



Annex 2

Local Implementation Framework - Leicester

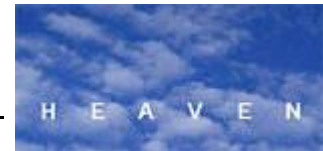


Table of Contents

	Page
1 Leicester.....	3
1.1 Physical Implementation Framework.....	3
1.2 Legal and Institutional Framework.....	7
1.3 Technical Framework.....	9
1.4 Appraisal Groups.....	10
1.5 Institutions Responsible for HEAVEN Implementation.....	12

List of Tables

	Page
Table 1: City Descriptor for Leicester.....	6
Table 2: Institutions/ departments using HEAVEN system components.....	7
Table 3: Staff using the HEAVEN system.....	8
Table 4: Names and institutions of HEAVEN users in Leicester.....	10

List of Figures

	Page
Figure 1: Map of the city-wide demonstration area.....	5
Figure 2: London Road demonstration site.....	5
Figure 3: Narborough Road demonstration site.....	5



1 Leicester

1.1 Physical Implementation Framework

A. City Airviro Grid 15 x 17km grid –

Physical Characteristics - this site covers a city-wide area of 255km². The area is a shallow bowl with some riverside areas adjacent to the River Sence, River Soar and Union Canal. 40% of this area is classed as built environment. The length of the main road network (A Roads) within this area is 213.368km, with a less significant secondary network (64.427km within the city, but this information is less readily available for the whole demonstration area). The whole of the grid will be the demonstration area at level A.

Current transport volumes/modal split – Traffic flows in and out of Leicester are very high. 69,770 people commute into Leicester, while 19,880 commute out of the city centre daily. The most common form of transport within the region is by car, making up 62.5% of transport to work. 12.5% of the population use the bus and 10% travel by foot. The train, motorcycle and bicycle are used by less than 5% of the population respectively, while around 3% of the population work from home, so have no need to travel on a daily basis. The public transit network consists of heavy rail and bus. Heavy rail has 33.8km of track within the demonstration area with a traffic volume of 13384.8 vehicle*km. The bus network is much larger than the rail, covering a distance of 649.058km and giving a traffic volume of 225223.12 vehicle*km. The majority of motor vehicles (including buses), enter and exit the city along the major radial and inner ring roads, causing high congestion in these areas during peak times of the day.

Socio-economic structure/demography – the population of the demonstration area is over 400,000, with an average household composition of two people. Least common are households of three, four and five people. Leicester City has the largest population of all areas within Leicestershire, with an extensive communications infrastructure (road/rail) and therefore historically has been the administrative centre of the county. Also, historically, the city has an industrial/manufacturing base (e.g. textiles) however this has declined significantly over the years and currently employers run on a service-based industry (namely food processing and packaging)

Current Air Quality Situation – there are a number of air quality monitoring stations within the demonstration area giving regular air quality information. There is obviously a large variation in air quality within the area, due to the large differences in traffic congestion along the different roads. Certain highly congested road can have high pollution levels, while other areas do not have a problem.

The demonstration area includes three PM₁₀/NO_x monitoring stations, two NO_x monitoring stations, an AUN monitoring station (CO, NO_x, SO₂, PM₁₀ and O₃) and 10 Roadside Monitoring Stations measuring NO₂ and CO. A Meteorological Mast at the junction of the A 50 Groby Road and New Parks Way measures absolute and differential temperatures

By 2005 there will be widespread failure to achieve the annual mean objective for NO₂ in zones that centre on the major road network (flows having average flows greater than about 20,000 vehicles per day). The declaration of air quality management areas is required in all areas where this exceedance coincides with areas containing schools, hospitals, housing and other residential accommodation at or near ground level.

There are a large number of roads within the city-wide demonstration area that have current or projected annual average daily vehicle flows above 20,000. Thus a number of roads are also likely to fail to achieve the 24-hour mean objectives for PM₁₀ and have subsequently been designated as Air Quality Management Areas.



B. A5460 Narborough Road –

Physical Characteristics – This road is 4.43km in length and has a high number of residential areas with high population densities, situated along it. The road passes out of the city and down to the M1 junction 21. The area has gradually developed into an ‘out of town’ retail area over the last 10 years. It constitutes the principle route for traffic entering the city from the A426, M69 and M1. The western end of the road features dual 2-lane carriageway, with 2 lane service roads either side. The next stretch occurs as dual three-lane and then two-lane carriageway, turning into four-lane carriageway towards Upperton Road. The section between Upperton Road and the Fosse Park will constitute the main demonstration area for level B.

