



2010 Air Quality Progress Report for *West Dunbartonshire Council*

In fulfillment of Part IV of the Environment Act 1995
Local Air Quality Management

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Executive Summary

West Dunbartonshire Councils 2009 Update and Screening Assessment concluded that it was not necessary to proceed to detailed assessment for any of the National Air Quality Objectives. This document fulfils the requirement to complete a Progress Report in 2010.

The main findings of the 2010 Progress Report are summarised below.

Nitrogen Dioxide (NO₂)

Real time monitoring

West Dunbartonshire Council has two automatic monitoring stations as detailed below. The locations have not changed since the 2009 Update and Screening Assessment.

1. Glasgow Road, Dumbarton. (A814) The ratified data from AEA shows an annual mean of 23µg/m³ for 2009. There were no exceedences of the hourly mean.
2. Briar Drive, Clydebank (Kilbowie Roundabout). The ratified data from AEA shows an annual mean for 2009 of 26µg/m³. There were no exceedences of the hourly mean.

Diffusion Tubes

West Dunbartonshire Council had 35 diffusion tube locations by the end of 2009. The existing network of 19 tube locations was added to at various times throughout the year as possible local developments came to light. None of these developments have been completed as yet however the information from the monitoring will assist in assessing the impact of the developments when and if they come to fruition.

Three diffusion tube locations exceeded the annual average National Air Quality Objective for NO₂ in 2009.

1. Milton 1 – the bias adjusted annual average was 60.5µg/m³. However the nearest receptors are residences located approximately 12 metres back from the roadside. A second tube designated Milton 2 located in the front garden of one of the houses recorded a bias adjusted annual average of 30.4µg/m³.
2. Clydebank 6 – the bias adjusted annual average was 42.5µg/m³. This tube is located on the Kilbowie roundabout. The nearest receptor is located 40 metres back from the roundabout. The automatic analyser at Briar Drive located 25 metres back from the same roundabout had a ratified annual average of 26µg/m³.
3. Clydebank 13 – this is a new diffusion tube site located on a lamppost on Kilbowie Road, Clydebank. Its purpose is to assess the effect on local air quality of an as yet incomplete park and ride development on Kilbowie Road.

The tube was installed in July 2009. The annualised annual average for 2009 was $40.8\mu\text{g}/\text{m}^3$. The nearest receptors are houses situated 10 metres back from the road. The distance calculator from the Air Quality Archive predicted the level of NO_2 at the nearest receptor to be $34.1\mu\text{g}/\text{m}^3$.

All three of these exceedences are discussed further on in the report.

PM₁₀

West Dunbartonshire Council has one Tapered Element Oscillating Microbalance (TEOM) with a Type C FDMS which was located at Briar Drive, Clydebank throughout 2009. The ratified annual average for 2009 was $17\mu\text{g}/\text{m}^3$. There were three (3) exceedences of the daily mean objective.

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1 Introduction

1.1 Description of Local Authority Area

West Dunbartonshire Council is the 4th smallest Scottish Council in terms of land area covering 17792 hectares. Population is mid placed in the table of 32 Councils at approximately 96,000 in 43,000 households.

The Authority comprises two main areas:

Clydebank situated on the north of the River Clyde. Almost half the population of West Dunbartonshire Council lives in the Clydebank area giving it a population density level similar to large cities.

Dumbarton and the Vale of Leven are less densely populated areas extending along the banks of the River Leven to Loch Lomond.

The dominant landscape is moorland alongside rolling farmlands and rugged hills and ridges. West Dunbartonshire is widely recognised as containing some of the finest lowland countryside in Scotland. Although West Dunbartonshire is not a particularly agricultural area, a high proportion of the area is classed as open countryside. Contrastingly the level of urban development is significantly higher than the Scottish average. The area has the highest proportion of fresh water in Scotland, much of it of very high quality.

1.2 Purpose of Progress Report

Progress Reports are required in the intervening years between the three-yearly Updating and Screening Assessment reports. Their purpose is to maintain continuity in the Local Air Quality Management process.

They are not intended to be as detailed as Updating and Screening Assessment Reports, or to require as much effort. However, if the Progress Report identifies the risk of exceedence of an Air Quality Objective, the Local Authority (LA) should undertake a Detailed Assessment immediately, and not wait until the next round of Review and Assessment.

1.3 Air Quality Objectives

The air quality objectives applicable to LAQM in Scotland are set out in the Air Quality (Scotland) Regulations 2000 (Scottish SI 2000 No 97), the Air Quality (Scotland) (Amendment) Regulations 2002 (Scottish SI 2002 No 297), and are shown in Table 1.1. This table shows the objectives in units of microgrammes per cubic metre, $\mu\text{g}/\text{m}^3$ (milligrammes per cubic metre, mg/m^3 for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).

Table 1.1 Air Quality Objectives included in Regulations for the purpose of Local Air Quality Management in Scotland.

Pollutant	Concentration	Measured as	Date to be achieved by
Benzene	16.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
	3.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
Carbon monoxide	10.0 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.5 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
	0.25 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2008
Nitrogen dioxide	200 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2005
Particles (PM₁₀) (gravimetric)	50 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	50 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 7 times a year	24-hour mean	31.12.2010
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
	18 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2010
Sulphur dioxide	350 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

1.4 Summary of Previous Review and Assessments

2004 Progress Report

Concluded that it was not necessary to proceed to detailed assessment as there was no risk of the National Air Quality Objectives being exceeded.

2005 Progress Report

Concluded that it was not necessary to proceed to detailed assessment as there was no risk of the National Air Quality Objectives being exceeded.

2006 Update & Screening Assessment

Concluded that the National Air Quality Objectives were being complied with. However PM₁₀ screening carried out using a light scattering device at the busiest junction within the West Dunbartonshire Council (Kilbowie Roundabout) indicated that a breach of the 2010 National Air Quality Objective was possible. It was decided to place a TEOM at the location at the earliest opportunity to verify or disprove these results.

2007 Progress Report

Concluded that during 2006 the National Air Quality Objective for NO₂ (NO₂ tubes) was exceeded at two locations within the West Dunbartonshire Council area. The first location, Milton 1, recorded a bias adjusted annual average of 45µg/m³. This tube is located on the A82 which is the main trunk road access to the west of Scotland. It is maintained and operated by Transport Scotland. The nearest relevant exposure at this location are residential properties which are set back 12 metres from the kerb. It was proposed that a diffusion tube would be located at the front elevation of one of the properties in an attempt to assess NO₂ levels at the residences. The second location, Dumbarton 1, located on the A814 (Glasgow Rd, Dumbarton close to its junction with Leven Street) showed a bias adjusted annual average of 44µg/m³. A NO₂ concentration of 41.8µg/m³ was predicted at the façade of the nearest residential property (approximately 2.5m distant). In response to this exceedence a real time NO_x analyser was located as close as possible to the site in April 2007.

PM₁₀ - As stated in the 2006 Progress Report a TEOM was located at the Kilbowie Roundabout junction in February 2007. Results were discussed in the 2008 Progress Report.

2008 Progress Report

Concluded that the NO₂ diffusion tube designated Milton 1 continued to exceed the National Air Quality Objective with a bias adjusted annual average in 2007 of 43µg/m³. In accordance with the intention stated in the 2007 Progress Report a diffusion tube had been located at the façade of one of the houses however the tube was persistently damaged or missing. A more secure location was found.

However as previously mentioned the nearest relevant exposures at this location are residential properties set back 12 metres from the kerb. Using factors provided in guidance a NO₂ concentration for 2007 of 35.25µg/m³ was estimated at the façade of the properties.

During 2007 investigations into the reason behind the increase in results from the diffusion tube designated Dumbarton 1 revealed that the exhaust from a balanced flue had been located on the façade of the building two metres away from the tube and that the exhaust discharge was at almost the same level as the tube. The tube was subsequently relocated at the opposite side of the road.

PM₁₀ - Results for February to December 2007 indicated an annual average of 17µg/m³. There were three (3) exceedences of the daily mean objective.

2009 Update and Screening Assessment

During 2008 one exceedence of the annual mean NO₂ was recorded. The diffusion tube designated Milton 1 had a bias adjusted annual mean of 63.2µg/m³. However the nearest relevant exposure are residential properties 15 metres from the roadside. During 2008 a diffusion tube designated Milton 2 was located in the front garden of one of those properties. The bias adjusted annual average of this diffusion tube was 24.1µg/m³. For the sake of robustness this figure was tested by using the NO₂ Distance Calculator on the National Air Quality Archive Website. Background NO₂ levels were obtained from the maps on the same website. The predicted annual mean NO₂ concentration at the receptor was 33.8µg/m³ – remaining within the National Air Quality Objectives.

The assessment did not identify any new or significantly changed sources apart from the installation of one biomass boiler in a building in the Balloch area.

The boiler was assessed in accordance with guidance and it was concluded that there was no need to proceed to detailed assessment.

The Update & Screening Assessment did not identify a need to proceed to detailed assessment for any pollutant.

Figure 1.1 Map of AQMA Boundaries (if applicable)

Not applicable

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

West Dunbartonshire Council has two automatic monitoring stations. Their location is unchanged since the 2009 Update and Screening Assessment. During 2009 they were sited at the following locations (location maps are included as Appendices at the end of this report)

1. Glasgow Road, Dumbarton

This unit, which contains a real time chemiluminescent NO_x analyser was moved to the A814 (Glasgow Road, Dumbarton at its junction with Leven Street) in April 2007. The unit was moved here following a breach of the NO₂ objective (based on diffusion tube results) at the site in 2006.

2. Briar Drive, Clydebank

This unit houses a similar real time NO_x analyser and a TEOM fitted with a Type C FDMS. This unit is located at Kilbowie Roundabout which is the busiest junction in the West Dunbartonshire Council area. This unit was located here in February 2007.

