AEA

Air Quality Review and Assessment

Progress Report 2008

Report to Luton Borough Council

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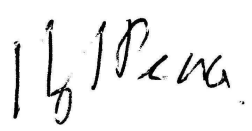
	Signature	
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Acronyms and Definitions Used in this Report

AQMA	Air Quality Management Area
APU	Auxiliary Power Units
AQS	Air Quality Strategy
BAM	Beta Attenuation Monitor
CO	Carbon monoxide
Defra	Department of the Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges
EIA	Environmental Impact Assessment
kerbside	0 to 1 m from the kerb
km	kilometre
LAQM	Local Air Quality Management
LAQM.PRG	Local Air Quality Management – Progress Report Guidance
LAQM.TG	Local Air Quality Management – Technical Guidance
LTP	Local Transport Plan
m	metre
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen
Mppa	million passengers per annum
$PM_{2.5}$	Particulate Matter smaller than 2.5 microns
PM_{10}	Particulate Matter smaller than 10 microns
ppb	parts per billion (1 ppb is 1 volume of pollutant in 10^9 volumes of air)
receptor	In the context of this study, the relevant location where air quality is assessed or predicted (for example, houses, hospitals and schools)
roadside	1 to 5 m from the kerb
SO_2	Sulphur dioxide
TEA	Triethanolamine
TEOM	Tapered Element Oscillating Microbalance
$\mu g\ m^{-3}$	Micrograms per cubic meter

1 Introduction

The Environment Act 1995 introduced the Local Air Quality Management (LAQM) system, which requires Local Authorities to undertake regular Review and Assessment of air quality, with respect to the standards and objectives set in the Air Quality Strategy (AQS) (Defra, 2007). The air quality objectives applicable to LAQM are set out in the Air Quality Regulations 2000, the Air Quality (Amendment) Regulations 2002. In areas where an air quality objective is predicted not to be met by the required date, Local Authorities are required to establish an Air Quality Management Area (AQMA) and implement action plans detailing measures intended to reduce or to eliminate exceedances.

Following the first and second rounds of air quality Review and Assessments, Local Authorities were required to proceed to the third round of Review and Assessment in which sources of emissions to air are reassessed in order to identify whether the situation has changed since the second round of Review and Assessment, and if so, what impact this may have on predicted exceedences of the air quality objectives.

The first step of the third round of Review and Assessment was an Updating and Screening Assessment, which updates the findings of the Review and Assessment cycle previously undertaken for all pollutants identified in the Air Quality Regulations. Where a significant risk of exceedance was identified for a pollutant as part of the Updating and Screening Assessment it was necessary for the Local Authority to proceed to a Detailed Assessment. Where a Local Authority does not need to undertake a Detailed Assessment, a Progress Report is required instead.

1.1 Purpose and Role of Progress Reports

Progress Reports are intended to ensure continuity in the LAQM process. The objective of the Progress Report is to provide an annual review and update on air quality issues, including developments that might be significant to air quality. Any significant developments can then be acted upon immediately, rather than waiting for the next full round of Review and Assessment. The benefits to Local Authorities are set out in Box 1.1 of the Progress Report Guidance LAQM.PRG (03) (Defra, 2003a), but these include the following.

- To provide a readily accessible source of up to date information on air quality, which may be useful to Local Authority staff for dealing with enquiries from members of the public, developers carrying out environmental assessments, and to assist in other areas such as transport and land use planning.
- To ensure continuity in maintaining resourcing, capability and staff skills for LAQM within the Local Authority.
- Helping to get maximum value from the monitoring carried out by the Local Authority.

This report forms the air quality Progress Report within the Luton Borough Council area as outlined in the Government's published guidance, Part IV of the Environment Act 1995 Local Air Quality Management – Progress Report Guidance LAQM.PRG (03) (Defra, 2003a), referred to in this report as the Progress Report Guidance.

In addition to fulfilling Luton Borough Councils requirement to produce a Progress Report, this report also considers London Luton Airport as an emission source that may affect air quality and assesses the need for a Detailed Assessment, in the context of air quality and the airport.

1.2 Air Quality Strategy Objectives

The Air Quality Strategy standards and objectives are shown in Table 1. The table shows the standards in µg m^{-3} (mg m^{-3} for carbon monoxide (CO)) with the number of exceedences that are permitted (where applicable).

Table 1: Objectives Included in the Air Quality Regulations 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 December 2003
Authorities in England and Wales only	5.00 µg m^{-3}	annual mean	31 December 2010
Authorities in Scotland and Northern Ireland only	3.25 µg m^{-3}	running annual mean	31 December 2010
1,3-Butadiene	2.25 µg m^{-3}	running annual mean	31 December 2003
Carbon Monoxide Authorities in England, Wales and Northern Ireland only [a]	10.0 mg m^{-3}	maximum daily running 8-hour mean	31 December 2003
Authorities in Scotland only	10.0 mg m^{-3}	running 8-hour mean	31 December 2003
Lead	0.5 µg m^{-3} 0.25 µg m^{-3}	annual mean annual mean	31 December 2004 31 December 2008
Nitrogen Dioxide [c]	200 µg m^{-3} not to be exceeded more than 18 times a year 40 µg m^{-3}	1-hour mean annual mean	31 December 2005 31 December 2005
Particles (PM_{10}) (gravimetric) [a] All authorities	50 µg m^{-3}, not to be exceeded more than 35 times a year 40 µg m^{-3}	24 hour running mean annual mean	31 December 2004 31 December 2004
Authorities in Scotland only [b]	50 µg m^{-3}, not to be exceeded more than 7 times a year 18 µg m^{-3}	24 hour running mean annual mean	31 December 2010 31 December 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 December 2004 31 December 2004 31 December 2005

a. Measured using the European gravimetric transfer sampler or equivalent
b. These 2010 Air Quality Objectives for PM_{10} apply in Scotland only, as set out in the Air Quality (Scotland) Amendment Regulations 2002.

In addition to the objectives the UK Government and the devolved administrations have set new national air quality objectives for $PM_{2.5}$, which are displayed in Table 2. These objectives have not been incorporated into LAQM Regulations, and authorities have no statutory obligation to Review and Assess air quality against them. However, the recent Consultation Document – Technical Guidance LAQM.TG (08) (Defra, 2008), provides informal guidance.

Table 2: Proposed new $PM_{2.5}$ objectives (not included in the Regulations)

Region	Air Quality Objective		Date to be Achieved by
	Concentration	Measured as	
UK (except Scotland) [a]	25 µg m^{-3}	annual mean	2020
Scotland [a]	12 µg m^{-3}	annual mean	2020
UK urban areas	Target of 15% reduction in concentrations at urban background locations	3-year mean	Between 2010 and 2020

a. The concentration cap is to be seen in conjunction with the 15% exposure reduction target

1.3 Previous Rounds of Review and Assessment

Luton Borough Council has completed the following rounds of Review and Assessment to date:

- Stages 1 and 2 (1999);
- Stage 3 (2001);
- Stage 4 (2003);
- Updating and Screening Assessment (2003);
- Further and Detailed Assessment (2004);
- Progress Report (2005);
- Updating and Screening Assessment (2006); and
- Progress Report (2007).

Stages 1 to 4 (1999 to 2002)

Luton Borough Council published its Stage 1 Review and Assessment in March 1999. It concluded that further investigation was required for CO, nitrogen dioxide (NO_2), particulate matter (PM_{10}) and Sulphur Dioxide (SO_2). The Stage 2 Review and Assessment published in October 1999 considered these pollutants in more detail and concluded that further investigation needed to be made regarding NO_2 and PM_{10}. Stage 3 Review and Assessment (2001) looked in greater detail at NO_2 and PM_{10} and found that the AQS objectives predicted to be exceeded were the annual mean NO_2 objective (21ppb/40µg m^{-3} by end of 2005) and the 24 hourly mean PM_{10} objective (50µg m^{-3} by end of 2004). However, after consideration of whether there was any relevant exposure, and consultation, it was decided not to declare an AQMA.

In 2003, the Stage 4 Review & Assessment report (AEAT, 2003) was used to feed into an Action Plan and to predict more up to date information on air quality in Luton. The Stage 4 Review and Assessment (AEAT, 2003) looked in detail at NO_2 and PM_{10}. The assessment concluded that the PM_{10} annual average objective would not be exceeded anywhere in Luton, that the 24-hour mean objective for PM_{10} would only be exceeded on the M1 Motorway itself (where relevant exposure does not occur) and that the provisional annual average objective for PM_{10} of 20 µg m^{-3} by 2010 would not be exceeded, except perhaps within approximately 5m of the boundary of the M1. The assessment also concluded that there was likely to be exceedences leading to relevant exposure, of the NO_2 annual mean objective. These locations of relevant exposure were at 24 specified dwellings that are stated to be within a 50 m band surrounding the M1.

Updating & Screening Assessment (2003)

The Updating and Screening Assessment (Luton Borough Council, 2003) concluded that the following pollutants would meet relevant AQS objectives Benzene, 1-3 Butadiene, CO, Lead, PM_{10} and SO_2. However, it was concluded that there was likely to be exceedence of the NO_2 annual mean objective at locations, both inside and outside of the AQMA declared in November 2003, which contained the 24 dwellings determined to have relevant exposure in the Stage 4 Review and Assessment. Therefore a Further Assessment and a Detailed Assessment were required.

Further and Detailed Assessment (2004)

The Further Assessment and Detailed Assessment (Netcen, 2004) concluded that the NO_2 annual mean objective of 40 µg m^{-3} for 2005 was likely to be exceeded over a much greater area than had been concluded by the Stage 3 and 4 Review and Assessments. The area of likely exceedence comprised 431 dwellings. An Air Quality Management Area (AQMA) was declared in March 2005, which contained these 431 dwellings (see Appendix 1 The Luton Air Quality Management Areas (NO_2) Order 2005).

Progress Report (2005)

The 2005 Progress Report showed that the trend in Luton for NO_2 concentrations at the measurement sites is downwards. During 2004 the measured average annual concentration of NO_2 in Luton reduced at all locations compared to 2003. There was only 1 Site exceeding the 40 µg m^{-3} Annual Mean objective for NO_2, by Junction 11 of the M1. All other AQS pollutant concentrations fell consistently below the objective concentrations.

Updating and Screening Assessment (2006)

The Updating and Screening Assessment (2006) concluded that Further Assessments or Detailed Assessments were not required for any of the AQS pollutants.

Progress Report (2007)

The 2007 Progress Report showed that the measured annual average NO_2 concentration in Luton reduced at virtually all locations compared with the 2003 concentrations. The trend in Luton for NO_2 concentrations at the measurement sites is downwards. All other AQS pollutant concentrations fell consistently below the objective concentrations.

2 New Monitoring Data

Luton Borough Council undertake ambient monitoring of the following pollutants covered by the AQS:

- Carbon Monoxide (CO);
- Nitrogen Dioxide (NO_2);
- Sulphur Dioxide (SO_2); and
- Particulate Matter (PM_{10}).

None of the other pollutants covered by the AQS are monitored.

2.1 Automatic Monitoring Sites

One automatic monitor is currently operational in the Borough, situated 179m from the central reservation of the M1 Motorway, just to the north of junction 11 (505571,222755). The site monitors Carbon Monoxide (CO), Nitrogen Dioxide (NO_2), Nitrogen Oxides (NO_x), Sulphur Dioxide (SO_2), Particulate Matter (PM_{10}) using the Tapered Element Oscillating Microbalance (TEOM) and Ozone. Data from this Station is collected hourly and ratified by ERG (formerly SEIPH). ERG place the data on the http://www.hertsbedsair.org.uk web site on which daily and longer term data can be viewed. Figure 1 (Appendix 2) displays the monitoring location of this automatic monitor.