Current transport volumes/modal split – The Narborough road experiences very high vehicle congestion during peak times due to its significance as an entry/exit route from and to the city and also the presence of large shopping complexes. The road has a projected annual average daily flow greater than 25,000 vehicles at both the northern and southern ends. Roads adjacent to Narborough Road also experience heavy congestion with vehicles numbers of a similar size.

Socio-economic structure – this area has a large variation in land usage. There are large residential areas in conjunction with large shopping complexes and exits to two major motorways. The road is also governed by two different government organisations with the boundary between Leicester City Council and Blaby District Council occurring at Braunstone Lane.

Current air quality – There is an air quality monitoring station situated along the road, which gives ‘near’ real-time data for both NO₂ and PM₁₀ together with a Roadside Monitoring Station for NO₂ and CO. Narborough Road has been classified as an Air Quality Management Area, since as a result of the high level of traffic, it is projected that this area will fail to achieve both the NO₂ and PM₁₀ objectives set for 2005

C. A6 London Road –

Physical Characteristics – The London Road services traffic entering and exiting the city from the neighbouring districts of Oadby and Wigston and Market Harborough. There is residential property situated along the full length of the road. It is 3.24km long and widens into dual carriageway upon entering the city. There are a number of traffic features along the road such as pedestrian crossings, pedestrian refuges and other width restrictions, junctions and cycle and bus lanes. Topography is very varied incorporating open areas and street canyons. The section between Waterloo Way and Evington Road will constitute the demonstration area for level C.

Current transport volumes – There is usually a high level of congestion along London road during peak times, especially close to the city centre. In the city centre the road is under SCOOT control, along with seven junctions within the Oadby area. Thus real-time traffic data can easily be collected. Due to the high number of traffic features, the traffic is often in a stop-start situation contributing significantly to poorer air quality. Through the Air Quality Review and Assessment process it is projected that annual traffic levels are greater than 25,000 between the city centre and Victoria park.

Socio-economic structure – The land use along London Road is very varied including recreational (creating large open spaces i.e. Victoria Park), residential, academic (in close proximity to Leicester University) and commercial.

Current Air Quality – there are no pollution monitors situated along London Road between the City Centre and Evington Road (Victoria Park), which will constitute the main demonstration area. However due to high traffic levels projected through the Air Quality review and Assessment process this area of London Road has been classed as an Air Quality management area.

