



2011 Air Quality Progress Report for *Renfrewshire Council*

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

June 2011



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Renfrewshire Council accepts full ownership of this report and all conclusions herein.

Executive Summary

A review of new pollutant monitoring data and atmospheric emissions sources within the Renfrewshire Council area has been undertaken. The assessment compared the available monitoring data to national air quality standards in order to identify any existing exceedences of the standards.

Data was gathered from various national and local sources with regards to atmospheric emissions from: road traffic; rail; aircraft; shipping; industrial processes; intensive farming operations; domestic properties; biomass plants; and dusty processes. The screening methods outlined in the technical guidance were used to determine the likelihood that a particular source would result in an exceedence of national air quality standards.

The review of new and changed emission sources identified no new sources that were likely to result in an exceedence of the NAQS objectives and that there is no requirement to proceed to a Detailed Assessment for any pollutant contained within the NAQS.

It is proposed that a new automatic monitoring station measuring both NO_x and PM₁₀ will be located at a location close to the M8 in Renfrew.

The next LAQM requirement for Renfrewshire Council will be submission of their Paisley Town Centre Draft Action Plan.

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1 Introduction

1.1 Description of Local Authority Area

The Renfrewshire Council area is situated to the west and south-west of Glasgow. It covers approximately 261km² and is bordered by Glasgow City, East Renfrewshire, Inverclyde and West Dunbartonshire Council areas. Renfrewshire has a population of around 170,000 which inhabits several main towns including Paisley, Renfrew, Johnstone and Erskine. Paisley is the largest town in Scotland with a population of over 75,000.

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, µg/m³ (milligrammes per cubic metre, mg/m³ 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 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	10.0 mg/m ³	Running 8-hour mean	31.12.2003
Lead	0.5 µg/m ³	Annual mean	31.12.2004

Pollutant	Concentration	Measured as	Date to be achieved by
	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 (PM ₁₀) (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

Since 1998 Renfrewshire Council has undertaken regular reviews of air quality; the various assessments undertaken since 2006 are described below and summarised in Table 1.2.

Table 1.2 Summary of historic review and assessment reports

Report Title	Date completed	Conclusion
U&SA 2006 ¹	January 2007	Detailed Assessment required for PM ₁₀ in Paisley town centre.
Detailed Assessment ²	February 2008	AQMA to be declared within Paisley town centre with regard to PM ₁₀ 2010 annual mean objective and NO ₂ annual mean objective.
Progress Report 2008 ³	April 2008	Detailed Assessment of NO ₂ required for both High St Johnstone and Hairst St Renfrew.
U&SA 2009 ⁴	May 2009	No new potential exceedences of objectives identified. No requirement to proceed to a Detailed Assessment for any pollutant.
Detailed Assessment of Johnstone & Renfrew ⁵	June 2009	Modelling predictions for Johnstone indicated that NO ₂ objectives would be met at specified receptor locations. The modelling predictions for Renfrew indicated that exceedences of the NO ₂ annual mean objective were predicted at numerous locations adjacent to the M8 within Renfrew. Report recommended that further monitoring should be carried out to verify modelling predictions.
Progress Report 2010	May 2010	No new potential exceedences of objectives identified. No requirement to proceed to a Detailed Assessment for any pollutant or due to any emissions sources.
Further Assessment	December 2010	The results of the Further Assessment indicated that both the NO ₂ and PM ₁₀ annual mean objectives were exceeded in 2009 within the AQMA. The areas of exceedence are all located within the boundary of the existing AQMA.

Previous review and assessments have concluded that there is no potential for exceedence of the NAQS objectives for CO, benzene, 1, 3-butadiene, lead and SO₂.

¹ Renfrewshire Council LAQM Updating and Screening Assessment 2006,

² Renfrewshire Council Detailed Assessment of PM₁₀ and NO₂ in Paisley Town Centre, BMT Cordah Ltd

³ Renfrewshire Council LAQM Progress Report 2008, Renfrewshire Council

⁴ Renfrewshire Council LAQM Updating and Screening Assessment 2009, BMT Cordah Ltd

⁵ Renfrewshire Council LAQM Detailed Assessment of Johnstone and Renfrew, BMT Cordah Ltd

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

During 2010 Renfrewshire Council monitored ambient PM₁₀ and NO₂ concentrations at several locations throughout the Council area using both automatic and passive sampling methods.