2.2 Diffusion Tube Monitoring Sites

Nitrogen dioxide concentrations were measured at 27 locations around the Borough using diffusion tubes, between 2002 and 2005. However, diffusion tubes were not deployed in 2006 or 2007. Diffusion tubes are being deployed again in 2008 within the AQMA. The results of this monitoring will be presented in future Review and Assessment reports.

2.3 Monitoring Results and Comparison With AQS Objectives

2.3.1 Automatic NO_2 Results

A historic time series of annual mean nitrogen dioxide concentrations over the last nine years and a projected concentration for 2010 are shown in Table 3. All statistics have been ratified by ERG and are shown graphically in Figure 2.

Table 3: Nitrogen Dioxide Monitoring at Junction 11 of the M1

Year	Annual mean ($\mu g\ m^{-3}$)	Number of Exceedences of the Hourly Mean of 200 $\mu g\ m^{-3}$ (Not to be Exceeded More Than 18 Times a Year)
1999	28.1*	0*
2000	32.0	0
2001	36.8	0
2002	30.5	0
2003	**43.1**	0
2004	32.1	0
2005	28.2	0
2006	34.0	8
2007	35	14
2010 (Projected from 2007)	32.2	-

Note: Values in **Bold** exceed the standard
* capture rate less than 75% for the year (60%). Results may not be representative of the full year and should be used for guidance only.

Monitoring at this site achieved a data capture of 90% or greater in all years apart from 1999 which had a 60% data capture. The 2010 annual mean NO_2 concentration was estimated using the approach specified in the Technical Guidance LAQM TG (03) (Defra, 2003b) and calculated from the 2007 annual mean concentration using the Netcen Year Adjustment Calculator v2.2a (AEA, 2007).

It can be seen from Table 3 that the 2007 NO_2 concentration does not exceed the AQS objective of **40µg m^{-3}** measured as an annual mean. Comparing the 2007 measurements with those recorded in previous years does however show an increase in concentrations since 2005, but this could be purely natural variation. There has been no more than the permitted number of exceedances of the short-term objective at this monitoring location during the monitoring period.

The projected 2010 NO_2 concentration is predicted to meet the AQS objective of 40µg m^{-3} measured as an annual mean. Table 3 also shows that future NO_2 concentrations are expected to decrease from the current situation.

Figure 2: Annual Mean NO_2 Concentrations from the Automatic Continuous Monitor Located at Junction 11 of the M1

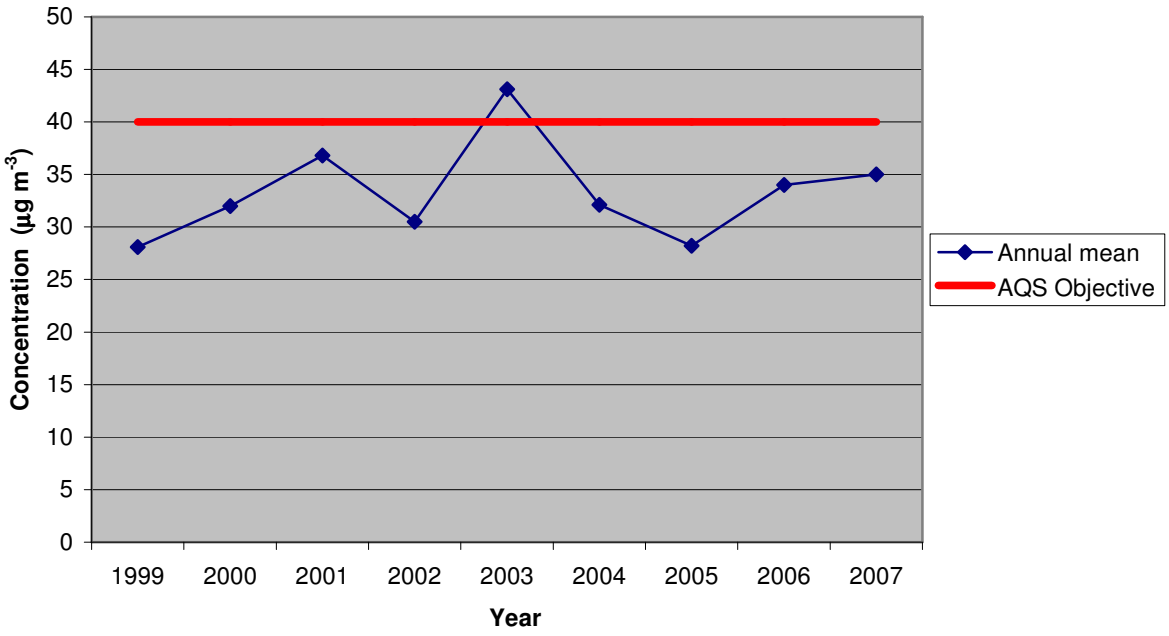

Figure 2 illustrates the trend in NO_2 annual mean concentrations from the monitoring undertaken at Junction 11 of the M1. NO_2 concentrations increased from 1999 through to 2001, and then, decreased in 2002. Concentrations peaked in 2003 exceeding the AQS annual mean objective. This peak was primarily due to meteorological factors, which contributed to the unusually warm and settled weather conditions experienced during the spring and summer of 2003. Concentrations decreased rapidly to a concentration of 28.2 µgm^{-3} in 2005 and since 2005 concentrations have again started to increase.

2.3.2 Automatic PM_{10} Results

A historic time series of annual mean PM_{10} concentrations over the last nine years and a projected concentration for 2010 are shown in Table 4. All data has been ratified by ERG and are shown graphically in Figure 3. PM_{10} concentrations were measured using a TEOM Sampler and monitored values have been multiplied by a factor of 1.3 to account for losses incurred during the measurement process in line with current guidance LAQM.TG (03) (Defra, 2003b).

The annual mean PM_{10} concentration for 2010 was estimated using the approach specified in the Technical Guidance LAQM.TG (03) (Defra, 2003b) and the 2006 Guidance Note for Use of the Year Adjustment Factors for Background and Roadside Annual Mean Pollution Concentrations (Bureau Veritas, 2006). The estimated annual mean concentration for 2010 is shown in Table 4, calculated using the Netcen Year Adjustment Calculator v2.2a (AEA, 2007).

Table 4: PM_{10} Monitoring at Junction 11 of the M1 (Corrected for Measuring Losses)

Jun 11 M1	Annual mean µg m^{-3} (Gravimetric Equivalents)	Number of Days Exceeding the Running 24 Hour Mean of 50 µg m^{-3} (Not to be Exceeded More Than 35 Times a Year)
1999	25*	2*
2000	24	1
2001	25	6
2002	25	5
2003	27	24
2004	23	1
2005	24	2
2006	24	10
2007	23	12
2010 (Projected from 2007)	21.79	-

Note: Values in **Bold** exceed the standard
*capture rate less than 75% for the year (60%). Results may not be representative of the full year and should be used for guidance only.

Monitoring at this site achieved a data capture of 90% or greater in all years apart from 1999 which had a 60% data capture. Table 4 shows that the 2007 PM_{10} concentration are below the AQS objectives of **40µg m^{-3}** measured as an annual mean and **50 µg m^{-3}** measured as a running 24 hour mean, not to be exceeded more than 35 times a year i.e. no more than the permitted 35 exceedances. Comparing the 2007 annual mean measurement with those recorded in previous years shows a slight decrease in concentrations.

The projected 2010 PM_{10} concentration is predicted to meet the AQS objective of 40µg m^{-3} measured as an annual mean and also shows that future PM_{10} concentrations are expected to decrease from the current situation.

Figure 3: Annual Mean PM_{10} Concentrations from the Automatic Continuous Monitor Located at Junction 11 of the M1 (Corrected for Measured Losses)

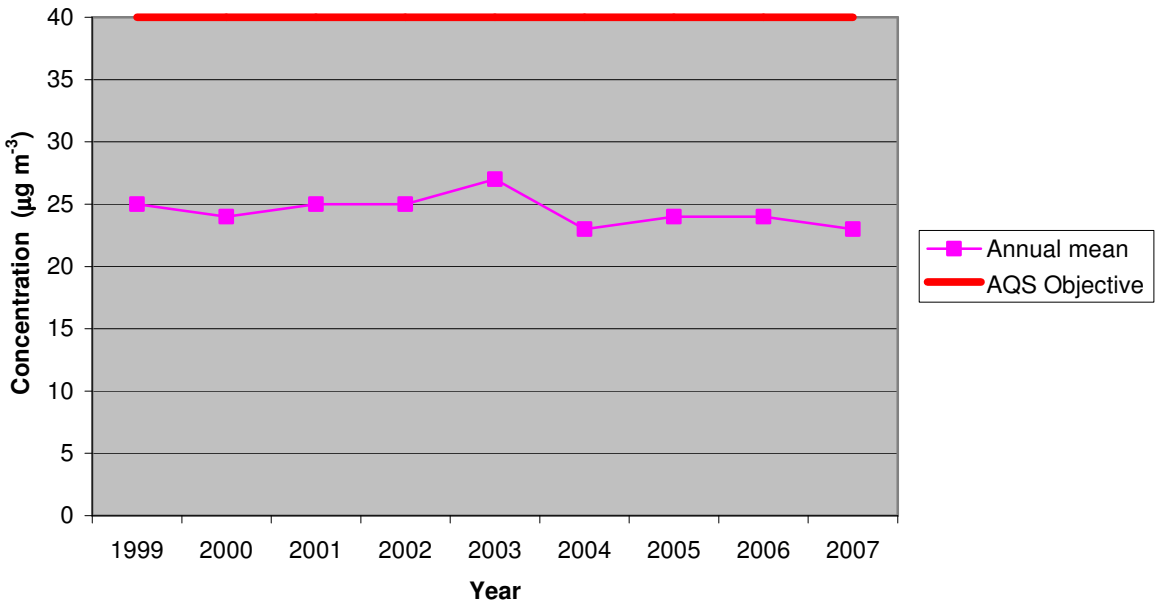

Figure 3 illustrates the annual mean PM_{10} concentrations from the monitoring undertaken at Junction 11 of the M1 between 1999-2007. It can be seen that there has been a steady downward trend in

PM_{10} annual mean concentrations over the monitoring period and that concentrations are well below the AQS objective.

2.3.3 Automatic CO Results

Monitoring of the CO maximum daily running 8-hour mean has been undertaken at the Junction 11 M1 continuous monitor site since 1999. Table 5 displays the number of times that the rolling 8-hour mean of 10 mg m^{-3} has been exceeded for each year in the monitoring period.

Table 5: Number of Occurrences of the Rolling 8-hour Mean Exceeding 10 mg m^{-3}

Year	No occurrences of Rolling 8hr Mean >10mg m^{-3}
1999	0
2000	0
2001	0
2002	0
2003	0
2004	0
2005	0
2006	0
2007	0

It can be seen from Table 5 that within the monitoring period 1999-2007 the AQS objective of 10 mg m^{-3} has never been exceeded.

2.3.4 Automatic SO_2 Results

The continuous monitoring station located at Junction 11 of the M1 has also monitored SO_2 concentrations since 1999. Table 6 displays the number of times that the 24-hour mean, 1-hour mean and the 15-minute mean was exceeded for each year in the monitoring period.

Table 6: Number of Occurrences of the Exceedances of the 24-Hour Mean, 1-Hour Mean and the 15-Minute Mean

Year	24-Hour Mean 125 µg m^{-3}, Not to be Exceeded More Than 3 Times a Year	1-Hour Mean 350 µg m^{-3}, Not to be Exceeded More Than 24 Times a Year	15-Minute Mean 266 µg m^{-3}, Not to be Exceeded More Than 35 Times a Year
1999	0*	0*	1*
2000	0	0	0
2001	0	0	0
2002	0	0	0
2003	0	0	0
2004	0	0	0
2005	0	0	0
2006	0**	0**	0**
2007	0	0	0

*Data capture rate was less than 75% for the year (54%).
** Data capture rate was less than 75% for the year (73%).