Figure 1: Map of the city-wide demonstration area

Figure 2: London Road demonstration site

Figure 3: Narborough Road demonstration site

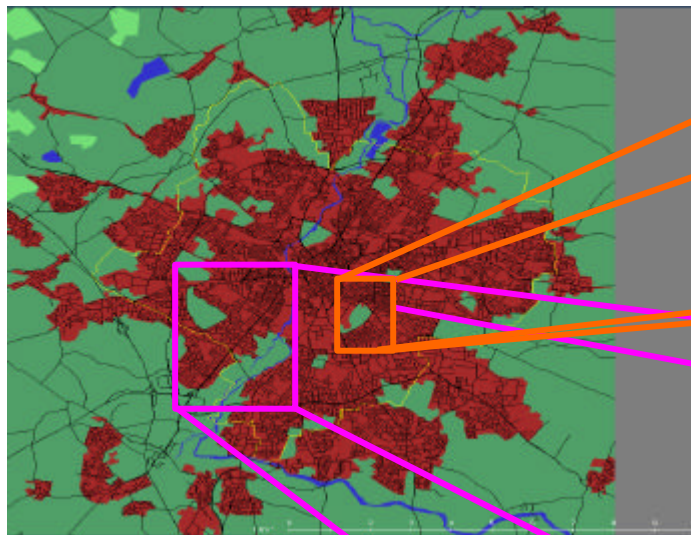


Figure 1

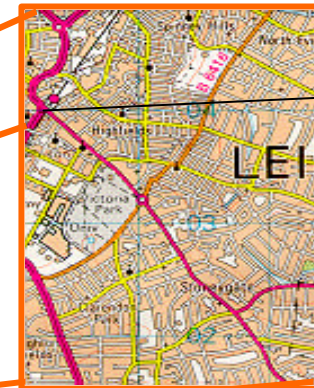


Figure 2



Figure 3

17 May 2001

Table 1: City Descriptor for Leicester

		Unit	Remarks
City			
Area	73.09	Km ²	July 2000
Population	294,000	Pers.	July 2000
Population density	4022.44	Pers./Km ²	July 2000
Road infrastructure			
Total road network	724.5	Km	April 2000
Urban roads	636.6	Km	April 2000 (C Roads and Unclassified Roads)
Highways	87.9	Km	April 2000 (Trunk, Principle and B roads)
Sensors	589	No.	Including 126 Count sites of loops, 455 SCOOT Loops and 8 infra red detectors.
Public transport network			
-Rail	13	Km	1999
-Tram		Km	No tram or underground network in Leicester.
-Underground		Km	
-Bus	110	Km	2000 (Approximate, assuming that at least all principle roads are covered by the bus network and a small percentage of the minor roads)
Total Emission/Energy			
CO	13219.72	T/a	1998
Nox	3446.82	T/a	1998
SO ₂	370.06	T/a	1998
HC	5455.46	T/a	1998 (Volatile Organic Compounds)
PM 10	190.01	T/a	1998
Energy Consumption	29.37	29.37 PJ	1995 (PJ = Petajoules, 1 PJ = 1 000 000 000 000 000 J)
Share of Emissions/ Energy from traffic			
CO	88.6	%	1998
NOx	50.2	%	1998
SO ₂	13.3	%	1998
HC	30.5	%	1998
PM	54.2	%	1998
Energy Consumption	20.3	%	1995
Vehicle fleet composition			
Passenger cars, with catalyst	46,3	%	Dec 2000
Passenger cars, without catalyst	29,4	%	Dec 2000
Diesel	13,9	%	Dec 2000
Light duty vehicles	7,6	%	Dec 2000
Heavy duty vehicles	1,0	%	Dec 2000
Buses	0,3	%	Dec 2000
Motor Cycles, Scooters and mopeds	1,5	%	Dec 2000
Electric Vehicles	0,1	%	Dec 2000
Air Quality Monitoring			
Stations	7	No.	May 2001
Pollutants Measured	CO, NO ₂ , NOX, Ozone, PM10, SO ₂ and HC		May 2001
Noise monitoring/ modelling			
Number of permanent monitoring sites	0		May 2001

Number of sound level metres available	4		May 2001
Frequency of noise map production	0		No noise modelling occurring

1.2 Legal and Institutional Framework

Actors of Relevance for HEAVEN

Table 2: Institutions/ departments using HEAVEN system components

Application	Decision Support System (DSS)	Air Quality Models	Urban Noise Model	Common Information Platform	Health Data Platform
Users	Area Traffic Control (LCC) Pollution Control Group (LCC)	Area Traffic Control (LCC) Pollution Control Group (LCC) District Council Environmental Health Officers	Area Traffic Control (LCC) Pollution Control Group (LCC)	Leicester Citizens Citizens in areas where there is a air quality problem Instrumented City	Local health Authorities Area Traffic Control (LCC) Pollution Control Group (LCC)
Type of use in HEAVEN	* Utilise in case of incidents or special events. * Enable local authority response to EU-directives on air quality and noise. * Scenario Testing in support of various planning regimes	* Enhance existing air quality model * Enable local authority response to EU Directives on air quality. * Analyse impacts of traffic pollution on air quality management plans. * Analyse land use planning scenarios	* Enable local authority response to EU-directives on noise. * Develop system for predicting noise pollution. *Analyse impacts of traffic pollution on noise quality management plans.	* Information dissemination and consultation with the public in cross-boundary scenario.	* First steps for research work on methodologies for transport related health impact analysis.

LCC = Leicester City Council

Management Structure

Each Service (e.g. Pollution Control, Area Traffic Control) has a Service Manager. Each Service Manager is responsible for several Team Leaders. The Team Leaders then have several staff who comprise their team. This structure is applicable to Leicester City council. Similar models are used by Leicestershire County Council and the District Councils. A diagrammatic representation of this structure is available if required. There are no plans to change the structure during HEAVEN. However HEAVEN will strengthen the interdisciplinary working both within Leicester City Council and with the other Local and Public Authorities.



Staff using the HEAVEN system

Table 3: Staff using the HEAVEN system

Department	Category	Role
Pollution Control Group	Environmental Health Officer	Assessing impact of TDMS on Air Quality Management Areas (modelled and actual)
Area Traffic Control	Traffic Operators and Engineers	Input of modelled/monitored Traffic Data resulting from TDMS use
Area Traffic Control	Special projects team	Operation of DSS and integrated systems Advice to other disciplines e.g. Environmental Health, Officers, Town Planners, Traffic Engineers, Health Authority, Researchers
District Councils' Environmental Health Departments	Environmental Health Officers	Assessing impact of TDMS on Air Quality Management Areas (modelled and actual)

Current Inter-Departmental Co-operation and the impact of HEAVEN

Area Traffic Control and Pollution Control Group currently work closely in some aspects of air quality modelling. ATC provide the Airviro model that Pollution Control utilises for air quality modelling in an annual context. Through EQUAL ATC are integrating the OPANA and NAME air quality model to provide background pollution levels for the AIRVIRO and ADMS air quality models. The Leicestershire County Council Planning and Transportation department provides traffic model data for Airviro. Both ATC and the County Planning and Transportation department play a supporting role to Pollution Control who have the responsibility for designating air quality management areas based on modelled and monitored data. HEAVEN is likely to enhance this co-operation with possible developments in exchanging data and expertise on the impact of Traffic Demand Management Strategies (TDMS).