All automatic monitoring NO₂ and PM₁₀ data have been fully ratified by AEA Technology on behalf of the Scottish Government. Diffusion tube data have been corrected using a local bias correction. Details of the quality control and data correction processes carried out are reported in Appendix A.

2.1.1 Automatic Monitoring Sites

Renfrewshire Council operates three automatic NO₂ analysers and two TEOM/FDMS PM₁₀ analysers. These are located at four sites:

1. Central Road, Paisley
2. Glasgow Airport, Paisley
3. Gordon St/ Causeyside St, Paisley
4. St James, Paisley

Automatic monitoring locations are shown in Figure 2 in Appendix B.

The automatic monitoring results for NO₂ and PM₁₀ are presented in Tables 2.3, 2.4, 2.7 & 2.8.

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?
Central Road	Roadside	248438	664192	NO ₂	CM*	Y	Y (2m)	1.5m	Y
Glasgow Airport	Special	248297	666545	NO ₂	CM*	N	N(60m)	40m	N
Gordon Street	Roadside	248316	663612	NO ₂ , PM ₁₀	CM*, FDMS	Y	Y(9m)	6m	Y
St James	Roadside	248173	664320	PM ₁₀	FDMS	Y	Y(5m)	4m	Y
*CM – Chemiluminescence analyser									

2.1.2 Non-Automatic Monitoring

Renfrewshire Council operates a network of forty-three NO₂ diffusion tube sites, located across the Council area. The monitoring sites represent public exposure and areas of high pollution concentrations at a variety of kerbside, roadside and urban background locations and details of each monitoring site are presented in Table 2.2. Maps annotating the locations of the diffusion tube sites are included in Appendix B, Figures 3 to 6.

The NO₂ concentrations measured within the Renfrewshire Council area since the 2010 Progress Report are presented in Table 2.5.

The QA/QC procedures followed by the Council and the laboratory and details of the bias correction factors used are presented in Appendix A.

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?
Paisley 1	Urban Centre	248350	664082	NO ₂	Y	Y (70)	68	N
Paisley 2	Urban Background	247925	664052	NO ₂	Y	Y (11)	35	Y
Paisley 3	Urban Background	249004	662142	NO ₂	N	Y (8)	1.5	Y
Paisley 4	Urban Background	249668	664367	NO ₂	N	Y (11)	2	Y
Johnstone 7	Kerbside	242914	663198	NO ₂	N	Y(1.5)	0	Y
Renfrew 8	Kerbside	250659	667546	NO ₂	N	Y (26)	0.5	Y
Bishopton 9	Roadside	243947	670550	NO ₂	N	Y (7)	3	Y
Paisley 13	Urban Background	247371	665674	NO ₂	N	Y (12)	21	Y
Paisley 14	Urban Background	247347	665796	NO ₂	N	Y (32)	5	Y
Paisley 15	Urban Background	249196	665711	NO ₂	N	Y (17)	30	Y
Renfrew 17	Urban Background	251528	666287	NO ₂	N	Y (6.5)	28	Y
Paisley 18	Roadside	248654	664206	NO ₂	Y	Y (16)	5	Y
Paisley 19	Roadside	245709	663581	NO ₂	N	Y (2)	1.5	Y
Johnstone 20	Kerbside	242665	663290	NO ₂	N	Y (1.5)	0	Y
Paisley 21	Roadside	248316	663612	NO ₂	Y	Y (9)	6	Y
Renfrew 23	Roadside	251869	666628	NO ₂	N	Y (16)	7	Y
Renfrew 24	Roadside	251687	666790	NO ₂	N	Y (19)	16	Y
Renfrew 25	Urban Industrial	249698	666863	NO ₂	N	Y (3)	3	Y
Bishopton 27	Suburban	243121	671189	NO ₂	N	Y (7)	2	Y
Linwood 30	Urban Background	243302	663998	NO ₂	N	Y(17)	1.5	Y