Details of QA/QC procedures for automatic monitors are included as Appendix A in this report

Table 2.1 Details of Automatic Monitoring Sites

Site Name	Site Type	OS Grid Ref		Pollutants Monitored	Monitoring Technique	In AQMA?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Does this location represent worst-case exposure?
Briar Drive, Clydebank	Roadside	X 249723	Y 672044	NOx PM ₁₀	Chemilumin escent analyser FDMS Type C	N	Y (18m)	25m	N
Glasgow Road, Dumbarton	Roadside	X240238	Y675193	NOx	Chemilumin escent analyser	N	Y *(2.5m)	5m	N

*location problems with this unit meant that it had to be set 5m back from kerb. Nearest relevant receptor (residential property) is 2.5 metres from kerb.

2.1.2 Non-Automatic Monitoring

By the end of 2009 West Dunbartonshire Council had 35 NO₂ diffusion tubes located throughout the Council area (excluding triplicates co-located with the automatic monitors). Additions were made throughout the year as deemed necessary. Full details are included in the following sections.

A bias adjustment figure of 1.23 obtained from the Air Quality Review & Assessment Helpdesk website has been applied to the diffusion tube results.

Diffusion tube QA/QC procedures are included as Appendix A to this report.

Figure 2.2 Map(s) of Non-Automatic Monitoring Sites (if applicable)

See Appendix

Table 2.2 Details of Non- Automatic Monitoring Sites

Site Name	Site Type	OS Grid Ref		Pollutants Monitored	In AQMA?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Worst-case Location?
Clydebank 1	Roadside	X248479	Y671115	NO ₂	N	Y	4m	Y
Clydebank 3	Background	X250438	Y669934	NO ₂	N	N	62m	N/A
Clydebank 4	Background	X250264	Y672910	NO ₂	N	N	5m	N/A
Clydebank 5	Kerbside	X250067	Y670893	NO ₂	N	Y	1m	Y
Clydebank 6	Kerbside	X249725	Y672069	NO ₂	N	Y	6m	N
Airport 1	Kerbside	X250770	Y669653	NO ₂	N	Y	1m	Y
Dumbarton 1	Roadside	X240322	Y675177	NO ₂	N	Y	1m	Y
Dumbarton 7	Background	X238754	Y675258	NO ₂	N	N	2m	N/A
Dumbarton 9	Background	X240880	Y675373	NO ₂	N	N	2m	N/A
Dumbarton 11	Roadside	X240515	Y675078	NO ₂	N	Y	1m	Y
Bowling 1	Kerbside	X243736	Y673791	NO ₂	N	N	N/A	N
Balloch 1	Kerbside	X238584	Y681562	NO ₂	N	Y	12m	Y
Alexandria 1	Kerbside	X239024	Y680206	NO ₂	N	Y	1m	Y
Briar Drive Triplicate 1	Roadside	X249723	Y672044	NO ₂	N	N	25m	N
Briar Drive Triplicate 2	Roadside	X249723	Y672044	NO ₂	N	N	25m	N
Briar Drive Triplicate 3	Roadside	X249723	Y672044	NO ₂	N	N	25m	N
Dumbarton Triplicate 1	Roadside	X240238	X675193	NO ₂	N	N	5m	N
Dumbarton Triplicate 2	Roadside	X240238	X675193	NO ₂	N	N	5m	N
Dumbarton Triplicate 3	Roadside	X240238	X675193	NO ₂	N	N	5m	N

Site Name	Site Type	OS Grid Ref		Pollutants Monitored	In AQMA?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Worst-case Location?
Jamestown 1	Kerbside	X239614	Y679875	NO ₂	N	Y	2m	N
Milton 1	Kerbside	X242266	Y674235	NO ₂	N	Y	1m	N
Milton 2	Roadside	X242160	Y674299	NO ₂	N	Y	12m	Y
Glasgow Rd Dumbarton 2	Roadside	X240178	Y675228	NO ₂	N	Y	1m	Y
Glasgow Rd Dumbarton 3	Roadside	X240279	Y675196	NO ₂	N	Y	2m	Y
Glasgow Rd Dumbarton 4	Roadside	X240425	Y675131	NO ₂	N	Y	1m	Y
Clydebank 7	Roadside	X249913	Y669865	NO ₂	N	Y	4m	Y
Clydebank 9	Kerbside	X248899	Y670784	NO ₂	N	Y	1m	Y
Clydebank 10	Kerbside	X249759	Y671845	NO ₂	N	Y	1m	Y
Clydebank 11	Roadside	X249801	Y672288	NO ₂	N	Y	1m	Y
Clydebank 12	Kerbside	X249747	Y671665	NO ₂	N	Y	1m	Y
Clydebank 13	Kerbside	X249762	Y671790	NO ₂	N	Y	1m	N
Clydebank 14	Kerbside	X249872	Y671854	NO ₂	N	Y	1m	Y
Clydebank 15	Kerbside	X249746	Y671966	NO ₂	N	Y	1m	Y
Clydebank 16	Kerbside	X249967	Y672548	NO ₂	N	Y	1m	Y
Clydebank 17	Kerbside	X249987	Y672440	NO ₂	N	Y	1m	Y
Clydebank 18	Kerbside	X249972	Y672351	NO ₂	N	Y	1m	Y
Vale of Leven 1	Kerbside	X240115	Y677101	NO ₂	N	Y	1m	Y
Vale of Leven 2	Kerbside	X240093	X677482	NO ₂	N	Y	1m	Y
Vale of Leven 3	Roadside	X240115	X677146	NO ₂	N	Y	4m	N
Vale of Leven 4	Kerbside	X240164	Y677014	NO ₂	N	Y	1m	Y
Dumbarton 12	Kerbside	X239410	Y675330	NO ₂	N	Y	1m	Y

2.2 Comparison of Monitoring Results with Air Quality Objectives

Since the 2009 Update and Screening Assessment the following additional diffusion tubes were added to the network.

1. Tube designated Clydebank 7 was located at the junction of Argyll Road and Glasgow Road in Clydebank in February 2009 in an attempt to assess the impact of the Queens Quay development on the shore of the River Clyde. Only a very small portion of the site is currently in use – Clydebank College relocated there in August 2009. The remainder of the site remains undeveloped at present and the site is currently mothballed. The new location of the college possibly meant an increase in the traffic using the junction. The only receptors in the area are flats located approximately 25 metres back from the opposite side of the junction.

10 months monitoring was carried out and data capture for the monitoring period was 90%. The bias adjusted average for Clydebank 7 was $28.8\mu\text{g}/\text{m}^3$.

2. Tube designated Clydebank 9 was located on a lamppost at 404 Dumbarton Road, Clydebank which is a tenement block at a previously quiet junction. The tube was located there as a result of rephasing of traffic lights at the junction to give preference to traffic from the Golden Jubilee Hospital. The concern was that the rephasing of the traffic lights would result in traffic queuing on the main Dumbarton Road would have an adverse effect on local air quality. The nearest tenement to the junction is located 18 metres back from the junction and on the opposite side of the road to any queuing traffic.

10 months monitoring was carried out and the data capture for the monitoring period was 80%. The 2009 bias adjusted average for Clydebank 9 was $30.6\mu\text{g}/\text{m}^3$.

3. Tubes designated Clydebank 10,12,13,14, &15 were located on lampposts along a 300 metre stretch of Kilbowie Road, Clydebank, south of Kilbowie Roundabout. The tubes were located there in reaction to a park and ride car park being constructed on a plot of vacant land off Kilbowie Road. The tubes were installed at various times throughout 2009 as definite proposals regarding the park and ride became available. A new set of traffic lights are proposed to facilitate access to the park and ride and will have the potential to cause traffic build up on both sides of Kilbowie Road. The traffic lights are not yet installed and no installation date is available at present. Houses are located approximately 15 metres back from the road.

Bias adjusted results for these tubes ranged from 33.6 to $38.2\mu\text{g}/\text{m}^3$. The data was annualised where appropriate (one location Clydebank 14 was only monitored during November and December it was decided not to annualise this tube). The results are included further on in this report.

4. Tubes designated Clydebank 11, 16, 17, and 18 were placed on lampposts at various locations on Kilbowie Road, Clydebank, north of Kilbowie Roundabout as a result of a priority bus lane being formed. This has adversely affected rush hour traffic by reducing what was a two lane road to a single lane road at rush hours. The road leads to the Kilbowie Roundabout junction which is the busiest in the West Dunbartonshire Council area. No prior notification was received regarding the formation of the bus lane therefore we hold no information on local air quality conditions prior to its formation. Again the tubes were installed at various times throughout 2009 as more information regarding the bus lane proposals became available. Houses located along the priority bus lane are located between 12 and 30 metres back from the road.

Bias adjusted results for these tubes range from 26.9 – 30.6µg/m³. The data was annualised and the results are included further on in this report.

5. Tube designated Dumbarton 12 was installed in High Street, Dumbarton in February 2009 in response to the re-opening of High Street to traffic. The area had been designated a pedestrian zone a few years ago but it was decided to re-open it to traffic. The tube was installed in February.

We have monitoring data for 10 months with 100% data capture. The bias adjusted average for the period was 25.5µg/m³.

6. Tubes designated Vale of Leven 1, 2, 3, & 4 were installed in September 2009. The purpose of the tubes at present is to provide background NO₂ information. In July 2009 the Councils Planning Department were advised that Aggreko (generator manufacturer) intended relocating their new plant. Aggreko had already submitted a Planning application for the construction of a new manufacturing facility in an existing industrial estate within the West Dunbartonshire Council area. However they decided that an alternative site was preferable. The proposed new site has two houses located 50 metres away. It was decided to install NO₂ tubes as soon as possible as we held no information about the local air quality in the proposed location which will be served by what is presently a relatively quiet road. . No definite date is available for commencement of construction at the moment as the site has overhead electricity wires which require to be rerouted or buried. The tubes were installed in September 2009. 4 months monitoring data is available for 2009 with 100% data capture. The available data was annualised and results ranged between 28.6 and 30.8µg/m³. Monitoring will continue and an update provided in the 2011 Progress Report.