During the last nine years there has been no occurrences of the1 hour or 24 hour mean standards being exceeded and one occurrence of the 15 minute mean standard being exceeded in 1999. However, as the 15 minute standard was only exceeded once the AQS objective of 266 µg m^{-3}, not to be exceeded more than 35 times a year was achieved, as were the 1 hour and 24 hour AQS objectives.

3 London Luton Airport

London Luton Airport occupies a 235 hectare site to the south east of the Luton, Dunstable and Houghton Regis urban area. The airport lies predominantly within the unitary authority of Luton Borough Council.

Eaton Green Road runs along the airports northern boundary and the A505 Vauxhall Way to the west. There are a number of access points to the airport from these routes and it is likely that the airports growth will have an impact on these roads. The M1 motorway is approximately 2.8km from the airport.

3.1 London Luton Airport Monitoring Results

3.1.1 Automatic Monitoring Sites

London Luton Airport currently operates a PM_{10} automatic monitor, which is situated by the airport terminal (511871, 221142). PM_{10} concentrations are measured using the Beta Attenuation Monitor (BAM) sampler method. Data from the station is collected hourly and ratified by ERG (formerly SEIPH). ERG places the data on the http://www.hertsbedsair.org.uk web site on which daily and longer term data can be viewed. Figure 4 in Appendix 2 displays the location of this automatic monitor.

3.1.2 Diffusion Tube Monitoring Sites

Nitrogen Dioxide concentrations are measured at 14 locations around London Luton Airport using diffusion tubes. Table 7 displays the details of each diffusion tube site. Figure 4 in Appendix 2 displays the locations of these diffusion tubes.

Table 7: Diffusion Tube Monitoring Site Details for London Luton Airport

Code	Address	X Grid Ref	Y Grid Ref	Class
LA01	Terminal Patio	511847	221336	background
LA02	Airport Approach Road	511586	220978	kerbside
LA03	Runway Threshold Western	511156	220437	background
LA04	Runway Threshold Eastern	513634	221198	background
LA05	Runway Apron	511703	221320	background
LA06	President Way Jct	511645	221679	kerbside
LA07	Terminal Car Park	512181	221352	intermediate
LA08	BAM Co Locator	511871	221142	background
LA09	Stagenhoe Bottom Farm	517637	222554	background
LA10	Grove Farm Slip End	507623	217724	background
LA12	Pickford Rd Markyate	505529	215773	kerbside
LA13	Delmerend Lane Flamstead	508426	214366	rural
LA14	Stand 60 Luton Airport	511861	221579	kerbside

The NO_2 diffusion tubes are prepared and analysed by Bureau Veritas (Gradko International Ltd). The laboratory takes part in the NO_2 Network QA/QC Field Intercomparison using the preparation method of 50% Triethanolamine (TEA) in Acetone.

Diffusion tubes frequently exhibit bias (over- or under-read) relative to the chemiluminescence analyser (the reference technique for NO_2), and the Guidance states that it is necessary to correct for any such bias, when using diffusion tube results for Review and Assessment purposes. Data are available from a summary spreadsheet (spreadsheet version number: 04/08) of Local Authority co-location studies prepared by Air Quality Consultants (2008) and available via the Air Quality Review and Assessment website http://www.uwe.ac.uk/aqm/review/.

Six nationwide co-location studies were carried out in 2007 using 50% TEA in Acetone diffusion tubes from Bureau Veritas (Gradko International Ltd). The overall bias factor calculated from these studies was 0.93. Diffusion tube results from previous years have also been bias adjusted using the summary

spreadsheet version 04/08 (Air Quality Consultants, 2008). The bias adjustment factors are as follows: 1.27 for 2002 based on 12 studies, 1.11 for 2003 based on 19 studies, 1.1 for 2004 based on 27 studies, 1.1 for 2005 based on 14 studies and 1.01 for 2006 based on 18 studies.

Table 8 displays the corrected and uncorrected for bias diffusion tube monitoring results for 2007.

Table 8: Annual Mean NO_2 Concentrations µg m^{-3}, Measured Using Diffusion Tubes 2007

Code	Address	2007 µg m^{-3}	2007 Bias Adjusted µg m^{-3}
LA01	Terminal Patio	38.3	35.6
LA02	Airport Approach Road	33.6	31.2
LA03	Runway Threshold Western	28.3	26.4
LA04	Runway Threshold Eastern	20.0	18.6
LA05	Runway Apron	**46.1**	**42.9**
LA06	President Way Jct	36.8	34.3
LA07	Terminal Car Park	29.4	27.4
LA08	BAM Co Locator	34.5	32.1
LA09	Stagenhoe Bottom Farm	11.8	11.0
LA10	Grove Farm Slip End	13.2	12.3
LA12	Pickford Rd Markyate	17.2	16.0
LA13	Delmerend Lane Flamstead	14.9	13.9
LA14	Stand 60 Luton Airport	**43.8**	**40.8**

Note: Values in **Bold** exceed the standard

When applying the bias correction to the mean 2007 results, all but two of the NO_2 diffusion tube sites meet the AQS objective of **40µg m^{-3}** measured as an annual mean. However, the values predicted for the Runway Apron (LA05) and Stand 60 Luton Airport (LA14) sites exceed the AQS objective.

Comparing measurements made at Runway Apron (LA05) with those recorded in previous years (Table 9) shows that bias corrected levels of NO_2 slightly increased in 2007. However, when comparing measurements made at Stand 60 Luton Airport (LA14) with those recorded in previous years (Table 9) a decrease in concentrations is experienced. It is understood that Runway Apron (LA05) is situated on the façade of the terminal building facing the main. Stand 60 Luton Airport (LA14) is located at the rear of the busy bus terminal, adjacent to the main apron. Both of these monitoring locations are not in areas of relevant exposure for annual mean therefore no Detailed Assessment of the exceedences are required.

Annual mean NO_2 concentrations for future years were estimated using the approach specified in the Technical Guidance LAQM TG (03) (Defra, 2003b). Estimated annual mean concentrations for 2010 determined from the 2007 annual mean concentrations are shown in Table 9. The 2010 concentrations were calculated using the Netcen Year Adjustment Calculator v2.2a (AEA, 2007). However, this method assumes a reduction in concentrations in future years as a consequence of lower background concentrations mainly resulting from improved road vehicle emission performance. As some of the main sources of nitrogen oxides emissions contributing to NO_2 concentrations at the airports monitoring locations are airport activities, such as aircraft auxiliary power units (APU) and aircraft take-off and taxiing, and assuming that Luton Airport will grow in the future it is unlikely that the 2010 projections will reflect the 2010 situation at all the monitoring sites. Therefore, the 2010 projections should be viewed with caution.

Table 9: Bias Adjusted Annual Mean NO_2 concentrations μg m^{-3}, Measured Using Diffusion Tubes 2002-2007and Estimated Annual Mean NO_2 Concentrations μg m^{-3}, for 2010

Code	Address	2002	2003	2004	2005	2006	2007	2010 (Projected From 2007)
LA01	Terminal Patio	**55.9**	**41.5**	**41.8**	**43.5**	39.5	35.6	32.7
LA02	Airport Approach Road	**54.6**	**46.6**	**41.8**	**48.2**	**45.1**	31.2	27.9
LA03	Runway Threshold Western	33.0	32.3	31.2	27.5	23.4	26.4	24.2
LA04	Runway Threshold Eastern	27.9	24.2	21.5	22.5	19.5	18.6	17.1
LA05	Runway Apron	**47.0**	**46.4**	**48.2**	**48.7**	**42.2**	**42.9**	39.4
LA06	President Way Jct	-	-	37.3	**40.7**	37.5	34.3	30.7
LA07	Terminal Car Park	-	-	31.2	33.1	28.2	27.4	24.5
LA08	BAM Co Locator	-	-	36.2	36.0	33.0	32.1	29.5
LA09	Stagenhoe Bottom Farm	-	-	14.4	14.9	11.8	11.0	10.1
LA10	Grove Farm Slip End	-	-	15.3	16.2	12.0	12.6	11.3
LA12	Pickford Rd Markyate	-	-	-	-	16.0	16.0	14.3
LA13	Delmerend Lane Flamstead	-	-	-	-	14.6	13.9	12.8
LA14	Stand 60 Luton Airport	-	-	-	-	**45.3**	**40.8**	38.5

Note: Values in **Bold** exceed the standard

All of the NO_2 diffusion tube sites are predicted to meet the AQS objective in 2010 of 40 μg m^{-3} measured as an annual mean, with the results corrected for bias. However, the values predicted for location Runway Apron LA05 and LA14 Stand 60 Luton Airport are close to the AQS objective, which have shown exceedances of the 40 μg m^{-3} threshold in every year previously monitored. There is however no relevant exposure for the annual mean averaging period. However the 2010 projections should be viewed with caution and the past measured concentrations should be considered rather that the 2010 projections (refer to the previous paragraph).

Figures 5 and 6 below illustrate the trend in the bias adjusted diffusion tube monitored data measured at the airport sites. Figure 5 displays the background monitoring sites and Figure 6 the remaining monitoring sites.

Figure 5: Annual Mean NO_2 Concentrations Measured Using Diffusion Tubes (Bias Corrected)

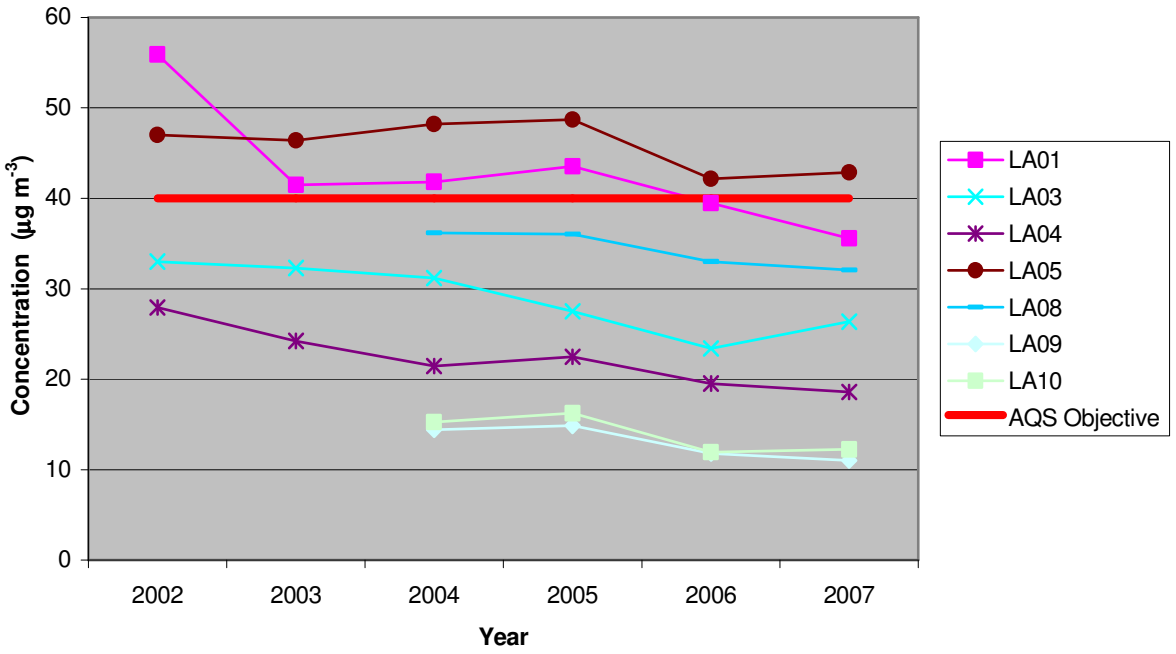

Figure 5 displays the trend in background NO_2 annual means from the airport diffusion tubes. It can be seen that there is a general downward trend in NO_2 annual mean concentration at the background diffusion tube monitoring sites for the airport. Diffusion tubes LA01 Terminal Patio and LA05 Runway Apron have consistently experienced concentrations above the AQS objective between 2002 and 2006 however, concentrations of NO_2 at LA01 are currently below the AQS standard.