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Wst Walkingshaw 31	Roadside	246197	666132	NO ₂	N	Y (3)	15	Y
Paisley 33	Roadside	248277	663524	NO ₂	Y	Y (0.5)	2	Y
Paisley 34	Kerbside	248302	663563	NO ₂	Y	Y (3.5)	0	Y
Paisley 35	Roadside	248360	664272	NO ₂	Y	Y (0)	1.5	Y
Paisley 36	Roadside	247932	664696	NO ₂	Y	Y (6)	6	Y
Paisley 37	Roadside	248438	664192	NO ₂	Y	Y (2)	1.5	Y
Renfrew 38	Roadside	250107	666857	NO ₂	N	Y (3)	3	Y
Paisley 39	Special	248297	666545	NO ₂	Y	N/A (Hotel approx 600m)	40	N
Renfrew 40	Roadside	250759	667631	NO ₂	N	Y (1)	6	Y
Paisley 41	Kerbside	248462	664182	NO ₂	Y	Y (17)	6	Y
Paisley 42	Roadside	248371	664187	NO ₂	Y	Y (50)	1.5	N
Paisley 43	Roadside	248480	664154	NO ₂	N	Y (13)	1.5	Y
Paisley 44	Roadside	248208	664473	NO ₂	Y	Y (0)	1.5	Y
Renfrew 45	Kerbside	251253	667881	NO ₂	N	Y (12)	1	Y
Renfrew 46	Kerbside	251797	667378	NO ₂	N	Y (17)	0.5	Y
Paisley 47	Roadside	249914	665059	NO ₂	N	Y(5)	2.5	
Renfrew 48	Other	251264	666216	NO ₂	N	Y (12)	1.5 from Glen Sax Drive, 47m from motorway	N
Renfrew 49	Other	251462	666326	NO ₂	N	Y(8)	26m from Glen Sax Drive, 87m from M8	N
Renfrew 50	Roadside	248985	665494	NO ₂	N	Y(7.5)	12m from Renfrew Rd, 3m from access road	Y
Linwood 51	Other	243344	663960	NO ₂	N	Y(4.5)	29m from Kintyre Ave, 35m from M8	Y
Glasgow 52	Roadside	251514	666954	NO ₂	N	Y(4.5)	3m	Y

2.2 Comparison of Monitoring Results with Air Quality Objectives

A comparison of measured NO₂ and PM₁₀ concentrations with relevant air quality objectives is provided in Sections 2.2.1 and 2.2.2.

2.2.1 Nitrogen Dioxide

Automatic Monitoring Data

The annual mean and 1-hour mean NO₂ automatic monitoring data for 2010 and previous years are presented in Tables 2.3 and 2.4 respectively.

In total there were 99 recorded exceedences of the 1-hour mean NO₂ objective, 43 of which were recorded at Central Road, 47 at Gordon Street and 9 at Glasgow Airport. The annual mean objective was also exceeded at both Central Road and Gordon Street.

The monitoring data indicates that the annual mean objective for NO₂ is exceeded at Central Road monitoring station; however the site is at a location with no relevant public exposure for the annual mean objective and is solely used as a bus stop with no nearby residential properties. The measured annual mean concentration at the Glasgow Airport monitoring site was substantially below the annual mean NO₂ objective. The measured annual mean NO₂ concentration at Gordon Street was above the annual mean NO₂ objective and has increased from 2009.

The data capture rate at each of the monitoring stations was 99% at Glasgow Airport and 93% at Gordon Street. A data capture rate of 50% measured at the Central Road monitoring station reflected a temporary closure of the site in November 2009 to June 2010 whilst road layout improvements were being carried out.

