Derry City Council

Air Quality Action Plan

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1 Introduction and aims of the Action Plan

1.1 Context

Derry City Council has prepared an Air Quality Action Plan (AQAP) following the declaration of an Air Quality Management Area (AQMA) for nitrogen dioxide (NO_2) at the junction of Creggan Road and Infirmary Road in February 2005. The final AQAP was approved and published in September 2008. Since then, further areas of exceedence of the Air Quality Strategy (AQS) objective for NO_2 annual mean have been identified outside the Creggan Road AQMA, and following Detailed Assessments based on monitoring and dispersion modelling, two new AQMAs have been declared in 2011, one at Dale's Corner in the Waterside and the other at the junction of Buncrana Road and Racecourse Road. Therefore, the Council decided to review and update the first AQAP to incorporate the new AQMAs.

1.2 Profile of the Local Authority

Derry City Council was established under the Local Government Act (NI) 1972 and, is the third largest of the 26 District Councils in Northern Ireland, with a resident population of 107,000. The Council area stretches from the Foyle and Faughan Valleys to the Donegal border and covers an area of approximately 147 square miles (38,500 hectares).

The Council plays a wider role within the North West of Ireland and the city has been recognised by the Department of Environment in its document "Shaping our Future" as, Northern Ireland's second city, the hub of the North West of Ireland and an area of "high growth potential".

Besides being an important centre within the Council district, the City plays a wider role within the North West of Ireland. Its hinterland includes the neighbouring Districts of Strabane, Limavady and Magherafelt and parts of Donegal and further afield. The population of this wider North Western region is more than 300,000.

In its draft Corporate Plan (2011 – 2015) the Council has a vision and ambition for excellence related to enhancing quality of life, which includes a focus on protecting the environment. Directly related to this, the urban regeneration company, Ilex URC's, "One Plan" (Detailed later in Section 3.6), incorporates the public transport measures to be implemented as part of the Integrated Transport Strategy (ITS) for Derry. The completion of a revised Action Plan for the 3 Air Quality Management Areas declared in the city is an important part of this process: **it is crucial to acknowledge that, having explored the feasibility of localised / engineered measures at some of the AQMAs and the fact that many of these measures will not be achievable, other measures, including the suggested Orbital Link with the 3rd Road Bridge and the other key projects of the "One Plan" must now be given prominence.**

1.3 Legislative background

The Air Quality Strategy for England, Scotland, Wales & Northern Ireland provides a framework for air quality control through air quality management and air quality standards. These and other air quality standards and their objectives (the Air Quality Strategy, or AQS objectives) have been enacted through the Air Quality Regulations (Northern Ireland) 2003 in Northern Ireland. The Environment (Northern Ireland) Order 2002 requires District Councils to undertake air quality reviews and assessments. The review and assessment of air quality is the first step in the Local Air Quality Management (LAQM) process. Local authorities have to designate those parts of their areas where the prescribed objectives (see Appendix 1) are not likely to be met by, or at, any point beyond the relevant deadline, as Air Quality Management Areas (AQMAs). This applies only to those locations where members of the public might reasonably be exposed.

1.4 Scope of the Action Plan

Where local authorities have designated AQMAs, they have a duty to produce an Air Quality Action Plan (AQAP). This plan must set out what measures the authority intends to introduce in pursuit of the AQS objectives. The principal aim of the AQAP is to minimise the effects of air pollution on human health within the local authority area

using all reasonable measures, within reasonable timeframes and by working towards achieving the AQS objectives and standards. In order to comply with the AQS objectives it may be necessary to include measures beyond the boundaries of the AQMAs. Some of the measures may also benefit areas not included within AQMAs thereby improving the health of the population in those areas.

Derry City Council has responsibility under Article 13(2) of the Environment (Northern Ireland) Order 2002 to prepare and submit an Action Plan to the Department of the Environment for Northern Ireland. The prime responsibility for preparing and submitting the Action Plan rests with district councils. However, there is a requirement on other relevant authorities to identify proposals in pursuit of the AQS objectives within their respective responsibilities and functions.

This final Action Plan has been added to and developed over the last number of months, in partnership with other relevant bodies, particularly the DRD Roads Service (NI), to incorporate the localised engineered measures in the AQMAs. The completed AQAP will now be circulated to all relevant authorities and strategic partners and to the members of the public.

2 Overview of air quality in Derry

2.1 Local Air Quality Management – Review and Assessment

2.1.1 First and Second Rounds of Review and Assessment

The First and Second Rounds of air quality Review and Assessment for the Derry City Council area was completed in November 2004. The main conclusion was that the AQS objective for nitrogen dioxide (NO_2) was likely to be exceeded at one location, the Creggan Road / Infirmary Road junction in the City.

The principal source of nitrogen oxides emissions is road transport. Nitrogen dioxide is a respiratory irritant associated with both acute (short-term) and chronic (long-term) effects on human health, particularly in people with asthma. Nitrogen dioxide (NO_2) and nitric oxide (NO) are both oxides of nitrogen, and are collectively referred to as nitrogen oxides (NO_x). All combustion processes produce NO_x emissions, largely in the form of nitric oxide, which is then converted to nitrogen dioxide, mainly as a result of reaction with ozone in the atmosphere. It is nitrogen dioxide that is associated with adverse effects upon human health.

Derry City Council subsequently declared an Air Quality Management Area (AQMA) in February 2005 at the Creggan Road/Infirmary Road junction (see Figure 1).

2.1.2 Third Round of Review and Assessment

The Third Round or Review and Assessment started with an Updating and Screening Assessment (USA) of air quality. Similar to Stage One of the previous Round, there was consideration to the seven pollutants of concern to health, and an assessment was made as to whether the AQS objectives for these pollutants would be met. The report was completed in September 2006 and concluded that no further assessment was required for carbon monoxide, benzene, 1,3-butadiene, lead and sulphur dioxide, while further monitoring of particulate (PM_{10}) was required in two areas outside Derry City Centre.

However, new monitoring results suggested that two areas in Derry (outside the Creggan Road AQMA) were at risk of exceeding the annual mean NO_2 AQS objective at the Dale's Corner junction and the Buncrana Road / Racecourse Road junction. Therefore a Detailed Assessment of NO_2 in these areas was required.

The Detailed Assessment was combined with the Further Assessment of the Creggan Road AQMA, also required as part of the LAQM regime. The report, based on detailed dispersion modelling of NO_2 and updated monitoring data at the junctions was completed in August 2006. It concluded that the NO_2 AQS objectives were not breached at Buncrana Road /Racecourse Road and Dale's Corner junction, and that an AQMA was not required in these areas. However, it was recommended that additional monitoring be installed at the façade of a property in Ebrington Terrace at Dale's Corner to confirm the conclusions of the assessment.

The report also concluded that the AQMA in Creggan Road was still required, although it was not necessary to further extend its boundaries. Finally, the report provided a breakdown of the contribution of pollutant sources to the total concentrations and the NO_2 reduction necessary to comply with the AQS objectives. These are discussed in Sections 2.6 and 2.7 below.

The air quality annual Progress Report 2008 confirmed the continuing need for the AQMA and concluded that a new detailed dispersion modelling was required for Dale's Corner junction due to exceedences of the NO_2 annual mean objective recorded at a new monitoring diffusion tube site at no.5 Glendermott Road (site D5).

The Detailed Assessment was completed in May 2009 and confirmed that exceedences of the NO_2 annual mean AQS objective were likely at the façade of properties along Glendermott Road and Limavady Road close to the junction. Following the recommendations of the report, the Council declared a second AQMA for NO_2 at Dale's Corner in December 2011 (see Figure 2).

2.1.3 Fourth Round of Review and Assessment

The Fourth Round of Review and Assessment started in 2009 with a new USA, which reviewed and assessed new monitoring data and potential new sources of pollutants

within the area. There were no new or significantly changed sources identified likely to cause exceedences of the AQS objectives. However, the assessment concluded that a new Detailed Assessment was required with regard to NO_2 at the Buncrana Road / Racecourse Road junction based on updated monitoring data showing exceedence of the NO_2 annual mean AQS objective.

The air quality Progress Report 2010 confirmed exceedences of the NO_2 annual mean AQS objective at several monitoring sites within the Creggan Road / Infirmary Road and Dale's Corner AQMAs, and at the junction of Buncrana Road and Racecourse Road. The Detailed Assessment of Buncrana Road, completed in September 2010, confirmed that a third AQMA was required at the junction for NO_2. The Council declared this new AQMA in December 2011 (see Figure 3).

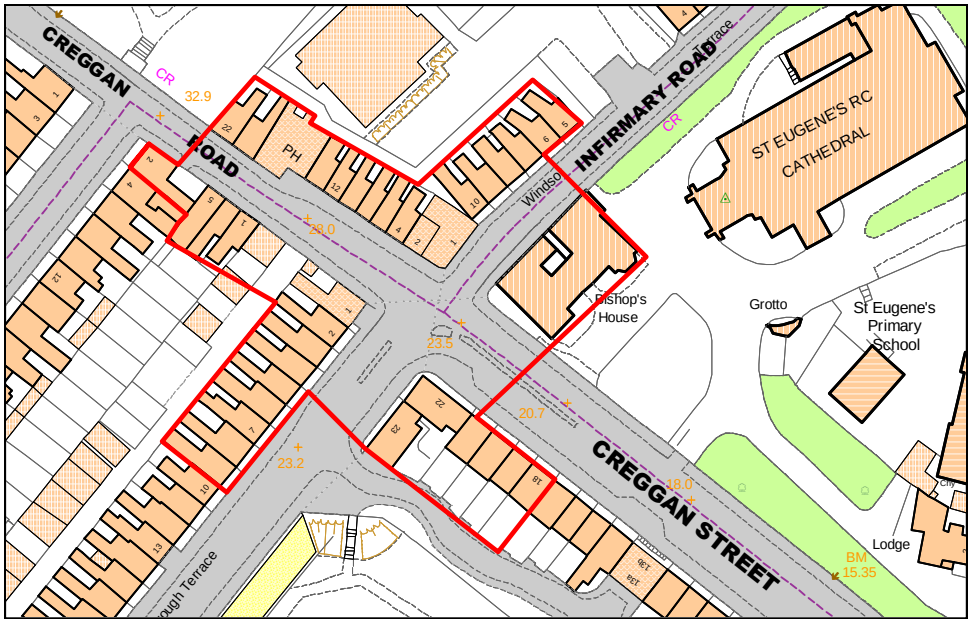
2.2 Creggan Road Air Quality Management Area

The AQMA declared at the Creggan Road/Infirmary Road junction encompasses parts of Creggan Road, Windsor Terrace on Infirmary Road, Creggan Street and Marlborough Terrace on Lone Moor Road (see Figure 1).

Creggan Road is a main arterial route for road traffic from the town centre to main residential areas to the west of the city. The principal cause of the NO_2 exceedences is the level of traffic on Creggan Road, its steep incline and its canyon design.

It would obviously not be cost effective or practical to change the topography and physical structure of the street and so alterations to traffic flow, make-up and emissions may need to be employed. As well as Creggan Road, the associated feeder roads and surrounding area may need to be considered.

Figure 1 – Creggan Road Air Quality Management Area



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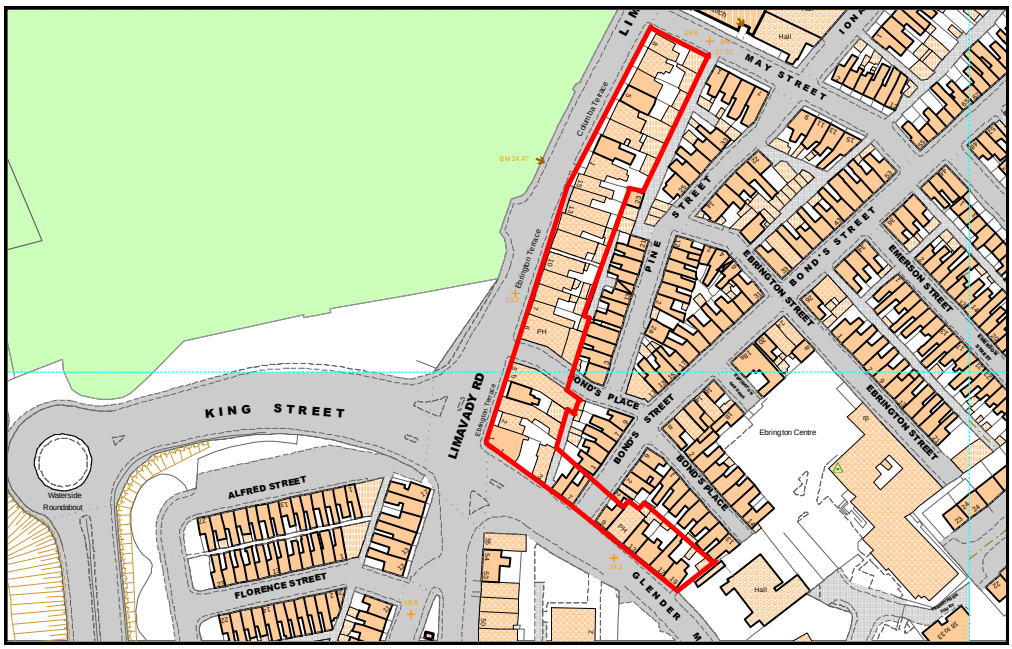
2.3 Dale's Corner Air Quality Management Area

The AQMA declared at Dale's Corner junction encompasses properties on Ebrington Terrace and Columba Terrace along Limavady Road from the junction up to May Street, and properties No's 1 – 19 along Glendermott Road (see Figure 2).

Dale's Corner is a busy junction where three of the city's busiest arterial routes meet: the A2 King Street leading to the city centre West of the River Foyle through Craigavon Bridge and to the main route to Dublin (A5); the A6 Glendermott Road, main route to Belfast, and the A2 Limavady Road providing main access to the city centre from Limavady and Coleraine. Congestion regularly occurs along these roads at the approach of the junction.

Figure 2 – Dale's Corner Air Quality Management Area



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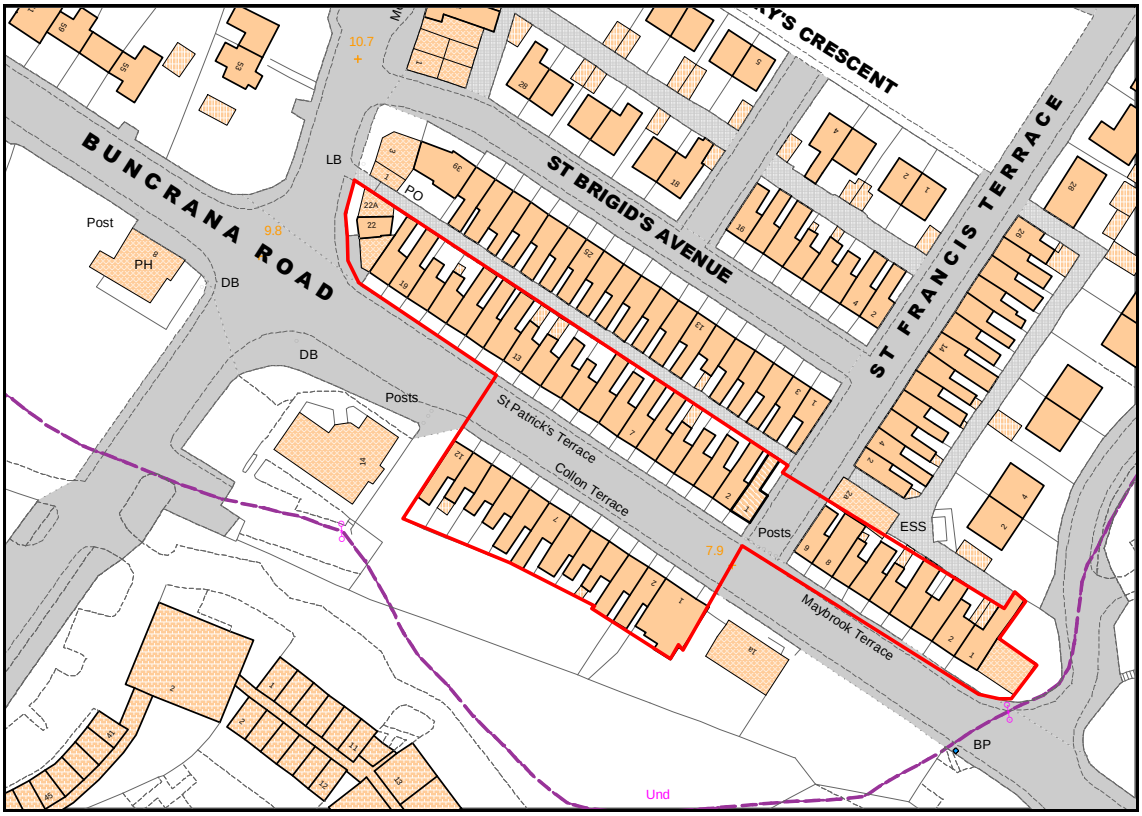
2.4 Buncrana Road Air Quality Management Area

The AQMA declared at the Buncrana Road / Racecourse Road junction encompasses all of St Patrick's Terrace and numbers 1 -12 Collon Terrace to the south east along Creggan Road. Following recommendations of the Further Assessment completed in August 2011, it was decided to extend the AQMA to include properties along Maybrook Terrace (see Figure 3).

Buncrana Road is part of the North Western Key Transport Corridor connecting Belfast to Londonderry and on to Donegal. The busiest section of the road – Pennyburn Roundabout to Springtown Road suffers from traffic congestion and delays occurring at peak periods on every weekday.

Figure 3 – Buncrana Road Air Quality Management Area



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2.5 Monitoring data

A continuous NO_x / NO_2 monitoring analyser is installed at Dale's Corner at the junction of King's Street and Melrose Terrace / Clooney Terrace, just outside the AQMA. Results for years 2007-2011 are provided in Table 1. Further details, including QA/QC procedures, are available in the latest LAQM Progress Report 2011.

Derry City Council also operates a network of NO_2 diffusion tube sampling sites across the City. Until 2011, 50 diffusion tubes were installed across the city, of which 5 tubes located at the Creggan Road / Infirmary Road junction (including 4 tubes within the AQMA – see Figure 4), 4 near Dale's Corner junction (2 in the AQMA – see Figure 5) and 4 near Buncrana Road / Racecourse Road junction (2 in the AQMA – see

Figure 6). Triplicate diffusion tubes are co-located with the NO_x continuous monitoring analyser at Dale's Corner.

In 2011, the Council installed additional diffusion tubes at several new locations, including:

- 3 new sites in Dale's Corner AQMA outside 19 Glendermott Road, 12 Ebrington Terrace and 9 Columba Terrace
- 2 new sites in Buncrana Road AQMA outside 8 Maybrook Terrace and 1 Collon Terrace

Moreover, all tubes installed in the AQMAs (including single tubes already installed before 2011) were duplicated to increase the precision of all monitoring results.

The 2007 and 2008 NO_2 diffusion tube results were analysed by Environmental Services Group Ltd (formerly Bureau Veritas Laboratories); the method used was 10% TEA in water. The 2009 diffusion tubes were analysed by Gradko International Ltd using the newly published practical guidance of 20% TEA in water. The 2010 diffusion tubes were analysed by Environmental Services Group Ltd, also based on the 20%TEA in water preparation method.

Bias adjusted results for years 2007-2011 are provided in Table 2. For 2010, adjusted concentrations based on both local and national adjustment factor are provided as in the Progress Report, as these significantly different. Results based on the local bias factor were worst-case as the adjustment factor was much greater than the national bias factor.

For 2011 data, a local bias adjustment factor of 0.91 has been derived from Dale's Corner monitoring analyser and triplicate diffusion tubes.

Further details, including raw monthly data, annualisation (to account for seasonal adjustment for tubes with less than 75% data capture) and discussion of bias adjustment are reported and discussed at length in recent LAQM reports (Updating and Screening Assessment 2009, Progress Reports 2010 and 2011) and are not reported here.

2.5.1 Measured Concentrations in Creggan Road AQMA

The annual mean NO_2 AQS objective has been exceeded at sites C1a,b C3a,b and C5a,b within the AQMA over the past few years. Site C2a,b also exceeded in 2010, even based on the national adjustment factor. Although it did not exceed in other recent years, results at the site have always been close to the AQS objective of 40µg/m^3. Tubes C4a,b outside the AQMA has been well below the objective over the past few years.

Concentrations measured at site C1a,b installed at the façade of a residential property have been consistently above 60µg/m^3 over the past 4 years, which suggests that there is a risk of breaching the hourly mean AQS objective for NO_2 (of 200µg/m^3 not to be exceeded more than 18 times a year).

The Council has installed a NO_x/NO_2 continuous monitoring analyser close to 3 Creggan Road to gauge the NO_2 hourly mean. Preliminary data will be reported in the Updating and Screening Assessment 2012. Decision whether to declare Creggan Road AQMA for the hourly mean NO_2 will depend on these results.