Figure 6: Annual Mean NO_2 Concentrations Measured Using Diffusion Tubes (Bias Corrected)

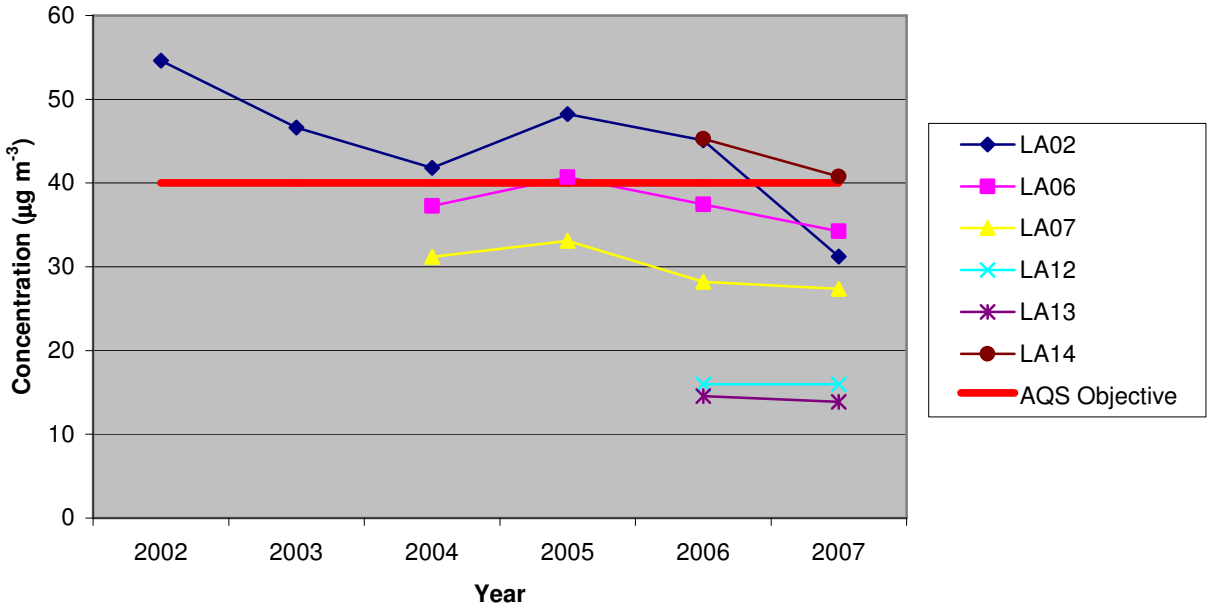

Figure 6 displays the trend in the NO_2 annual means from the remaining airport diffusion tubes. It should be noted that five to ten years of data is needed before a true trend can be established as natural conditions such as climatic variations can cause fluctuations in concentrations. It can be seen

that NO_2 annual mean concentration appear to be decreasing at the remaining airport diffusion tube monitoring sites, but as only one monitoring locations has data for more than four years the evidence is inconclusive. Diffusion tube LA02 Airport Approach Road has consistently experienced concentrations above the AQS objective between 2002 and 2006 and LA14 Stand 60 Luton Airport experienced concentrations above the AQS objective since monitoring began at that location in 2006, concentrations of NO_2 at LA02 are currently below the AQS standard. There is however no relevant exposure for LA14 for the annual mean averaging period.

Diffusion tube 06 is closest to areas of relevant exposure being approximate 230m away from residential properties. It can be seen from the monitoring results that concentrations of NO_2 are close to the AQS objective. As the residential properties are close the Eaton Green Road and the Airport Approach Road air pollution levels could potentially be higher at these locations due to traffic flows along these roads. Therefore it is recommended that monitoring at relevant exposure points in the vicinity of the airport be undertaken to determine air pollution concentrations.

3.1.3 Automatic PM_{10} Results

A historic time series of annual mean PM_{10} concentrations monitored at the airports automatic monitor over the last five years and a projected concentration for 2010 are shown in Table 10. All data has been ratified by ERG. PM_{10} concentrations were measured using a BAM Sampler and monitored values have been multiplied by a factor of 0.83 to account for losses incurred during the measurement process in line with current guidance LAQM.TG (03) (Defra, 2003b).

The annual mean PM_{10} concentration for 2010 was estimated using the approach specified in the Technical Guidance LAQM TG (03) (Defra, 2003b) and the 2006 Guidance Note for Use of the Year Adjustment Factors for Background and Roadside Annual Mean Pollution Concentrations (Bureau Veritas, 2006). The estimated annual mean concentration for 2010 is shown in Table 10, calculated using the Netcen Year Adjustment Calculator v2.2a (AEA, 2007).

Table 10: PM_{10} Monitoring at London Luton Airport (Corrected for Measuring Losses)

Airport	Annual mean µg m^{-3} Gravimetric Equivalents	Number of Days Exceeding the Daily Mean of 50 µg m^{-3}
2003*	31	3
2004	32	33
2005	31	30
2006	28	15
2007	23	10
2010 (Projected from 2007)	21.78	-

Note: *capture rate less than 75% for the year (17%). Results may not be representative of the full year and should be used for guidance only

Monitoring at this site achieved a data capture of 90% or greater in all years apart from 2003 which had a 17% data capture. Table 10 shows that the 2007 PM_{10} concentrations are below the AQS objectives of **40µg m^{-3}** measured as an annual mean and **50 µg m^{-3}** measured as a running 24 hour mean, not to be exceeded more than 35 times a year. Comparing the 2007 annual mean measurement with those recorded in previous years shows a decrease in concentrations.

The projected 2010 PM_{10} concentration is predicted to meet the AQS objective of 40µg m^{-3} measured as an annual mean and also shows that future PM_{10} concentrations are expected to decrease from the current situation.

Figure 7 illustrates that the annual mean PM_{10} concentrations (corrected for measuring losses) between 2003-2007 measured at the automatic monitor located at London Luton Airport.

Figure 7: Annual Mean PM_{10} Concentrations from the Automatic Monitor Located at London Luton Airport (Corrected for Measured Losses)

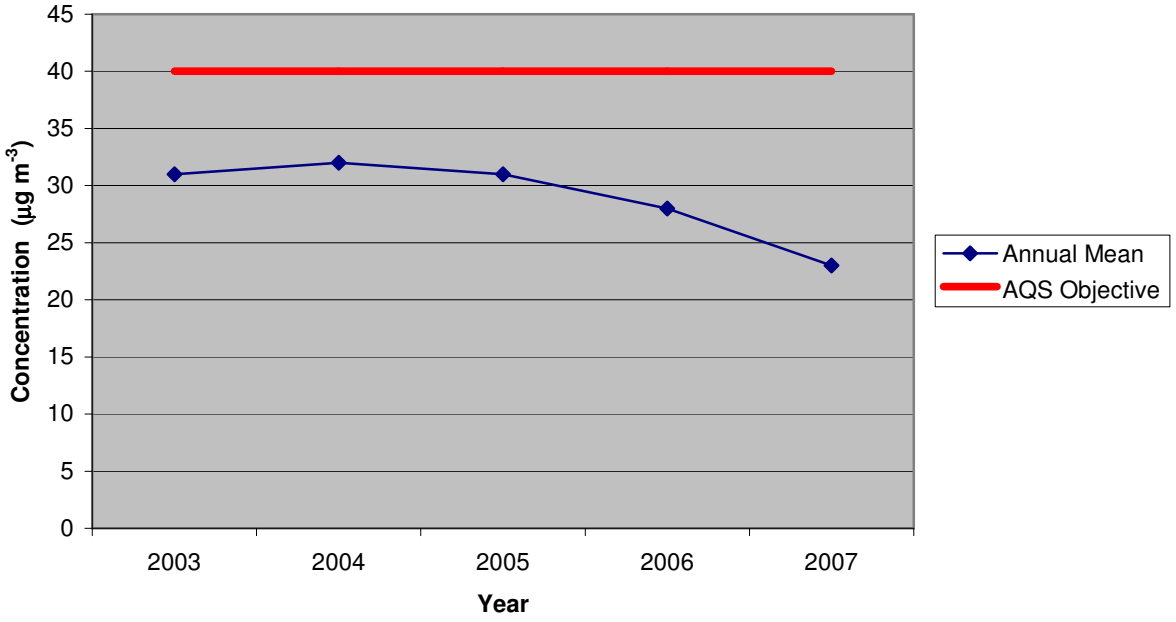

Figure 7 shows that annual mean PM_{10} concentrations have been steady decreasing and are currently well below the AQS objective.

3.2 Screening of Airport Emissions

Airports are a potentially significant source of nitrogen oxides emissions, especially during aircraft take-off. It is the intention of this report to assess the likelihood of London Luton aircraft emissions contributing to an exceedence of AQS objectives in areas of relevant exposure. The methodology outlined in the consultation document Technical Guidance LAQM.TG (08) (Defra, 2008) was used to assess these aircraft emissions.

3.2.1 Aircraft Emissions

Since the last round of Review and Assessment new information has resulted in the criteria to trigger a Detailed Assessment of aircraft generated emissions being relaxed, and the requirement to assess PM_{10} has now been removed (Defra, 2008). Therefore only nitrogen dioxide NO_2 emissions need to be assessed as described in LAQM.TG (08) (Defra, 2008).

Assessment for NO_2

Concentrations of NO_2 reduce rapidly with distance from the source. In order to screen for relevant exposure from aircraft emissions a 1000 metre buffer zone around the airport boundary is used, as concentrations beyond this distance are unlikely to make a significant contribution to local air quality.

Figure 8 (Appendix 2) shows a 1000m buffer zone around the airport boundary and establishes that there is relevant exposure in the vicinity of London Luton airport.

To determine if concentrations of NO_2 in the vicinity of the airport are likely to be of significance the total equivalent passenger throughput in million passengers per annum (mppa) and the background NO_x needs to be determined.

To determine mppa the annual throughput of passengers and the tonnes of freight taken in 'freight-only' planes are required for the most recent year possible.

Figures for London Luton Airport are displayed in Table 11; the passenger numbers figure was taken from the London Luton Airport Annual Monitoring Report 2007 and the tonnes of freight carried on dedicated aircraft was provided by the Airports Airspace and Airfield Environment Manager.

Table 11: Passenger Numbers and Tonnes of Freight Moved in 2007

Passenger Numbers	Tonnes of Freight
9,939,801	37,098

The tonnes of freight moved is converted to an equivalent number of passengers using the conversion of 100,000 tonnes =1mppa. Therefore in 2007 London Luton Airports total equivalent passenger throughput was 10.31mppa (i.e. 9.94mppa + 0.37mppa equivalent based on freight tonnage).

Background NO_x concentrations were determined using the netcen Year Adjustment Calculator v2.2a (AEA, 2007) and the 2004 base year estimated background air pollution data for Luton Borough Council (http://www.airquality.co.uk/archive/laqm/tools/150_2004.csv). Table 12 displays NO_x concentrations from the various combinations of the grid squares surrounding the London Luton Airport.

Table 12: Background NO_x Concentrations in the Vicinity of London Luton Airport

Grid Squares Used to Determine NO_x Concentrations	2005 $\mu g\ m^{-3}$	2007 $\mu g\ m^{-3}$
512500, 221500	28.1	25.9
511500, 220500	28.7	26.5
512500, 220500	26.5	24.4
511500, 221500	31.8	29.3
512500, 221500; 512500, 220500	27.3	25.2
512500, 220500; 511500, 220500	27.6	25.5
512500, 221500; 512500, 220500; 511500, 220500	27.8	25.6
512500, 221500; 512500, 220500; 511500, 220500; 511500, 221500	28.8	26.6

It can be seen from Table 12 that determined background concentrations of NO_x for 2007 range from 25.2 $\mu g\ m^{-3}$ to 29.3 $\mu g\ m^{-3}$. We consider the NO_x background which best represents the airport site is 25.5 $\mu g\ m^{-3}$ determined from grid squares 512500,220500 and 511500,220500 as these grid squares cover the airports location.