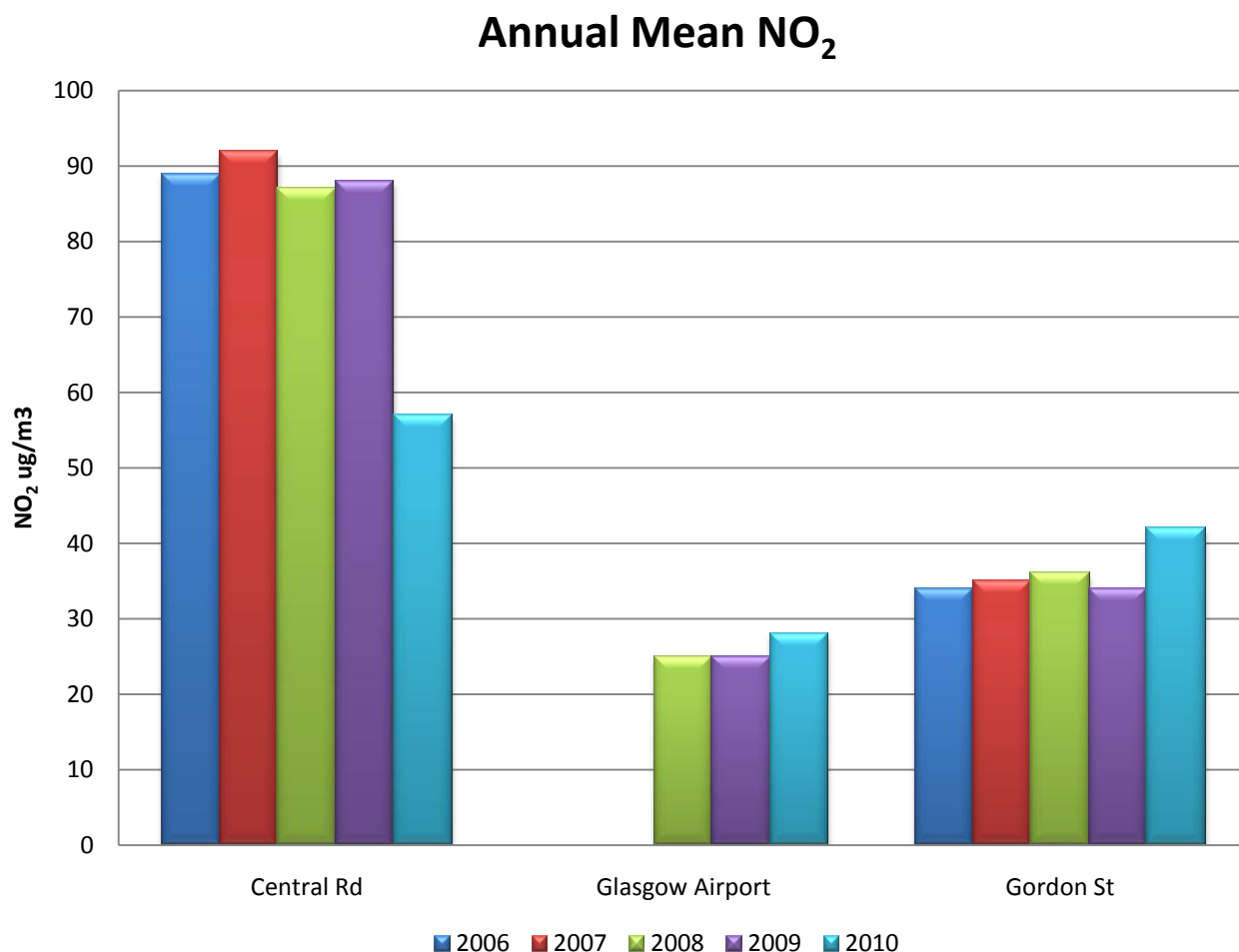
Monitored 1-hour mean NO₂ concentrations at both Central Road and Gordon Street indicated that the 1-hour mean objective level of 200µg/m³ was exceeded on a total of 43 and 47 hours, respectively in 2010, substantially above the permitted 18 exceedences per year. A trend chart of historic automatic NO₂ monitoring data is also presented in Chart 2.3.

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

Site ID	Location	Within AQMA?	Data Capture for monitoring period %	Data Capture for full calendar year 2010 %	Annual mean concentrations (µg/m ³)			
					2007	2008	2009	2010
Central Rd	Central Rd	Y	100	50.3	92	87	88	51.9*
Glasgow Airport	Glasgow Airport	N	99.3	99.3	-	25	25	28
Gordon St	Gordon St	Y	93.3	93.3	35	36	34	42

*Annualised

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



Measured annual mean NO₂ concentrations at the three automatic monitoring stations within Renfrewshire remained relatively constant from 2006 to 2009 although measured concentrations at Glasgow Airport and Gordon Street have increased from 2009 to 2010.