No monitoring locations have been removed from the diffusion tube network since the 2009 Update and Screening Assessment

2.2.1 Nitrogen Dioxide

Automatic Monitoring Data

West Dunbartonshire Council has two automatic NO_x monitoring stations. During 2009 they were sited in the following locations. Neither station breached any of the NO₂ objectives. (Location maps are included as Appendices at the end of this report)

1. Glasgow Road, Dumbarton

This unit, which contains a real time chemiluminescent NO_x analyser, was moved to the A814 (Glasgow Rd, Dumbarton at its junction with Leven Street) in April 2007. The unit was moved here to provide real time data following an apparent breach (diffusion tube results) of the NO₂ National Air Quality Objective at the site in 2006. The unit is located 5m from the kerbside. The ratified data from AEA indicates that the annual average NO₂ level for 2009 was 23µg/m³. There were no exceedences of the hourly mean objective during 2009.

The nearest receptors are residential properties located 2.5m from the roadside. The NO₂ Distance Calculator on the Air Quality Archive web site was used to predict the NO₂ levels at the nearest receptors which are 2.5 metres closer to the roadside than the automatic monitor. The calculator predicted NO₂ levels at the façade of the nearest residential property of 25.5µg/m³.

2. Briar Drive, Clydebank (Kilbowie Roundabout)

This unit houses a real time chemiluminescent NO_x analyser and a TEOM. It has been located there since February 2007. Kilbowie Roundabout is the busiest junction within the West Dunbartonshire Council area. The unit is located approximately 25 metres from the roundabout. The ratified data from AEA indicates that the annual average NO₂ level for 2009 was 26µg/m³. There were no exceedences of the hourly mean objective during 2009.

The nearest receptors are residential properties located approximately 40 metres from the roundabout.

Table 2.3a Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with Annual Mean Objective

Site ID	Location	Within AQMA?	Data Capture for monitoring period ^a %	Data Capture for full calendar year 2009 ^b %	Annual mean concentrations ($\mu\text{g}/\text{m}^3$)		
					2007* ^{c, d}	2008* ^{c, d}	2009 ^c
Briar Dr, Clydebank	Briar Dr, Clydebank	N	98.7%	98.7%	25	24	26
Glasgow Rd, Dumbarton	Glasgow Rd, Dumbarton	N	98.2%	98.2%	19	19	23

- * Data capture for Briar Drive 2008 – 96.6%
- * Data capture for Briar Drive 2007 – 82.4%
- * Data capture for Glasgow Road 2008 – 99.3%
- * Data capture for Glasgow Road 2007 – 65.4%

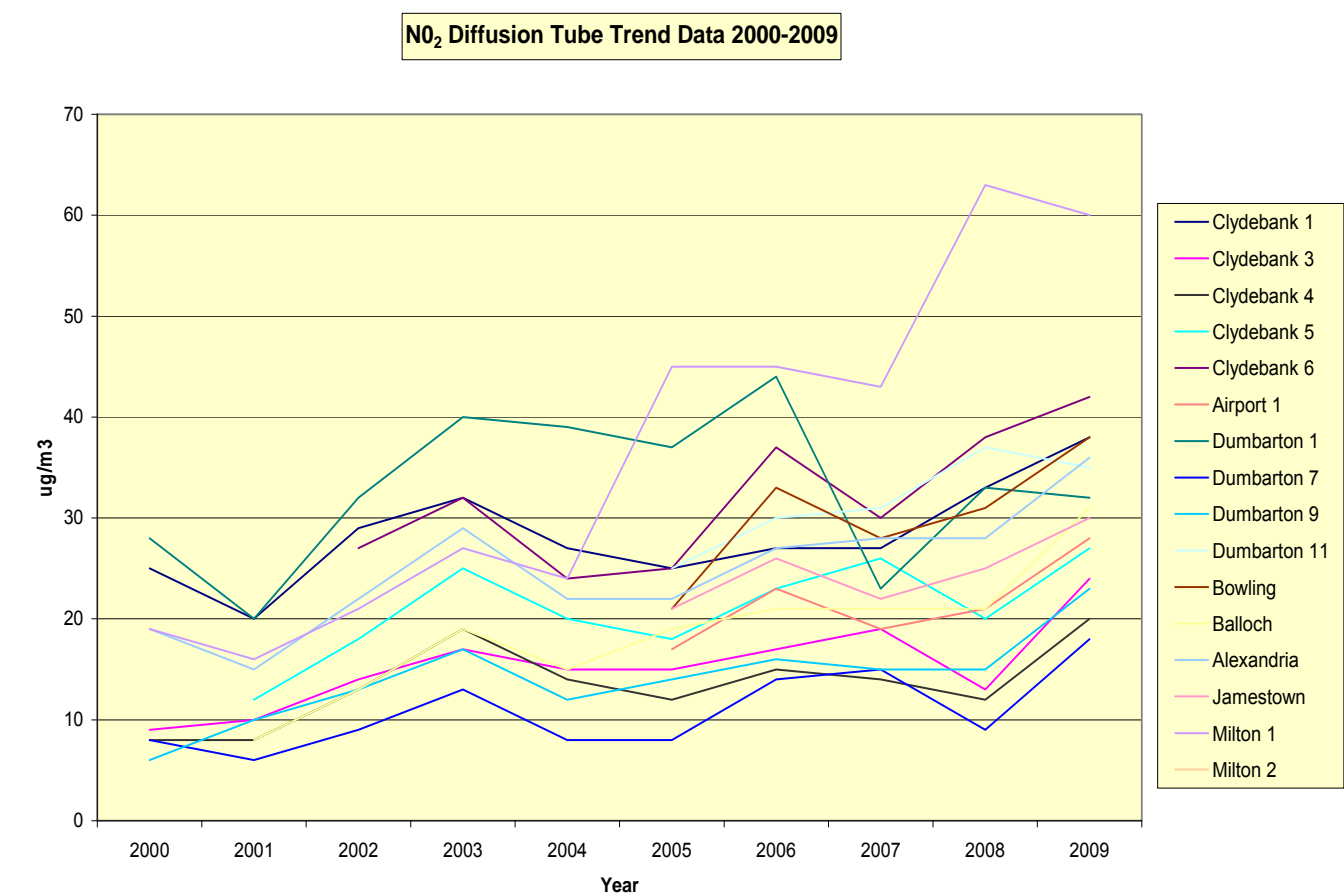
Figure 2.3 Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Automatic Monitoring Sites.

Monitoring data from our automatic monitors is only available for three years a trend graph was therefore not included.

Table 2.3b Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour Mean Objective

Site ID	Location	Within AQMA?	Data Capture for monitoring period ^a %	Data Capture for full calendar year 2009 ^b %	Number of Exceedences of hourly mean (200 µg/m ³) <i>If the period of valid data is less than 90% of a full year, include the 99.8th percentile of hourly means in brackets.</i>		
					2007 ^c	2008 ^c	2009
Briar Dr, Clydebank	Briar Dr, Clydebank	N	98.7%	98.7%	0	0	0
Glasgow Rd, Dumbarton	Glasgow Rd, Dumbarton	N	98.2%	98.2%	0	0	0

Figure 2.4 Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites.



Diffusion Tube Monitoring Data

West Dunbartonshire Council has 35 NO₂ diffusion tubes located throughout the Council area (excluding triplicates co-located with automatic monitors). All results have been bias adjusted using a factor of 1.23 obtained from the Review and Assessment website. The above trend graph demonstrates a significant rise in NO₂ levels in the West Dunbartonshire Council area. Results from the last two months of 2009, and especially December, showed a sharp rise in levels throughout the Council area. We can attribute this to no reason other than weather conditions but are unsure if this is the case.

Diffusion tubes exceeding the National Air Quality Objectives

Three diffusion tubes breached the National Air Quality Objective for NO₂ during 2009.

1. Milton 1 –bias adjusted annual average of 60.5µg/m³. This tube is located at the Dumbuck traffic light junction on the A82. The A82 is the main trunk road access to the west of Scotland and is the busiest road within the Council area. Prior to 2006 this location had never breached the National Air Quality Objective. It is not possible to locate an automatic monitor at the location as there is no suitable site.

However as the nearest receptors are residential properties, located approximately 12 metres back from the kerb, it was decided to locate an additional diffusion tube in the front garden approximately 5 metres from the front façade of one of the houses to gain data of NO₂ levels at the residences. The tube has been at this site since 2008. The bias adjusted annual mean for 2009 was 30.4µg/m³. Additionally the NO₂ Distance Calculator from the Air Quality Archive web site was used to predict NO₂ levels at the residences based on the results of Milton 1 diffusion tube. The calculator predicted the NO₂ levels at the residences to be 34.7µg/m³ which although higher than the Milton 2 diffusion tube results remain within the National Air Quality Objective for NO₂.

2. Clydebank 6 - bias adjusted annual average of 42.5 µg/m³. This tube is located on a lamppost on Kilbowie Roundabout - the busiest junction in the West Dunbartonshire Council area. Prior to 2009 this location has never breached the National Air Quality Objective although it was highlighted as approaching a breach in our 2009 Update And Screening Assessment. An automatic monitor designated Briar Drive is located approximately 25 metres back from the roundabout. The ratified data from AEA for Briar Drive indicates an annual average of 26µg/m³ and no exceedences of the hourly mean. The nearest receptors at this location are located 40 metres from the roundabout. The NO₂ Distance Calculator from the Air Quality Archive web site was used to predict NO₂ levels at residences based on the results of Clydebank 6 diffusion tube. The calculator predicted the NO₂ level at the residences to be 21.2µg/m³. For interest the distance calculation was also applied to the Briar Drive automatic monitor result of 26 µg/m³. The calculator predicted the NO₂ at the residences in this case to be 22.7µg/m³. Both results are within the National Air Quality Objective for NO₂.