From 2007 to 2010, the general trend at sites within the AQMA was a regular increase in NO_2 annual mean concentrations, although 2011 results indicate levels similar to 2008 and 2009.

2.5.2 Measured Concentrations in Dale's Corner AQMA

In Dale's Corner two monitoring sites within the AQMA have been consistently exceeding the NO_2 annual mean AQS objective over the past few years: diffusion tube D3a,b (5 Glendermott Road) and D5a,b (4 Ebrington Terrace). These tubes were of particular concern in 2010 as they exceeded or were close to 60µg/m^3, which indicate the potential for an exceedence of the NO_2 hourly mean objective (of 200µg/m^3, not to be exceeded more than 18 times a year). However, 2011 results do not suggest this may be the case.

Diffusion tubes outside the AQMA (D1a,b,c, D2a,b on Clooney Terrace and D8a,b in Melrose Terrace) have been below the objective, although based on the local bias

adjustment factor, 2010 results showed a risk of exceedence (this was not the case if results are corrected based on the national factor). However, concentration monitored in 2011 was back well below the objective.

Results at new site installed in 2011 in the AQMA further from the junction on Glendermott Road (tube D4a,b) show another exceedence of the objective. Levels monitored at new sites along Limadady Road (tubes D6a,b and D7a,b) were below the objective, and show that concentration tends to drop further from the junction.

Results at Dale's Corner continuous monitoring station (outside the AQMA) show an exceedence of the NO_2 AQS objective in 2010. Although there are more uncertainties as results have been annualised due to data capture < 75% in 2010, NO_2 levels at the site have been oscillating over and below the AQS objective of 40µg/m^3 in previous years, which shows that the site is borderline. 2011 monitored levels were back to the low 30s.

As for Creggan Road, the general trend from 2007 to 2010 was an increase in NO_2 annual mean concentrations at all sites across the AQMA, although 2011 levels are back to 2007-2008 levels.

2.5.3 Measured Concentrations in Buncrana Road AQMA

Monitoring sites installed before 2011 within the Buncrana Road AQMA (sites P4a,b St Patrick's Terrace and P6a,b Collon Terrace) exceeded the NO_2 annual mean AQS objective over the past few years, including 2010. Monitored concentrations in 2011 confirm the exceedence at tube P6a,b.

The two sites outside the AQMA (P1a,b and P2a,b along Messines Park) have been consistently below the objective, although based on the local bias adjustment factor, 2010 results did show a risk of exceedence (this was not the case based on the national bias adjustment factor). This was not the case anymore in 2011 with levels back below 30µg/m^3.

Monitored concentrations at the new site installed in the AQMA along Collon Terrace further away from the junction (P5a,b) were below but close to the objective.

Levels monitored at a new site P3a,b along Maybrook Terrace were well below the objective, which seem to indicate that extending the AQMA (based on conclusions of the Further Assessment 2011) may not have been necessary. However several years of monitoring will be necessary to confirm this.

As opposed to concentrations in the other 2 AQMAs, results from 2007 to 2011 suggest a relatively flat trend in NO_2 levels in Buncrana Road AQMA.

Figure 4 - Monitoring Sites Near Creggan Road / Infirmary Road Junction

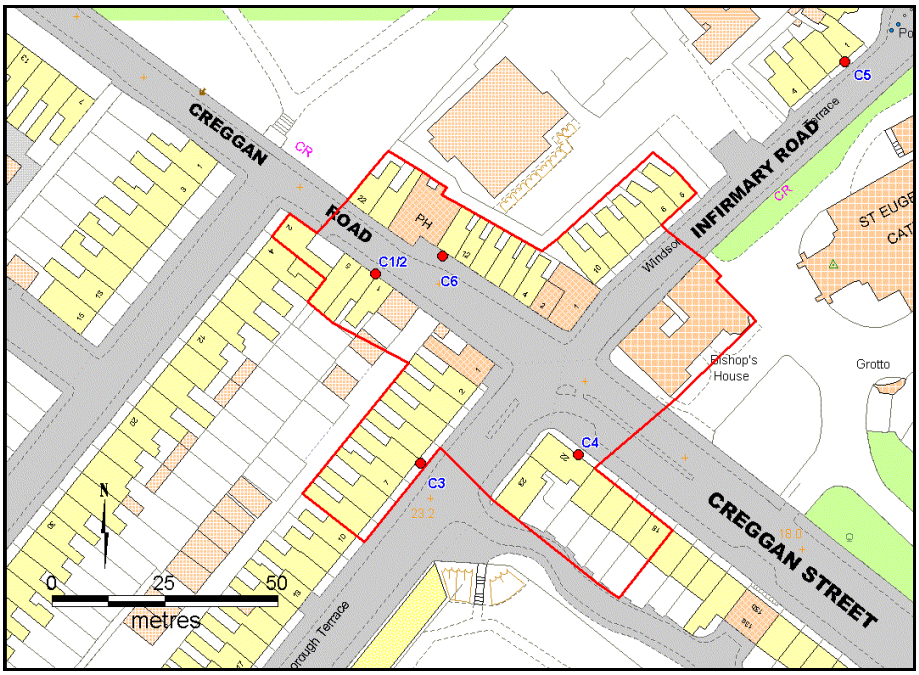

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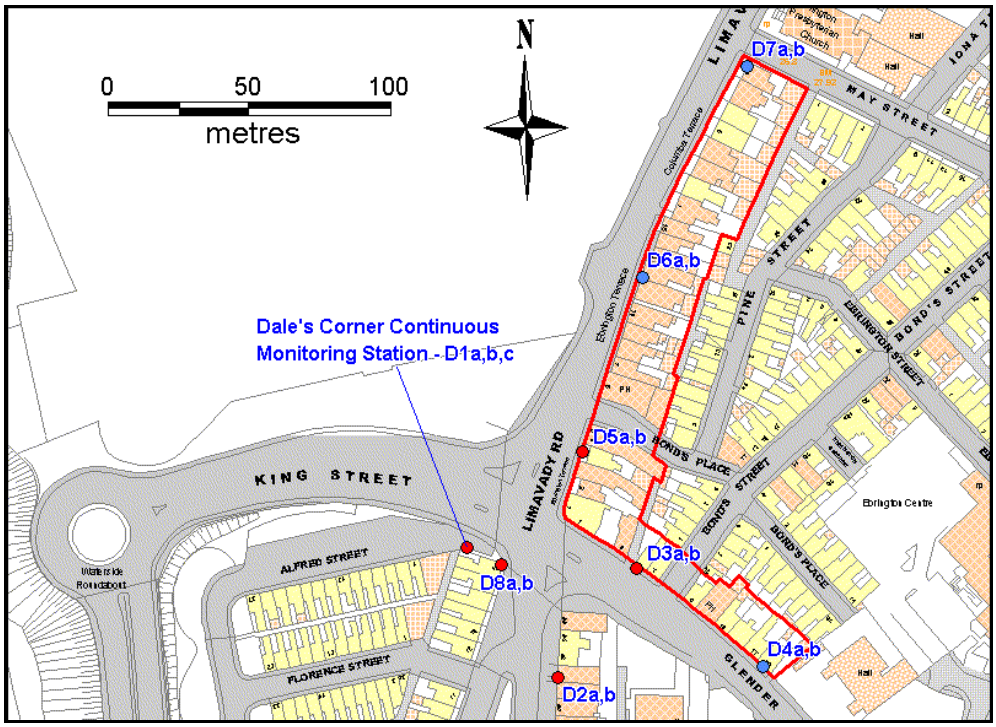
Figure 5 - Monitoring Sites Near Dale's Corner Junction



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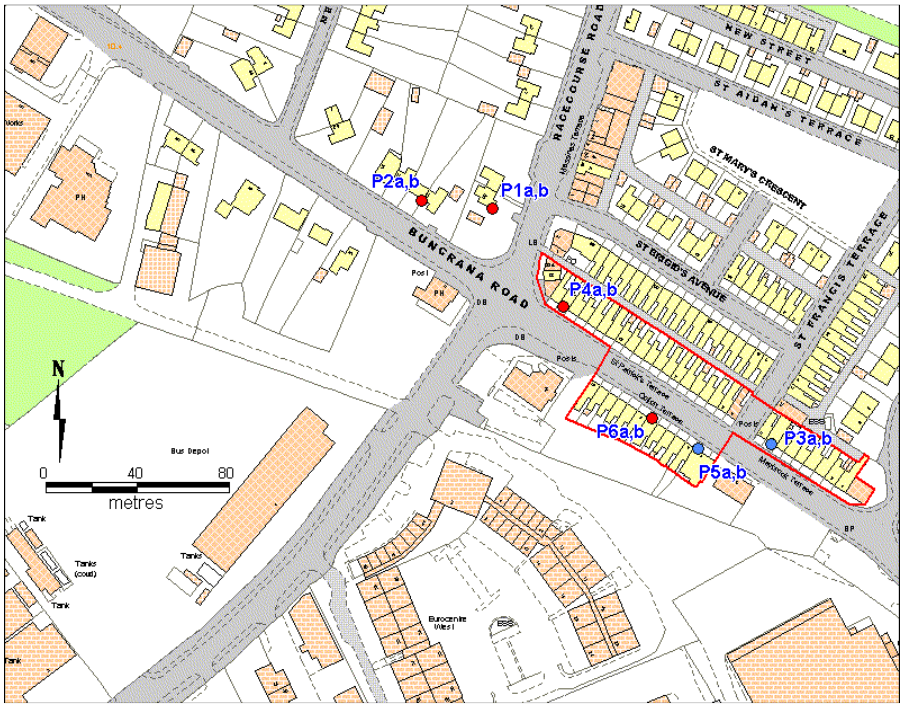
Sites in blue = diffusion tubes installed in 2011

Figure 6 - Monitoring Sites Near Buncrana Road / Racecourse Road Junction



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Sites in blue = diffusion tubes installed in 2011

Table 1 – NO_2 Continuous Monitoring Results Around AQMAs

ID	Location	OS Grid		Site Type	Within AQMA	Year	NO_2 Annual Mean ($\mu g/m^3$)	No. of NO_2 Hourly Means > $200\mu g/m^3$	% Data Capture
		X	Y						
Dale's Corner CMS	Dales Corner	244178	416760	Roadside	No	2007	38.5	0	88
						2008	**40.2**	0	97
						2009	39.0	0	97
						2010	**43.2** (1)	0	77
						2011	34.0	1	99
In bold, exceedence of the NO_2 annual mean AQS objective of $40\mu g/m^3$									
(1) Data Annualised - Detailed provided in LAQM Progress Report 2011									

Table 2 - NO_2 Diffusion Tube Monitoring Results Around AQMAs

AQMA	Old ID	New ID	Location	OS Grid		Site Type	Within AQMA	Annual Mean NO_2 Concentrations (µg/m^3)					
				X	Y			2007 (0.88) (1)	2008 (0.83) (1)	2009 (0.93) (2)	2010 (0.85) (1)	2010 (0.99) (2)	2011 (0.91) (2)
Creggan Road	C1,2	C1a,b	3 Creggan Rd	242913	417144	R	Yes	**58**	**63**	**64**	**79**	**94**	**69**
	C3	C2a,b	6 Marlborough Terrace	242921	417101	R	Yes	31	37	37	**40**	**48**	35
	C4	C3a,b	22A Creggan Street	242959	417102	S	Yes	38	**41**	**42**	**45**	**54**	**42**
	C5	C4a,b	1 Windsor Terrace	243017	417191	R	No (3)	25	31	23	19	23	25
	C6	C5a,b	14 Creggan Road	242928	417148	R	Yes	37	38	**41**	**54**	**63**	**40**
Dale's Corner	D1,2,3	D1a,b,c	Dales Corner	244178	416760	R	No	31	33	35	37	**44**	34
	D4	D2a,b	52 Clooney Terrace	244210	416714	UC	No	25	27	30	34	**41**	25
	D5	D3a,b	5 Glendermott Road	244238	416753	R	Yes	**44**	**53**	**48**	**60**	**71**	**45**
	E1,2	D5a,b	4 Ebrington terrace	244219	416794	R	Yes	NI	**47**	**54**	**57**	**68**	**47**
	E4	D8a,b	17 Melrose Terrace	244190	416754	R	No	NI	NI	27	34	**41**	29
	-	D4a,b	19 Glendermott Road	244283	416718	K	Yes	NI	NI	NI	NI	NI	**51**
	-	D6a,b	12 Ebrington Terrace	244240	416856	R	Yes	NI	NI	NI	NI	NI	38
	-	D7a,b	9 Columba Terrace	244277	416931	R	Yes	NI	NI	NI	NI	NI	32
Buncrana Road	P1	P1a,b	53 Messines Park	243449	419013	S	No	20	21	27	25	29	22
	P2	P2a,b	57 Messines Park	243418	419016	S	No	27	26	28	35	**41**	26
	P3	P4a,b	19 St Patricks Terrace	243480	418970	R	Yes	32	**42**	36	**43**	**51**	33
	P4	P6a,b	5 Collon Terrace	243519	418921	R	Yes	37	**43**	**42**	**44**	**52**	**46**
	-	P3a,b	8 Maybrook Terrace	243571	418910	R	Yes	NI	NI	NI	NI	NI	25
	-	P5a,b	1 Collon Terrace	243539	418908	R	Yes	NI	NI	NI	NI	NI	38

(1) National Bias Correction Factor

(2) Local Bias Correction Factor

(3) C5 changed from no.10 Windsor Terrance (within the AQMA) to No.1 Windsor Terrace (outside the AQMA) in August 2008

Site Type: K=kerbside, R=roadside, S=Suburban, UC=Urban Centre

In bold, sites above the NO_2 annual mean AQS objective (40µg/m^3) - Coloured cells = site within AQMA – NI = Not Installed

2.6 Source Apportionment

A source apportionment has been carried out for each AQMA as part of separate Further Assessments completed following declaration, as required by the Local Air Quality Management regime. Apportionment was based on the following vehicle categories:

- Cars;
- Buses and coaches;
- Light Goods Vehicles (LGVs); and
- Heavy Goods Vehicles (HGVs).

Contribution of background sources (i.e. sources not considered in dispersion modelling) was also provided. Source apportionment was carried out at the worst-case receptor within the AQMA, as recommended in Technical Guidance LAQM.TG(09).

LAQM.TG(09) also recommends the calculation of regional background (for which local authorities do not have control over) and local background contribution (which authorities should have some influence over). This was calculated for Dale's Corner and Buncrana Roads. For Creggan Road AQMA, the Further Assessment was completed before Technical Guidance was updated (in Frebruary 2009) so only general background (local+regional) was calculated at the time.

A summary of source apportionment results is provided for each AQMA below. The full data have been reported in the relevant Further Assessment reports, which are available on the Northern Ireland Air Quality website[1].

2.6.1 Creggan Road AQMA

The Further Assessment of Creggan Road AQMA carried out in 2007 provided the relative contribution to total NO_x concentrations in the AQMA for each source category. The results indicated that:

- Traffic-related emissions contribute up to 79% of the total NO_x concentration, the remaining 21% representing the background contribution from various sources in and around Derry
- HGVs account for up to 30% of the total NO_x , closely followed by cars, which contribute up to 27%

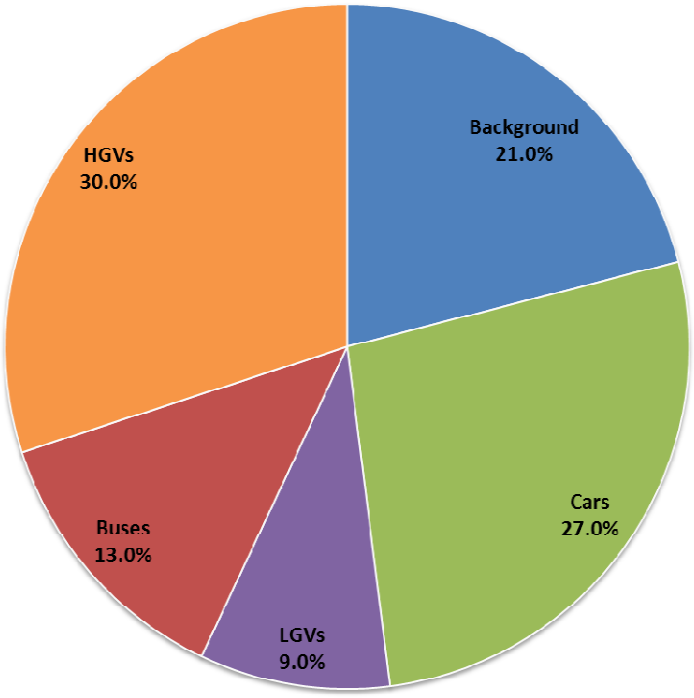
[1] http://www.airqualityni.co.uk/reports.php?n_action=dc_report

- HDVs (the combination of buses/coaches and HGVs) contributed up to 43% of the total NO_x

- The contribution of LGVs is about 9% of the total NO_x

These results are summarised in Figure 7, which shows the breakdown of annual mean NO_x concentration at the worst-case receptor.

Figure 7 – Creggan Road AQMA - Source Contribution to NO_x Annual Mean



2.6.2 Dale's Corner Junction AQMA

The Further Assessment of Dale's Corner Junction AQMA carried out in 2011 provided the relative contribution to total NO_x concentrations in the AQMA for each source category. The results indicated that, at the worst-case receptor:

- Road traffic emissions of NO_x account for 84% of the total NO_x concentration

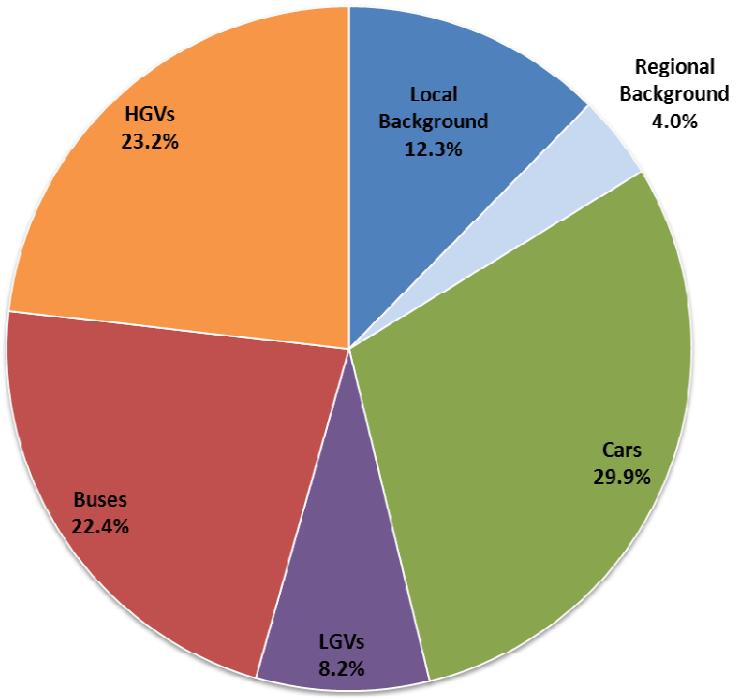
- Local background sources contribute to 12% of the total NO_x concentration, while regional background sources (outside the local authority's control) contribute to 4% of the total NO_x

- Of the overall road-traffic contribution, cars account for near 30% of the overall NO_x concentration, followed by buses and HGVs (about 22-23% each) and LGVs (8%)

- Combined contribution of HDVs (combination of buses/coaches and HGVs) account for 45% of the total NO_x concentration

These results are summarised in Figure 8, which shows the breakdown of annual mean NO_x concentration at the worst-case receptor.

Figure 8 – Dale's Corner AQMA - Source Contribution to NO_x Annual Mean



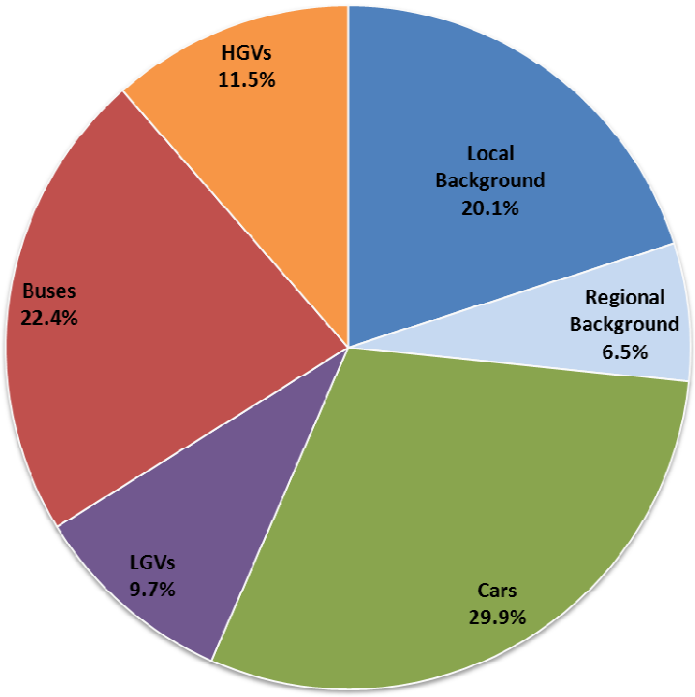
2.6.3 Buncrana Road AQMA

The Further Assessment of Buncrana Road AQMA carried out in 2011 provided the relative contribution to total NO_x concentrations in the AQMA for each vehicle category. The results indicated that at the worst-case receptor:

- Road traffic emissions of NO_x account for 73.5% of the total NO_x concentration;
- Local background sources contribute to 20% of the total NO_x concentration, while regional background sources (outside the local authority's control) contribute to 6.5% of the total NO_x
- The breakdown of road-traffic contribution shows that cars account for about 30% of the overall NO_x concentration, followed by buses (22.5%), HGVs (11.5%) and LGVs (9.5%)
- Combined contribution of HDVs (combination of buses/coaches and HGVs) account for 34% of the total NO_x concentration

These results are summarised in Figure 9, which shows the breakdown of annual mean NO_x concentration at the worst-case receptor.