Annual mean concentrations at Central Road have reduced by almost half between 2009 and 2010 as a result of the new road layout. The Central Road improvements consisted of reducing the traffic flow to westbound traffic only and the number of bus stops was also reduced from four to two thus effectively halving the traffic using Central Rd.

Table 2.4 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 2010 %	Number of Exceedences of hourly Mean objective (200 $\mu\text{g}/\text{m}^3$)			
					2007	2008	2009	2010
Central Rd	Central Rd	Y	100	50.3	999	715	760	43*
Glasgow Airport	Glasgow Airport	N	99.3	99.3	-	1	0	9
Gordon St	Gordon St	Y	93.3	93.3	0	0	1	47
*based on data from July to December only								

All three monitoring sites have had a number of exceedences of the 1-hour NO₂ objective. All of the measured exceedences were during December 2010 and can be attributed to the extremely cold weather system. Measured concentrations at Central Road have shown a significant drop in the number of exceedences of the hourly mean objective again this improvement in air quality is due to the new road layout in Central Road.

Diffusion Tube Monitoring Data

The NO₂ diffusion tube monitoring data for 2010 are presented in Table 2.5. Measured concentrations exceeding the annual mean objective level have been highlighted for ease of reference. Where the data capture is less than 75% the data have been annualised following the method described in technical guidance. The diffusion tube monitoring results have been adjusted for laboratory bias using a local bias adjustment factor. Further detail of the annualisation and laboratory bias adjustment is provided in Appendix A. Trend charts of historic diffusion tube data at urban background, roadside and kerbside sites are presented in Charts 2.4a, 2.4b and 2.4c respectively.

Where diffusion tubes 2010 measured annual mean is above the objective and the diffusion tube site is located closer to the road than the nearest receptor it has been necessary to estimate the annual mean at the nearest receptor using the nitrogen dioxide fall off with distance calculator.⁶ These results are presented in Table 2.6.