There is no current program of large scale noise modelling or monitoring but the structure of co-operation is likely to be similar, with the traffic-related departments providing a supporting role to Pollution Control who have responsibility for regulation of noise pollution. HEAVEN is likely to see the first developments in the understanding of the relationship of traffic and noise between the departments.

There is some co-operation between the Health Authority and Pollution Control at the moment. HEAVEN may progress this to include ATC and the County P & T Department and therefore improve levels of co-operation between the departments that monitor and influence traffic patterns and those that are concerned with the health impacts of the traffic.

Effect of HEAVEN on neighbouring authorities?

As was discussed earlier in this document, the urban area of Leicester extends into neighbouring authorities. If the demonstration area of HEAVEN extends over the administrative boundary into neighbouring authorities then the elected councillors and their supporting council officers may be involved in any related decision-making process.



Impact of HEAVEN on staff roles and duties

It is difficult to foresee the precise nature of how HEAVEN will impact on staff duties. It is possible that staff contact with decision-makers (eg; higher-level management or elected members) will increase. The HEAVEN DSS will offer the staff an opportunity to provide a broader based service.

Other parties (i.e. non-users) expected to take an interest in HEAVEN

The Common Information Platform of the DSS will make environmental information more readily available. It is expected that NGOs and the media will use HEAVEN information. Examples are Transport 2000 and Friends of the Earth.

Data providers for the DSS

Air Quality Monitoring: Area Traffic Control; Pollution Control Group

Air Quality Modelling: Area Traffic Control; Pollution Control Group; UK Meteorological Office Emissions database: Pollution Control Group Health Data: Leicestershire Health Authority

Traffic data (modelled): Leicestershire County Council/ Pollution Control Group

Traffic data (measured): Area Traffic Control/ District Councils

TDMS Scenarios: Area Traffic Control/Traffic Group

Weather Data: Area Traffic Control; UK Meteorological Office

Current status of public air quality and noise information

The public currently receive information on air quality via the Web, BBC Local Radio 104.9 FM Broadcasts by ATC (including RDS technology), Variable Message Signs and local newspapers. HEAVEN may lead to more localised detail for the air quality information focused on air quality management areas. This information may be targeted at local residents and businesses in these areas rather than at the general public.

There is no publicly available noise information. HEAVEN may lead to the internet and media being used to disseminate noise model results, although this may be a longer term goal outside the HEAVEN time frame.

1.3 Technical Framework

In Leicester the main system for traffic control occurs through the Urban Traffic Management and Control (UTMC) system. This system is the hardware that gathers Traffic data and uses it to control the traffic signals within the demonstration site and beyond (Leicestershire and Rutland). Traffic flow data is collected through two systems, count sites and SCOOT. The SCOOT system also collects data on traffic flows, congestion, stops, delays, flows, saturation, historical flow parameters, detector flow, detector occupancy, stage length and journey time. The ASTRID and INGRID systems provide operational and historical diagnostic tools. CCTV is also used to monitor traffic within the city, especially in areas prone to congestion. This information is relayed to Area Traffic Control, where traffic movements within the network can be managed using traffic signalling and diversions etc. A number of signal systems within the city are controlled automatically within SCOOT regions. Narborough Road and London Road demonstration sites are both within SCOOT Regions. Road users are also informed of Traffic situations, possible delays and car Park availability using variable message signs, strategically located on the busy radial roads in the city. Radio Broadcasts are also used. Regular updates on the traffic situation are relayed by Area Traffic Control staff, via BBC Radio Leicester 104.9 FM RDS-EON, which hopefully in turn reduces the problem by encouraging individuals to divert away from these certain routes.

There are also a number of traffic modelling systems in place within the Leicester demonstration area. These include the transportation model TRIPS, the traffic assignment model SATURN, signal optimisation model TRANSYT, the congestion information system COMIS and the incident detection system ASTRID

and INGRID. The data developed through these systems is fed into the environmental modelling systems that are currently in place within Leicester (AIRVIRO, ADMS, NAME and OPANA), to provide 'now cast' and 24/48 hour pollution forecasts for all areas of the City-wide demonstration area.