Figure 9 - Buncrana Road AQMA - Source Contribution to NO_x Annual Mean



2.7 Required Reductions in NO_2

A requirement of the Further Assessments was to determine the amount of NO_2 reduction required at the worst-case receptors within AQMAs. This approach highlights the maximum reduction in NO_2 required (as NO_x, in $\mu g/m^3$) to comply with the AQS objective, and assumes that other receptors will require less of a reduction. For the current assessment, the approach to estimate the required NO_2 reduction was to determine the levels of NO_x for the highest concentrations predicted at sensitive receptors relevant of public exposure.

Results are summarised in Table 3 below for each AQMA, based on the results of dispersion modelling carried out as part of the relevant Further Assessment. As such, values provided below are associated to monitored and/or modelled concentrations for a specific base year (as provided in table), which was different for each assessment. However, they are still deemed valid and provide a good indication of the expected range of reduction in pollutant concentration required for each AQMA to comply with the NO_2 annual mean AQS objective.

2.7.1 Creggan Road AQMA

For Creggan Road AQMA, the maximum predicted road-NO_x reduction required to comply with the NO_2 annual mean AQS objective is 48µg/m^3 along Creggan Road, equivalent to a reduction of 33% in road-NO_x concentrations. This equates to a reduction of 15µg/m^3 in NO_2 levels (equivalent to a reduction of 28% in total NO_2 concentrations).

2.7.2 Dale's Corner AQMA

For Dale's Corner Junction AQMA, the maximum predicted road-NO_x reduction required is 59µg/m^3 along Glendermott Road, equivalent to a reduction of 49% in road-NO_x concentrations. This equates to a reduction of 15µg/m^3 in NO_2 levels (equivalent to a reduction of 28% in total NO_2 concentrations).

2.7.3 Buncrana Road AQMA

For Buncrana Road AQMA, the maximum predicted road-NO_x reduction required is 37µg/m^3 along St Patrick's Terrace, equivalent to a reduction of 42% in road-NO_x concentrations. This equates to a reduction of 11µg/m^3 in NO_2 levels (equivalent to a reduction of 22% in total NO_2 concentrations).

Table 3 – Maximum Required NO_x and NO_2 Reduction in AQMAs

AQMA	Receptor Name and Location	Concentration (µg/m^3)				Required Reduction in Local Road-NO_X		Modelled NO_2 (µg/m^3)	NO_2 AQS Objective (µg/m^3)	Required Reduction in NO_2	
		Modelled Total NO_x	Background NO_x	Road NO_x-Current	Road NOx-Required (equivalent to 40µg/m^3 NO_2)	µg/m^3	%			µg/m^3	%
Creggan Road (1)	3 Creggan Road (Tube C1/2)	165.8	19.3	146.5	98.6	47.9	33%	55.3		15.3	28%
Dale's Corner Junction (2)	GlendermottRd1	144.7	23.6	121.1	61.8	59.3	49%	55.6		15.6	28%
	GlendermottRd2	134.8		111.2		49.4	44%	53.3		13.3	25%
	EbringtonTerrace1_4m	119.9		96.3		34.5	36%	49.7		9.7	20%
	MelroseTerrace1	89.0		65.4		3.6	6%	41.1		1.1	3%
Buncrana Road (3)	7 - St Patricks Terrace	119.9	31.9	88.0	51.1	36.9	42%	51.2	40	11.2	22%
	1 - St Patricks Terrace	112.3		80.4		29.3	36%	49.1		9.1	19%
	3 - St Patricks Terrace	106.7		74.8		23.7	32%	47.5		7.5	16%
	11 - Maybrooke Terrace	101.1		69.2		18.1	26%	45.8		5.8	13%
	4 - St Patricks Terrace	101.0		69.1		18.0	26%	45.8		5.8	13%
	2 - Collon Terrace	100.3		68.4		17.3	25%	45.6		5.6	12%
	16 - Buncrana Road	95.8		63.9		12.8	20%	44.2		4.2	9%
	13 - Buncrana Road	94.5		62.6		11.5	18%	43.8		3.8	9%
	12 - Buncrana Road	91.6		59.7		8.6	14%	42.8		2.9	7%
	5 - Buncrana Road	86.5		54.6		3.5	6%	41.2		1.2	3%

(1) - Results from Further Assessment 2007; dispersion modelling based on year 2006

(2) - Results from Further Assessment 2011; dispersion modelling based on year 2009

(3) - Results from Further Assessment 2011; dispersion modelling based on year 2010

3 Local and regional policies and strategies

There are a number of related policies and strategies, at the local and regional level, that can be tied in directly with the aims of the Air Quality Action Plan. A majority of these policies and strategies are focused on transportation issues, and therefore are likely to help contribute to overall improvements in air quality across the Derry City Council Area.

3.1 Regional Development Strategy

The Regional Development Strategy (RDS) 2025 "*Shaping Our Future*" is a strategy to guide the future development of Northern Ireland. The RDS, published in 2001, has been subject to a 10 year review in 2011, and now offers a strategic and long-term perspective up to year 2035. It provides an overarching spatial framework to influence the future distribution of activities throughout the Region and recognises that development policies will have a significant impact on the environment and the health of individuals. The RDS strategy for Derry, considered as the Hub of the North West, is the improvement and the enhancement of the natural environment, the economic and social opportunities and the encouragement of tourism to the area through improvements in the built environment and transport infrastructure and linkage to the natural gas network.

Changes to the policy updated in 2011 include Strategic Guidance SG16, related to air quality:

> ***"SG16: Reduce our carbon footprint and facilitate mitigation and adaptation to climate change whilst improving air quality"***

SG16 is based on several strategic aims, which are summarised below:

- Consideration needs to be given to ways to reduce energy consumption towards more sustainable methods of production, by, for example, recycling waste and recovering energy from it, which can reduce the use of fossil fuels and greenhouse gas emissions

- Reduce the need to use the car by designating neighbourhoods that have shops, offices, schools, churches, parks and other amenities near homes so that there are greater opportunities to use sustainable modes of transport;

- Adapt the existing transport network to facilitate the modal shift away from cars and favour modes of transport that allow reduction of the Region's carbon footprint

- Increase the use of renewable energies - especially in the power sector - which, along with energy efficiency, is key to achieving emission reduction targets set in the Strategic Energy Framework (SEF 2010) for Northern Ireland[2] (40% of electricity consumption from renewable sources by 2020 as well as achieving 10% penetration of renewable heat).

- Develop strong linkages between policies for managing air pollution and climate change, which share common sources;

- Use more energy efficient forms of transport, relying on more fuel efficient vehicles and vehicles which do not rely on fossil fuels, such as electric vehicles; and

- Improve energy efficiency of buildings to minimise energy use and encourage zero carbon emissions

Strategic Guidance specific to Derry and likely to have an impact on air quality in the city centre also includes SG7:

"SG7: Strengthen the role of Derry as the capital city of the North West"

SG7 especially aims at providing better accessibility to the central area of the city, recognising the need to improve the main radial routes for public transport, walking, and cycling, along with improvement to the interchange facilities between bus and rail.

[2] Strategic Energy Framework for Northern Ireland, DETI NI, September 2010 – Available at http://www.detini.gov.uk/deti-energy-index/deti-energy-strategic-energy-framework.htm

3.2 Regional Transportation Strategy

The Regional Transportation Strategy (RTS) for Northern Ireland 2002-2012 identified strategic transportation investment priorities and considered potential funding sources and affordability of planned initiatives. A New Approach to Regional Transportation is now being developed following consultation on the Review of RTS in June 2011, seeking to build on what has been achieved and summarising the present situation in terms of transportation.

The current RTS focuses on three geographic areas and one overlying Network. These are as follows:

- Belfast Metropolitan Area (BMA), containing the continuous area comprising Belfast City Council and the built-up areas within the Council areas of Carrickfergus, Castlereagh, Lisburn, Newtownabbey and North Down;
- Other Urban Areas (OUAs): collectively those towns described as main or local hubs in the RDS (including Derry) and other towns outside the BMA with a population greater than 5,000);
- Rural Area – the remainder of Northern Ireland; and
- Regional Strategic Transport Network (RSTN) comprising the complete rail network and all motorway and trunk road links (including the Key Transport Corridors and Link Corridors).

The RTS is a “daughter document” of the Regional Development Strategy (RDS). Implementation of the Strategy was through three Transport Plans covering the Regional Strategic Transport Network (RSTN), the Belfast Metropolitan Area (BMA), and the Sub-Regional Transport Plan (SRTP). Transport studies undertaken to support the RSTN Transport Plan took due account of current and future cross-border inter-urban transport demands and the roles of the gateway cities and towns, including Derry. The RSTN Transport Plan is detailed in Section 3.3. The Sub-Regional Transport Plan is detailed in Section 3.4.

3.3 Regional Strategic Transport Network Transport Plan

The Regional Strategic Transport Network Transport Plan 2015 (RSTN TP) has been prepared by the Department for Regional Development (DRD) and covers the complete rail network, five Key Transport Corridors (KTCs), four Link Corridors, the Belfast Metropolitan Transport Corridors and the remaining trunk network across Northern Ireland. The Plan is based on the guidance set out in the Regional Development Strategy (RDS) and the Regional Transportation Strategy (RTS), as described in Sections 3.1 and 3.2, above.

The RSTN TP consists of proposals for transport schemes and measures for the maintenance, management and development of Northern Ireland's Strategic Transport Network until 2015. It also includes a number of measures for rail, bus, roads, walking and cycling.

3.4 Sub-Regional Transport Plan 2015

The Sub-Regional Transport Plan (SRTP) was prepared by the Department for Regional Development (DRD) and completed in 2007. The SRTP is based upon the guidance provided by the Regional Development Strategy (RDS) and the Regional Transportation Strategy (RTS).

Its purpose is to provide more detailed plans for the urban and rural areas with the Sub-Region and highlights proposals specifically designed for Derry.

The SRTP identified separate packages of measures for walking and cycling, bus, rail and highways. These will be subject to availability of land and financial resources and relevant statutory procedures such as planning guidance.

- Improved walk/cycle access to bus/rail station or principal stops
- Highway Measures – town centres need to include traffic measures to lessen the forecast increase in traffic flows, reduction of bottlenecks at junctions, re-direction of traffic away from high-pedestrian flow areas. This may include new roads to new development areas which may be financed by the developer if the need is directly

consequential to the new development, and /or new roads to reduce congestion in town centres or other sensitive areas.

- Parking Measures – provision of short term car parking close to town centres with long stay parking sited further from urban centres (Park and Ride facilities are now operational at 2 locations near the city - at the railway station on Duke Street, 1 mile from the city centre and also at Drumahoe, a small village 4 miles from the city centre), additional provision for blue badge holders, taxi ranks and loading bays, convenience to bus and rail stations.

- Public Transport Measures – upgrade number of bus stops in town centres and well used routes from housing centres, bus priority for bus services especially at entry / exit of stations. Additional taxi ranks with at least one on-street rank wherever practicable.

The improvement of the highways network through link road provisions is considered to lead to the improvement of air quality as adjacent roads would be relieved of traffic flow but may lead to dispersion over a wider area leading to diffuse worsening of air quality. Widening and junction improvements would reduce congestion and improve air quality on these roads and immediately adjacent roads.

Specifically for Derry, there is limited provision of rail services to Belfast, and there are no current plans to improve service provision. A Track Renewals programme is however scheduled for the Derry to Coleraine section of the line, commencing April 2012 until April 2013. The co-ordinated bus service is inconvenient for the town centre so commuters have spilled into residential areas for free, unrestricted parking. A commuter coach service running between Derry and Belfast has proved very popular and taxi provision is good. The current problem for Derry is the increasing traffic flow, fuel tourism from the Republic of Ireland and long delays at junctions to the north of the City, which has led to worsening air quality. The Derry Local Transport Study looked at the limitations of the transport network in 2006 and proposed measures to improve transport and air quality. These were further outlined in the Derry Area Plan.

3.5 Derry Area Plan 2011

The Derry Area Plan 2011 was completed in May 2000 under the provisions of Part III of the Planning (Northern Ireland) Order 1991 by the Planning Service, an Agency within the Department of the Environment.

The Plan provides strategies to achieve key objectives, amongst with the development of a transportation strategy for the City and District, which will have a direct impact on air quality in Derry.

The Plan promotes the concept of sustainable development based on the belief that conservation and development are not mutually exclusive alternatives. As part of the plan a City Development Limit has been established around all future development area beyond which there is a presumption of no further development. This separates Derry City from Culmore, Newbuildings and Strathfoyle and restricts future development to the periphery of the City although it is assumed that this will provide sufficient land for these developments to take place. Thirteen small settlements have been identified in the district which are smaller than villages and do not possess the same range of service provision; these have been selected for limited development such that the character will be reflected in the scale and style of each settlement. The total theoretical provision of future dwellings is 11,500 which is greater the 8,500 dwellings anticipated need.

The Plan outlined development zones within the City Development Limit in which future developments could take place provided that such developments met a number of conditions relating to design. These included the provision of open spaces in housing and commercial developments, satisfactory layouts for pedestrian and cycling linkages and roads layout and car parking and access provision. Proposals close to the City and preserving future access to adjacent parcels would be given greater importance. New Industrial developments in existing industrial areas would only be granted permission if they make full use of the existing infrastructure. Commercial development should consolidate the commercial centre of the City and would not lead to the detrimental impacts on the air quality and traffic movements

The Derry Area Plan 2011 outlined transportation needs in the immediate future in Derry City and the wider Derry-Londonderry district. The strategy of the Regional Transport Plan seeks to:

- Encourage alternative travel modes and reduce dependence on the private car;
- Encourage a high quality accessible public transport system providing a frequent, reliable and popular service;
- Maximise the efficiency of the existing road network by reviewing traffic management measures and implementing low cost improvements;
- Facilitate the safe and convenient movement of traffic and pedestrians by the appropriate development of the local road network;
- Improve cycling facilities and promote, encourage and facilitate increased cycle use.

The Plan sets out a number of policies in areas such as housing, industry and transport:

- **Policy TR 1 Public Transport -** The Department will seek to ensure the development of a high quality public transport system accessible to all. This includes supporting developments in public transport by local operators to take advantage of improvements to the road network. Strategic Highway Proposals also takes into consideration the recommendations of the Derry Transportation Study and include the following schemes:
    - Strand Road widening – now complete;
    - Culmore Road widening; now complete;
    - Queens Quay widening - pedestrian landscaping has been given precedence;
    - Buncrana Road widening, at planning stage;

- Glendermott Road and Dungiven Road widening, now complete;
- Skeoge Link Road, now complete;
- Crescent Link dualling, now complete;
- Maydown to Broadbridge dualling, now complete;
- Newbuildings to Magheramason widening - beginning in October 2012; and
- Culmore Road improvements, now complete.

- **Policy TR 2 Traffic Management/Bus Measures -** The Department will seek to encourage public transport usage by according priority to bus movements where practicable. Bus priority measures will be considered in association with traffic management measures and may include bus priority signals and bus lanes along the Core Public Transport Route.
- **Policy TR 3 Cycling -** The Department will seek to increase cycle activity and provide safe facilities for cyclists – by the development of a national Cycle Network, the implementation of a Riverside Strategy, new cycle routes, integration of cycling in new housing developments were possible, safe routes to school initiatives, and provision of cycle facilities.
- **Policy TR 4: Access to Main Traffic Routes -** The Department will seek to reduce the number of crossover points on dual carriageways as well as controlling access to main routes.
- **Policy TR 5 Car Parking Provision in New Developments -** Taking into consideration existing provision, these would be controlled on a zonal basis as follows:
    - Zone A - the Commercial Core, in which only operational car parking (servicing and other essential operations) would normally be permitted.

- Zone B - the remainder of the Central Area and areas of mixed use elsewhere in the urban area, in which both operational and non-operational car parking would be permitted as determined by the Department.

- Zone C - all other areas in which full operational and non-operational car parking would normally be permitted.

- **Policy IND 1 Assessment of Industrial Proposals -** The Department will consider the scale of the development, any impact on amenity, heritage or nature conservation interest, the design and layout of the scheme, and whether the proposal is appropriate to the character of the area or settlement. The Department will require that all industrial development is carried out to the highest design standards including the provision of access and car parking arrangements.

- **Policy IND 4 Environmental Impact -** In considering planning applications for new industrial development, the potential impact on the environment will be assessed.

3.6 Integrated Transport Strategy and Regeneration Plan

The Integrated Transport Strategy and Implementation Action Plan for Derry ~ Londonderry City Region was commissioned by Ilex-URC, an urban regeneration company established to promote the physical, economic and social regeneration of the city with specific responsibility to manage and re-develop two former military bases of Ebrington (26 acres) and Fort George (14 acres).

A Steering Group has been formed by an appointed transport planning consultancy with members consisting of Ilex-URC, Derry City Council, Donegal CC, Londonderry Chamber of Commerce, Department of Social Development, North West Regeneration Office, DoE Planning Service, Department of Regional Development Roads Service, Translink and Sustrans, to prepare an Integrated Transport Strategy (ITS), giving consideration to all modes of transport, integrated with land-use and

regeneration for the city and city region including cross-border. The final draft ITS was published in April 2009.

In February 2009 Ilex-URC facilitated a Future Search visioning exercise with a representative cross section of our community with varied resources, expertise and formal authority to have a respectful and meaningful conversation about our past, our present and our future. 120 people from the City, the region and other parts of Northern Ireland worked together, to agree a single, shared vision and a set of clear regeneration objectives and priorities for the City. This led to the formation of 12 Sector Working Groups to look at common areas going forward with the development of a Regeneration Plan for the City and its region area. These included the following groups, which could help contribute to improvement of air quality in Derry:

- Health and Well Being
- Environment & Conservation
- Transport and Infrastructure

The Sector Working Group on Transport and Infrastructure reviewed the ITS in the context of the proposed Regeneration Plan and identified the following priorities:

- Reduce congestion and reliance on the private car;
- Create an integrated public transport system;
- Promote safe and sustainable modes of transport; and
- Enhance access and connectivity to, from and within the region

The Regeneration Plan, "*One Plan*", launched on 24 June 2011, makes the following recommendations:

> *"As part of an overarching Integrated Transport Strategy a number of major projects have been proposed to create a fully integrated transport network. To*

ensure that there is an effective and efficient transport system operating it is essential that all of the elements of the strategy are implemented, one element will provide minor improvements but it is only through a co-ordinated approach that all elements will be implemented and real transformational changes to the network are achieved that will help target issues of accessibility"

The key projects are:

- Quality Bus Corridors (QBCs) and Feeder Taxi Services;
- Upgrade of the Rail Line and Rolling Stock;
- Upgrade of the A5 and A6 (to include the Atlantic Corridor);
- Orbital Link with the 3rd Road Bridge; and
- Implementation of Walking and Cycling Masterplan.

Aims include improved accessibility and reduction in car dependence, consideration of the most promising alternatives to the car, penalisation of the car user in order to get these alternatives used and assessment of required transport arrangements for major new developments. The ITS Group aims to broaden the Sub-Regional Transport Plan to take account of the above aims.

An Implementation Action Plan has also been devised with a commitment to costs / actions by executive agencies, provision of infrastructure and services including detailed planning and economic studies. Further information is provided in Appendix 4.

One of the key objectives of the strategy is to achieve a modal shift from the private car to other forms of transport. By offering a fully integrated network, people have more attractive and efficient modes of travel to choose from and are less likely to rely on private transport and align with the City's commitment to sustainability.

The above proposals are a mixture of short, medium and long term objectives. Benefits to the AQMAs declared in Derry are difficult to assess but expected outcomes from their implementation will include:

- Improved Public Transport
- The proposed orbital route will remove HDV traffic from the city centre and congested areas associated with the AQMA
- Travel across the City will be more efficient and less congested
- Increased use of cycling and walking

The proposed steps are City wide proposals and will not negate the need to take other specific measures already mentioned in the Air Quality Action Plan.