LAQM.TG (08) (Defra, 2008) states that if the total equivalent passenger throughput is more than 10mppa and the existing background NO_x concentration are above 25 $\mu g\ m^{-3}$ then it will be necessary to proceed to a Detailed Assessment for NO_2.

It has been established that London Luton Airport has a total equivalent passenger throughput of 10.31mppa, slightly above the 10mppa threshold, and a background NO_x concentration of 25.5 $\mu g\ m^{-3,}$ which is also slightly above the threshold of 25 $\mu g\ m^{-3}$ stated in LAQM.TG (08) (Defra, 2008).

It can be seen from the monitoring undertaken by London Luton Airport that in 2007 all but two of the NO_2 diffusion tube sites met the AQS objective of **40$\mu g\ m^{-3}$** measured as an annual mean. However, the monitoring locations, which exceeded the AQS objective were not in areas of relevant exposure.

Concentrations of NO_2 in the vicinity of the airport will not only be influenced by aircraft take-off and landing, but by aircraft taxiing to and from the runway and apron areas, APUs, aircraft support vehicles and associated road traffic on roads used to access the airport. Therefore any future growth in passengers per annum at London Luton Airport will not only lead to an increase of NO_2 concentrations

due to an increase in flights and associated airport activity, but will also increase NO_2 concentrations along roads used to access the airport. due to associated road traffic growth.

As London Luton Airport is currently only slightly exceeding the criteria to trigger a Detailed Assessment of aircraft generated NO_2 emissions as described in LAQM.TG (08) (Defra, 2008), it is recommended that monitoring at locations of relevant exposure within the 1000m buffer zone be undertaken for a minimum of 6 months. Possible monitoring locations include residential properties close to the junction of the A505 Vauxhall Way and Eaton Green Road, residential properties close to the junction between Eaton Green Road and Airport Approach Road and residential properties close to Eaton Green Road towards the northeast corner of the airport boundary. This monitoring will establish if a Detailed Assessment is required, by highlighting potential AQS objective exceedences.

3.2.2 Airport Road Traffic

To determine if concentrations of NO_2 or PM_{10} in the vicinity of the airport resulting from the East Luton Corridor Improvements are likely to be of significance and therefore require a Detailed Assessment, an assessed as described in LAQM.TG (08) (Defra, 2008) was carried out.

The East Luton Corridor Improvements includes a new link road between the A505 Vauxhall Way and Airport Way East being constructed. 18 hour traffic flows for the do minimum (no new link road) and do something (with the new link road) scenarios are presented in Appendix 3.

The LAQM.TG (08) approach for assessing new roads requires the new roads' traffic flow to be established. If the roads' traffic flow is greater than 10,000 vehicles per day or where the new road increases traffic flow on existing roads previously identified as having:

a. nitrogen dioxide annual mean concentrations greater than 36μg m^{-3}; or,
b. more than 30, 24-hour exceedences of the PM_{10} objective of 50 μg m^{-3}

The DMRB screening model should be used to predict the current nitrogen dioxide annual mean and/or the number of PM_{10} 24-hour exceedences of 50 μg m^{-3} at relevant receptor locations. However the assessment should only proceed if there is relevant exposure within 10m of the effected links.

From traffic counts provided by Luton Borough Council it can be seen that the new link road will have a traffic flow of more than 10,000 vehicles a day (see Table 13). However, there are no areas of relevant public exposure within 10 m of this link. Luton Borough Council's Updating and Screening Assessment (Luton Borough Council, 2006) identified no existing roads with nitrogen dioxide annual mean concentrations greater than 36μg m^{-3} or more than 30, 24-hour exceedences of the PM_{10} objective of 50 μg m^{-3} therefore it is not necessary to proceed to using the DMRB screening model and a Detailed Assessment for the East Luton Corridor Improvements is not required.

Table 13: East Luton Corridor Improvements 18 hour Traffic Flows for 2020 do minimum and Do something scenarios and % difference

Road Link	2020 Do Minimum	2020 Do Something	% Difference
M1 Spur	48470	53850	11
London Road	23140	24360	5
A1081	23860	25120	5
Airport Way A1081	43710	48560	11
Gipsy Lane A505	23140	24610	6
Windmill road	30260	31647	5
Kimpton Road	13230	17826	35
Vauxhall Way between Gipsy Lane and Kimpton Road	42860	46630	9
New link	-	22951	100
Vauxhall Way A505	42530	47260	11
L/Harpenden Road	14280	18390	29
Airport Way East	36240	28440	-22
Harrowden Road	1690	750	-56
Eaton Green Road	22310	24780	11

3.3 Conclusions

The assessment of London Luton Airport aircraft emissions in areas of relevant exposure found that the total equivalent passenger throughput in million passengers per annum (mppa) and the background NO_x slightly exceeded the criteria used to determine if concentrations of NO_2 in the vicinity of the airport are likely to be significance.

The assessment of the East Luton Corridor Improvements determined that the new link road will have a traffic flow of more than 10,000 vehicles a day and will increase traffic flow on existing roads in the vicinity however, these roads have not been identified as having nitrogen dioxide annual mean concentrations greater than 36mg m^{-3} or more than 30, 24-hour exceedences of the PM_{10} objective of 50 mg m^{-3} identified

Although London Luton Airport undertakes automatic PM_{10} monitoring and NO_2 diffusion tube monitoring at locations around the airport, no monitoring at locations of relevant exposure is currently undertaken and there is no measured concentrations to support the assessments. Therefore the assessments of London Luton airport are inconclusive.

It is therefore recommended that monitoring at locations of relevant exposure within the 1000m buffer zone of the airport be undertaken for a minimum of 6 months. Possible monitoring locations include residential properties close to the junction of the A505 Vauxhall Way and Eaton Green Road, residential properties close to the junction between Eaton Green Road and Airport Approach Road and residential properties close to Eaton Green Road towards the northeast corner of the airport boundary. Monitoring at relevant locations of exposure will establish if a Detailed Assessment is required, by highlighting potential AQS objective exceedences.

4 New Developments

4.1 Industrial Processes

There are no well-established industrial processes that are significant sources of emissions in the context of LAQM in Luton Borough Councils area. There have been no new Part A and Part B Processes authorised in the area since the last round of Review and Assessment.

4.2 Residential, Commercial and Public Developments

The Vauxhall site and the Butterfield Green Development off the A505 to the northwest of Luton are both at the construction stage. These developments may affect local air quality, however, in some cases this will be in a beneficial manner.

4.2.1 Northern Gateway

Northern Gateway is a proposed mixed-use retail and residential development on land between the Arndale Centre and Guildford Street within Luton town centre. The development includes associated servicing, landscaping, highways alterations and improvements, and associated car parking. It comprises:

- Retail, 36,933 square metres;
- Offices, 1,054 square metres;
- Residential, 120 residential units; and
- Circa 330 car parking spaces.

The proposed development site is not located within an air quality management zone.

According to the Environmental Impact Assessment (EIA) Scoping Report (WYG, 2007) in terms of air quality impacts the proposed development is predicted to have a substantial negative impact, without mitigation in the construction phase due to vehicle emissions and dust from static and mobile plant, demolition of existing buildings, the import/export of construction materials and export of construction waste and use of on site haul roads; and dust and other wind blown material from storage / stockpiling of materials. In the operational phase (occupation), emissions to air potentially arising are likely to include vehicle emissions and some minor emissions from the centres heating systems. These emissions are predicted to have a slight-moderate negative. However, confidence in this assessment is low as the Transport Assessment and Travel Plan was under review at the time of writing the Scoping Report. When the Transport Assessment and Travel Plan are available the air quality assessment will need to be reviewed and refined.

4.3 Transport

The improvements to the East Luton Corridor - route from Junction 10a of M1 Motorway to London Luton Airport are approaching completion.

There are a number of proposed road schemes, which are predicted to have beneficial effects on air quality in Luton due to the schemes either diverting traffic away from the centre of Luton or by improving the traffic flow on existing routes. These proposed schemes include:

- Translink Guided Bus Way, which is currently at the planning stage;
- Luton North Bypass - from A6 North of Luton westerly to M1 at a new Junction.

Currently neither the Luton North Bypass nor the Luton East Circular North schemes are included in implementation programmes.

It may be that some of the above schemes will direct traffic away from the sections of the M1 within/close to Luton, thereby giving a reduction in M1 emissions. Traffic to the North of Luton could access the M1 for going Northbound via the proposed new junction in the vicinity of Chalton, in between Junction 11 (Luton & Dunstable Hospital) and Junction 12 (Toddington). Traffic from the

North of Luton could access the M1 going Southbound via the Luton East Circular North and the improved East Luton Corridor, joining the M1 at Junction 10, via Junction 10a.

There are also proposals to widen the M1 motorway in 2 schemes, the first chronologically being the M1 to the South of Junction 10 and later the M1 to the North of Junction 10.

5 Air Quality Plans and Policies

5.1 AQMA Action Plan

Luton's AQMA is directly related to traffic on the M1, therefore the council has no direct control on traffic emissions contributing to the AQMA. Luton has led discussions with the Highways Agency over potential alleviation tools, although agreement on the suitability of mitigation measures has not yet been reached.

5.2 Local Transport Plan

Luton Borough Council jointly prepared the second Local Transport Plan (LTP2) for the Luton Dunstable Houghton Regis conurbation, with Bedfordshire County and South Bedfordshire District Councils.

The LTP contains a section on Air quality and quality of life, which has the main objective of minimising the impact of transport on the environment. The primary focus is to improve air quality by alleviation of declared AQMA's in the plans area. The LTP has the target of no new AQMAs to be declared during the LTP 2 period. In order to achieve this the councils will continue to work with the Highways Agency to implement potential mitigation measures to alleviate AQMAs.

As Luton's AQMA is directly related to traffic on the M1, mitigations would be outside the scope of the LTP. However, the LTP reports on joint working and includes road transport remedial measures.

6 Conclusions and Recommendations

Since the Local Air Quality Management Progress Report (Luton Borough Council, 2007), automatic monitoring at the M1 Junction 11 monitoring site has continued. Luton Borough Council re-deployed NO_2 diffusion tubes within their AQMA in 2008. There is currently no data to present from the NO_2 diffusion tube monitoring sites, as this report summarises monitoring data from 2007.

In recent years there has been no exceedance of the annual or short-term objectives for NO_2, PM_{10}, CO or SO_2 at the M1 Junction 11 monitoring site. None of the other pollutants covered by the AQS are monitored in Luton.

London Luton Airport undertakes automatic PM_{10} monitoring and NO_2 diffusion tube monitoring at locations around the airport. Monitoring results illustrate that in 2007 all but two locations Runway Apron and Stand 60 Luton Airport met the AQS objective for NO_2. Automatic PM_{10} monitoring showed that in recent years there has been no exceedance of the annual or short-term PM_{10} objectives. No monitoring at locations of relevant exposure is currently undertaken.

An assessment of London Luton Airport aircraft emissions contributing to an exceedence of the NO_2 AQS objectives in areas of relevant exposure was undertaken using the methodology outlined in the consultation document Technical Guidance LAQM.TG (08) (Defra, 2008). The assessment found that there was relevant exposure in the vicinity of London Luton airport and that the total equivalent passenger throughput in million passengers per annum (mppa) and the background NO_x slightly exceeded the criteria used to determine if concentrations of NO_2 in the vicinity of the airport are likely to be significance.

The assessment of the East Luton Corridor Improvements determined that the new link road will have a traffic flow of more than 10,000 vehicles a day and will increase traffic flow on existing roads in the vicinity however, these roads have not been identified as having nitrogen dioxide annual mean concentrations greater than 36mg m^{-3} or more than 30, 24-hour exceedences of the PM_{10} objective of 50 mg m^{-3} identified.