3. Clydebank 13 – annualised bias adjusted average of 40.8 µg/m³. Tubes designated Clydebank 10,12,13,14, &15 were located on lampposts along a 300 metre stretch of Kilbowie Road, Clydebank, the tubes were located there in reaction to a park and ride car park having been constructed on a plot of vacant land off Kilbowie Road. The tubes were installed at various times throughout 2009 as definite proposals regarding the park and ride became available. A new set of traffic lights are proposed to facilitate access to the park and ride and will have the potential to cause traffic build up on both sides of Kilbowie Road. The traffic lights are not yet installed and there is no installation date proposed at present. One of these new tubes Clydebank 13 breached the National Air Quality Objective for NO₂ with an annualised average of 40.8µg/m³. The

nearest receptors are located approximately 10 metres back from the road. The NO₂ Distance Calculator from the Air Quality Archive web site was used to predict NO₂ levels at residences based on the results of Clydebank 13 diffusion tube. The calculator predicted NO₂ at the residences to be 34.1 µg/m³.

Table 2.4 Results of Nitrogen Dioxide Diffusion Tubes

Site ID	Location	Within AQMA ?	Data Capture for monitoring period ^a %	Data Capture for full calendar year 2009 ^b %	Annual mean concentrations (µg/m ³)		
					2007 ^{c, d}	2008 ^{c, d}	2009 ^c
Clydebank 1	Drain pipe at right Of front door. Dalmuir Park H.A. 631 Dumbarton Rd Dalmuir	N	75	75	27	33	38
Clydebank 3	Lamp-post in front Of 23 Dean St, Whitecrook	N	75	75	19	13	24
Clydebank 4	Lamp-post outside 90 Craigs Avenue, Faifley	N	83	83	14	12	20
Clydebank 5	Lamp-post beside Police Station car Park, Montrose St, Clydebank	N	100	100	26	20	27
Clydebank 6	Lamp-post outside Briar Drive, Clydebank	N	100	100	30	38	42
Airport 1	Lamp-post outside 11 Johnston Ave, Clydebank	N	100	100	19	21	28
Dumbarton 1	Lamp-post outside 62 Glasgow Rd, Dumbarton	N	92	92	23	33	32
Dumbarton 7	Lamp-post, 35 Oxhill Place, D'ton	N	83	83	15	9	18
Dumbarton 9	Lamp-post, Millburn Crescent, Dumbarton	N	83	83	15	15	23
Dumbarton 11	Lamp-post, 151 Glasgow Road, Dumbarton	N	83	83	31	37	35
Bowling 1	Lamp-post on A82 At Bowling Roundabout	N	100	100	28	31	38
Alexandria 1	Lamp-post at Fountain, Bank St, Alexandria	N	100	100	28	28	36

Jamestown 1	Post at eastern Side of Bonhill Bridge	N	92	92	22	25	30
Milton 1	Lamp-post on A8, At Dumbuck light Milton	N	100	100	43	63	60
Milton 2	Fencing at Cruachan bungalow Dumbuck, Milton	N	100	100	N/A	24	30
Glasgow Rd Dumbarton 2	Lamp-post outside 55 Glasgow Road, Dumbarton	N	67	67	N/A	35	35.9*
Glasgow Rd Dumbarton 3	Post outside 77 Glasgow Road, Dumbarton	N	92	92	N/A	35	39
Glasgow Rd Dumbarton 4	Post outside 177 Glasgow Road, Dumbarton	N	83	83	N/A	36	39
Clydebank 7	Post – Corner of Argyll St/Glasgow Rd, Clydebank	N	90	75	N/A	N/A	28
Clydebank 9	Post – along from 404 Dumbarton Rd Clydebank	N	80	67	N/A	N/A	29.4*
Clydebank 10	Post – outside 455 Kilbowie Road, Clydebank	N	90	75	N/A	N/A	34
Clydebank 11	Southend Road, In front of firemens Houses	N	90	75	N/A	N/A	27
Clydebank 12	Post corner of 425 Kilbowie Rd and Hawthorn Street, Clydebank	N	86	50	N/A	N/A	34
Clydebank 13	Post at 437 Kilbowie Road, Clydebank	N	100	50	N/A	N/A	40.8*
Clydebank 14	Post at 2 Morar Drive, Clydebank	N	100	17	N/A	N/A	38
Clydebank 15	Post outside 489 Kilbowie Road, Clydebank	N	100	58	N/A	N/A	34
Clydebank 16	Post – Kilbowie Rd Across from 1 Gavins Rd, C'bank	N	100	50	N/A	N/A	31
Clydebank 17	Post – Kilbowie Rd Across from 12 Gavins Rd, C'bank	N	100	50	N/A	N/A	29
Clydebank 18	Post – Kilbowie Rd Across from 19 Gavins Rd, C'bank	N	100	50	N/A	N/A	30
Dumbarton 12	Post – High Street D'ton, next to Church	N	100	83	N/A	N/A	25

Vale of Leven 1	On Stirling Road, A813 Dumbarton	N	100	33	N/A	N/A	30
Vale of Leven 2	On Stirling Road, A813 Dumbarton	N	100	33	N/A	N/A	33
Vale of Leven 3	On Stirling Road, A813 Dumbarton	N	100	33	N/A	N/A	32
Vale of Leven 4	On Stirling Road, A813 Dumbarton	N	100	33	N/A	N/A	32
Briar Drive Triplicate 1	On Briar Drive air Quality unit	N	92	92	25	25	27
Briar Drive Triplicate 2	On Briar Drive air Quality unit	N	92	92	23	23	28
Briar Drive Triplicate 3	On Briar Drive air Quality unit	N	92	92	26	24	29
Dumbarton Triplicate 1	On Glasgow Road Air quality unit	N	92	92	21	22	23
Dumbarton Triplicate 2	On Glasgow Road Air quality unit	N	92	92	22	22	23
Dumbarton Triplicate 3	On Glasgow Road Air quality unit	N	92	92	22	22	25

2

* annualised average

2.2.2 PM₁₀

West Dunbartonshire Council has one particulate monitoring station (TEOM with type C FDMS) located at Briar Drive (Kilbowie Roundabout) Clydebank. The unit has been at this site since February 2007. The FDMS was installed in June 2008.

The annual mean concentration of PM₁₀ for 2009 at the location was 17µg/m. There were 3 exceedences of the daily mean. The nearest relevant receptors are residences approximately 40 metres from the roundabout. Data capture for 2009 was 71.9% as a result of numerous breakdowns of the FDMS.

Table 2.5a Results of PM₁₀ Automatic Monitoring: Comparison with Annual Mean Objective

Site ID	Location	Within AQMA?	Data Capture for monitoring period ^a %	Data Capture for full calendar year 2009 ^b %	Annual mean concentrations (µg/m ³)		
					2007 ^{c, d}	2008 ^{c, d}	2009 ^c
West Dunbartonshire Clydebank	Briar Drive	N	71.9	71.9	17	13.2	17

Table 2.5b Results of PM₁₀ Automatic Monitoring: Comparison with 24-hour Mean Objective

Site ID	Location	Within AQMA?	Data Capture for monitoring period ^a %	Data Capture 2009 ^b %	Number of Exceedences of daily mean objective (50 µg/m ³) If data capture < 90%, include the 90 th percentile of daily means in brackets.		
					2007 ^c	2008 ^c	2009 ^c
West Dunbartonshire Clydebank	Briar Drive, Clydebank	N	71.9	71.9	3	0	3(26)

2.2.3 Sulphur Dioxide

Sulphur dioxide is not monitored in the West Dunbartonshire Council area.

Table 2.6 Results of SO₂ Automatic Monitoring: Comparison with Objectives

Site ID	Location	Within AQMA	Data Capture for monitoring period ^a %	Data Capture 2009 ^b %	Number of Exceedences of: (µg/m ³)		
					15-minute Objective (266 µg/m ³)	1-hour Objective (350 µg/m ³)	24-hour Objective (125 µg/m ³)
A1	1 Example Site	N	98	95	4	1	0

^a I.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

^b This column shows data capture for the full calendar year – e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%.

2.2.4 Benzene

Benzene is not monitored in the West Dunbartonshire Council area

2.2.5 Other pollutants monitored

West Dunbartonshire Council is not currently monitoring any other pollutants

2.2.6 Summary of Compliance with AQS Objectives

West Dunbartonshire Council has examined the results from monitoring in the West Dunbartonshire Council area. Concentrations are all below the objectives, therefore there is no need to proceed to a Detailed Assessment.

3 New Local Developments

West Dunbartonshire Council confirms that there are no new or newly identified local developments which may have an impact on air quality within the Local Authority area.

4 Local / Regional Air Quality Strategy

In April 2004 an in-house working group was set up to allow officers from different West Dunbartonshire Council services to come together and discuss what actions were already being taken which had a positive effect on local air quality. The group also discussed additional actions West Dunbartonshire Council, local businesses and residents could take which would have a positive impact on local air quality. The purpose of the working group was to produce a Local Air Quality Strategy as recommended within LAQM Policy Guidance (LAQM.PG (03) and LAQM.PG(S) (03)).

The strategy was put out for consultation in October 2004. A copy of the consultative document was forwarded to all community groups perceived to have an interest in local air quality. The draft strategy was also published on the West Dunbartonshire Council web site and comments were invited.