Indeed, regarding increased use of walking, a project officer is currently in place and is undertaking research on the development of the Real Walkability Network (RWN) for Derry. The work is primarily aimed at promoting physical activity and talking obesity but will have benefits to the wider environment by providing information to policy makers and helping to promote walking.

Entitled "**Knowledge Exchange, Spatial Analysis and Health Urban Environments: Integrating Walkability Models Into Practice**", this project aims to maximise the policy impact of research already undertaken on walkability, by extending the applicability of developed policy tools to a variety of public bodies and further dissemination to potential practice-users, in order to increase the evidence base for interventions in the built environment aimed at promoting physical activity.

Through the engagement with end users, the project also seeks to improve researcher's' understanding of the needs of decision-makers, to provide a virtuous circle of research, implementation and feedback. It will do this through placements, workshops and policy briefings.

The specific objectives of the project are to:

- Develop the Real Walkability Network (RWN) and associated walkability model as a policy-support tool for increasing physical activity in the cities of Belfast and Derry, including expanding the coverage of detailed elements of the GIS tool to encompass both these local authority areas.

- Further develop the analytical functions of the walkability model and associated data to align with specific council initiatives, including improved park management, increased connectivity, promoting "shared space" and prioritising infrastructure investment for physical activity;

- Develop an evidence base of built environment attributes in Derry and Belfast that can contribute directly to the delivery of strategies for physical activity, including the NI Obesity Strategy, the Cardiovascular Service Framework, the forthcoming **Active Travel Strategy** and the forthcoming Regional Transportation Strategy;

- Provide direct training to local government officers in Belfast and Derry City Council so they are able to integrate and expand the use of the tool as a sustainable part of the Councils' activities.

- Identify further opportunities for implementing the walkability tool in other settlements across Northern Ireland;

- Disseminate the use of GIS-based walkability tools in other UK cities as a decision-support tool for promoting physical activity.

The work is currently progressing and is to be reported to Derry City Council's Access Forum this summer. The findings will be incorporated, where possible, in future Action Plan Progress Reports.

4 Consultation

Local Authorities are required to consult on their LAQM Action Plan. It is important for the success of the Action Plan to seek involvement from all local stakeholders including local residents, community groups and local businesses in the drawing up the Action Plan in addition to their active participation in achieving the action plan measures. The Action Plan has been drawn up for consultation with relevant environmental health and transport representatives from Derry City Council.

The following is a list of statutory and non-statutory consultees to which the Plan has been sent:

- The Secretary of State
- Department of the Environment / The Environment and Heritage Service
- Department of Regional Development
- Primary Care Trusts
- Derry City Council Councillors and Officers
- Neighbouring local authorities
- Local residents within and bordering the AQMA (Updating letter sent)
- Relevant local businesses, community groups and forums
- Other relevant local stakeholders

All comments from both Statutory and non-statutory consultee's received on the draft Action Plan have been considered and incorporated where appropriate into the final Action Plan. The Plan will now be presented to Derry City Council for endorsement and subsequently placed on the Northern Ireland Air Quality website[3].

[3] http://www.airqualityni.co.uk/reports.php

5 Action Plan Proposals for Derry City Council

It is essential that all relevant authorities as defined in the Air Quality Regulations (Northern Ireland) 2003 provide the Council with the necessary information on their proposals that will ensure that the required reduction in Nitrogen Dioxide outlined above is achieved by 2010. In particular, as the major source of pollution in the AQMAs is transport related those relevant authorities with responsibilities for transport have a very important role.

A summary of these proposals is outlined in the following pages, including the impact and timescales for these proposals. In order to inform the action planning process a simple assessment of the cost and benefit of each proposal has been undertaken. The following table gives an indication of the scoring used. A simple multiplication of the cost and impact gives some indication as to the cost effective score of the proposals.

A summary of predicted impact of potential measures tested as part of the Further Assessment of each AQMA is also provided in Section 5.1.

Table 4 - Scoring Used to Assess and Prioritise Proposals

Costs		Air Quality Impacts		Timescale	
Score	**Approximate Cost**	**Score**	**Indicative Impact**		**Years**
7	<100k	7	>5 µg/m^3	Short (S)	1- 2
6	100-500k	6	2-5 µg/m^3		
5	500k-1million	5	1-2 µg/m^3		
4	1-10 million	4	0.5 - 1 µg/m^3	Medium (M)	3-5
3	10-50 million	3	0.2 – 0.5 µg/m^3		
2	50-100 million	2	0 - 0.2 µg/m^3		
1	>100million	1	0 µg/m^3	Long (L)	6+

5.1 Scenario Testing of Potential Traffic Measures in the AQMAs

Source apportionment work carried out as part of the Further Assessment 2007 (for Creggan Road AQMA) and 2011 (for Dales' Corner and Buncrana Road AQMAs) (see Section 2.6) provided evidence that cars and Heavy-Goods Vehicles (HGVs) are the main contributors of the total NO_2 concentrations measured in Creggan Road and Buncrana Road AQMAs; whilst for Dale's Corner AQMA, cars and buses are the key contributors.

A series of road-traffic scenarios were tested as part of the Further Assessments, and conclusions are summarised in sections below for each AQMA.

5.1.1 Creggan Road AQMA

Derry City Council has worked with the Department for Regional Development (Roads Service Agency) to identify potential traffic measures that could be implemented in the AQMA to reduce NO_2 levels.

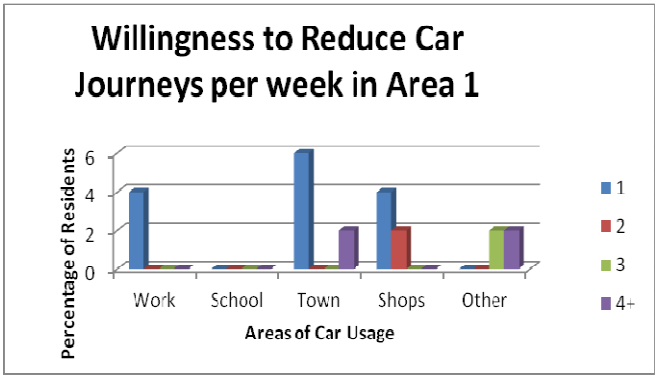
Quantification of their impact on pollutant levels was carried out based on dispersion modelling. The results of the modelling are provided in Appendix 2. It is acknowledged that there may be difficulty in realising Scenario 1 (restriction of all Heavy-Duty Vehicles in all links in and out of the junction). Therefore, although not modelled, a combination of Scenario 4 (part restriction of HDVs) with Scenario 2 (5% decrease of the overall traffic in the AQMA - all types of vehicles) is likely to have a similar beneficial effect on air quality as Scenario 1, as the predicted results show a further decrease in NO_2 annual concentrations.

However, there will still be access for deliveries to dwellings and businesses in the AQMA and surrounding areas. Also, policing of the traffic restrictions will not be continuous and deterring drivers to other routes away from the AQMA, to achieve the 5% reduction in overall traffic, will be down to good-will.

In this context, it is therefore considered essential that additional measures are incorporated into the Action Plan to further assist in reducing traffic at this location.

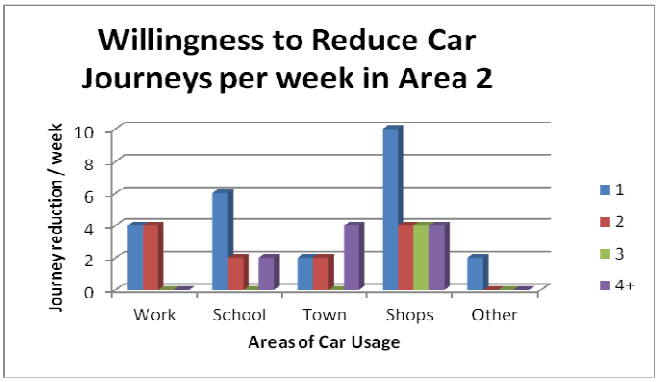
A survey[4] was conducted at the Creggan Road area to gauge residents' opinions / travel habits. 100 residents were surveyed - 50 from within the AQMA area (Area 1) and 50 from outer Creggan Road area (Area 2) – approximately 1 mile away from the AQMA. The following tables summarise responses for both areas.

Table 5 – Creggan Road Travel Habits Survey – Area 1 (AQMA)



Car use/week	1	2	3	4+
Work	4%	0%	0%	0%
School	0%	0%	0%	0%
Town	6%	0%	0%	2%
Shops	4%	2%	0%	0%
Other	0%	0%	2%	2%

Table 6 - Creggan Road Travel Habits Survey – Area 2 (Outer Creggan Road Area)



Car use/week	1	2	3	4+
Work	4%	4%	0%	0%
School	6%	2%	0%	2%
Town	2%	2%	0%	4%
Shops	10%	4%	4%	4%
Other	2%	0%	0%	0%

The research carried out showed that Area 1 residents are less responsible than Area 2 for the high levels of pollution in the AQMA and also that Area 1 residents were

[4] Attitudinal Alternative Travel Survey: Derry City Council's Air Quality Management Area at Creggan Road / Infirmary Road Traffic Junction, Gary Mc Geehan, dissertation submitted to the University of Derby in partial fulfilment for the degree of Master of Science in Environmental Health, 2011

more reliant on public transport than those in Area 2. There is substantially less car ownership in Area 1 with 14% willing to use the car less. Area 2 has much greater car ownership with 44% willing to use the car less, an encouraging trend.

5.1.2 Dale's Corner AQMA

The impact of several potential mitigation measures for Dale's Corner AQMA has been modelled as part of the Further Assessment completed in 2011. The measures considered included:

1. The realignment of the A2 Limavady Road 5m away from the nearest properties;
2. A change in traffic lights sequence to allow more free-moving traffic on the A2 Limavady Road; and
3. Several scenarios of reduction in Heavy Goods Vehicles (HGVs) at the junction.

Although these mitigation measures were deemed feasible at the time the Further Assessment was carried out, implementation for measures 1 and 3 now appears unlikely following further discussions with DRD Roads Service due to funding issues. Reducing HGVs at the junction is deemed difficult to implement due to a lack of alternative route. DRD Roads Service are currently investigating the possibility of implementing measure 2.

Moving the A2 Limavady Road further away from the properties located on the East side of the road was initially proposed as the land directly to the West of the A2, currently occupied by Ebrington Barracks (an old military base) was about to be redeveloped, which provided the opportunity. Results of the dispersion modelling showed that, although concentrations were still predicted to be above (only just slightly) the objective, a reduction of up to 16% in NO_2 annual mean concentration (8µg/m^3 decrease) was likely for properties on Ebrington Terrace as a result of the realignment.

The change in traffic lights sequence at Dale's Corner junction was proposed as a potential way to ease the flow of traffic going through the AQMA, particularly for vehicles moving southbound on the A2 Limavady Road and turning left to the A6 Glendermott Road. The impact of this measure was modelled based on potential changes (increase) in average vehicle speed that could be achieved. The Further Assessment concluded that, although concentrations were still predicted to be above the objective following implementation, this measure would reduce NO_2 concentrations significantly at the façade of properties in the AQMA along Glendermott Road and Ebrington Terrace. The predicted NO_2 reduction was in the range of 5% to 10% (2µg/m^3 to 6µg/m^3), depending on the average increase in vehicle speed considered in the modelling (from +5kph to +15kph).

A third potential measure considered in the Further Assessment was the reduction of Heavy-Goods Vehicles (HGVs) transiting through the junction, which account for nearly a quarter of the overall NO_x concentration levels at the junction (see Section 2.6.2). A range of hypothetical HGV traffic reductions were investigated based on dispersion modelling. Results showed that no significant reduction was likely to be achieved below a 50% reduction in HGV flows, and that this measure alone would not result in compliance with the NO_2 annual mean AQS objective at all properties in the AQMA. Although not technically feasible, a full ban in HGVs showed that concentrations would reduce by 7 to 8µg/m^3 in the AQMA and 2 to 4µg/m^3 outside the AQMA. A more reasonable – although still difficult to achieve - 50% reduction was likely to reduce NO_2 levels below the AQS objective along Melrose Terrace but not along Ebrington Terrace or Glendermott Road.

An attitudinal survey[5] was also conducted in this area to gauge residents' opinions / travel habits. 75 households were surveyed from each zone, providing an overall sample of 150 participants. Figure 10 and Table 7 summarise responses for both areas.

[5] A Critical Evaluation of the Derry City Council's Strategies to Tackle NO_2 Pollution at Dale's Corner, Derry, Northern Ireland", Edward Broderick, Dissertation presented for the Honours Degree of BSc School of Geography University of Nottingham, 2009)

Figure 10 – Dales Corner - Reasons for Residents Not Using Public Transports

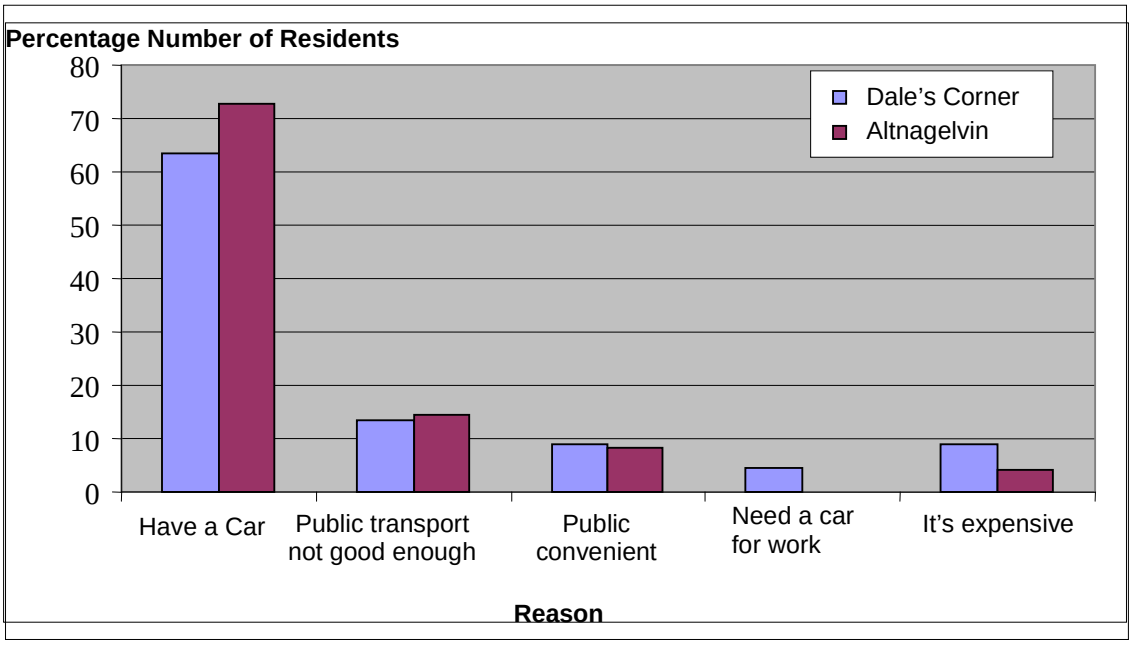


Table 7 – Dales Corner - Willingness of Residents to Change Travel Habits

Use car less?	Residents in Dale's Corner	Residents in Altnagelvin
Yes	20.5	35.6
No	75.0	60.3
Maybe	4.5	4.1

The Research has shown that the residents who live in closest proximity to Dale's Corner are less responsible for the rise in pollution than those who live further out in areas such as Altnagelvin (1 mile away along the main arterial route into Dale's Corner). This conclusion has been reached due to the fact that there is a greater degree of car ownership in households in Altnagelvin, whose main access to the city centre is through Dale's Corner. Residents in this area use public transport less suggesting a greater reliance on cars than those in Dale's Corner. These findings reflect those found for the Creggan Road junction. It is apparent that traffic from outside the central areas of the town is contributing most to pollution levels.

From local knowledge, it is apparent that a substantial percentage of traffic traversing the junction is Heavy Duty Vehicles coming from Londonderry Port and Harbour to other towns outside Derry. The suggested Orbital Link around the city would alleviate most of this traffic class. Consideration is also being given to targeting the source of the pollution: it may be prudent to investigate the suitability of this location for designation as a Low Emissions Zone.

5.1.3 Buncrana Road AQMA

As for Dale's Corner, the Further Assessment of Buncrana Road AQMA considered the potential for reduction of Heavy-Goods Vehicles (HGVs) transiting through the AQMA. A range of hypothetical reductions in HGV flows were assessed from 25% up to 100% (full ban).

Modelling results showed that a 25% reduction in HGV would lead to an average reduction in NO_2 concentration of up to 4% (a 2µg/m^3 decrease); not sufficient to comply with the AQS objective. A 50% reduction would equate to a reduction of 3 to 4µg/m^3 in NO_2 levels, which would mean compliance with the objective at one property. A full ban on HGVs was predicted to reduce NO_2 levels by a maximum of 12% (a 6µg/m^3 decrease), but exceedence of the objective were still predicted at several properties along Buncrana Road.

Although a reduction of HGV flows transiting through the AQMA is not likely to lead to compliance, the assessment showed that significant reductions in overall NO_2 could be achieved. However, implementation of HGV restrictions at the junction proves to be very difficult, perhaps unachievable, due to the lack of rerouting options.

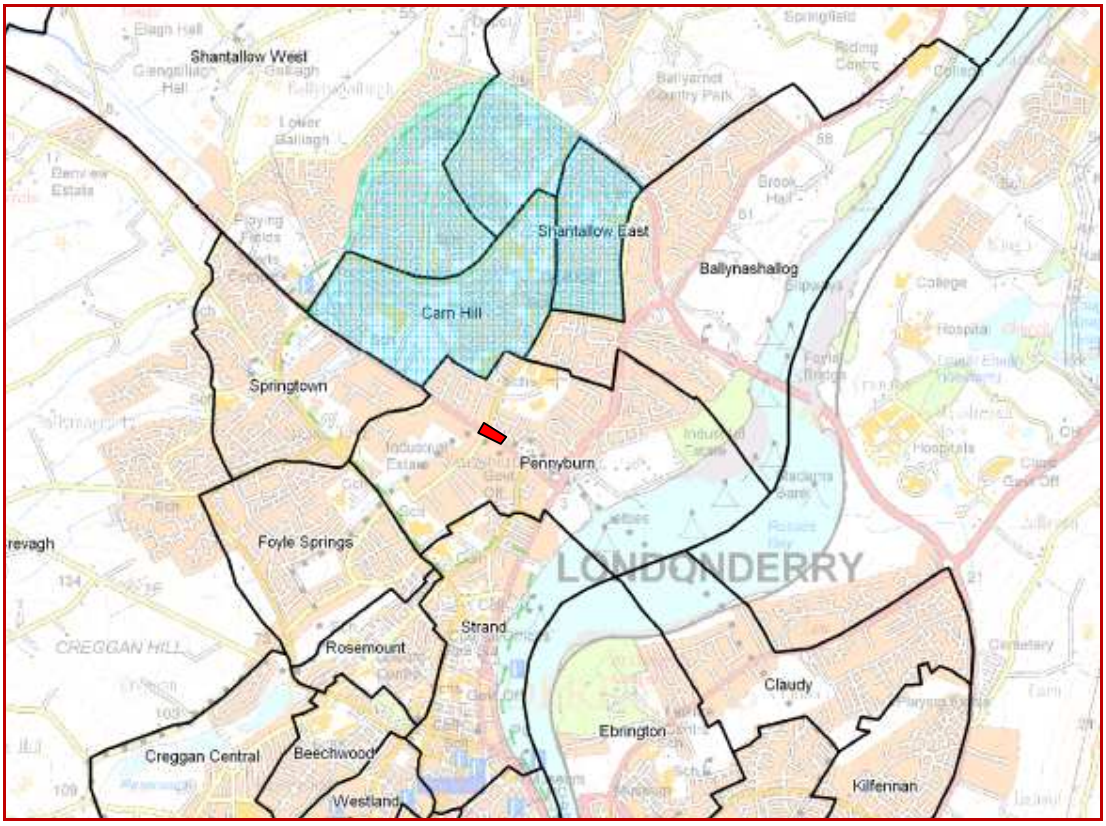
Individualised Travel Marketing Project in Derry~Londonderry (2011)

This scheme involved the implementation of Sustran's Personalised Travel Planning (PTP) project, known as TravelSmart, which aims at reversing the trend towards increased car use and tackling its impacts on climate, public health and quality of life. This project, delivered by Sustrans and Socialdata with funding from the Department for Social Development, Department for Regional Development Travelwise NI, Derry City Council and Translink, is the first of its kind in Northern Ireland and ROI.

TravelSmart has succeeded in reducing car use by 10% or more wherever it has operated. This survey was undertaken in one of the largest housing areas in the outskirts of the city. To access the city centre areas, most traffic from these areas will traverse the Buncrana Road / Racecourse Road AQMA.