It is recommended that monitoring at locations of relevant exposure within the 1000m buffer zone of the airport be undertaken for a minimum of 6 months. Possible monitoring locations include residential properties close to the junction of the A505 Vauxhall Way and Eaton Green Road, residential properties close to the junction between Eaton Green Road and Airport Approach Road and residential properties close to Eaton Green Road towards the northeast corner of the airport boundary. Monitoring at relevant locations of exposure will establish if a Detailed Assessment is required, by highlighting potential AQS objective exceedences.

Since the last Updating and Screening Report (Luton Borough Council, 2006), no new Part A or Part B processes have been authorised.

There are currently two Residential, Commercial and Public Developments in construction within Luton the Vauxhall site development and the Butterfield Green Development. A planning application for The Northern Gateway mixed-use retail and residential development on land between the Arndale Centre and Guildford Street within Luton town centre has been submitted to Luton Borough council.

The improvements to the East Luton Corridor - route from Junction 10a of M1 Motorway to London Luton Airport are approaching completion and there are a number of proposed road schemes, which are predicted to have beneficial effects on air quality. These proposed schemes include: -

- Translink Guided Bus Way, which is currently at the planning stage;
- Luton North Bypass - from A6 North of Luton westerly to M1 at a new Junction

An Updating and Screening Assessment will need to be completed by Luton Borough Council by the end of April 2009. If this assessment identifies the need for a Detailed Assessment, one would need to be completed by the end of April 2010. A Progress Report will need to be completed by the end of 2010 regardless of whether a Detailed Assessment is required.

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Appendices

Appendix 1: The Luton Air Quality Management Areas (NO_2) Order 2005

Appendix 2: Figures

Appendix 3: East Luton Corridor Improvements Traffic Flows

Appendix 1

The Luton Air Quality Management Areas (NO_2) Order 2005

The Luton Air Quality Management Area (No 2) Order 2005

This order is made under S.83 (1) of the Environment Act 1995, which states: -

> "Where, as a result of an air quality review, it appears that any air quality standards or objectives are not being achieved, or are not likely within the relevant period to be achieved, within the area of a local authority, the local authority shall by order designate as an air quality management area (in this Part referred to as a "designated area") any part of its area in which it appears that those standards or objectives are not being achieved, or are not likely to be achieved within the relevant period."

Detailed Assessments and *Further Assessments* of air quality have been carried out which indicated that the annual mean air quality objective for Nitrogen Dioxide (NO_2) of 40µgm^{-3} (40 microgrammes per cubic metre of air) was not likely to be achieved by December 31st 2005 in areas within the vicinity of the M1 motorway, those areas comprising 431premises.

The locations of the 431 premises are shown for convenience on the attached maps, but their addresses, which shall be conclusive, are: -

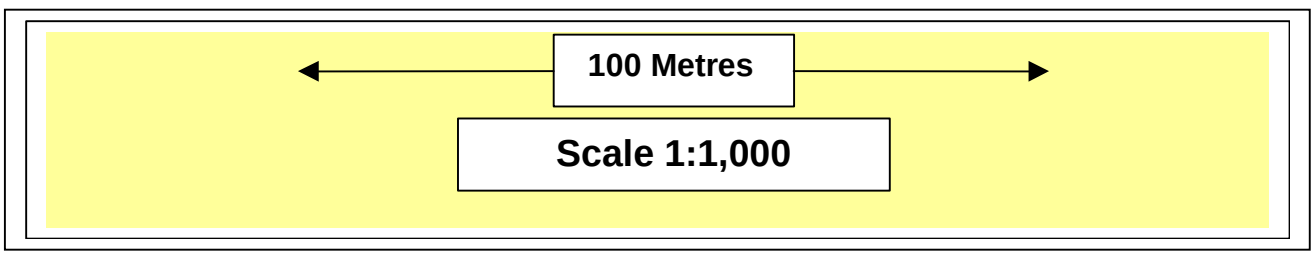
Road	House Numbers names of properties
Abingdon Road	1 - 55 (odd numbers), 36 - 42 (even numbers),
Armitage Gardens	1 to 8 (inclusive)
Bank Close	6 - 18 (even numbers), 9 - 19 (odd numbers), 32 - 46 (even numbers)
Belper Road	2 - 30 (even numbers), 15 - 35 (odd numbers), 9, 11, 19a, 21a
Bradley Road	88 - 98 (even numbers), 99 - 129 (odd numbers), 116, 118, 120, 135 - 147 (odd numbers)
Copperfields	5 - 17 inclusive, 20 - 28 inclusive, 32 - 42 (inclusive), 44
Derby Road	7 - 27 (odd numbers)
Dunstable Road	633, 649 - 657 (odd), 657a, 677, 679, 762 - 768 (even numbers), 681 - 687 (odd numbers)
Eldon Road	51 - 113 (odd numbers), 62 - 104 (even numbers)
Faringdon Road	2 -8 (even numbers)
Gilderdale	12 - 68 (even numbers)
Halfway Avenue	48 - 76 (even numbers), 67 - 85 (odd numbers)
High Street	171 - 181 (odd numbers), 183, 185, 187
Hockwell Ring	82, 93 - 135 (odd numbers), 84 - 134 (even number)
Lime Avenue	57 - 63 (odd numbers), 90, 92, 94
Longfield Drive	2 - 20 (even numbers), 1 - 19 (odd numbers), 17,19
Manor Farm Close	9 - 11 (inclusive)
Raleigh Grove	2 - 14 (even numbers), 1 - 11 (odd numbers), 11a, 14, 16
Saltfield Crescent	43
Seabrook	61 - 71 (odd numbers), 44 - 50 (even numbers)
Withy Close	2 - 16 (even numbers), 1 - 11 (odd numbers)
Wyndham Road	1 - 6 (inclusive)

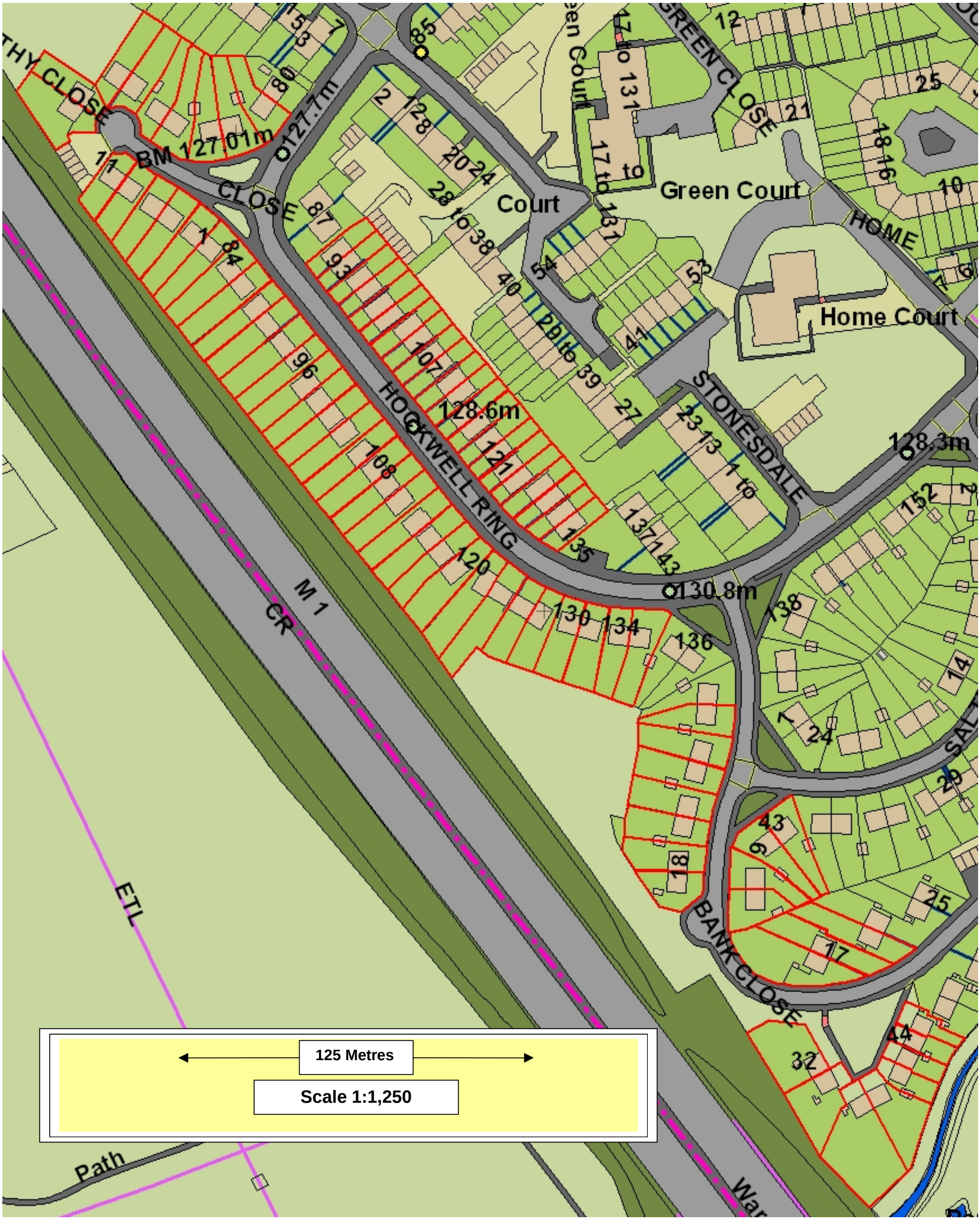
This Order shall come into Effect on 31st March 2005

The pages containing the Maps & Photos in this document should, where possible, be printed on A3 paper. If that is not possible and A4 paper is used, the scales will be numerically greater by a factor of 1:1414 compared to the specified scales.

Various scales have been used in order to maximise the size of the views.