The finalised strategy was approved by Councillors in May 2005 and published in June the same year. An abridged version of the strategy was prepared as it was considered that the public would be more likely to read a condensed format. Both formats were distributed to all local libraries and Council buildings. The full format has recently been published on our web site.

The strategy is currently being reviewed.

As part of its corporate plan to create a better environment and promote health and well-being West Dunbartonshire Council has two air quality publicity campaigns running:

the general campaign "If you breathe you're involved" and a campaign directed at vehicles and their drivers "Idling Gets You Nowhere"

The "If you breathe you're involved" campaign is aimed at forging partnerships with local businesses, industry, residents of West Dunbartonshire Council and most particularly local schools to encourage sustainable improvements in the local air quality.

The "Idling Gets You Nowhere" campaign urges local drivers to help improve local air quality by switching off their engine when parked and where possible leave their car at home and either use public transport or walk/cycle to their destination.

Vehicle Emissions Testing

In September 2005 the Council elected to adopt the provisions of the Road Traffic (Vehicle Emissions) (Fixed Penalty) (Scotland) Regulations 2003 and were duly authorised by the Scottish Executive on 29 March 2006.

Roadside vehicle emission testing days are undertaken in partnership with staff from Glasgow City Council and Strathclyde Police.

In partnership with Strathclyde Police, Officers regularly visit taxi ranks and bus termini to ensure that waiting vehicles are switching off their engines. To date it has not been necessary to issue any Fixed Penalty Notices as all drivers have co-operated with our requests to switch off their engines.

5. Local Transport Plans and Strategies

The following is an extract from West Dunbartonshire Councils current Local Transport Strategy 2007 – 2010 which particularly refer to local air quality. The full document can be viewed at West Dunbartonshire Councils website - <http://www.wdcweb.info/>.

LTP103 – The Council will continue to monitor and work to meet statutory air quality requirements as appropriate.

LTP104 – Improve air quality by reducing the impact of transport through the promotion of more sustainable travel, minimising long term congestion at sensitive locations and promoting improved technology in vehicles and fuel.

The following are actions which will be undertaken by the council to monitor and improve local air quality

LTA126 – Assessment to be made of transport-related new developments to ensure that air quality continues to meet or exceed air quality objectives for Scotland.

LTA127 – The council will operate their continuous equipment in the areas which are most likely to be closest to breaching the 2010 objective for PM₁₀.

6. Conclusions and Proposed Actions

6.1 Conclusions from New Monitoring Data

West Dunbartonshire Council has declared no Air Quality Management Areas. During 2009 three locations (all diffusion tubes) exceeded the annual mean for NO₂.

1. Milton 1 – has a bias adjusted annual average of 60.5µg/m³. However the nearest receptors are residences approximately 15metres back from the road. A second tube designated Milton 2 is located in the front garden of one of the houses approximately 5 metres from the façade of the property. The bias adjusted annual average for this tube was 30.4µg/m³. For the sake of robustness this figure was tested by using the NO₂ Distance Calculator on the National Air Quality Archive Website. Background NO₂ levels were obtained from the maps on the same website. The predicted annual mean NO₂ concentration at the receptor was 34.7µg/m³ – remaining within the National Air Quality Objectives.
2. Clydebank 6 – has a bias adjusted annual average of 42.5µg/m³. This tube is located on the Kilbowie Roundabout the busiest junction within the West Dunbartonshire Council area. There is a real time NO_x analyser sited at the same junction but set back 25metres from the junction. The ratified annual average for this site was 26µg/m³. The nearest receptors at this junction are residences located a further 15 metres back from the real time analyser.
3. Clydebank 13 – has a bias adjusted annual average of 37.8µg/m³. This tube was only in place for 6 months of the year (July – December), with 100% data capture for the period. The data was annualised in accordance with guidance and the derived annual average was 40.8µg/m³. The nearest receptors are residences located 10 metres from the roadside. The NO₂ Distance Calculator was used and the annual mean concentration at the receptor was 34.1µg/m³ – remaining within the National Air Quality Objective.

6.2 Conclusions relating to New Local Developments

There have been no new developments in 2009 which would require to be considered in the next Update And Screening Assessment.

6.3 Other Conclusions

None

6.4 Proposed Actions

All three exceedences of the annual objective for NO₂ have been shown (following use of the distance calculator) to be below the objective at the nearest receptor therefore there is no need to proceed to detailed assessment.

The next course of action for West Dunbartonshire Council will be the submission of the 2011 Progress Report.

7. References

Local Air Quality Management Technical Guidance TG (09)

West Dunbartonshire Council Update and Screening Assessment 2009

West Dunbartonshire Council Air Quality Progress Report 2008

West Dunbartonshire Council Air Quality Progress Report 2007

West Dunbartonshire Council Update and Screening Assessment 2006

West Dunbartonshire Council Air Quality Progress Report 2005

West Dunbartonshire Council Air Quality Progress Report 2004

8. Appendices

Appendix A: QA/QC Data

Appendix B: Location map showing Briar Drive, Clydebank automatic monitoring station

Appendix C: Location map showing Glasgow Road, Dumbarton automatic monitoring station

Appendix D: Location map showing Clydebank NO₂ diffusion tube sites

Appendix E: Location map showing Dumbarton NO₂ diffusion tube sites

Appendix F: Location map showing Vale of Leven & Balloch NO₂ diffusion tube sites

Appendix G: AEA Report for Briar Drive, Clydebank Automatic Monitoring Station

Appendix H: AEA Report for Glasgow Road, Dumbarton Automatic Monitoring Station

Appendix I: Short-term to long-term data adjustment

Appendix J: 2009 Monthly NO₂ diffusion tube results

Appendix A: QA:QC Data

Diffusion Tube Bias Adjustment Factors

West Dunbartonshire Council use Glasgow Scientific Services (GSS) for NO₂ tube analysis. Tubes are provided and analysed by GSS.

The bias adjustment figure of 1.23 used in this report was obtained from the R&D website.

Factor from Local Co-location Studies (if available)

A locally derived bias adjustment figure of 0.98 was calculated using the on line spreadsheet.

Discussion of Choice of Factor to Use

It was decided to use the bias adjustment figure of 1.23 obtained from the Nitrogen Dioxide Diffusion Tube Bias Adjustment Factor Spreadsheet on the Review and Assessment Website. It was felt that this was the more conservative approach.

PM Monitoring Adjustment

Data from West Dunbartonshire Council automatic monitors is downloaded daily by AEA. The data is screened, scaled and ratified by AEA and a comprehensive report is provided.

Guidance sought from AEA who advised that although the Type C FDMS is not equivalent there is no published correction factor which can be applied to the data. This data has therefore not undergone any correction.

Short-term to Long-term Data adjustment

Please see Appendix F for short-term to long-term data adjustment

QA/QC of automatic monitoring

Data from West Dunbartonshire Council automatic monitors is downloaded daily by AEA. The data is screened, scaled and ratified by AEA and a comprehensive report is provided.

Additionally AEA carry out an audit of all automatic monitors twice yearly. All units have a comprehensive service contract and are serviced by Horiba at 6 monthly intervals.

West Dunbartonshire Council staff change filters and carry out manual calibration of the NO_x analysers on a fortnightly basis. The calibration data is forwarded to AEA for QA/QC purposes. The NO_x units also carry out automatic calibration every three days.

The TEOM head is dismantled and cleaned every four weeks.

The units are remotely checked each working day to ensure that data capture is optimal.

QA/QC of diffusion tube monitoring

This Authority participates in the NO₂ Network and uses diffusion tube measurements for local air quality purposes. Glasgow Scientific Services (GSS) provide and analyse diffusion tubes for all NO₂ diffusion sites within the area and are UKAS accredited for NO₂ diffusion tube analysis. All GSS results are documented and scrutinised by UKAS each year.

GSS participates in the WASP Scheme which is the co-ordination of a quality assurance/quality control (QA/QC) framework, aimed at the analytical laboratories that supply and analyse the diffusion tubes. This currently comprises

Promotion of the independent Workplace Analysis Scheme for Proficiency (WASP) operated by the Health and Safety Laboratory, with yearly assessment against agreed performance criteria.

Operation of a field intercomparison exercise, in which diffusion tubes are co-located with an automatic analyser: from January 2006 this is at a roadside site.

Operation of a QC solution testing scheme. Participation is recommended for any laboratory that prepares or analyses NO₂ diffusion tubes used by Local Authorities for LAQM purposes.

The Workplace Analysis Scheme for Proficiency (WASP) is an independent analytical performance testing scheme, operated by the Health and Safety Laboratory (HSL). WASP formed a key part of the former UK NO₂ Network's QA/QC, and remains an important QA/QC exercise for laboratories supplying diffusion tubes to Local Authorities for use in the context of Local Air Quality Management (LAQM). The WASP scheme is operated independently by HSL. Defra and the Devolved Administrations advise that diffusion tubes used for Local Air Quality Management should be obtained from laboratories that have demonstrated satisfactory performance in the WASP scheme. For this reason, although WASP remains an independent proficiency testing scheme, laboratory performance in WASP is also assessed by AEA, according to criteria which have been agreed with Defra, the Devolved Administrations and HSL.