Direct contact was made with 1,311 households (66% of the initial 2,000 households) between May and July 2011 in Galliagh, Shantallow and Carnhill to identify and meet individual travel needs and to motivate people to reconsider their day-to-day travel choices. The following map illustrates the survey area, highlighted in blue. The AQMA at Buncrana Road / Racecourse Road is highlighted in red.

Figure 11 – Area Covered by 2011 Travelsmart Survey

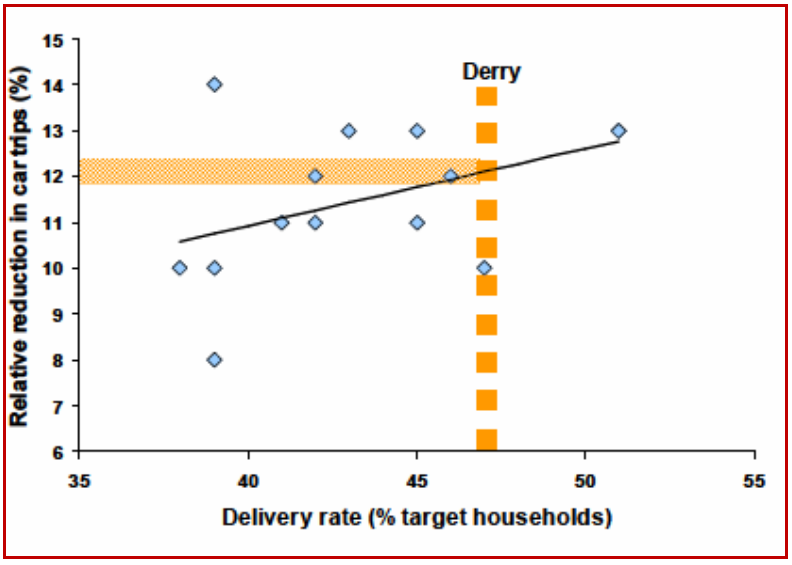


Based on their current use of sustainable travel modes and level of interest in receiving information on walking, cycling and / or public transport, households were segmented into Interested, Regular User and Not Interested ('I', 'R' and 'N') Groups.

All households in Group 'R' (with or without information needs) and those in Group 'I' that regularly walked or cycled were offered a TravelSmart-branded reward as a way of reinforcing (or 'confirming') their behaviour. Of these households, a total of 744 rewards were delivered. Households in Groups 'I' and 'R' completed the project order form with assistance from a member of the team. A total of 899 households were included and of these 894 requested information materials. The household's individualised information pack and/or incentive/reward was then hand-delivered. In total, deliveries containing 10,134 rewards, incentives and items of travel information were made to a total of 935 households. Each delivery was packed in a project-branded bag with information materials held in a TravelSmart folder. A follow-up survey was carried out at the end of 2011, and the conclusions of the draft final report are summarised below:

- The final proportion of the target population requesting and receiving a tailor-made TravelSmart pack reached 47%, one of the highest levels recorded in recent years suggesting that the resultant modal shift should be in the upper half of the values recorded elsewhere, i.e. around 11 – 13%.

Figure 12 – Outputs and Outcomes of Travelsmart Projects (2005-2012)



- There was a reduction in the mode share of car driver trips among the target population from 39% before ITM to 37% afterwards, together with increases in the mode shares for walking and public transport.

The Derry TravelSmart project was successful in meeting its key objectives and that it provides a solid foundation for further investment in cost-effective smarter choices work tailored to the specific conditions prevailing in urban areas of Northern Ireland.

It must be acknowledged that much of the traffic traversing the Buncrana Road / Racecourse Road AQMA comprises Heavy Duty Vehicles including buses accessing the Pennyburn Industrial Estate and bus depot, adjacent to the AQMA. It is difficult to reduce the volume of this traffic. However, Derry City Council will continue to work with DRD Roads Service (NI) and other relevant partners to attempt to reduce pollution levels at this location. As the Industrial Estate, traffic and locations of relevant public exposure are fixed entities as such at this location, consideration is being given to targeting the source of the pollution: it may be prudent to investigate the suitability of this location, as at Dale's Corner, for designation as a Low Emissions Zone.

5.2 Specific Measures to Be Implemented for Creggan Road AQMA

To work towards compliance with the AQS objectives, the following measures are proposed to be implemented for Creggan Road AQMA:

- **Measure M1:** Restriction of HDVs on Creggan Road in combination with a 5% reduction in overall traffic flows at the junction with Infirmary Road.

  An order was passed by DRD Road Service (NI) under the Road Traffic Regulation (NI) Order 1997 and signage has been erected at the approach of the AQMA suggesting alternative routes to raise drivers' awareness. HGV restriction from Creggan Road has not yet been implemented due to delays in the DRD Roads Service consultation process: objections have been received by an enforcement body and the process is not yet complete.

- **Measure M2:** Development of an Alternative Travel Plan targeted at 1000 households in and around the Creggan Road AQMA.

  Due to lack of funding, this measure was not realised. An attitudinal survey was completed by a university student, as previously mentioned.

5.3 Measures To Be Implemented as part of the ITS to Reduce Congestion in the City Centre

The Integrated Transport Strategy (ITS) established that a genuine multi-modal solution is required in the city rather than previous strategies solely focused on highway and traffic solutions, which had limited success. It mentions the need to increase sustainable transport and modal shift from private car to public transport, cycling and walking especially during peak hour traffic periods, in preference to continued increases in highway capacity.

The ITS proposes a series of policies focusing on measures targeting all modes of transport for the Derry~Londonderry urban area. If implemented, some of the measures would help reduce congestion on the main arterial roads and busy junction including Dale's Corner and Buncrana Road, which would have a beneficial impact on air quality in these AQMAs. Therefore, the following measures, part of the ITS *Short-Term Strategy S1*, have been incorporated in this Action Plan:

- **Measure M3:** Implement a cross-city Quality Bus Corridor with appropriate bus priority at key congestion hot spots

  The ITS established that:

  "…*buses in the city are currently underperforming and not providing an urban level of service. They are at a point where increased frequencies, cross-city services and good interchange between them at a central point will make a real difference and provide an alternative to the car for city centre / university area / Ebrington / Fort George trips"*

Therefore, it recommends that bus priority should be focused where it is needed to eliminate congestion delays to buses. The implementation of 3 cross-city Quality Bus Corridors, from Creggan to Altnagelvin, Slievemore to Curryneirn / Gobnascale, and Ballymagroarty to Kilfennan via the city centre, was one of the key measures proposed in the ITS. Although the Corridor routes have not as yet been designated and implemented by DRD Roads Service (NI), the bus services have been in place since September 2010 with initial uptake on these routes having increased. However, journey times are similar to before so that the design benefit is not being realised. It is essential that DRD Roads Service (NI) further this work as soon as possible. In addition, one of the routes traverses the Buncrana Road AQMA and all routes traverse the Dale's Corner AQMA. If the scheme is fully implemented, reduced journey times will encourage more use of public transport and less cars on the road.

- **Measure M4:** Improve Parking Control to Enable a Modal Shift from Private Car to Public Transport, Cycling and Walking in the City Centre

  The ITS recognises the need for successful towns and cities to promote a hierarchy of transport modes allowing a progressive move from private car in the outer city, to public transport cycling and walking once the city centre is reached. However, it is established that current parking conditions in the city centre partly prevent this model to be achieved, due to several factors, including:

  - A number of streets in the city centre dominated by free all day parking, providing incentive to commuters to use their private car to access the inner city;
  - Limited stay regulations labour intensive to enforce, and often flouted by motorists;
  - Pedestrianised streets outside the Walled City commonly disregarded by car users.

  The ITS concludes that:

> *"In summary the city centre is currently dominated by cars. The streets are almost continuously parked and there are almost no restrictions on car access, including the Walled City, the conservation area and the busy shopping streets. This apparent policy of a free rein for the private car, even if not explicit, fits uneasily with any emerging policies to promote walking, cycling and public transport"*

To tackle this issue, the ITS considered several car parking policy options, including the following, which should contribute to a modal shift from car to public transport, cycling and walking, therefore working towards a reduction of road-traffic congestion and air pollution in Derry's AQMAs:

- Rigorous Enforcement of existing regulations in the city centre;
- Reduction of on-street parking in the city centre;
- Implementation of a continuous city centre Controlled Parking Zone (CPZ) - an area within which parking provision is closely planned, managed and enforced; and
- Implementation of more extensive CPZ including the University areas.

As part of the ITS *Short-Term Strategy S1*, an increase of the average central area charge is suggested to restrain commuter parking in the city centre. Although transport model results suggest that overall impacts would be mixed and small in scale, it is recommended that improvement of car parking management form part of the Strategy, and be supplemented by other measures such as improved sustainable modes of transport and environmental traffic management measures.

- **QUEST "Active Travel" Grant Bid**

In addition, Derry city Council has made an "Active Travel" grant bid under the QUEST (Quality management tool for Urban Energy efficient Sustainable

Transport) project - a new European Initiative aimed at developing an audit tool that evaluates a city's urban mobility policies and supports cities in their efforts of developing more sustainable urban mobility systems. The programme can be linked directly to strategic objectives related to sustainability in:

- The Regeneration Plan for Derry-Londonderry 2011
- The Integrated Transport Strategy for the Derry-Londonderry City Region 2009
- Access Plan Derry-Londonderry 2009-2014

Derry City Council will receive a tailor made Action Plan supported by the relevant stakeholders in the city in order to improve sustainable urban mobility. This specific and practical improvement program will be based on the outcomes of the QUEST audit and self-assessment process. The Action Plan makes the agreed actions concrete by allocating a timetable, specific budgets, responsible persons and departments for implementation of the agreed objectives and actions. Derry City Council will receive a QUEST certificate on the present level of their urban mobility policy and participate at international workshops to exchange experiences with other cities. The key measures and objectives for delivering the project are outlined below:

- To create 3000m of new traffic free greenways along the gaps in the existing greenway network in the City in order to promote accessibility and connectivity.
- To work with DRD Road Service in delivering Traffic Management Measures that target key gaps in the existing on road network in order to facilitate active travel to and from:
    - The existing Foyle Greenway
    - The existing Riverside Greenway
    - Craigavon Bridge (Waterside)

  - Limavady Road and Waterside Greenway

- To work in partnership with the proposed new Western Education and Library Board "Schools Travel Plan Officer" to deliver 40. No. Schools Travel Plans

- To work in partnership with Sustrans and others in securing funding through the rates estimate and other funding streams to employ a "Community Active Travel Officer" with responsibility for:

  - Completing an Active Travel Vision paper for the City

  - Investigating the development of a Bike Hire scheme

  - Extending the current Travel Smart programme to the Waterside

  - Implementing a Cycle Training Proficiency Programme

  - Delivery of community based programmes that promote active travel

- To work in partnership with DRD Travelwise to deliver 10 No. Workplace Travel Plans

- To put in place 5 No. combined pedestrian and cycle monitoring systems at strategic points along the greenway network in order to monitor use

- To undertake 15 No. User Intercept Surveys and Manual Counts over a 3 year period to assess modal shift

<u>"Active Travel" Key Targets</u>

- To increase the number of people walking from a baseline of 17% (2012) to 20% by 2015

- To increase the number of people cycling from a baseline of 1% to (2012) to 6% by 2015

- To increase the annual walking distance from 232km to 300km by 2015
- To increase the annual cycling distance from 31km to 60km by 2015
- 105km City Greenway Network in place by 2019
- 44 Primary and Secondary Schools with Travel Plans in place by 2020
- 10 Workplace Travel plans completed by 2015

Implementation, funding and timescales for this project are contained in Appendix 4. Should the grant bid be successful, Derry city Council will incorporate the above fully into the Action Plan.

5.4 Measures To Be Implemented by DRD Travelwise/Department of Transport (DoT) in the Republic of Ireland to reduce Air Pollution

- **Measure M5:** Establish a Cross Border "Travelwise" Car Share scheme in the North West that will service the Derry and Donegal areas.

  There are a number of major businesses on both sides of the border with large work forces commuting from Donegal into Derry and vice versa each day. Derry City Management Team estimated in 2008 that 10,000 vehicles entered the city each week from the Donegal area for work purposes.

  It was proposed to contact these companies and make them aware of the scheme so that it is promoted with staff. Cross border school traffic was also to be targeted. It was also proposed to contact the 15% of the total workforce from Derry City Council staff residing in the ROI.

  In June 2009, just before the Carshare NW scheme, there were 213 car sharers from within a 10km radius of Derry City registered on the Car Share Northern Ireland website (CarshareNI)[6]. At June 2012 there were 298 car sharers from within a 10km radius of Derry City registered on the CarshareNI website.

[6] http://www.carshareni.com/

Figures obtained from DRD Travelwise indicate that car sharing in the Derry area shows a 40% growth in the last 3 years

In 2012, DRD Travelwise NI participated in the establishment and promotion of the Car Share North West website (CarshareNW), www.carsharenw.com to promote car sharing in the Derry, Donegal and Strabane areas. The website has had considerable success with 16,000 webhits, 200 commuters registered and a 20% growth in the CarshareNI registrations following the launch of CarshareNW. On 19 July 2011 Alan Kelly, the Minister for Transport in Dublin, announced the launch of a new website, www.carsharing.ie, that will be promoted publicly by the National Transport Authority (NTA) across the island. As a result Travelwise NI and Department of Transport / NTA have henceforth joined together in promoting the new website alongside the long established CarshareNI site and we will not renew the CarshareNW website at the end of its two year licence. Existing CarshareNW members and other commuters wanting to car share will be able to seek a car share partner on either or both of the remaining sites.

5.5 Measures To Be Implemented To Reduce Air Pollution From The Derry City Council Vehicle Fleet

To minimise and control air pollution from the fleet, Derry City Council gives a commitment to: -

Measure M6: Carry out regular emissions testing of its vehicle fleet to ensure that all vehicles comply with the law.

The feasibility of testing emissions from Council vehicle fleet has been assessed and all vehicles now undergo PSV and emissions testing against compliance with MOT criteria when routine servicing is carried out.

- **Measure M7:** Fit pollution abatement equipment if necessary to older Heavy-Goods Vehicles to help minimise pollution.

  Retrofitting of old HGVs with pollution abatement equipment has not been pursued as new vehicles are now to be purchased as part of the Replacement Scheme (see Measure 7 below).

- **Measure M8:** Promote the use of cleaner or alternative fuels where possible including the introduction of electrically powered vans.

  The Council purchased two new electric Light Duty Vehicles (LGVs) in 2010 and will seek to increase its fleet of electric vehicles. These have subsequently been sold and are to be replaced with one van and one car, so that the benefit from the recent efficiency advances in technology in this field will be realised. In addition, DRD Roads Service (NI), in conjunction with Derry City Council, has installed 6 electrical vehicle charging points throughout the district at 4 locations in and around the city centre and at 2 locations at 2–3 miles radii at different directions from the city centre.

- **Measure M9:** Establish and implement a rolling programme for replacing older more polluting vehicles with newer cleaner vehicles, which comply with the prevailing EURO standard.

  The Council has made progress towards the introduction of Euro compliant fleet vehicles, which will reduce pollutant emissions from Council vehicles, as a 7-year rolling Replacement Scheme of Euro-compliant vehicles is now in place. As part of this programme, most of the Refuse Collection Vehicles (RCVs) owned by the Council have been replaced to comply with EURO V emission standards; and all RCVs and large sweepers will comply with Euro VI standards by 2014. Details of the Council's vehicle fleet are provided in Appendix 3.

- **Measure M10:** Improve the Council's vehicle fuel consumption efficiency by better management of fleet activities. Undertake a baseline study into Derry City Council mobile plant fuel usage.

  Currently, Derry City Council is investigating the feasibility of using a Global Positioning System (GPS) to minimise travel distance by all vehicles, especially RCVs, to save on travel costs and also reduce pollution levels.

- **Measure M11:** Investigate options for better travel planning amongst Derry City Council employees.

  This measure would aim at reducing vehicle pollution from staff travelling to and from work. Additional benefits involve cost savings and a healthier workforce, although it is acknowledged that this can be challenging due to factors such as reluctance to give up car, the lack of cycling facilities and safety concerns, which need to be overcome.

  Proposed options include the following:

  - Develop a workplace travel plan for Derry City Council;
  - Undertake staff travel surveys to establish current travel patterns to and from Council premises;
  - Establish car-sharing practices and encourage use of public transport among staff;
  - Encourage walking and cycling among staff.

  To date, the Council secured consultancy expertise from Travelwise NI to progress a Travel Plan. Meetings are currently ongoing with senior management within Derry City Council (there have been recent major reorganisation at senior management level). It is intended to progress this scheme as soon as possible.

5.6 Measures To Be Implemented By Derry City Council to Reduce Air Pollution from Its Operations throughout The City

To ensure that the impact of Derry City Council's operations have minimum impact upon air pollution levels, Derry City Council gives a commitment to: -

- **Measure M12:** Adopt an environmentally friendly source of power for Council buildings by switching to electricity generated from renewable energy sources were possible.

  A target of rolling 3% annual exchange to renewable sources was formulated in the original draft Action Plan. The Council is ahead of schedule for renewable sources of electricity. In 2008, 23% of electricity consumption came from renewable energies. This increased to 51% in 2010. Since April 2011, 100% of Derry City Council's buildings / facilities have been using electricity from renewable energies. The measure focuses on all large facilities owned by the Council, including civic offices, leisure centres and the City of Derry Airport, previously owned by the Council.

- **Measure M13:** Employ an energy manager to assess Derry City Councils energy needs and make recommendations to the Council on reduction of carbon emissions.

  The Council is seeking to develop a "Smart City" approach to energy production, consumption and measurement as part of the CO_2Free project[7], funded by EU-programme INTERREG IVC. The project focuses on addressing climate change at local level by transferring best practice from 9 partner regions across the EU. As part of the programme, the Council installed an online Targeting and Monitoring Smart Metering System to monitor energy consumption in ten of its most energy-demanding buildings.

  The Council also took part in the *Minus 3% Project*[8] funded by the European Commission, through the Intelligent Energy Europe programme. The project aimed at establishing best practice examples for the implementation of the

[7] http://www.co2free-project.eu/
[8] http://www.minus3.org/Home.php

Energy End-use Efficiency & Energy Services Directive (2006/32/EC) in cities and showing that it was possible to save 3% of the City Authority's own energy consumption per year.

The Council has been working towards the minimisation of energy consumption and the reduction of carbon emissions, with very encouraging results as a 13% reduction in CO_2 emissions had been achieved in 2010 compared to the baseline (based on the average energy consumption between 2000 and 2006), which exceeded expectations. The current figure stands at 20%, compared to the above baseline.

- **Measure M14:** Explore the viability of using landfill gas produced at Culmore landfill site to reduce carbon dioxide emissions.

  Culmore Landfill Site was closed in March 2007 and a Restoration Project is underway. The Masterplan for the proposed redevelopment includes establishing plans for capturing methane gas that would be used to generate electricity and either sell it to national grid or provide additional energy for Council buildings.

  The viability of the management of landfill gas produced at Culmore is currently being tested. To date, investigations indicated that there is potential to generate 0.5MW of power sustainably over time, potentially up to 20 years, although duration of viable energy production is unknown at this stage.

  Using landfill gas to generate electricity would reduce the city's dependency upon imported fossil fuels and thus reduce CO_2 emissions.

5.7 Measures To Be Implemented By Derry City Council to Reduce Air Pollution through Education And Community Initiatives

To ensure that members of the public have access to information about air pollution and can make informed choices, Derry City Council gives a commitment to: -

- **Measure M15:** Implement education initiatives as outlined in the interagency working group on bonfires so as manage bonfire sites and educate communities on types of material, which can be burned on bonfires.

  In 2010, the Council commissioned a project on behalf of the North West Cluster, including a community-based survey of issues around bonfires, an audit of good practices and the compilation of an Action Plan to address concerns associates with bonfires. A report was published[9] in 2011, which includes examples of good practices and general recommendations to improve the management of bonfires.

- **Measure M16:** Develop an awareness of environmental issues amongst young people via a targeted education programme, which could be delivered online or through schools.

  To create sustainable attitudes to our environment among young people, the Council is seeking to implement an education campaign highlighting the health and environmental problems associated with air pollution, via a targeted education program, which is being delivered through schools, for example through the Step-Up Programme coordinated by the University of Ulster and Derry City Council.

- **Measure M17:** Continue working partnerships with Sustrans to ensure that walking and cycling initiatives are promoted and supported through the Derry Access Forum (formerly Derry Cycling Forum). Completion of the Foyle Valley Greenway project to connect the two bridges in Derry with a cycle path on both sides of the River Foyle with inter-connecting cycle paths throughout the city.