⁶ <http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html>

Table 2.5 Results of Nitrogen Dioxide Diffusion Tubes

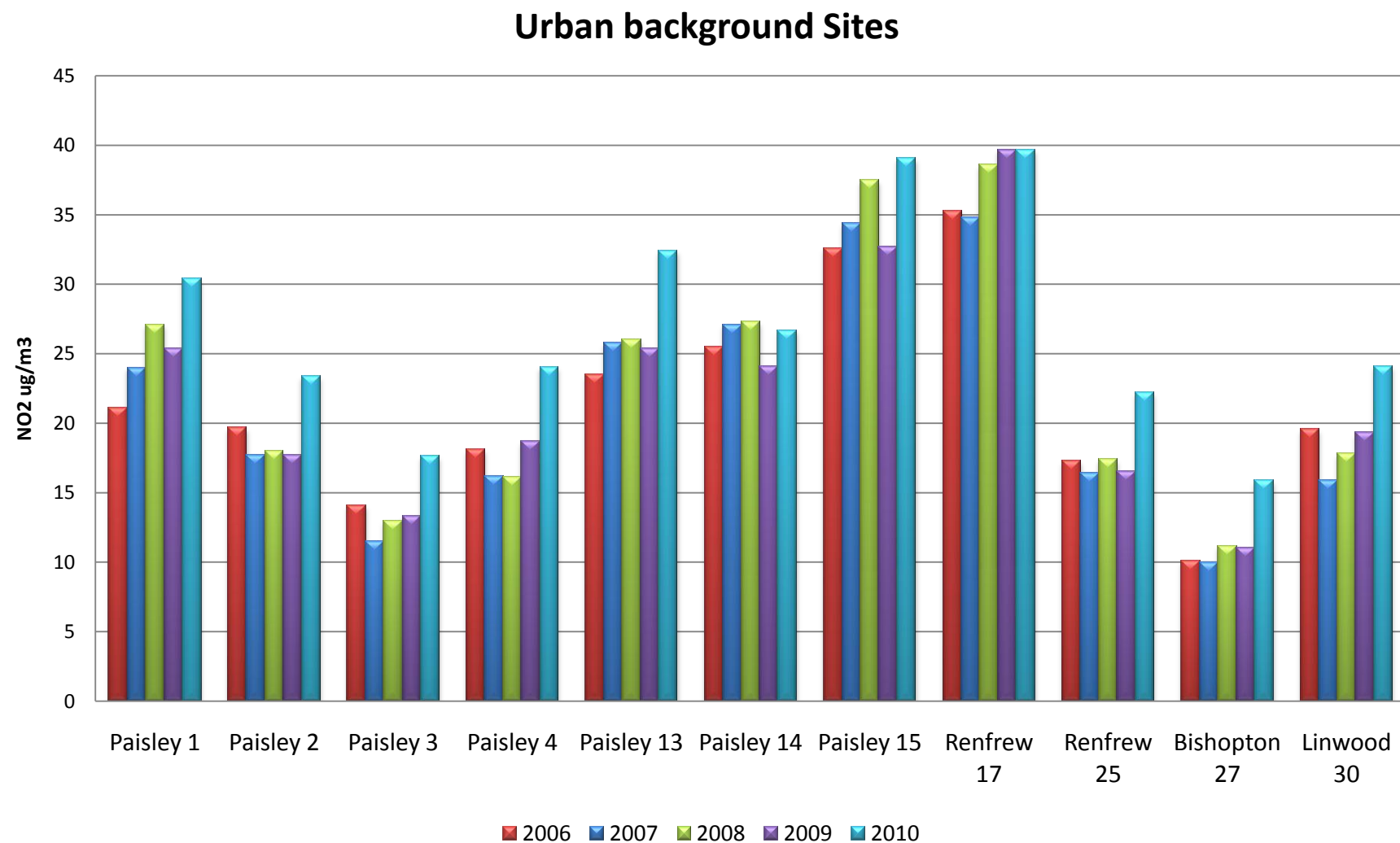
Site ID	Location	Within AQMA?	Data Capture for monitoring period %	Data Capture for full calendar year 2010 %	Annual mean concentrations ($\mu\text{g}/\text{m}^3$)			
					2007	2008	2009	2010
Paisley 1	Gilmour Street, Paisley	Y	100%	100%	24.0	27.1	25.4	30.4
Paisley 2	Oakshaw Street, Paisley	Y	92%	92%	17.7	18.0	17.7	23.4
Paisley 3	Lochfield Drive, Paisley	N	100%	100%	11.5	13.0	13.3	17.7
Paisley 4	Regent Street, Paisley	N	92%	92%	16.2	16.1	18.7	24.1
Johnstone 7	High Street, Johnstone	N	92%	92%	33.5	34.3	30.8	40.4
Renfrew 8	Hairst Street, Renfrew	N	83%	83%	2 months data only	37.9	43.4	42.6
Bishopton 9	Station Road, Bishopton	N	83%	83%	16.3	13.7	15.3	16.6
Paisley 13	Greenock Road, Paisley	N	100%	100%	25.8	26.0	25.4	32.4
Paisley 14	Arkleston Rd, Paisley	N	100%	100%	27.1	27.3	*24.1	26.7
Paisley 15	Montgomery Drive, Paisley	N	92%	92%	34.4	37.5	32.7	39.1
Renfrew 17	Tanar Way, Renfrew	N	75%	75%	34.8	38.6	*39.7	42.4
Paisley 18	Incle Street, Paisley	Y	92%	92%	53.9	49.2	44.0	51.8
Paisley 19	Linwood Road, Paisley	N	100%	100%	30.9	31.7	30.3	36.1
Johnstone 20	High Street, Johnstone	N	92%	92%	44.3	34.5	36.1	46.8