The latest information from the Local Authority Air Quality Support Website stated that GSS demonstrated "good" performance in the WASP scheme of analysis of NO₂ diffusion tubes. **GOOD:** Results obtained by the participating laboratory are on average within 13% of the assigned value. This equates to an **RPI of 169 or less**

Appendix B - Location map showing Briar Drive, Clydebank automatic monitoring station



Appendix C – Location map showing Glasgow Road, Dumbarton automatic monitoring station



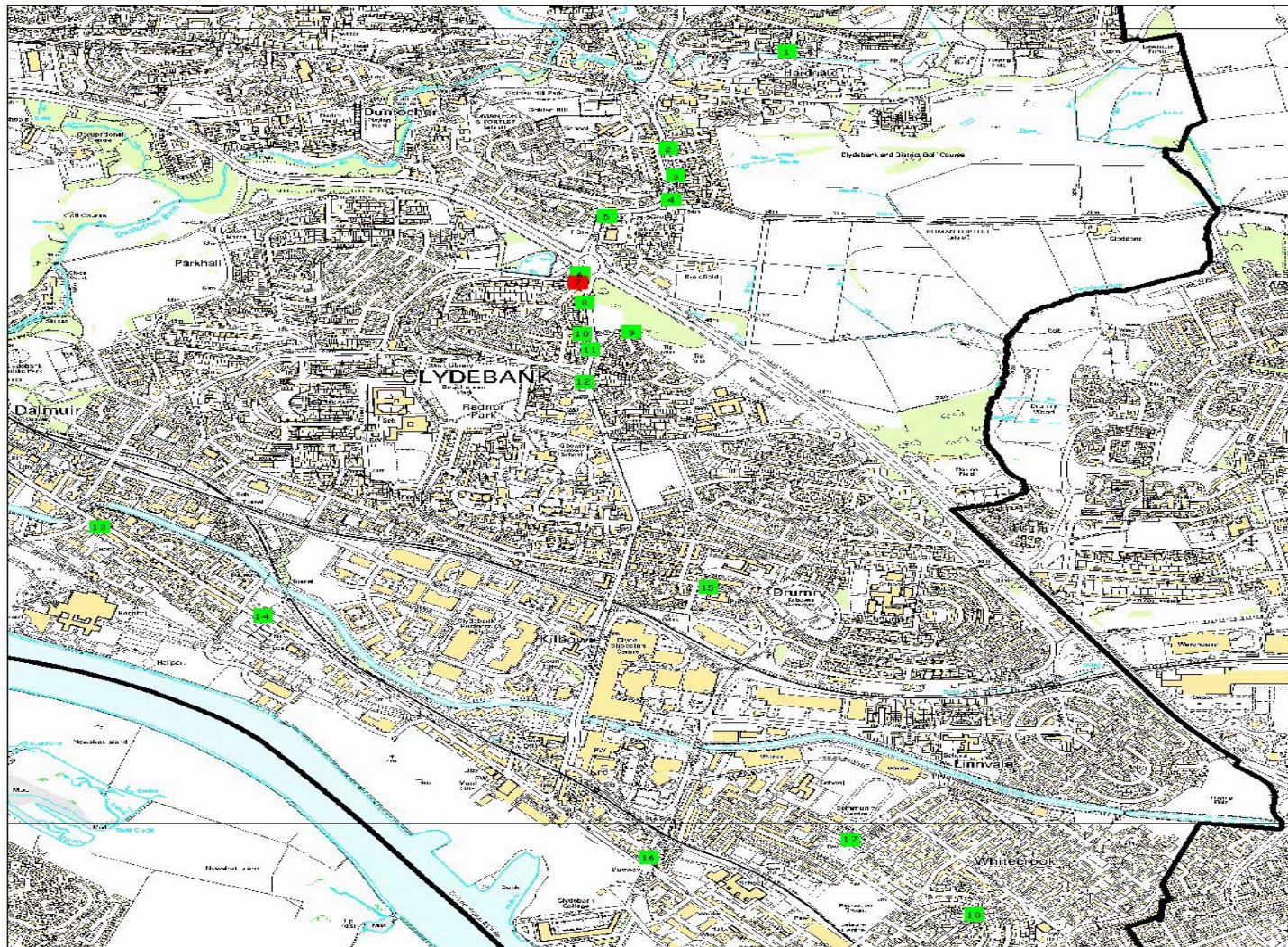
Appendix D - Location map showing Clydebank NO₂ diffusion tube sites

West Dunbartonshire Council

Title: Clydebank N02 Monitoring Sites

Map No :
Date : 13/05/2010Map Ref: NS4970
Scale : 1:12000

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**Index for Map 1 – Clydebank N02 Monitoring Sites**

Map Numbers	Name of Site	Map Numbers	Name of Site
1	Clydebank 4	10	Clydebank 10
2	Clydebank 16	11	Clydebank 13
3	Clydebank 17	12	Clydebank 12
4	Clydebank 18	13	Clydebank 1
5	Clydebank 11	14	Clydebank 9
6	Clydebank 6	15	Clydebank 5
7	Air quality monitoring station, Briar Drive, Clydebank	16	Clydebank 7
8	Clydebank 15	17	Clydebank 3
9	Clydebank 14	18	Airport 1

Appendix E: Location map showing Dumbarton NO₂ diffusion tube sites**West Dunbartonshire Council****Title: Dumbarton N02 Monitoring Sites**

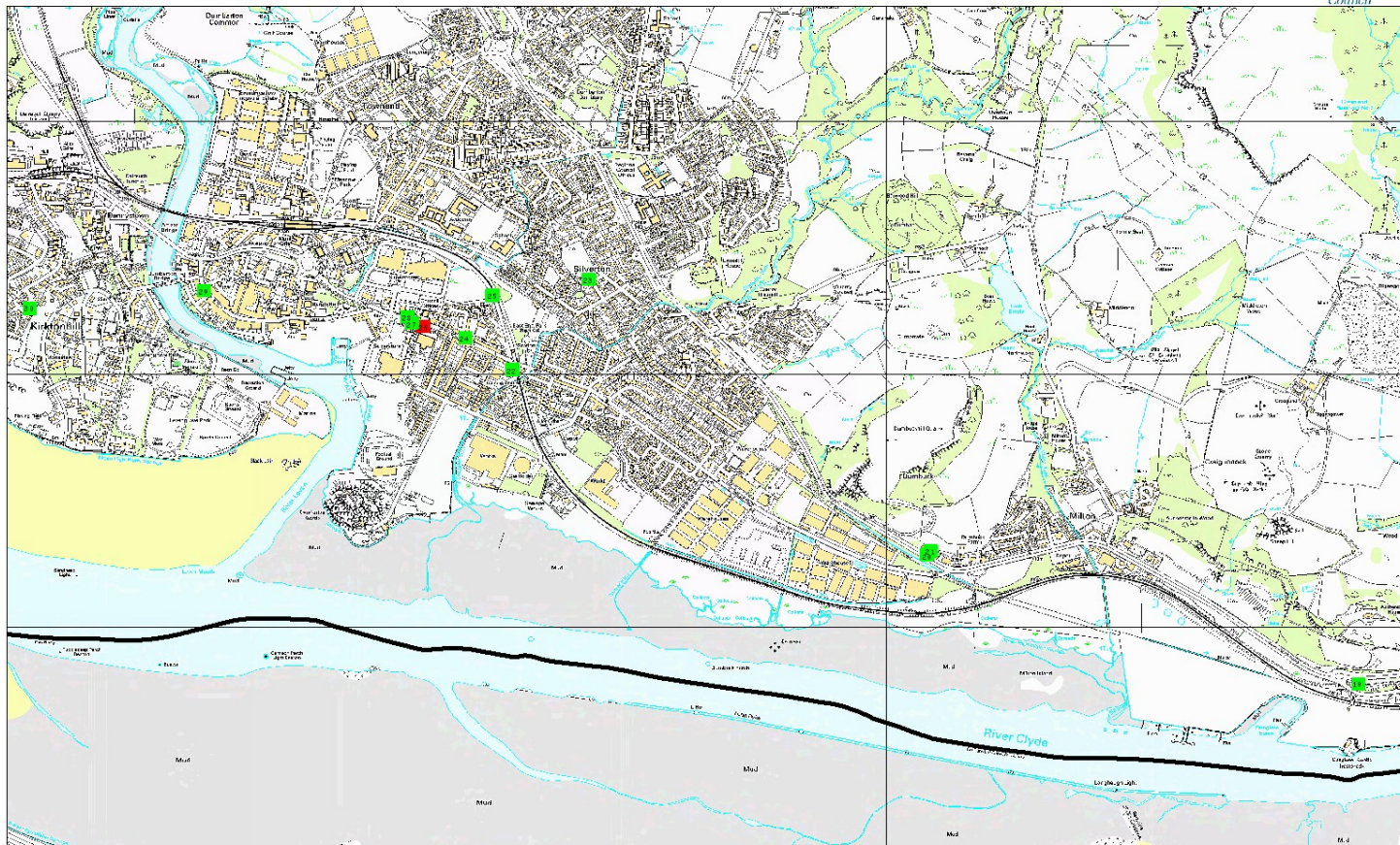
Map No :

Map Ref: NS4174

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Date : 13/05/2010

Scale : 1:13000

**Index for Map 2 – Dumbarton N02 Monitoring Sites**

Map Numbers	Name of Site
19	Bowling 1
20	Milton 1
21	Milton 2
22	Dumbarton 11
23	Dumbarton 9
24	Glasgow Road Dumbarton 4
25	Dumbarton 1
26	Air quality monitoring station, Glasgow Road, Dumbarton
27	Glasgow Road Dumbarton 2
28	Glasgow Road Dumbarton 3
29	Dumbarton 12
30	Dumbarton 7

Appendix F: Location map showing Vale of Leven & Balloch NO₂ diffusion tube sites**West Dunbartonshire Council****Title: Balloch and Vale of Leven NO₂ Monitoring Sites**Map No :
Date : 13/05/2010Map Ref: NS3979
Scale : 1:13000

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**Index Table for Map 3: Vale of Leven and Balloch**

Map Number	Name of Site
31	Vale of Leven 4
32	Vale of Leven 1
33	Vale of Leven 3
34	Vale of Leven 2
35	Jamestown
36	Alexandria 1
37	Balloch 1