  The Council continues to develop cycling initiatives through the Derry Access Forum. The Access Plan - Year 1 Monitoring Report, compiled in 2010, details the progress made against the objectives set in the Derry-Londonderry Access

[9] "Burning Issues" Research Report – February 2011

Plan 2009 -2014, adopted by Council in September 2009. £1.8m was secured towards the development of the urban greenway network in Derry, and progress has been made towards the extension of the Derry Cycle Greenway Network by 15km, including completion of the Drumahoe Link, Greenhaw Road, and Fort George links.

As part of the "Active Travel" grant bid under the QUEST project, (see full details in Measure M4 above), further measures aimed at improving walking and cycling would include:

- The creation of 3000m of new traffic free greenways along the gaps in the existing greenway network in the City in order to promote accessibility and connectivity.
- Work towards delivering Traffic Management Measures that target key gaps in the existing on road network in order to facilitate active travel to and from the existing Foyle Greenway, the existing Riverside Greenway, Craigavon Bridge (Waterside), Limavady Road and Waterside Greenway.
- Work in securing funding to employ a "Community Active Travel Officer"
- Put in place 5 No. combined pedestrian and cycle monitoring systems at strategic points along the greenway network in order to monitor use

- **Measure M18:** Encourage Derry City Council employees to consider the use of bicycles for commuting to and from work and also for work purposes.

  A Cycle to Work Scheme has been approved and a legal contract is currently being finalised. The scheme is imminently due for implementation. A feasibility survey confirmed that upwards of 50 employees (7% of the workforce) are keen to purchase a bike under the scheme. It is hoped that, as cycling routes are being given more prominence in and around the city, that more employees will see the benefit of the scheme.

- **Measure M19 & M20:** Public Information

  - **M19** - Provide the public with 'real time' air quality information thus enabling commuters to make informed choices about their transport options. This information is available on-line at www.airqualityni.co.uk

  - **M20** - Consider the provision of free vehicle emissions testing for motorists and supporting information about responsible car ownership.

    To date, is has not been possible to progress this measure due to lack of funds. Moreover, potential sites for emissions testing would be limited.

5.8 Measures To Be Implemented By Derry City Council to Reduce Air Pollution through Statutory Functions

To ensure that air pollution is controlled by legislation and targeted enforcement, Derry City Council will continue to: -

- **Measure M21:** Comment upon planning applications to ensure that all relevant air quality issues are highlighted and mitigation measures are considered wherever possible.

  The Council continues to use Planning Process to ensure potential air quality issues are assessed in planning applications.

- **Measure M22:** Contribute to influence forthcoming development policies for Derry to ensure that sustainable development considerations are included.

  The Council has been involved in the preparation of the Integrated Transport Strategy (ITS), which gives consideration to all modes of transport, integrated with land-use and regeneration for the city and city region including cross-border. As mentioned previously, the key objective of the ITS is to achieve a

modal shift from the private car to other forms of transport. By offering a fully integrated network, people have more attractive and efficient modes of travel to choose from and are less likely to rely on private transport and align with the City's commitment to sustainability. Expected outcomes from the implementation of the ITS proposals include the following, likely to benefit the AQMAs in Derry:

- Improved Public Transport
- The proposed orbital route to remove HDV traffic from the city centre and congested areas associated with the AQMAs
- Improve travel efficiency and reduce congestion across the city

- **Measure M23:** Authorise and regularly inspect industrial premises under the Industrial Pollution Control (NI) Order 1997 and the Pollution Prevention and Control (NI) Regulations 2003.

  The Council continues to use its powers to control industrial premises and ensure they comply with the regulations.

- **Measure M24:** Enforce relevant legislation to reduce the burning of commercial and domestic waste.

- **Measure M25:** Promoting composting in a bid to reduce pollution from domestic bonfires.

  The Council's website[10] has been updated to promote home composting and provides advice to the public.

[10] http://www.derrycity.gov.uk/Recycle/Composting/Composting

5.9 Measures To Be Implemented By Derry City Council to Ensure That Air Pollution is Monitored

To ensure that there is adequate air pollution monitoring data with which to manage air quality across the city, Derry City Council will: -

- **Measure M26:** Continue to monitor a range of air pollutants throughout Derry and make the monitoring information freely available to the public in an easily understood form.

  The air quality monitoring network operated by the Council has been expanded over the past few years and covers all pollution hot spots that have been progressively identified as part of LAQM statutory yearly reports.

  Access to air quality information to the public has been improved through the Northern Ireland Environment Agency website[11], which now contains the Council's LAQM reports and relevant monitoring data.

  Data from the NO_x / NO_2 continuous monitoring analysers are also available on the Northern Ireland Air Quality website[12].

- **Measure M27:** Ensure that all air quality monitoring data reported to the public is both accurate and precise by implementing quality control measures.

  Monitoring data from continuous monitoring analysers and passive diffusion tubes are compliant with best practice guidance on Quality Assurance / Quality Control. Comprehensive information in relation to QA/QC is provided every year in statutory air quality reports (LAQM Progress Reports or Updating and Screening Assessments).

[11] http://www.doeni.gov.uk/niea/index.htm
[12] http://www.airqualityni.co.uk/data.php

- **Measure M28:** Establish additional monitoring sites across the city in locations where poor air quality is suspected.

  The Council has been proactive over the past few years, progressively increasing the number of monitoring sites to nearly double the air quality monitoring network, from 28 NO_2 diffusion tubes in 2008 to 60 in 2011. Moreover, diffusion tube accuracy has been significantly increased thanks to the installation of duplicates at most of the sites (rather than single diffusion tubes), increasing the total number of diffusion tubes deployed across the city to 65 tubes in 2012.

- **Measure M29:** Continue to assist with Governmental research studies into the causes of air pollution within Derry and Northern Ireland.

5.10 Measures Considered but Dismissed on the Grounds of Cost-effectiveness and/or Feasibility

These include potential measures considered as part of the Further Assessments of Dale's Corner and Buncrana Road AQMAs, which have been for the most part dismissed as not deemed feasible, as discussed in Section 5.1:

- **Measure M30:** Realignment of the A2 Limavady Road away from nearest properties

- **Measure M31:** Change in traffic lights sequence to allow more free-moving traffic on the A2 Limavady Road (although DRD Roads service is now giving consideration to this measure).

- **Measure M32:** Implement restrictions on HGV traffic at Dale's Corner junction

- **Measure M33:** Implement restrictions on HGV traffic at Dale's Corner junction.

It must be acknowledged that Derry City Council is facing great difficulty in realising many of the explored measures aimed at reducing pollution levels at the 3 AQMAs in the Council district. In relation to the Creggan Road AQMA, the signage suggesting alternative routes has been erected and DRD Roads service (NI) has indicated that there may be a resultant 5% reduction in traffic. Until the Order is passed - restricting HDVs greater than 3 tonnes axle weight - the modelled pollutant reductions will not be realised. The consultation process is currently stalled due to objections from interested parties.

Regarding the AQMA at Dale's Corner, only one engineered measure - changing sequence of the traffic lights to allow more free-flowing traffic closest to areas of relevant public exposure - is potentially achievable and could result in a reduction in NO_2 concentrations in the range of 5% to 10% (2µg/m^3 to 6µg/m^3). This measure is to be explored by DRD Roads service (NI). This measure alone however, will not bring pollution levels to below the required limit and other measures such as the Orbital Route and 3rd Road Bridge and also the introduction of a Low Emissions Zone, must now be explored.

In relation to the AQMA at Buncrana Road, it is apparent that even a full ban on HDVs, as modelled for the LAQM Further Assessment report, would not suffice to bring all residential properties below the NO_2 AQS objective. Although pollution levels here exceed less than the two other AQMAs and recent monitoring results have shown a reduction compared to previous years, consideration must now be given to other measures such as the introduction of a Low Emissions Zone here also.

Table 8 - Summary of Action Plan Measures

Category	No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in AQMA	Progress to Date	Progress in last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
Specific measures to be implemented in Creggan Road AQMA	**M1**	Restriction of HDVs on Creggan Road plus a 5% reduction in overall traffic at the junction	DRD Roads Service pass Order restricting >3tonne axle weight vehicles and erect signage at strategic locations (Alternate Routes)	DRD Roads Service (NI)	Completed	Ongoing	Reduce numbers of highly polluting vehicles on Creggan Road. Direct reduction in NO_2 levels	Reduction of 30% to 35% in NO_2 annual mean (modelling results Appendix 2)	Regular liaison with DRD	Lengthy delays during DRD Roads Service consultation process resulting in delay in Order being passed. Alternate Route Signage erected	Late 2012	Access/ deliveries for HDVs will reduce efficacy of the measure. Down to goodwill of motorists
	M2	Changed to Attitudinal Survey targeted at 150 households in and around the AQMA	Make residents in and around AQMA aware of alternative-to-car travel options	Derry City	Completed	Completed	Reduce number of vehicles at AQMA. Reduction in NO_2 levels	As yet unknown	Student undertook survey as part of Master's degree	Completed	Completed	Direct reduction in car usage - Healthier lifestyles. Car-dependency culture barrier to be weakened
Measures Proposed in ITS Short-Term Strategy (S1)	**M3**	Quality Bus Corridor and Bus Priority Measures	3 no. Cross-city QBC's and bus services via city centre and bus priority at key congestion hot spots	Derry City	Ongoing	Ongoing	Implementation of QBC's and priority measures	N/A	Cross-city QBC's at Proposal Stage - 3 no. Cross-city bus services via city centre, in place since September 2010		1-5 years	Direct reduction in car usage - Healthier lifestyles. Car-dependency culture barrier to be weakened
	M4	Improve Cark Parking Management	Continuous city centre Controlled Parking Zone to restrain commuter parking and contribute to modal shift	Derry City	Ongoing	Ongoing	Implementation of CPZ	N/A	Proposal Stage		1-5 years	Direct reduction in car usage - Healthier lifestyles. Car-dependency culture barrier to be weakened
To reduce air pollution by DRD Travelwise / Department of Transport in the Republic of Ireland	**M5**	Establish a Cross Border Travelwise Car Share scheme in the North West that will service the Derry and Donegal areas	DRD Travelwise group to target organisations / Employers / stakeholders to assess needs and possibilities	DRD Roads Service (NI) - Travelwise group	Completed	Ongoing	Direct reduction in car usage	As yet unknown	Establish working web-site with list of named organisations / establishments/workplaces / individuals who can partake of car-sharing	298 car sharers (40% growth since 2009) from within a 10km radius of Derry City registered on the CarshareNI website. New website, www.carsharing.ie for all of Ireland	Ongoing	Car-dependency culture barrier to be weakened
To reduce air pollution from Derry city Council fleet vehicles	**M6**	Vehicle emission testing	Assess the feasibility of testing vehicle emissions when routine servicing is carried out / compliance with MOT emissions criteria	Derry City Council	Completed	Ongoing	Reduce numbers of highly polluting vehicles on the road.	N/A	Implemented	Implemented	Ongoing	Identification of highly polluting vehicles in fleet and reduction in emissions of Nitrogen Dioxide
	M7	Cleaning up Council vehicles	Fitting pollution abatement equipment to older heavy goods vehicles depending on EURO classification	Derry City Council	Completed	Ongoing	Reduction in polluting emissions from Council vehicles	N/A	Pollution abatement equipment now to be fitted – rolling programme of Euro-compliant replacement vehicles (see vehicle fleet table in Appendix 3)		2-5 years	Potential capital costs and maintenance implications
	M8	Promotion of newer cleaner vehicles or alternative fuels where possible	Use of electrically powered vehicles	Derry City Council	Completed	Ongoing	Reduction in polluting emissions from Council vehicles	N/A	Purchase of 2 electric LDVs	Vehicles taken out of use. 6 new electrical vehicle charging points in and around city centre	1 year	Potential capital costs, maintenance implications and operational difficulties
	M9	Vehicle upgrading programme to comply with EURO emission standards	Replacement programme for Council vehicles	Derry City Council	Completed	Ongoing	Reduction in pollution / noise emissions from Council vehicles and increased fuel efficiency.	N/A	Purchase vehicles that comply with the prevailing EURO standard: rolling programme (see vehicle fleet table in Appendix 3)		Ongoing	Capital cost of purchasing new vehicles
		Establish vehicle replacement programme	Programmed replacement of heavy goods vehicles every 7 years	Derry City Council	Completed	Ongoing	Reduction in pollution / noise emissions from Council vehicles. Less maintenance for newer vehicles and increased fuel efficiency	N/A	7-year rolling Replacement Scheme in place	Ongoing (see vehicle fleet table in Appendix 3)	Ongoing	Capital cost of purchasing new vehicles.
	M10	Vehicle Fuel Efficiency	Assess Councils vehicle and mobile plant fuel consumption efficiency and make improvement	Derry City Council	Ongoing	Ongoing	Better fleet and mobile plant management operations. Increase vehicle and mobile plant fuel use efficiency	N/A	Awaiting available finance to instigate scheme		1-3 years	Purchase software or introduce a GPS monitoring/guidance system and procedures to establish Council vehicle and mobile plant fuel consumption.

Category	No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in AQMA	Progress to Date	Progress in last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
	M11	Investigate options for better travel planning amongst Derry City Council employees	Develop a workplace travel plan for Derry City Council. Undertake staff travel surveys to establish current travel patterns to and from Council premises. Establish car-sharing practices and encourage use of public transport among staff. Encourage walking and cycling among staff	Derry City Council / - Travelwise NI to assist			Reduced vehicle pollution from staff travelling to and from work. Cost savings. Healthier workforce	As yet unknown	Travelwise Northern Ireland consultancy expertise secured to progress Travel Plan. Engaging senior management at Derry City Council to lead form the top down		1 - 2 years	Reluctance of staff to give up car. Lack of cycle facilities. Safety concerns
To reduce air pollution from Derry City operations throughout the City	**M12**	Adopt an environmentally friendly source of power for Council buildings	Power Council buildings with electricity generated from renewable sources	Derry City Council	Target of rolling 3% annual exchange to renewable sources (ahead of schedule)	Ongoing	Percentage of electricity from renewables	N/A	2008 - 23% from renewable sources; 2010 – 51% from renewable sources; Since April 2011, 100% target achieved	All Council large facilities- leisure centres, civic offices, airport now using electricity generated from renewable sources	Complete	Promotion of renewable energy sources for the generation of electricity. Lack of renewable energy sources of electricity
	M13	Employment of a Council Energy Manager	Assessment of Council energy needs and usage. Adopt recommendations made by the Energy Manager to ensure the minimisation of energy consumption and reduction of carbon emissions	Derry City Council	Completed	Completed	Reduction in carbon emissions from Council facilities	N/A	13% reduction in CO_2 emissions achieved between 2008 and 2010. Now 20% in 2012	Implemented	Ongoing	
	M14	Reduce Carbon Dioxide	Manage landfill gas production at Culmore landfill site. Explore the viability of using landfill gas produced at Culmore landfill site emissions.	Derry City Council	Ongoing	Ongoing	Offsetting Council power requirements	N/A	Gas to be used to generate electricity to be sold to national grid. Excess to be used on Council buildings at landfill site	Contractor appointed-viability testing currently awaiting planning permission	5 years	Capital cost and resource implications
To reduce air pollution through education and community initiatives	**M15**	Managing bonfire sites	Establish a Council Policy on dealing with bonfires. Educate communities on the types of material that should be burned on bonfires.	Derry City Council	Completed	Ongoing	Reduction of pollution from bonfires. Reduction in the number and size of bonfires	N/A	Pilot an agreed Community based initiative to manage bonfire sites	Consultant appointed (£23k) to explore, agree and implement possible socio-cultural alternatives to bonfires. Report produced with recommendations for alternatives to bonfires	Ongoing	Difficulty in engaging and persuading some young people in the community from taking part in such initiatives.
	M16	Education initiatives, Develop an awareness of environmental issues amongst young people	Education campaign for young people highlighting the health and environmental problems associated with air pollution, via a targeted education programmed, which could be delivered online or through schools.eg Step-Up Programme	Derry City Council	Ongoing	Ongoing	Creation of sustainable attitudes to our environment among young people	N/A	Ongoing		Ongoing	Resource implications in supporting such initiatives
	M17	Cycling Initiatives	Derry Access Forum	Derry City Council	Ongoing		Reduced peak hour congestion	N/A	Continue working partnerships with Sustrans to ensure that cycling initiatives are supported through the Derry Access Forum; Progress made notably in the development of urban greenway network in Derry		Ongoing	Lack of facilities for cyclists
	M18	Cycling Initiatives	Promote cycling among staff. Encourage Derry City Council employees to consider the use of bicycles in their daily duties.	Derry City Council	Ongoing		Assess the viability of a cycle usage mileage for employees. Health benefits. Reduced pollution from non use of vehicles	N/A	Council has approved in principle to implement Cycle to Work Scheme		Scheme for 50 members to progress in summer 2012	Impracticable for certain staff. Increased response time. Staff reluctance to cycle.
	M19	Improve information provision via electronic methods	Provide the public with air quality information through the Councils web site and links to the Northern	Derry City Council	Completed			n/a	Central Northern Ireland Environment Agency (NIEA) web-site up and running and containing Derry CC's LAQM Reports and all monitoring		Ongoing	Allows public to keep up to date on current local and provincial air quality issues

Category	No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in AQMA	Progress to Date	Progress in last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
			Ireland air quality website (www.airqualityni.co.uk)						site data/pollutant monitoring			
	M20	Vehicle emission tests	Consider the provision of free vehicle emissions testing for motorists and supporting information about responsible car ownership, highlight vehicle pollution issues, eco driving and alternatives to the motor car	Derry City Council	Ongoing			N/A	No emissions testing due to lack of funds. New link to Derry CC website from NIEA website with eco-driving tips and cost savings			Location of sites for testing limited
To reduce air pollution through Statutory Functions	**M21**	Development Control	Use Planning Process to ensure potential air quality issues are assessed. Comment upon planning applications to ensure that all relevant air quality issues are highlighted and mitigation measures are considered wherever possible	Derry City Council	Completed	Ongoing	Sustainable development which considers environmental as well as socio-economic impact	N/A	Ongoing		Ongoing	Increased capital cost of development. Perceived reduction in development opportunities
	M22	Sustainable Development	Incorporate sustainable policies in Council Corporate Plan and sub-Regional Transport Plan Continue to influence forthcoming development policies for Derry to ensure that sustainable development and air quality considerations are included. Continue to support financially the work locally of the - Northern Ireland Energy Agency	Derry City Council	Completed	Ongoing	General environmental impact. Inform policy and decision makers. Increased awareness of sustainable development issues among a variety of stakeholders	N/A	Integrated Transport Strategy has been published. Draft Regeneration Plan now out to consultation		Ongoing	Perceived reduction in development opportunities
	M23	Industrial Pollution Control	Permitting and inspection of industrial processes and installations under Part C of the Industrial Pollution Control (NI) Order 1997 and the Pollution, Prevention and Control (NI) Regulations 2003	Derry City Council	Completed	Ongoing	Reduced ambient pollution	N/A	Ongoing		Ongoing	
	M24	Nuisance policy for dealing with burning of commercial and domestic waste	Take enforcement action under Public Health (Ireland) Act 1878 and Pollution Control local Government (NI) Order 1978 in accordance with Council enforcement policy	Derry City Council	Completed	Ongoing	Reduced pollution from burning of commercial and domestic waste	N/A	Ongoing		Ongoing	
	M25	Recycling	Promoting domestic composting and use of Civic Amenity centres in a bid to reduce pollution from domestic garden bonfires	Derry City Council	Completed	Ongoing	Reduced pollution from uncontrolled burning of commercial and domestic waste	N/A	Council's website updated with advice on composting		Ongoing	
To ensure Air Pollution is Monitored	**M26**	Monitor ambient air quality throughout the City Council area.	Continue ambient air quality monitoring programmes	Derry City Council	Completed	Ongoing	Decisions on future air quality policies based on accurate and ratified monitoring data. Identification of areas of poor air quality.	N/A	Ongoing		Ongoing	Resource implications. Difficulty locating monitoring sites
	M27		Evaluate results from air quality monitoring against air quality objectives					N/A	Detailed Assessment undertaken			
	M28		Install and maintain air quality equipment in areas of potential poor air quality					N/A	New diffusion tube sites installed			
	M29		Continue to assist with Governmental research studies into the causes of air pollution within Derry and Northern Ireland.					N/A	New NOx monitor to be installed at new Dale's Corner AQMA (replacement of existing monitor)			

Category	No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in AQMA	Progress to Date	Progress in last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
Measures considered as part of the Further Assessments of Dale's Corner and Buncrana Road AQMAs	**M30**	Realignment of the A2 Limavady Road away from nearest properties	Major works programme with land-owner compensated	DRD Roads service(NI)	Measure not feasible							
	M31	Change in traffic lights sequence to allow more free-moving traffic on the A2 Limavady Road	Deter traffic crossing main through route to allow more traffic to more quickly traverse worst affected part of the AQMA	DRD Roads service(NI)	Initial design options to be investigated	Ongoing	Reduction in polluting emissions due to more vehicles moving through more quickly	5% to 10% of total NO_2 (2µg/m^3 to 6µg/m^3)	DRD Roads service(NI) to investigate detailed design		Liaison with DRD Roads service(NI) ongoing	2 – 3 years (2015)
	M32	Implement restrictions on HGV traffic at Dale's Corner junction	Remove the worst polluting vehicles	DRD Roads service(NI)	Measure not feasible (Consideration to be given to the feasibility of a Low Emissions Zone / Orbital route with 3rd road-bridge)							
	M33	Implement restrictions on HGV traffic at Buncrana Road	Remove the worst polluting vehicles	DRD Roads service(NI)	Measure not feasible (Consideration to be given to the feasibility of a Low Emissions Zone / Orbital route with 3rd road-bridge)							

6 Implementation and Monitoring

Derry City Council will work jointly on the action plan measures with the relevant partners including the Department for Regional Development, transport operators, schools and local businesses. To secure the necessary air quality improvements, there must be involvement by all local stakeholders who should actively work to encourage community participation in the process.

