus corridors to include enhanced phasing, selective vehicle detection and in some cases new signals	High This will give priority to queuing buses which are the most polluting vehicles in the AQMA – a key measure	Medium Signal light priority change is relatively low cost but Junction alternation and new signalling is medium	6	1
	1.4	Enforcement of vehicle idling regulations	80 Council officers will enforce the vehicle idling regulations focusing on buses and taxis. Monthly progress will be provided.	High Infringement of the vehicle idling regulations appears prevalent with much additional congestion and higher emissions resulting	Neutral Uses Council enforcement officers to 'police' bus lanes and issue penalty notices as appropriate	12	1

Category	No.	Measure	Focus	AQ Impact	Cost	Cost Effectiveness	Prioritised Rank
Traffic Management	2.1	Trial of MESSAGE system	<p>A trial will be carried out (subject to funding) to assess using real time Mote sensor systems to feed air pollution data into Liverpool's traffic management systems. The systems will use this information to develop strategies to manage congestion and avoid peaks in concentrations.</p> <p>The trial will be done at two locations (Islington and Wavertree) and could be expanded further if it is successful and if funding is available.</p>	<p>High</p> <p>Research indicates that impact is high. Scoot operators already improving the system to achieve transport efficiencies – this is likely to provide additional improvements</p>	<p>Low</p> <p>The cost of the trials is low but onward implementation is expected to be medium</p>	9	1
	2.2	Continual development of UTM/SCOOT systems	<p>Maximise efficiency of network utilisation and therefore manage congestion by upgrading systems on an ongoing basis.</p> <p>For example optimisation location of SCOOT loops, new communications systems allowing real time data gathering, improved roadwork handling, optimising junction staging, revalidation of existing junctions with improved</p>	<p>High</p> <p>This will deliver congestion and emission reduction improvements on a city wide basis through time</p>	<p>Low</p> <p>Finances already in place to continually optimise SCOOT over the next 3 years</p>	9	1

		software.				
2.3	Day to day operation of UTMC/SCOOT centre	<p>High levels of investment has led to significant work being done in the past few years and Liverpool's advanced systems are preventing congestion and therefore reducing polluting emissions now.</p> <p>The centre will continue to offer protection to current levels of air quality, and where possible will implement measures aimed at improving it.</p>	<p>High</p> <p>Reduced congestion will lead to reduced emission</p>	<p>Low</p> <p>Finances are in place to deliver ongoing SCOOT performance enhancements</p>	9	1

SUPPLEMENTARY MEASURES

Category	No.	Measure	Focus	Air Quality Impact	Cost	Cost Effectiveness	Prioritised rank
Smart measures	3.1	Travel Plans in: 1) Workplaces 2) Schools 3) New developments	<p>TravelWise offer advice to organisations in Liverpool on implementing Travel Plans.</p> <p>To support the more than 100 businesses now involved in Travel Plans, TravelWise have developed the Wise Moves Membership services to help make Travel Planning simpler.</p> <p>The recent Transport SPD also specifies the need for Travel Plans in new developments and requires monitoring.</p> <p>Activity data will be sought each year to assess the level of participation in Travel Plans in workplaces.</p>	<p>Low</p> <p>Encourage sustainable transport which will benefit air quality over the longer term</p>	<p>Neutral</p> <p>Finances already in place to deliver</p>	4	2
	3.2	Walking	<p>The Merseyside Local Transport Plan partners are working to make walking around Merseyside easier and more enjoyable. This includes improvements to public spaces and pavements as well as signposts and better provision for disabled</p>	<p>Low</p> <p>Encourage sustainable transport which will benefit air quality over the longer term</p>	<p>Neutral</p> <p>Finances already in place to deliver</p>	4	2

			<p>people.</p> <p>A Walk to Work Week, and two Walk to School Weeks are also run each year.</p> <p>The recent Transport SPD also seeks accessibility to walking routes and facilities for new developments.</p>				
	3.3	Cycling	<p>An agreement between Liverpool Primary Care Trust and Merseyside Transport Partnership sets out to generate a 10% increase in trips made by bike before the end of March 2011, compared to journeys in 2006.</p> <p>Working together, MTP (through the TravelWise programme), Liverpool PCT and Liverpool City Council aim to secure support from more than 100 organisations over the remainder of Year of the Environment and during the city's Year of Health and Wellbeing 2010.</p> <p>In addition, the Transport SPD sets standards for new developments with regard to accessibility to cycling routes and facilities.</p>	<p>Low</p> <p>Encourage sustainable transport which will benefit air quality over the longer term</p>	<p>Neutral</p> <p>Finances already in place to deliver</p>	4	2

			Cycling training is also offered in schools				
	3.4	Car sharing	<p>The Merseyside Car Share Scheme has been set up to help you. Drivers can register their details, where they are travelling to and from, and the scheme will automatically find matches. It is free to register on the car share database to find someone to share your journey with.</p> <p>The recent SPD contains a commitment to operating a car club.</p>	Low Encourage sustainable transport which will benefit air quality over the longer term	Neutral Finances already in place to deliver	4	2
Education/ Awareness	4.1	Enhanced design of Live Air website	To redesign the website including a strong educational element to the site to increase usage and public awareness	Low Encourage sustainable transport which will benefit air quality over the longer term	Neutral Finances already in place to deliver	4	2
	4.2	Air Alert health and Air Quality system	Launch of an Air Alert system, whereby registered members receive a text when pollution levels are high	Low Encourage sustainable transport which will benefit air quality over the longer term	Neutral Finances already in place to deliver	4	2
	4.3						
Other	5.1	Enhance design of air quality monitoring network	There are currently several schemes in operation in the City aimed	Low Encourage sustainable transport which will benefit air	Neutral Finances already in place to deliver	4	2

		<p>at reducing congestion but the current monitoring network is not optimised to track the air quality effects of these policies- particularly for the corridors specified in the LTP2 Congestion Delivery Plan .</p> <p>If SCOOT enhancements are ongoing there could be a need to place additional monitoring around the junctions to supplement the congestion reduction metrics generated by the UTM.</p> <p>Depending on the air quality provisions and spatial focus of LTP3 it may be appropriate to revisit the locations of monitoring to reflect implementation of congestion reducing measures.</p>	quality over the longer term			
--	--	--	------------------------------	--	--	--

The measures set out above are those thought the most cost effective and feasible to improve air quality within the City. These recommendations followed from consultation with stakeholders within the Council and its partner organizations, stakeholders in the business community and with selected representatives of the whole community forming a Citizen's Panel

At present, the likely reduction of oxides of nitrogen emissions in the AQMA that could be delivered by this Action Plan remains uncertain. .

It is anticipated that despite the implementation of all the proposed measures in the action plan, the necessary reductions in NO₂ in order to meet the air quality objectives is unlikely to be achieved. More far reaching measures which may achieve greater reductions are likely to be dependent upon central government funding and/ or directions.

Oxfordshire
OX11 0QJ

Tel: 0870 190 6504