Appendix G – AEA Report for Briar Drive, Clydebank Automatic Monitoring Station

Air Pollution Report

Produced by AEA on behalf of the Scottish Government

WEST DUNBARTONSHIRE CLYDEBANK 1st January to 31st December 2009

These data have been fully ratified by AEA

POLLUTANT	PM ₁₀ ⁺	NO ₂	NO _x
Number Very High	0	0	-
Number High	0	0	-
Number Moderate	7	0	-
Number Low	6236	8650	-
Maximum 15-minute mean	113 µg m ⁻³	204 µg m ⁻³	1089 µg m ⁻³
Maximum hourly mean	111 µg m ⁻³	185 µg m ⁻³	972 µg m ⁻³
Maximum running 8-hour mean	74 µg m ⁻³	148 µg m ⁻³	680 µg m ⁻³
Maximum running 24-hour mean	66 µg m ⁻³	113 µg m ⁻³	461 µg m ⁻³
Maximum daily mean	60 µg m ⁻³	113 µg m ⁻³	456 µg m ⁻³
Average	17 µg m ⁻³	26 µg m ⁻³	60 µg m ⁻³
Data capture	71.9 %	98.7 %	98.7 %

+ PM₁₀ as measured by a FDMS using a gravimetric factor of 1

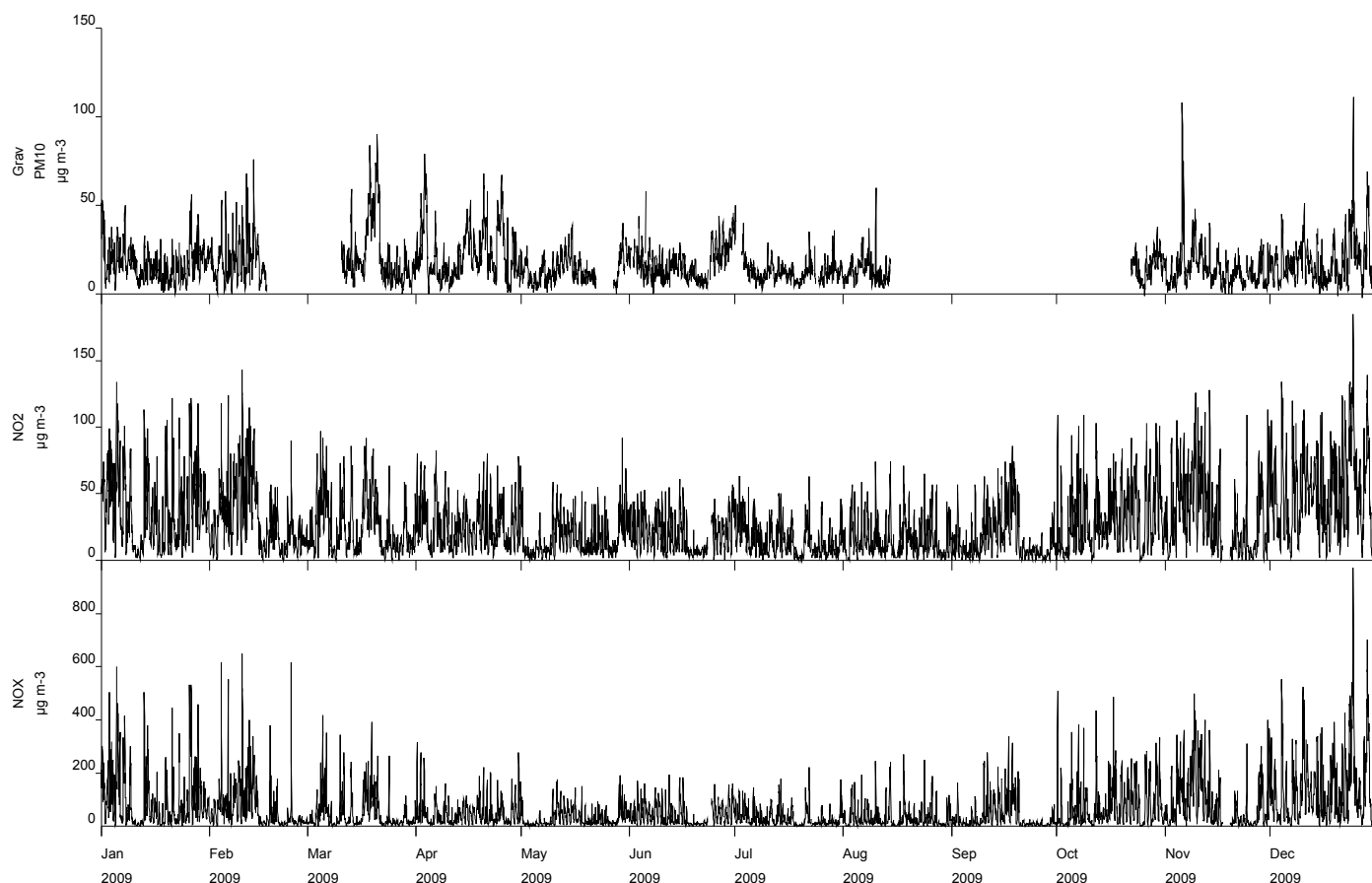
All mass units are at 20°C and 1013mb

NO_x mass units are NO_x as NO₂ µg m⁻³

Pollutant	Air Quality Regulations (2000) and Air Quality (Scotland) Amendment Regulations 2002	Exceedences	Days
PM ₁₀ Particulate Matter (Gravimetric)	Daily mean > 50 µg m ⁻³	3	3
PM ₁₀ Particulate Matter (Gravimetric)	Annual mean > 18 µg m ⁻³	0	-
Nitrogen Dioxide	Annual mean > 40 µg m ⁻³	0	-
Nitrogen Dioxide	Hourly mean > 200 µg m ⁻³	0	0

Produced by AEA on behalf of the Scottish Government

**West Dunbartonshire Clydebank Air Monitoring
Hourly Mean Data for 1st January to 31st December 2009**



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Appendix H – AEA Report for Glasgow Road, Dumbarton Automatic Monitoring Station

Air Pollution Report

Produced by AEA on behalf of the Scottish Government

WEST DUNBARTONSHIRE GLASGOW ROAD 1st January to 31st December 2009

These data have been fully ratified by AEA

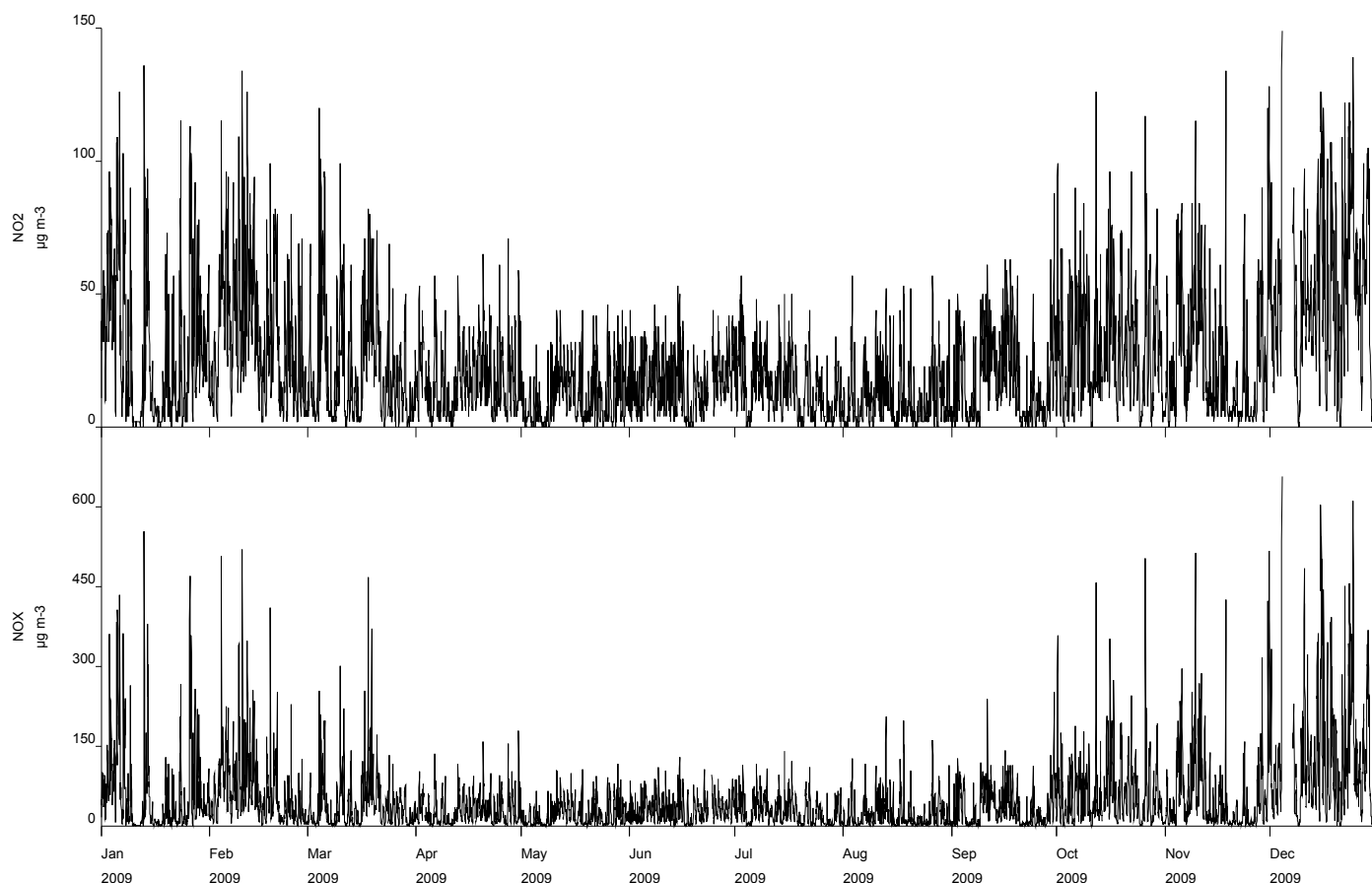
POLLUTANT	NO ₂	NO _x
Number Very High	0	-
Number High	0	-
Number Moderate	0	-
Number Low	8598	-
Maximum 15-minute mean	166 µg m ⁻³	733 µg m ⁻³
Maximum hourly mean	149 µg m ⁻³	657 µg m ⁻³
Maximum running 8-hour mean	113 µg m ⁻³	463 µg m ⁻³
Maximum running 24-hour mean	95 µg m ⁻³	307 µg m ⁻³
Maximum daily mean	94 µg m ⁻³	302 µg m ⁻³
Average	23 µg m ⁻³	47 µg m ⁻³
Data capture	98.2 %	98.2 %