The implementation and effectiveness of the Action Plan will be carefully monitored through monitoring of NO_2 at relevant receptor locations within the AQMA. In addition, traffic flow changes on the key roads will also be assessed through the review and assessment process, and the uptake of local measures.

There will be regular review and assessment of the action plan proposals to evaluate progress and this will be reported annually as part of the LAQM Action Plan Progress Report.

7 Glossary of Terms

Abbreviation	Full name
AQMA	Air Quality Management Area
AQS	Air Quality Strategy
AURN	Automatic Urban and Rural Network
BMA	Belfast Metropolitan Area
DRD	Department for Regional Development
HDV	Heavy-Duty Vehicle
HGV	Heavy-Goods Vehicle
KTC	Key Transport Corridor
LAQM	Local Air Quality Management
LGV	Light-Goods Vehicle
NO	Nitric Oxides
NO_2	Nitrogen Dioxide
NO_x	Oxides of Nitrogen
OUAs	Other Urban Areas
PM_{10}	Particles of up to 10 µm
RDS	Regional Development Strategy

Abbreviation	Full name
RSTN	Regional Strategic Transport Network
RTS	Regional Transport System
SDS	Spatial Development Strategy
SRTP	Sub-Regional Transport Plan
TEA	TriEthanolAmine
µg/m^3	Micrograms per cubic metre

Appendix 1. National Air Quality Strategy (AQS) Objectives

Table 9 – UK AQS Objectives Applicable in Northern Ireland for LAQM

Pollutant	Objective		Date to be Achieved By
	Concentration	Measured As	
Benzene (C_6H_6)	16.25 µg/m^3	Running annual mean	31/12/2003
	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 (CO)	10.0 mg/m^3	Maximum daily running 8-hour mean	31/12/2003
Lead (Pb)	0.5 µg/m^3	Annual mean	31/12/2004
	0.25 µg/m^3	Annual mean	31/12/2008
Nitrogen Dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year (99.8th percentile)	1-hour mean	31/12/2005
	40 µg/m^3	Annual mean	31/12/2005
Particles (PM_{10}) (gravimetric)	50 µg/m^3, not to be exceeded more than 35 times a year (90.4th percentile)	24-hour mean	31/12/2004
	40 µg/m^3	Annual mean	31/12/2004
Particles ($PM_{2.5}$) (gravimetric) Exposure Reduction (1)	25 µg/m^3 (target value)	Annual mean	2020
	Target of 15% reduction in concentration at urban background		Between 2010 and 2020
Sulphur Dioxide (SO_2)	350 µg/m^3, not to be exceeded more than 24 times a year (99.7th percentile)	1-hour mean	31/12/2004
	125 µg/m^3, not to be exceeded more than 3 times a year (99.2nd percentile)	24-hour mean	31/12/2004
	266 µg/m^3, not to be exceeded more than 35 times a year (99.9th percentile)	15-minute mean	31/12/2005
Ozone (O_3)	100 µg/m^3 not to be exceeded more than 10 times a year	8-hour mean	31/12/2005
Polycyclic Aromatic Hydrocarbons (PAHs)	0.25 ng/m^3 B[a]P (2)	Annual mean	31/12/2010

(1) 25 µg/m^3 is a cap to be seen in conjunction with 15% reduction

(2) Benzo[a]pyrene

Appendix 2. Dispersion modelling of potential traffic mitigation measures

A1. Introduction

Local Authorities are required to produce Action Plans for areas where the limit values for specific UK air quality regulated pollutants are likely to be exceeded by compliance date (UK Air Quality Regulations 2007). Derry County Council has an Air Quality Management Area (AQMA) declared at the junction of Creggan Road and Infirmary Road for nitrogen dioxide (NO_2). As part of the air quality Action Plan work**,** (required) several scenarios of traffic have been considered to help to delineate the measures needed to achieve compliance in 2010.

To quantify the impact of these scenarios on air quality in the AQMA, detailed dispersion modelling of NO_2 has been carried out, based on the CERC ADMS Urban software. The modelling work followed the same methodology described in the LAQM air quality Further Assessment Report 2007[13].

Initially, these scenarios were to be compared with the baseline case (current traffic conditions) presented in the Further Assessment. However, the modelling work carried out for the Further Assessment was based on 2004 traffic data projected to 2006. As new traffic counts have been carried out by the Council and the Department of Regional Development Roads Service (NI) in early 2008, showing that traffic growth in this area was over estimated in the previous assessment, it has been decided to remodel the baseline scenario based on these new data. Moreover, the modelling presented in the Further Assessment was based on year 2006. Since new monitoring data for year 2007 were available, all scenarios have been based on 2007 to provide the most up-to-date results.

The scenarios considered were the following:

- Scenario 0 - Baseline scenario, based on the current traffic conditions (2007) in Creggan Road. Updated traffic, monitoring and meteorological data for year 2007 have been taken into account;
- Scenario 1 - Removal of HDVs in the AQMA (including buses and heavy goods vehicles – HGVs);
- Scenario 2 - 5% decrease of the overall traffic in the AQMA (all types of vehicles);
- Scenario 3 - Combination of Scenario 1 and Scenario 2;

[13] Derry City Council, Local Air Quality Management, Detailed Assessment and Further Assessment, Report BV/AQ/AGGX0813/EC/2486, August 2007

- Scenario 4 - Removal of HDVs on Creggan Road only - assuming that a significant part of the HDVs previously using Creggan Road would be diverted before entering the AQMA.

Predicted results for Scenario 0 have been verified against NO_2 diffusion tube monitoring data and NO_x and NO_2 concentrations have been corrected accordingly. Subsequently, the same correction factors have been applied to the other scenarios.

A2. Dispersion Modelling Methodology

A2.1 Traffic data

The roads considered in the dispersion modelling were the following:

- Creggan Road;
- Creggan Street;
- Infirmary Road;
- Lone Moore Road.

These are the same as the ones modelled in the Further Assessment 2007. Traffic flows were derived from the latest traffic counts carried out by Derry City Council in February 2008. The new traffic data consisted in a series of 1-hr manual traffic counts (peak and off-peak) on the roads mentioned above as well as a 24-hr automatic traffic counts (ATC) on Creggan Road only. The annual average daily traffic (AADT) for all four roads has been derived from the ratio between the manual traffic counts and the automatic 24-hr traffic flows observed on Creggan Road.

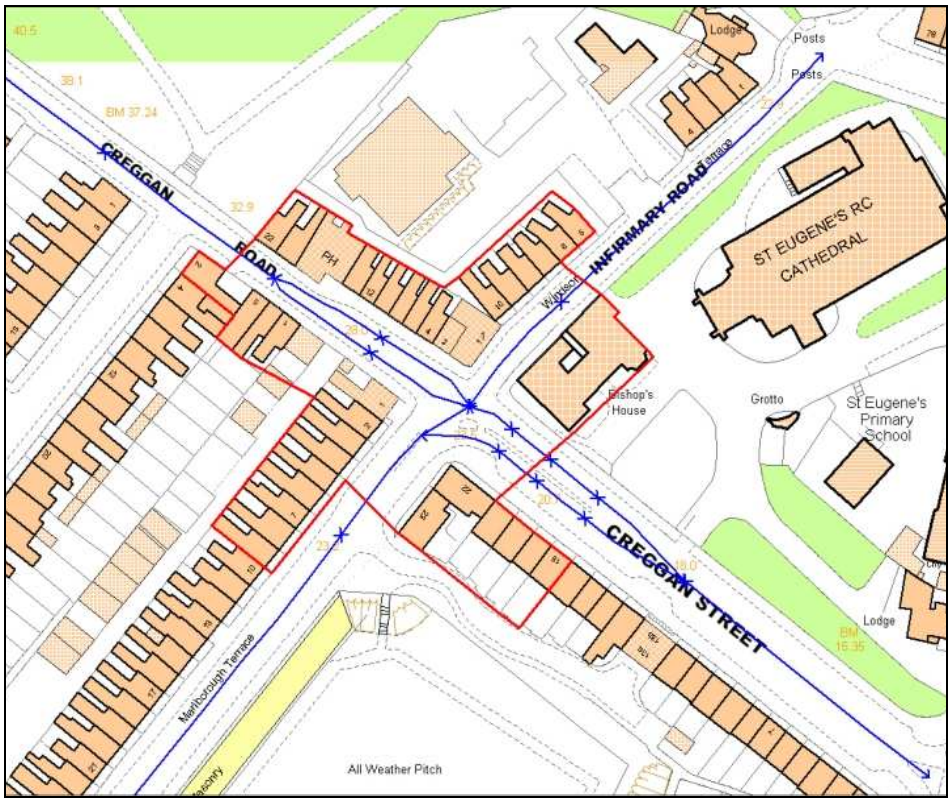
All roads have been split in several links near the junction to allow for speed reductions at the approach of the junction, especially for vehicles going uphill on Creggan Road. All speeds were the same as the ones used for the Further Assessment 2007.

The AADT, speed and percentage of HDVs for each modelled road are provided in Table 10 below, while modelled roads are presented in Figure 13.

Table 10 - Creggan Road Junction - Traffic data 2007

Road	Modelled Road Link	AADT 2007 (veh/day)	HDVs (%)	Speed (km/hr)
Creggan Road	CregganRd1	10362	2.5%	30
	CregganRd2_J	10362	2.5%	20
	CregganRd_SEB_1J	5603	2.5%	20
	CregganRd_SEB_2J	5603	2.5%	20
	CregganRd_NWB_2J	4759	2.5%	5
	CregganRd_NWB_1J	4759	2.5%	10
Creggan Street	CregganSt3_J	4833	1.5%	5
	CregganSt4_J	4833	1.5%	10
	CregganSt5	10000	2.0%	30
	CregganSt6_J	5167	2.5%	10
	CregganSt7_J	5167	2.5%	5
Infirmary Road	Infirmary1_J	6664	1.7%	15
	Infirmary2	6664	1.7%	30
Lone Moore Road	LoneMoor1_J	10896	2.2%	15
	LoneMoor2	10896	2.2%	30

Figure 13 - Modelled Road and Air Quality Management Area in Derry



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A2.2 Background concentrations

NO_x and NO_2 background monitoring data have been collated from the urban background AURN (Automatic Urban and Rural Network) monitoring station installed in Brooke Park in Derry. This station had also been used to determine the 2006 NO_x/NO_2 local background annual means for the Further Assessment of the AQMA, which was consistent with the estimated national background maps[14].

Monitored concentrations at Brooke Park for year 2007 are very similar to 2006 data, which confirms that the station is still suitable to derive local background for dispersion modelling. Table 11 shows the background NO_x and NO_2 concentrations used in this assessment.

[14] Estimated Background Air Pollution Data - http://www.airquality.co.uk/archive/laqm/laqm.php

Table 11 - Background Concentrations for Derry City Centre

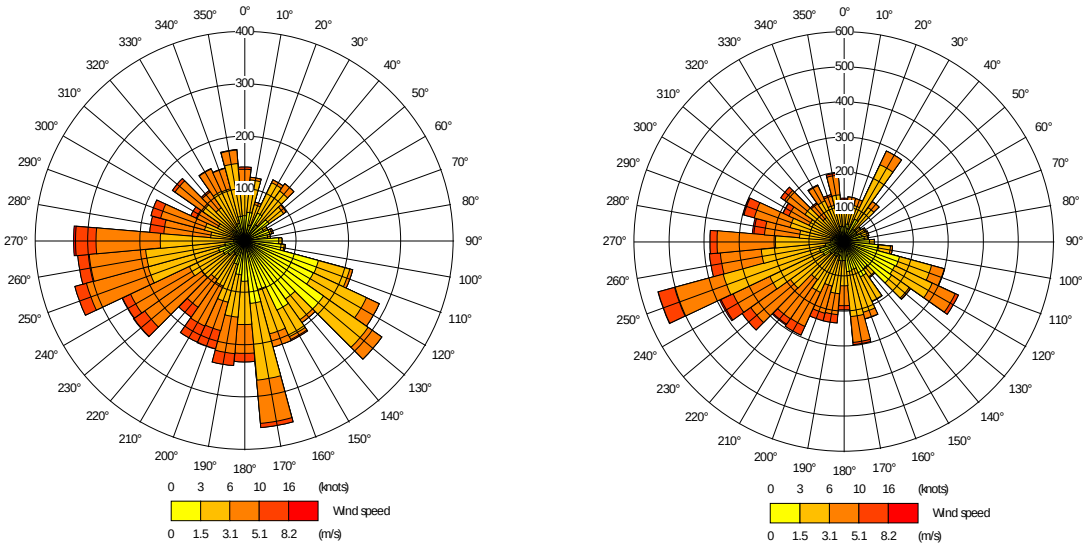
Pollutant	2007 background annual mean (µg/m^3)
NO_x	18.0
NO_2	13.0

A2.3 Meteorological data

Dispersion of pollutant emissions is entirely dependent upon the prevailing meteorological conditions at the time of emissions release. Hourly sequential meteorological data from the closest Met Office station (Ballykelly, 10 miles North East of Derry) has been used in this assessment, based on year 2007.

As shown in Figure 14, the wind rose in 2007 is slightly different from the 2006 one used in the Further Assessment, although the general trend is similar (south-westerly winds prevailing).

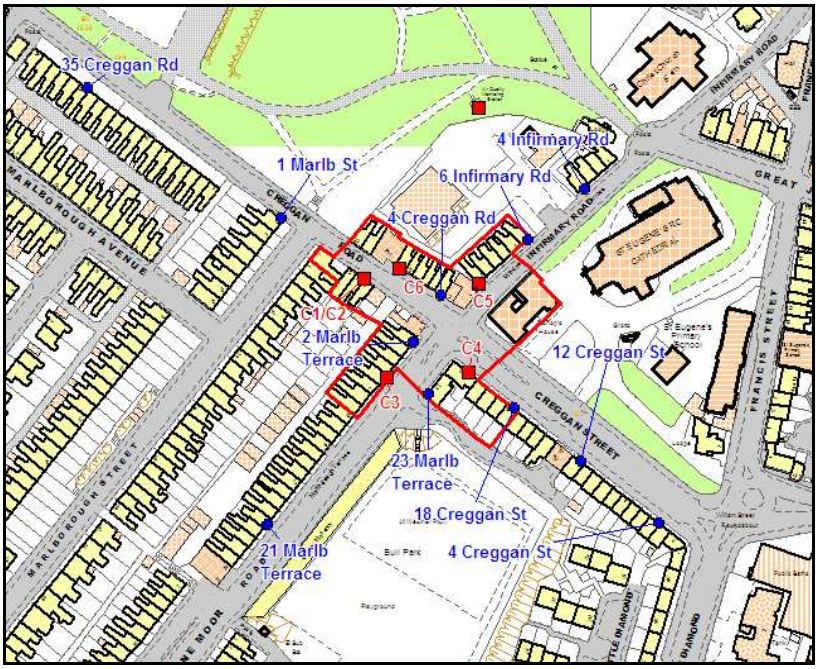
Figure 14 - Ballykelly 2006 (left) and 2007 (right) Hourly Sequential Meteorological Data



A2.4 Specific and grid receptors

NO_2 annual average concentrations have been predicted for year 2007 for each scenario at a number of specific receptors relevant of public exposure (facade of properties, see Figure 15), in addition to a 5m-grid spacing covering the AQMA allowing results to be shown on contour maps. All results have been predicted at 1.5 m from the ground.

Figure 15 - Location of Specific Receptors – Creggan Road / Infirmary Road Junction



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A2.5 Model Verification

A2.5.1 Overview

Model verification and adjustment of NO_x/NO_2 modelled concentrations have been carried out at specific monitoring locations. The objectives of the model verification are:

- to evaluate model performance,
- to show that the baseline is well established, and
- to provide confidence in the assessment.

The comparison of the modelled results versus monitoring has been carried out based on the roadside NO_2 diffusion tubes located in the AQMA (see Table 12). Diffusion tube C5 in Windsor Terrace (Infirmary Road) was not included, as the Further Assessment showed that modelled results tend to significantly over predict concentrations at this site. The monitored NO_2 annual mean at this site has been well below the AQS objective over the past two years (23.8µg/m^3 in 2006; 24.3µg/m^3 in 2007), while other sites in the AQMA show higher results. The Further Assessment concluded that the NO_2 monitoring levels could be lower due to local wind effects (vortex or air recirculation) as this site is shielded by a nearby building.

The verification process aims to show that all final modelled NO_2 concentrations are within 25% of the monitored NO_2 concentrations. Modelled results may not compare as well at some locations for a number of reasons including:

- Errors in traffic flow and speed data estimates;
- Model setup (including street canyons, road width, receptor location);
- Model limitations (treatment of roughness and meteorological data);
- Uncertainty in monitoring data (notably diffusion tubes, e.g. bias adjustment factors and annualisation of short-term data).

The above factors were all investigated, as part of the model verification process to minimize the uncertainties as much as is practicable. Sensitivity tests regarding vehicle speed and the width of street canyons have been carried out. Canyon width has been adjusted to make sure that the diffusion tubes at facades were effectively within street canyons.

A2.5.2 Methodology

Following recent analysis of the NO_x/NO_2 ratio at a number of roadside and kerbside monitoring sites in the UK over the past years, the methodology to convert NO_x to NO_2 and vice versa has been reviewed in 2007[15]. This updated empirical relationship is based on monitoring data for years 2003 to 2006, collated from the AURN, the LAQN (London Air Quality Network) and the Highways Agency's air quality monitoring networks. The report highlights that the relationship described in guidance LAQM.TG(03) is no longer applicable, as comparison with monitoring data shows that it is likely to under predict NO_2 concentration by an average of 20%. Therefore, the NO_x to NO_2 conversion in this assessment was based on the new methodology, as described below:

1. Both monitored and predicted road-NO_x concentrations are calculated by subtracting the background NO_x concentration as provided in Section 0. Monitored NO_x was estimated from diffusion tube results

[15] 'Deriving NO_2 from NO_x for Air Quality Assessments of Roads - Updated to 2006' - AQC, March 2007, http://www.uwe.ac.uk/aqm/review/NO_x_NO_2_Report_27_03_07.pdf

based on the NO_x from NO_2 calculator spreadsheet available at the UK Air Quality Archive website[16]. The ratio between monitored road-NO_x and modelled road-NO_x is calculated for each site.

Table 12 - Calculation of Road-NO_x concentrations (µg/m^3)

ID	Name/Location	Modelled NO_x 2007 - µg/m^3	Monitored NO_x 2007 (converted from monitored NO_2, µg/m^3)	Background NO_x 2007 - µg/m^3	Road-NO_x (modelled, µg/m^3)	Road-NO_x (monitored, µg/m^3)	Factor [Road-NOx (monitored) / Road-NO_x (modelled)]
C1/C2	3 Creggan Road	51.3	188.4	18	33.3	170.4	5.1
C3	6 Marlborough Terrace	38.6	76.0		20.6	58.0	2.8
C4	22A Creggan Street	42.2	127.7		24.2	109.7	4.5
C6	14 Creggan Road	35.5	103.9		17.5	85.9	4.9
						Overall factor (based on linear regression)	**4.5**

2. The modelled road-NO_x is then adjusted based on an overall factor, which is calculated by a linear regression analysis between monitored road-NO_x and modelled road-NO_x results, and the total predicted NO_x is obtained by adding the background NO_x concentration.

3. Predicted road-NO_2 is then calculated using the following updated empirical NO_x/NO_2 relationship:

$$\text{road-}NO_2 = (-0.0719 \times \text{Ln}(\text{total-}NO_x)+0.6248) \times \text{road-}NO_x$$

4. Modelled road-NO_2 results are finally adjusted based on a second linear regression analysis between modelled road-NO_2 and monitored

[16] www.airquality.co.uk/archive/laqm/tools/NOxfromNO2calculator2007.xls

road-NO_2, and the local background NO_2 concentration is added to obtain the final total model**l**ed NO_2.