From an air pollution monitoring point of view, there is a large system of air pollution monitors already situated within Leicester City and the surrounding Districts. These monitors measure a number of pollutants including SO₂, NO_x, CO, PM₁₀ every 15 minutes, SO₂ daily and NO_x and benzene on a monthly basis. The different monitoring systems used include the Automated urban network (AUN), which measures background data, NO_x/TEOM monitors, which measure PM₁₀ and NO_x and lastly Roadside Pollution Monitors (RPM), which measure NO_x and CO. The monitors are situated at various locations throughout the city giving pollution data on a large spatial resolution. Data from a number of the monitoring stations, namely the AUN and RPM stations, is fed into the AIRVIRO pollution modelling system where it can be monitored on a daily basis and can be used for the production of forecasts with the OPANA and NAME models.

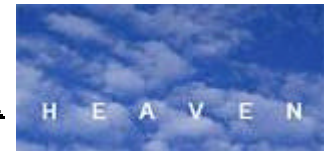
1.4 Appraisal Groups

[Leicester has deleted those users contacted during WP 4 User Needs Analysis who provided limited feedback even after significant prompting. However, for the guidelines, Leicester has deleted them from this document.]

Table 4: Names and institutions of HEAVEN users in Leicester

HEAVEN User Category	Names of User Organisations	Names of Key Individuals in Organisations
Authorities as Direct HEAVEN Users		
Traffic/ Transport Departments		
- Traffic Group	- Leicester City Council	- Howard Thomas
- Department of Planning and Transport	- Leicestershire County Council	- Sonny Tolofari
- Area Traffic Control	- Leicester City Council	- John Gillam
Environment Departments		
- Environment Team Policy Unit	- Leicester City Council	- A Dodd
- Environment and consumer services	- Birmingham City Council	- B Appleby
- Environmental health Services	- Blaby District Council	- D Gould
-	-	-
-	-	-
-	-	-
- Environmental Protection	- Charnwood Borough Council	- Environmental health
- Development Plans	- Leicester City Council	- D Chapman

HEAVEN User Category	Names of User Organisations	Names of Key Individuals in Organisations
Decision Makers (directly or via administration) as Indirect HEAVEN Users		
Urban Development		
-	- institution	- name
-	- institution	- name
Traffic/ Transport		
- Highways and Transportation	- Leicester City Council	- Director
- Department of Planning and Transport	- Leicestershire County Council	- Director
-	-	-
-	-	-
Environment		
- Environment and Development	- Leicester City Council	- Director
Health		
- Department of Respiratory Medicine	- Glenfield Hospital	-
- Institute for Environmental Health	- Leicester University	- L Rushton
- Department of Child Health	- Leicester University	- Dr M Silverman
Public & Interest Groups as Other Stakeholders		
Citizens		
Residents of "Hot Spot" Areas		
Patient Groups		
-	- institution	- name
-	- institution	- name
NGOs		
- Friends of the Earth	- Leicester	- S Tewley
- Transport 2000	- Leicester	- T Kirby
Research Institutions		
- Institute of Energy and Sustainable Development	- De-Montfort University	- J Madalavich



HEAVEN User Category	Names of User Organisations	Names of Key Individuals in Organisations
- Department of Respiratory Medicine	- Glenfield Hospital	-
- Institute for Environmental Health	- Leicester University	- L Rushton
- Department of Child Health	- Leicester University	- Dr M Silverman
Public Transport Operators		
- First Bus Leicester	- First Bus Group	- name
- ARRIVA	- ARRIVA Group	- name

1.5 Institutions Responsible for HEAVEN Implementation

Key decision makers for Mobility, Air Quality and Noise

These are ultimately the elected local politicians in Leicester: the 56 councillors who comprise Leicester City Council. However they will often make decisions based on the advice of local government officers, in these cases from the Environment and Development Department of Leicester City Council and the relevant constituent elements: Area Traffic Control; Pollution Control Group; Traffic Group, Development Plans Group etc.

The urban area of Leicester overlaps into the neighbouring District Council areas. This means that the elected local councillors of the District Councils will also form part of the decision-making process on air quality, noise and traffic issues impacting on their District. The District Councils have responsibility for Environmental Health (including air quality and noise) however Leicestershire County Council has responsibility for Traffic (including mobility). The elected councillors of Leicestershire County Council will therefore also form part of the decision making process for mobility issues outside the boundary of Leicester City Council.