All mass units are at 20°C and 1013mb
NO_x mass units are NO_x as NO₂ µg m⁻³

Pollutant	Air Quality Regulations (2000) and Air Quality (Scotland) Amendment Regulations 2002	Exceedences	Days
Nitrogen Dioxide	Annual mean > 40 µg m ⁻³	0	-
Nitrogen Dioxide	Hourly mean > 200 µg m ⁻³	0	0

Produced by AEA on behalf of the Scottish Government

**West Dunbartonshire Glasgow Road Air Monitoring
Hourly Mean Data for 1st January to 31st December 2009**



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Appendix I - Short-term to long-term data adjustment**Clydebank 13, 16, 17, 18 (Monitored July – December 2009)**

LONG TERM SITE	ANNUAL MEAN 2009	PERIOD MEAN 2009	RATIO AM/PM
Paisley Glasgow Airport	25	24.3	1.03
Bush Estate	7.2	7.7	0.94
Eskdalemuir	4.3	3.1	1.38
Glasgow Waulkmillglen Reservoir	11.5	11.5	1
Average (Ra)			1.08
Clydebank 13 estimated 2009 annual average $(37.8 \times 1.08) = 40.8 \mu\text{g}/\text{m}^3$			
Clydebank 16 estimated 2009 annual average $(30.6 \times 1.08) = 33.04 \mu\text{g}/\text{m}^3$			
Clydebank 17 estimated 2009 annual average $(28.9 \times 1.08) = 31.2 \mu\text{g}/\text{m}^3$			
Clydebank 18 estimated 2009 annual average $(30.2 \times 1.08) = 32.6 \mu\text{g}/\text{m}^3$			

Clydebank 12 and 15 (Monitored June – December 2009)

LONG TERM SITE	ANNUAL MEAN 2009	PERIOD MEAN 2009	RATIO AM/PM
Paisley Glasgow Airport	25	22.9	1.1
Bush Estate	7.2	7.5	0.96
Eskdalemuir	4.3	3.4	1.26
Glasgow Waulkmillglen Reservoir	11.5	10.9	1.05
Average (Ra)			1.09
Clydebank 12 estimated 2009 annual average $(34.5 \times 1.09) = 34.2 \mu\text{g}/\text{m}^3$			
Clydebank 15 estimated 2009 annual average $(33.6 \times 1.09) = 36.6 \mu\text{g}/\text{m}^3$			

Vale of Leven 1, 2, 3, 4 (Monitored September – December)

LONG TERM SITE	ANNUAL MEAN 2009	PERIOD MEAN 2009	RATIO AM/PM
Paisley Glasgow Airport	25	29.75	0.84
Bush Estate	7.2	8.95	0.8
Eskdalemuir	4.3	3.05	1.4
Glasgow Waulkmillglen Reservoir	11.5	14.9	0.77
Average (Ra)			0.95
Vale of Leven 1 estimated annual 2009 average $(30.1 \times 0.95) = 28.6\mu\text{g}/\text{m}^3$			
Vale of Leven 2 estimated annual 2009 average $(32.6 \times 0.95) = 30.8\mu\text{g}/\text{m}^3$			
Vale of Leven 3 estimated annual 2009 average $(31.6 \times 0.95) = 30\mu\text{g}/\text{m}^3$			
Vale of Leven 4 estimated annual 2009 average $(32.1 \times 0.95) = 30.5\mu\text{g}/\text{m}^3$			

Clydebank 9 (Monitored Mar – Jun, Aug – Oct, and December)

LONG TERM SITE	ANNUAL MEAN 2009	PERIOD MEAN 2009	RATIO AM/PM
Bush Estate	7.2	8.8	0.82
Eskdalemuir	4.3	3.75	1.15
Average (Ra)			0.98
Clydebank 9 estimated annual mean 2009 $(30 \times 0.98) = 29.4\mu\text{g}/\text{m}^3$			

Dumbarton 2 (Monitored Jan-Feb, April, Jun, Aug – Nov.

LONG TERM SITE	ANNUAL MEAN 2009	PERIOD MEAN 2009	RATIO AM/PM
Bush Estate	7.2	6.65	1.08
Eskdalemuir	4.3	5	0.86
Average (Ra)			0.97
Dumbarton 2 estimated annual mean 2009 $(37 \times 0.97) = 35.9\mu\text{g}/\text{m}^3$			

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Appendix J - 2009 Monthly NO₂ diffusion tube results

April 2010

Site	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Average	Bias adj. of 1.23	Annualised Mean (where appropriate)
Clydebank 1	47.7	32.2	26.8	32.3	25.4		21.6	24.5	27.7		38.6		30.8	37.8	
Clydebank 3		21.7	13.6	15.6	12.8		25.8	20.6	12.8		21.6	33.2	19.7	24.3	
Clydebank 4	23.7	17.4	15.4	12.5	10	9.2			9.9	17	17.1	30.4	16.3	20	
Clydebank 5	36.1	26.9	47.3	23.5	19.7	16.7	14	14.7	20.4	30.9	37.4	49.5	23.9	28.1	
Clydebank 6	50.6	27.1	25.1	31.6	27	33.2	20.4	23	25.8	39.8	47.7	63.8	34.6	42.5	
Clydebank 7			26.4	29.4	24.2	19.8		20.2	10.5	22.3	23.7	34.5	23.4	28.8	32.3
Clydebank 9			20	27.4	23.5	19.2		16.7	17.4	23.9		50.9	24.9	30.6	29.4
Clydebank 10		<2.1	26.8	24.2	23.3	22.7		18.1	18.8	30.1	31.1	51.9	27.4	33.8	37.8
Clydebank 11			17	25.6	17.3		15.4	15.2	19.2	23.2	28.8	35.2	21.9	26.9	30.1
Clydebank 12						14.1	15	20.6		29.7	39	49.8	28	34.5	37.6
Clydebank 13							15.9	32.2	16.2	33.7	37.4	49.2	30.8	37.8	40.8
Clydebank 14											30.6	31.5	31.1	38.2	
Clydebank 15						19.7	17.3	16.5	25.2	31.9	35.5	45	27.3	33.6	36.6
Clydebank 16							16.5	12.1	17.9	29.8	29.4	43.4	24.9	30.6	30.6
Clydebank 17							8.9	3.1	18.9	35	37.6	37.5	23.5	28.9	28.9
Clydebank 18							14.3	12.8	20.1	28.3	32.7	39.1	24.6	30.2	30.2
Dumbarton 1	20.7	35.9	26	20.9	17	30.8	11.9	13.6	19	27.6		59	25.7	31.6	
Dumbarton 7	27.6	12	11.8	9			23.4	3.7	6.2	10.2	14.8	28.7	14.7	18.1	
Dumbarton 9	37.8	19.4	15.5	13.7	10.7	9.4		9.1		19.3	22	34.5	19.1	23.5	
Airport 1	59.7	20.4	17	21.6	14.5	13.8	12.7	10.5	14.1	22.5	27.8	38.6	22.8	28	

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Alexandria	31	30.2	27.2	33.9	25.6	18.4	18.1	21.1	28.2	29.9	34.2	50.9	29.1	35.7	
Milton 1	37.2	43.9	39.3	63.3	60.6	47.9	40.3	42.1	43.3	44.3	67.5	60.3	49.2	60.5	
Milton 2	39.9	26.7	30.8	20.3	19.8	15.9	18	19.2	22.4	24.8	27.1	31.4	24.7	30.4	
Bowling 1	25.2	28	24	30.9	26.9	26.5	22.4	28.4	27.2	35.6	43.2	49.4	30.6	37.7	
Dumbarton 11	35.6	34.4	23.8	27.2	23.7	23	10.1		25.6	39	41		28.3	34.9	
Dumbarton 12			22.3	19.1	17.1	14.6	12.9	10.8	15.6	25.8	24.4	44.4	20.7	25.5	28.6
Jamestown 1	32.3	27.2	24.9	21.5	24.1	13.5	14.6	20.9	20.5		33.7	36.2	24.5	30.1	
Balloch 1	39.3	24.8	17	25.2	20	20.2	14.7	11.5	20.6	30.2	27.3	51.5	25.2	31	
Glasgow Rd D'ton 2	30.4	27.4		36.3		15		26.1	28.7	39.4	34.5		29.7	36.6	35.9
Glasgow Rd D'ton 3	39.1	34.2	23.6	37	31.8	24.9	27.9	21.5		34.4	42.7		31.7	39	
Glasgow Rd D'ton 4	28.1	39.1	27	36.6	22.8	24.5	24.1	21.5		28.3		68.3	32	39.4	
Vale of Leven 1									23.2	30.6	22	22	24.5	30.1	28.6
Vale of Leven 2									24.8	29.6	23.5	28	26.5	32.6	30.8
Vale of Leven 3									18.3	24	22.2	38.4	25.7	31.6	30.2
Vale of Leven 4									19.9	25.9	21.7	36.8	26.1	32.1	30.5