Table 13 - Model verification Results – Creggan Road AQMA

ID	Name/Location	Type	Within AQMA	2007 Predicted Total NO_2 ($\mu g/m^3$)	2007 Monitored NO_2 ($\mu g/m^3$)	Difference predicted / monitored ($\mu g/m^3$)	Difference predicted / monitored (%)
C1/C2	3 Creggan Road	Roadside	Yes	**54.2**	**55.3**	-1.1	-2.0%
C3	6 Marlborough Terrace	Roadside	Yes	37.7	31.2	6.4	20.6%
C4	22A Creggan Street	Roadside	Yes	**42.7**	**43.3**	-0.6	-1.4%
C6	14 Creggan Road	Roadside	Yes	33.3	38.0	-4.8	-12.5%

Following the adjustment of modelled NO_x/NO_2, most of the results are within 25% of monitored concentrations. Predicted NO_2 concentrations at sites C1/C2 and C4 are very close to the monitored values (less than 2% difference), while the model over predicts by 20% at site C3, and under predicts by 12% at site C6. Overall, the model managed to predict monitored exceedences of the NO_2 annual mean AQS objective.

A2.6 Dispersion Modelling Results

Results at specific receptors for each scenario are illustrated in Table 14, which also provides the percentage of decrease in NO_2 for each scenario (compared to the baseline case). Contour maps of NO_2 concentrations are also provided in Figure 16 and Figure 17 for all scenarios.

A2.6.1 Scenario 1 – Removal of HDVs

The removal of HDVs (buses and HGVs) in the AQMA would greatly improve air quality. Although HDVs only represent a maximum of 2% of the total traffic going through the AQMA, NO_2 annual mean is predicted to be below the AQS objective at all sensitive receptors in the area. The decrease in NO_2

concentrations would be between 25% and 35% at all sites. The maximum predicted NO_2 annual mean at sensitive receptors is just above 36µg/m^3 outside 3 Creggan Road, where the co-located diffusion tubes C1 and C2 are installed, and similar outside 1 Marlborough Street further North uphill. These results are in line with the source apportionment carried out in the Further Assessment in 2007, which showed that HDVs were the main contributors of the high concentrations monitored.

A2.6.2 Scenario 2 - Overall reduction of traffic flow

A decrease of 5% of the overall traffic flows would reduce the NO_2 annual mean by 4% (between 1µg/m^3 and 2µg/m^3 reduction). This would not prevent the AQS objective to be exceeded at sensitive receptors, as all sites currently exceeding are still predicted to be over 40µg/m^3 with this measure in place.

A2.6.3 Scenario 3 – Combination of Scenario 1 and Scenario 2

The combination of Scenario 1 and Scenario 2 (5% reduction of the overall traffic and removal of all HDVs going through the AQMA) would be greatly beneficial and would help reduce the NO_2 concentrations by up to 36%. As for Scenario 1, all sensitive receptors are predicted to be well below the AQS objective; the maximum predicted annual mean being 35µg/m^3 outside 1 Marlborough Street and at diffusion tube site C1/C2.

A2.6.4 Scenario 4 – Removal of HDVs on Creggan Road only

In this scenario, it is assumed that a significant number of the HDVs that would have used Creggan Road would be diverted before they reach the junction, as follows:

- For HDVs coming from Creggan Street, assuming 50% would turn right, they would all use Francis Street (further East) instead of Infirmary Road. For the 50% turning left, half of them (i.e. 25%) could be diverted before entering the AQMA via Westland Street (encouraged by careful signage); the remaining half (25%) turning left on Lone Moore Road. This means 75% of the HDVs coming from Creggan Street would effectively be diverted before reaching the AQMA.

- For HDVs coming from Lone Moore Road, we assume 50% would continue on Infirmary Road, the remainder being re-routed prior to reaching the junction.

This option would have a similar effect as scenario 1 at receptors along Creggan Road, showing a decrease of 32%, which would reduce levels below the objective. Properties in Infirmary Road would also be below the objective. However, some properties on Creggan Street would still be likely to exceed the objective (41.7µg/m^3 predicted at diffusion tube C4). Receptor 9 in Lone Moore Road (39.9µg/m^3 predicted) also shows that there would still be a risk of exceeding the objective.

Table 14 - Summary of NO_2 Results at Sensitive Receptors for each Scenario

ID	Name/Location	X (m)	Y (m)	Z (m)	Predicted NO_2 2007 (µg/m^3)					Percentage Difference with Base Scenario			
					Scenario 0 - Base	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 1	Scenario 2	Scenario 3	Scenario 4
0	C1/C2 - 3 Creggan Road	242913	417144	1.5	**54.2**	36.1	**52.1**	34.7	37.0	-33%	-3.8%	-36%	-32%
1	C3 - 6 Marlborough Terrace	242923	417102	1.5	37.7	26.6	36.3	25.6	36.1	-29%	-3.8%	-32%	-4%
2	C4 - 22A Creggan Street	242958	417104	1.5	**42.6**	27.5	**41.0**	26.4	**41.7**	-35%	-3.8%	-38%	-2%
3	C5 - 10 Windsor Terrace	242962	417142	1.5	**40.2**	28.9	38.7	27.8	36.5	-28%	-3.8%	-31%	-9%
4	C6 - 14 Creggan Road	242928	417148	1.5	33.2	22.4	32.0	21.6	23.9	-32%	-3.6%	-35%	-28%
5	4 Creggan Street	243039	417040	1.5	19.0	14.2	18.3	13.6	17.8	-25%	-3.8%	-28%	-6%
6	21 Marlborough Terrace	242872	417039	1.5	27.4	20.2	26.2	19.5	26.7	-26%	-4.1%	-29%	-3%
7	35 Creggan Road	242795	417225	1.5	22.3	15.9	21.4	15.3	16.1	-29%	-3.8%	-31%	-28%
8	1 Marlborough Street	242878	417170	1.5	**51.5**	36.4	**49.6**	35.0	36.8	-29%	-3.6%	-32%	-29%

ID	Name/Location	X (m)	Y (m)	Z (m)	Predicted NO_2 2007 (µg/m^3)					Percentage Difference with Base Scenario			
					Scenario 0 - Base	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 1	Scenario 2	Scenario 3	Scenario 4
9	2 Marlborough Terrace	242934	417117	1.5	**42.6**	29.7	**40.9**	28.5	39.6	-30%	-4.1%	-33%	-7%
10	4 Creggan Road	242946	417137	1.5	**50.4**	34.7	**48.5**	33.3	37.6	-31%	-3.7%	-34%	-25%
11	6 Infirmary Road	242983	417161	1.5	28.3	21.4	27.2	20.6	26.6	-24%	-3.9%	-27%	-6%
12	4 Infirmary Road	243007	417183	1.5	25.3	19.5	24.3	18.6	24.1	-23%	-3.9%	-26%	-5%
13	23 Marlborough Terrace	242940	417095	1.5	28.3	19.7	27.2	19.0	26.8	-30%	-3.9%	-33%	-5%
14	12 Creggan Street	243006	417066	1.5	22.3	16.4	21.4	15.7	20.9	-26%	-3.8%	-30%	-6%
15	18 Creggan Street	242977	417089	1.5	30.3	20.2	29.1	19.3	29.8	-33%	-4.1%	-36%	-2%

In bold, exceedences of the NO_2 annual mean AQS objective

Figure 16 - Predicted Annual Average NO_2 Concentrations 2007 – Baseline Scenario

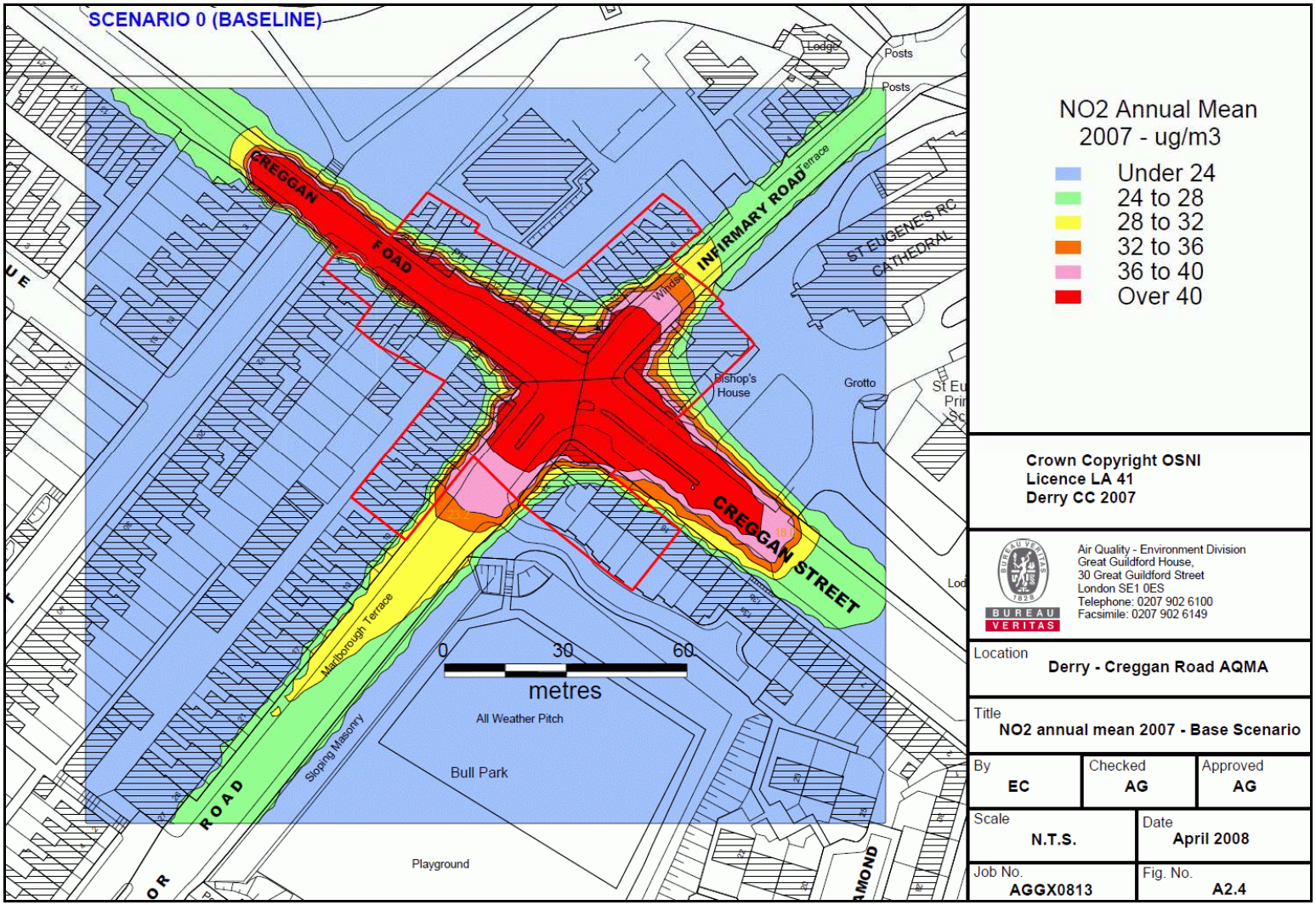
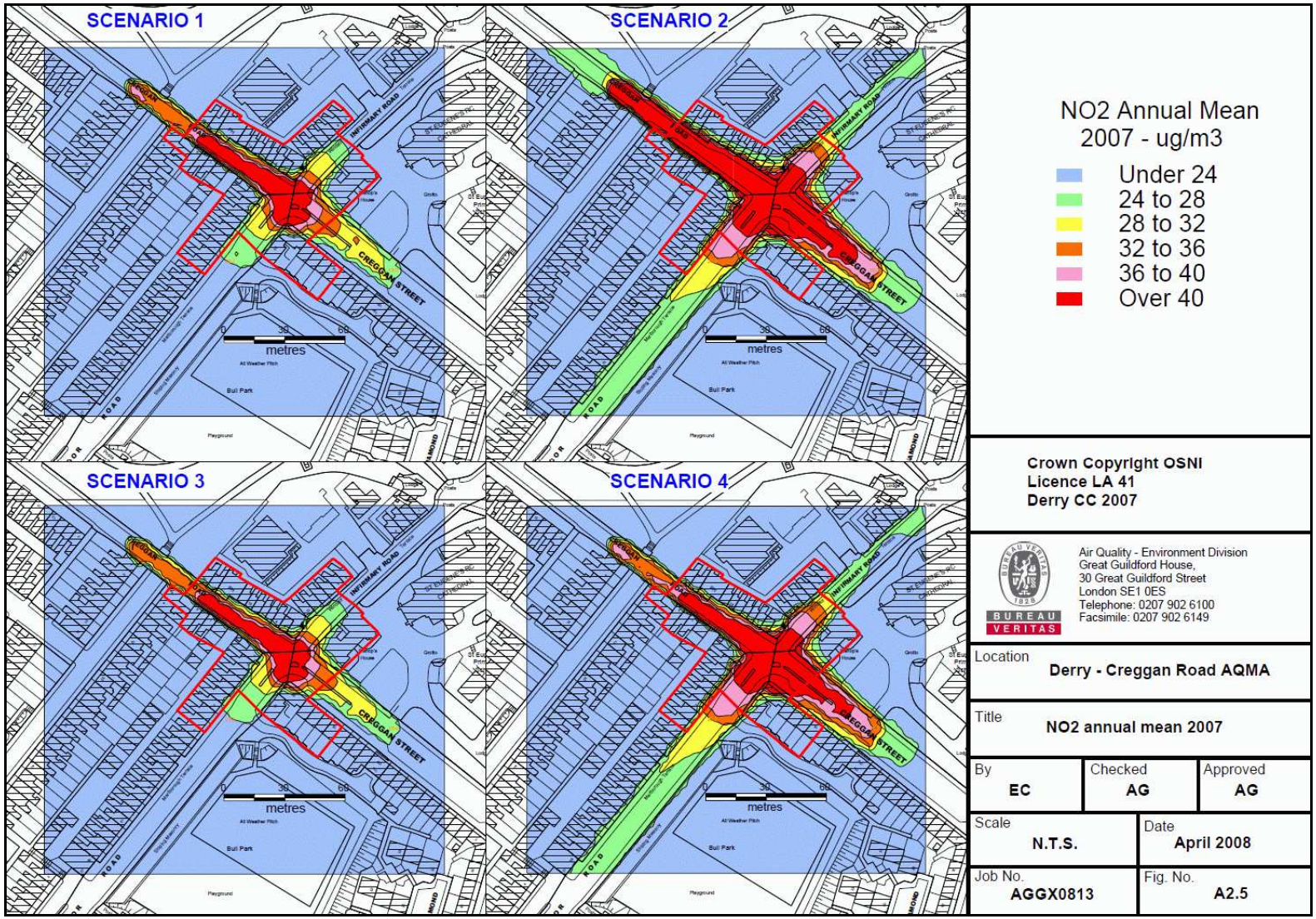


Figure 17 - Predicted Annual Average NO_2 Concentrations 2007 – Scenarios 1 - 4



A3. Conclusions

Following the declaration of an Air Quality Management Area (AQMA) for nitrogen dioxide (NO_2) due to traffic emissions at the Creggan Road / Infirmary Road junction in Derry, detailed dispersion modelling has been carried out to help quantify the impact of potential traffic measures on air quality in the area. Dispersion modelling allows an estimation of the efficiency of traffic measures, and provides valuable answers to support the air quality Action Plan required to tackle air pollution within the AQMA.

Five scenarios have been considered:

- Scenario 0 - Baseline scenario, based on the current traffic conditions (2007) in the AQMA;
- Scenario 1 - Removal of heavy duty vehicles (HDVs) in the AQMA (including buses and heavy goods vehicles – HGVs);
- Scenario 2 - 5% decrease of the overall traffic in the AQMA (all types of vehicles);
- Scenario 3 - Combination of Scenario 1 and Scenario 2;
- Scenario 4 - Removal of HDVs on Creggan Road only - assuming that a significant part of the HDVs previously using Creggan Road would be diverted before reaching the AQMA.

All results have been based on the latest traffic, pollution monitoring and meteorological data, updated in 2007. The dispersion modelling has been based on the same methodology followed in the latest Local Air Quality Management (LAQM) report (Further Assessment 2007), using Adms-Urban model software. Predicted results have been verified against monitoring data and adjusted where necessary. NO_2 concentrations have been predicted at a series of receptors relevant of public exposure, and on a grid of receptors, allowing the mapping of concentration contours.

The results show that the removal of HDVs (Scenario 1) currently going through the AQMA should significantly decrease NO_2 concentrations in the AQMA. Predicted results show that all sensitive receptors (façade of properties) would be below the NO_2 annual mean AQS objective of 40µg/m^3 with such a measure in place, reducing annual concentrations by 25% to 35%. This is in line with the source apportionment of pollutant sources carried out in the Further Assessment in 2007, which showed that HDVs were the main contributors of NO_x/NO_2 in the AQMA.

On the other hand, an overall reduction of 5% in traffic flows (Scenario 2) is unlikely to reduce NO_2 concentrations significantly, and is not predicted to be sufficient to comply with the AQS objective. Results show that the annual mean would be reduced by 4%, representing a decrease of 1% to 2% maximum. Based on current NO_2 levels in the AQMA, several sites would still exceed the objective.

Removal of HDVs on Creggan Road only would have a beneficial effect at most properties near the junction, with a significant reduction of NO_2 levels in Creggan Road. Predictions show that nearly all receptors would be below the AQS objective. However, there would still

be a risk of exceedences at the properties close to the junction in Creggan Street and Lone Moore Road.

Another option, although not directly modelled, would be the combination of Scenario 2 (5% decrease of the overall traffic in the AQMA) with Scenario 4 (restriction of HDVs in Creggan Road), which is likely to have a similar beneficial effect on air quality as Scenario 1.

Appendix 3. Derry City Council Fleet of Road-Worthy Vehicles 2012

Table 15 – Derry City Council Vehicle Fleet

Vehicle Type		Quantity	Engine Classification	Additional	Age of Vehicles (years)	Percentage of Vehicles compliant with 7-year Replacement Scheme**
Refuse Collection Vehicles(RCV) 32 tonnes		1	Euro IV	All RCV's/large sweepers will be Euro VI category by 2014	0 - 6 (2 vehicles overdue replacement)	90%
Refuse Collection Vehicles(RCV) 26 tonnes		13	2 no. Euro IV - 11 no. Euro V			
Refuse Collection Vehicles(RCV) 7.5 tonnes		2	Euro IV			
		1	Euro V			
Street Sweepers	Large 7.5 tonnes	12	Euro IV		1 - 5	100%
	Small	5	Diesel	All vehicles undergo annual PSV and emissions testing		
Vans		45			3 – 15 ½ (19 vehicles overdue replacement)*	42%
Tractors		10			Not as yet part of the 7-year vehicle replacement Scheme (except tractors)	
Airport Foam Tenders		4				
Ancillary Vehicles: mowers/gum-busters		10				
Cars		2				
Electric Vans		1	Electric	To be purchased		
Totals		**105**				

* Replacement dependent on financial availability

******Troublesome vehicles may be changed early but others, with low mileage, may be retained more than 7 years

Appendix 4. Implementation of the Integrated Transport Strategy (particularly public transport)

Table 16 – ITS – Implementation of Measures

Programme Activity	Lead Body (1)	Lead Partners (2)	Funding Requirement		Timescale Years			State of Readiness (3)
			Capital (£'000s)	Recurrent (£'000s)	S	M	L	
East Bank Greenway	Derry City Council	Sustrans, DRD	2,200		1-3			√√√
Greenway walking and cycling network development	Derry City Council	Derry Access Forum comprising DCC, DRD, DHC, DSD, Disability Action	5,000		2	-	10	√√
Bus Priority Measures New bus station and interchange	Translink	DRD, Roads Service, DCC	1,000 26,400		1-5	5	10	√√ √
Rail	Translink	DRD	- 8,000		1-5	5	10	√√ √
Parking – includes Park and Ride	Roads Service	DRD	5,300		1-5			√√
Traffic Engineering	Roads Service	DRD	2,000		1-5			
Highway Links – includes Outer Orbital	DRD	Roads Service, Planning Service	6,000 188,000		1-5	5	10	√√ √
Environmental – traffic calming	DRD	Roads Service, Planning Service	1,900 35,000		1-5	5	10	√√ √
Regional Highway – includes A5 and A6	DRD	Roads Service, Planning Service	25,000 1,110,000		1-5	5	10	√√ √
Regional Bus	Translink	DRD, Roads Service	200		1-5			√√
Regional Rail – includes station relocation	Translink	DRD	- 7,000			5	10	√
City of Derry Airport Infrastructure	Derry City Council		2,000		2-3			√√√
Cross Border	DRD	Roads Service	300		1-5			√√
Totals			1,425,300					

(1) Lead Body – Responsible for leading delivery of Catalyst Programme & accountability for performance

(2) Lead Partners – Responsible for delivery of specific actions/projects

(3) State of Readiness – Feasibility Stage (√) Development Stage (√√) Implementation Stage (√√√)