Luton Air Quality Management Area 2005

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BM 127.01m
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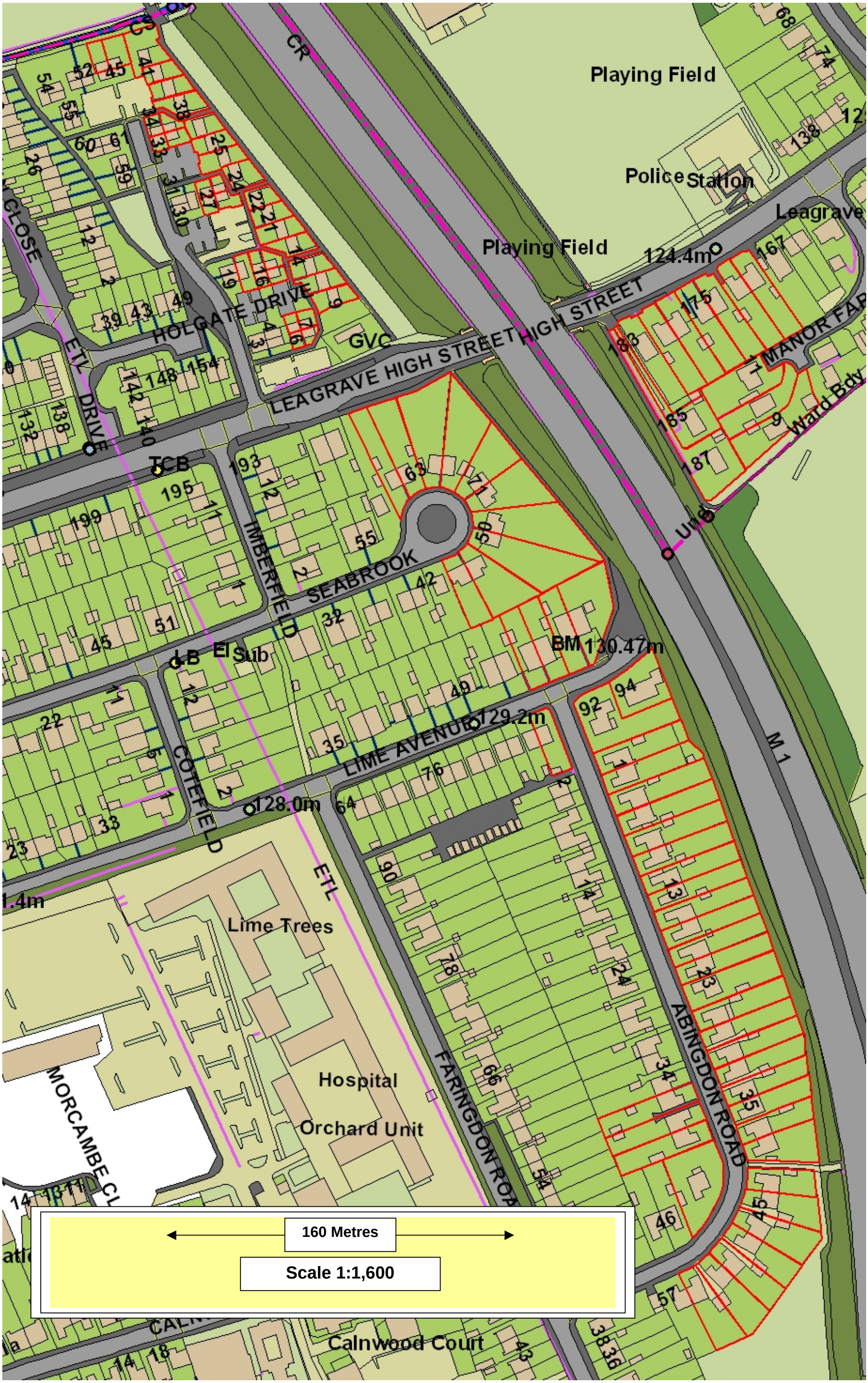
Green Court
HOME
Home Court
STONESDALE
HOCKWELL RING
128.6m
128.3m
130.8m
M1
CR
ETL
Path
125 Metres
Scale 1:1,250


Playing Field
Police Station
Playing Field
124.4m
Leagrave
CR
CS
CLOSE
HOLGATE DRIVE
ETV
DRIVE
GVC
LEAGRAVE HIGH STREET
HIGH STREET
MANOR FAR
Ward Bdy
TCB
IMBERFIELD
SEABROOK
Unit
M1
BM 130.47m
El Sub
LIME AVENUE
129.2m
128.0m
COTEFIELD
ETL
Lime Trees
Hospital
Orchard Unit
MORCAMBE CL
FARINGDON ROAD
ABINGDON ROAD
Calnwood Court
160 Metres
Scale 1:1,600

E:\EnvHlth\EnvProtect\Pollution\reports\LAQM -AQMA order # 2 , version 5 of 11-02-05.doc

END

Appendix 2

Figures

Contents

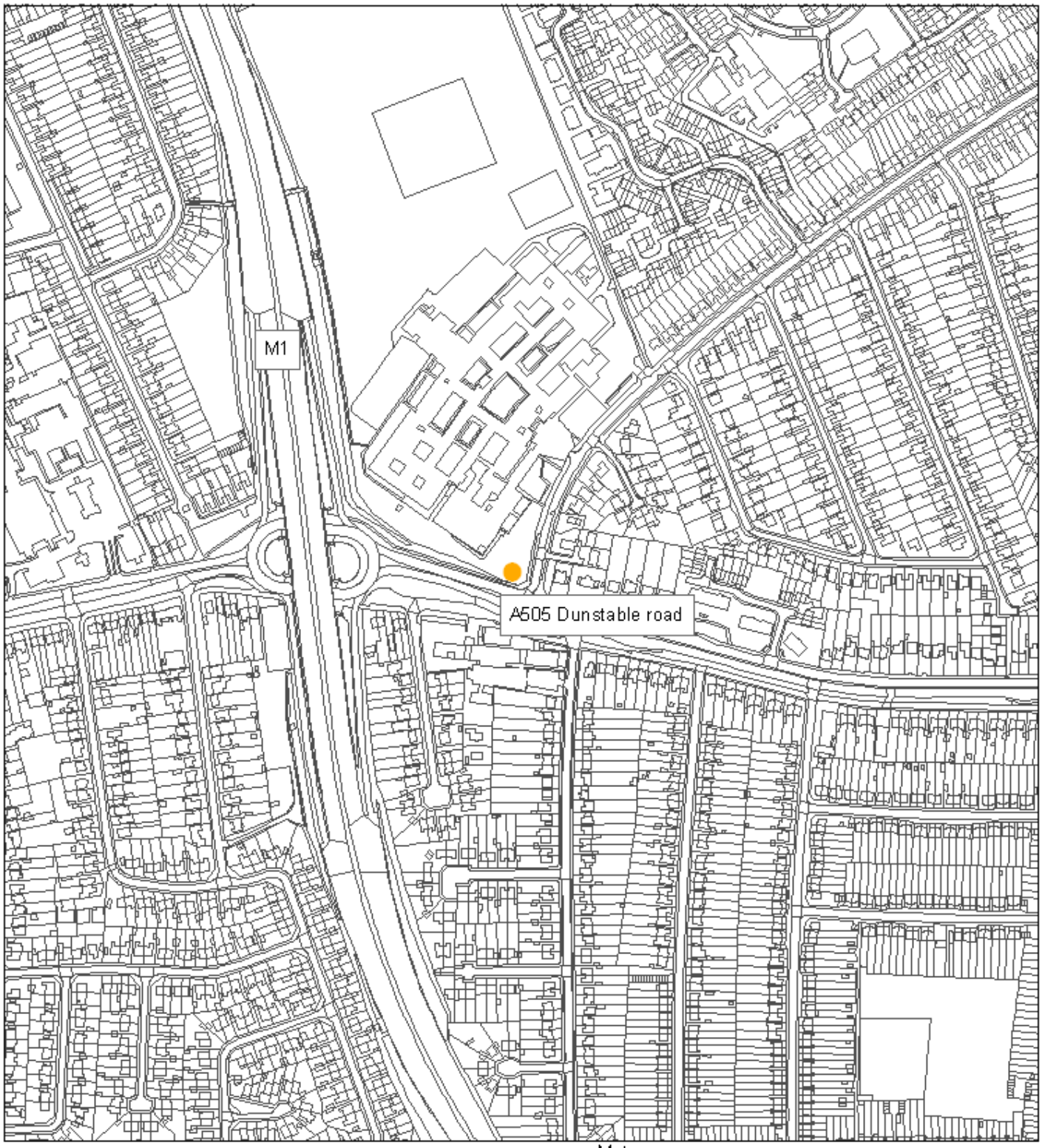


Figure 1: Luton Borough Council Automatic Monitoring Site
Junction 11 of the M1

Grid Reference: 505571,222755

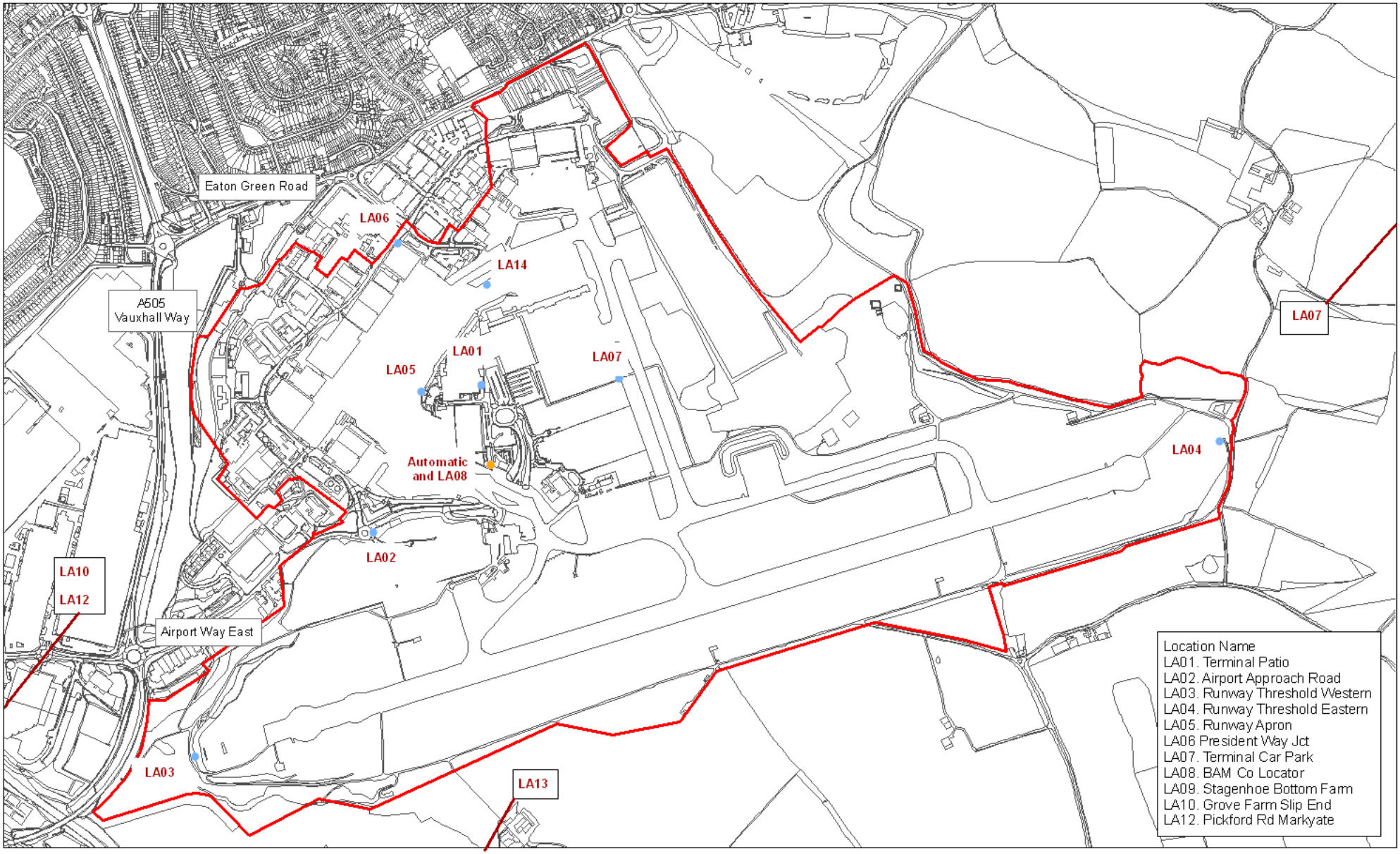


Figure 4: London Luton Airport Monitoring Sites

Legend

- Airport Automatic monitor
- Airport Diffusion tubes
- Airport Boundary

N

0 60 120 240 360 480 Meters

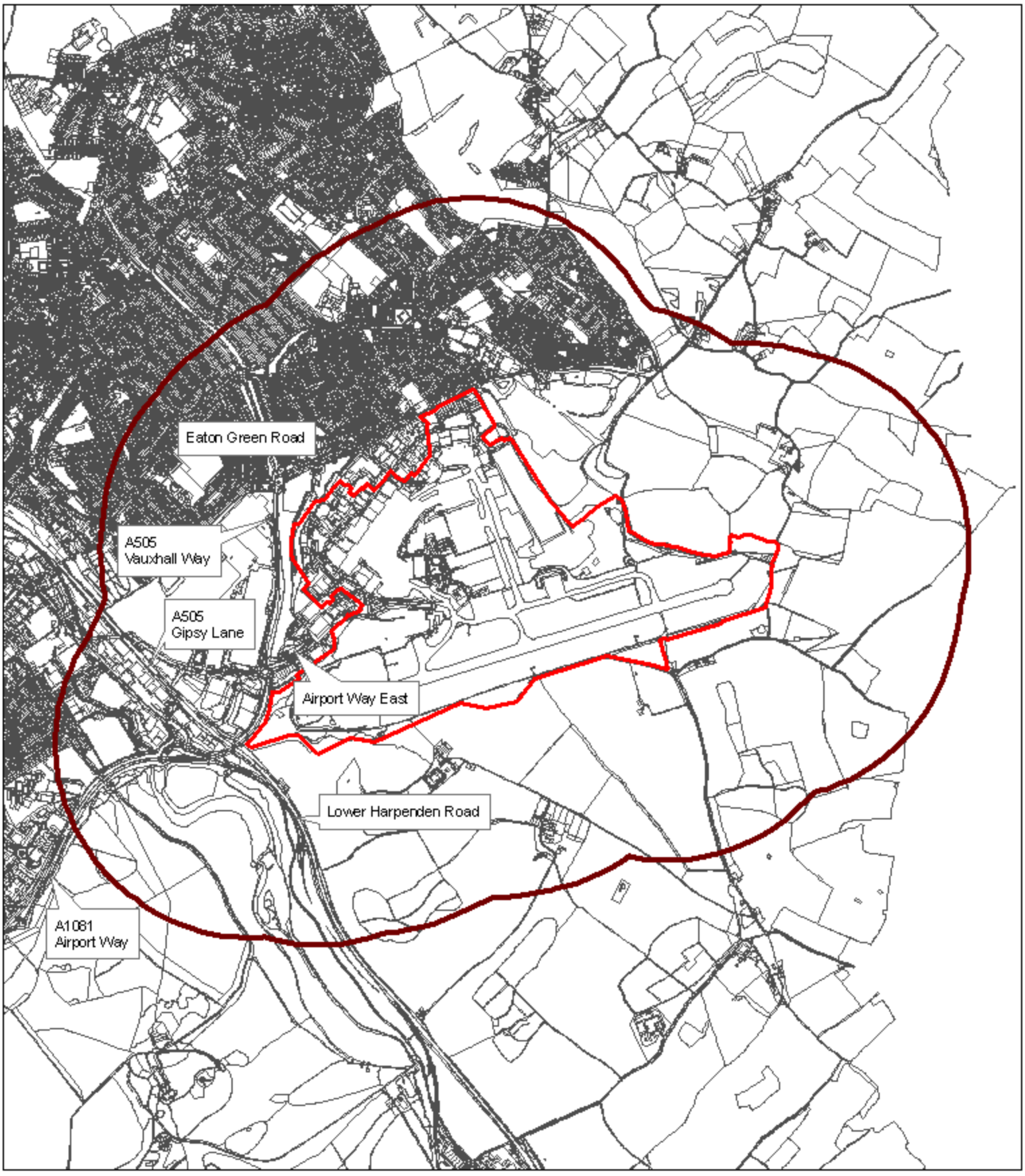


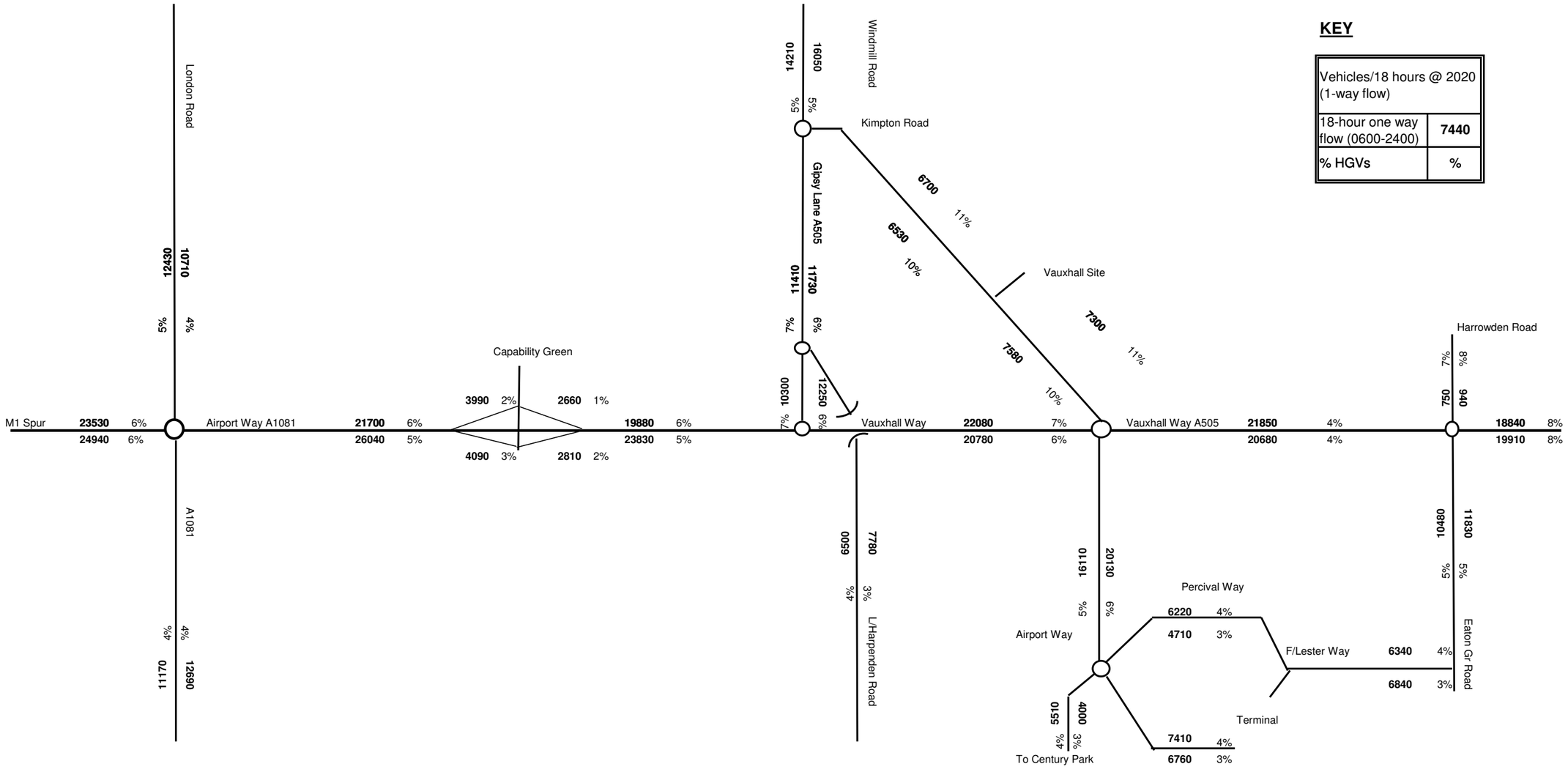
Figure 8: 1000m Buffer Zone Around the London Luton Airport Boundary

Appendix 2

East Luton Corridor Improvements Traffic

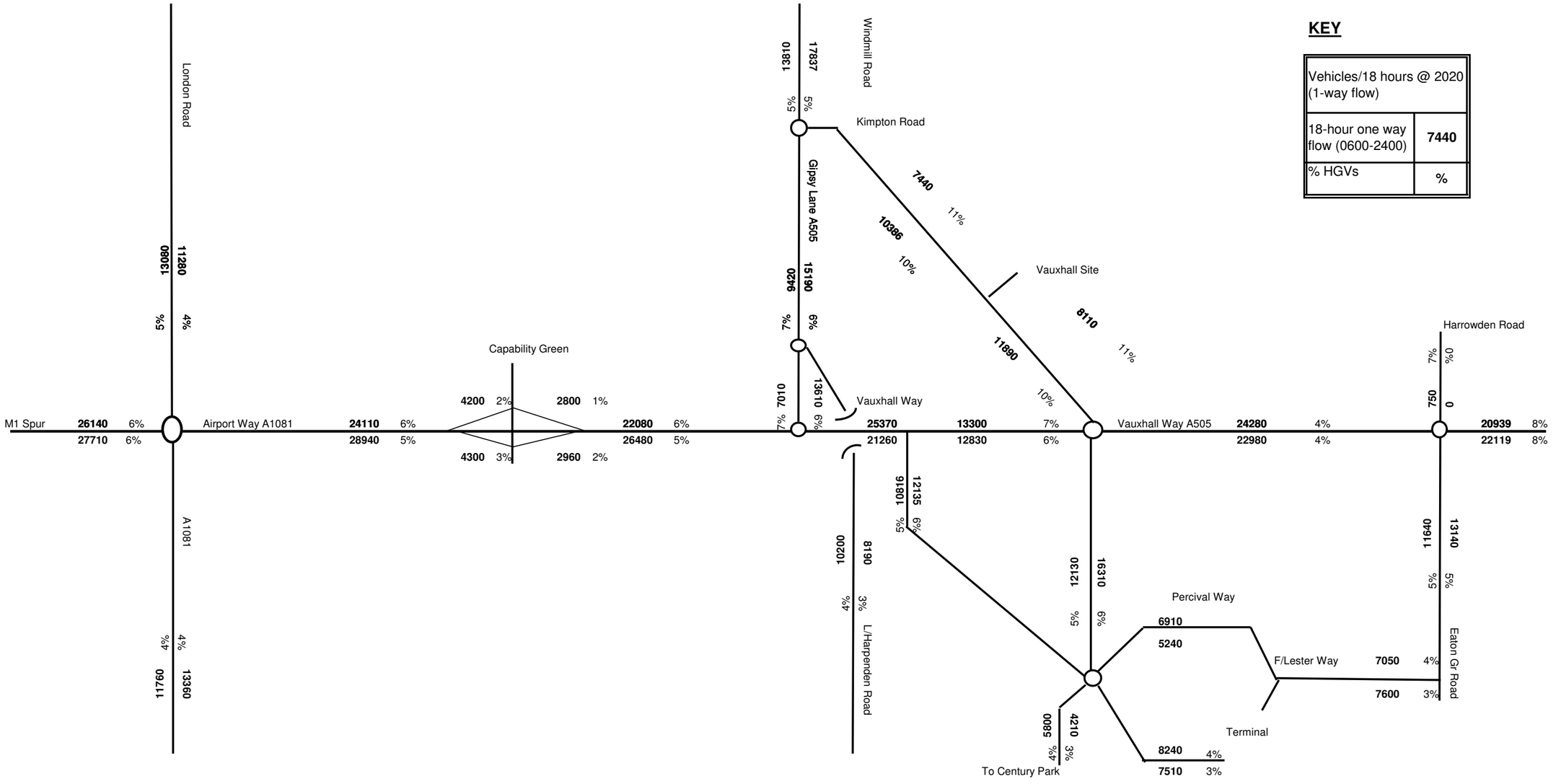
Contents

18 HOUR FLOWS IN 2020 WITHOUT SCHEME (DO MINIMUM)



CONSULTING ENGINEERS **URS** URS House, Horne Lane, Bedford MK40 1TS. Tel: 44 (0) 1234 349641	Project: **EAST LUTON CORRIDOR IMPROVEMENTS**	Client: **AIRO**			
	Drawing: **18 HOUR DO MINIMUM FLOWS**	Drawn: A.J.	Approved: M.R.T.	Scale: N.T.S.	Drg No: Figure 2 / Sheet: 1
		Observed: M.R.T.	Date: 29/08/2003		

18 HOUR FLOWS IN 2020 WITH SCHEME (DO SOMETHING)



CONSULTING ENGINEERS **URS** URS House, Horne Lane, Bedford MK40 1TS. Tel: 44 (0) 1234 349641	Project: **EAST LUTON CORRIDOR IMPROVEMENTS**	Client: **AIRO**			
	Drawing: **18 HOUR DO MINIMUM FLOWS**	Drawn: A.J.	Approved: M.R.T.	Scale: N.T.S.	Drg No: Figure 3 / Sheet: 1
		Observed: M.R.T.	Date: 29/08/2003		

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