Site ID	Location	Within AQMA?	Data Capture for monitoring period %	Data Capture for full calendar year 2010 %	Annual mean concentrations ($\mu\text{g}/\text{m}^3$)			
					2007	2008	2009	2010
Paisley 21(1)	Causeyside Street, Paisley (Triplicate)	Y	100%	100%	38.7	39.4	37.6	41.8
Renfrew 23	Hillington Road, Renfrew	N	100%	100%	30.2	31.6	30.2	35.2
Renfrew 24	Glasgow Road, Renfrew	N	67%	67%	26.0	24.2	24.0	*30.5
Renfrew 25	French Street, Renfrew	N	92%	92%	16.4	17.4	16.5	22.2
Bishopton 27	Rossland Gardens, Bishopton	N	92%	92%	10	11.2	11.0	15.9
Linwood 30	Kintyre Avenue, Linwood	N	100%	100%	15.9	17.8	19.3	24.1
West Walkingshaw31	West Walkingshaw	N	75%	75%	25.5	28.0	25.9	28.4
Paisley 33	76 Causeyside Street, Paisley	Y	100%	100%	40.6	44.4	41.4	50.7
Paisley 34	63 Causeyside Street, Paisley	Y	92%	92%	41.7	44.7	41.7	48.0
Paisley 35	Old Sneddon Street, Paisley	Y	92%	92%	51.7	49.9	42.9	50.9
Paisley 36	37 Caledonia Street, Paisley	Y	100%	100%	37.5	34.5	30.4	34.8
Paisley 37	Central Road, Monitoring Station, Paisley (Triplicate)	Y	75%	75%	73.5	68	60.9	43.6

Site ID	Location	Within AQMA?	Data Capture for monitoring period %	Data Capture for full calendar year 2010 %	Annual mean concentrations ($\mu\text{g}/\text{m}^3$)			
					2007	2008	2009	2010
Renfrew 38	99 Paisley Road, Renfrew	N	100%	100%	34.3	37.5	34.2	34.8
Paisley 39	Glasgow Airport, Paisley (Triplicate)	N	100%	100%	25.2	22.6	21.9	26.3
Renfrew 40	Hairst Street, Renfrew	N	83%	83%	36.5	22.3	32.8	37.0
Paisley 41	Smithhills Street (West), Paisley	Y	25%	25%	63.7	62.3	*56.1	*38.3
Paisley 42	Central Road (West), Paisley	Y	67%	67%	47.2	46.2	*42.7	*44.5
Paisley 43	Smithhills Street (East), Paisley	Y	100%	100%	50.4	48.7	42.1	42.9
Paisley 44	Love Street, Paisley	Y	83%	83%	28.4	32	45.8	38.6
Renfrew 45	Xscape, Renfrew	N	100%	100%	N/A	33.7	28.2	35.1
Renfrew 46	Ferry Village, Renfrew	N	92%	92%	N/A	20.6	24.3	30.8
Paisley 47	Arkleston Road	N	92%	92%	24.0	27.1	29.9	35.8
Renfrew 48	Glen Sax Drive, Renfrew	N	100%	100%	N/A	N/A	*27.3	38.0
Renfrew 49	Tanar Way , Renfrew	N	100%	100%	N/A	N/A	*32.2	36.0
Renfrew 50	Renfrew Road, Paisley	N	92%	92%	N/A	N/A	*29.1	34.0
Linwood 51	Kintyre Avenue 2, Linwood	N	100%	100%	N/A	N/A	*25.4	25.8
Glasgow 52	Glasgow Road 2, Renfrew	N	100%	100%	N/A	N/A	*33.5	35.7
* Annualised data								

Table 2.6 Corrected Nitrogen Dioxide Annual mean for drop off with distance

Site ID	Site location	Annual mean ($\mu\text{g}/\text{m}^3$)	Distance from tube to kerb (m)	Distance of receptor to kerb (m)	Adjusted Annual Mean ($\mu\text{g}/\text{m}^3$)
Johnstone 7	High Street Johnstone	40.4	0	1.5	29.5
Renfrew 8	Hairst Street, Renfrew	42.6	0.5	26	20.4
Renfrew 17	Tanar Way, Renfrew	42.4	23	28	39.7
Johnstone 20	High Street Johnstone	46.8	0	1.5	33.5
Renfrew 48	Glen Sax Drive, Renfrew	38.0	47	35	45.1

Chart 2.4a Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Urban Background Diffusion Tube Monitoring Sites.

Date (June 2011)

Renfrewshire Council- Scotland

Chart 2.4b Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Roadside Diffusion Tube Monitoring Sites.

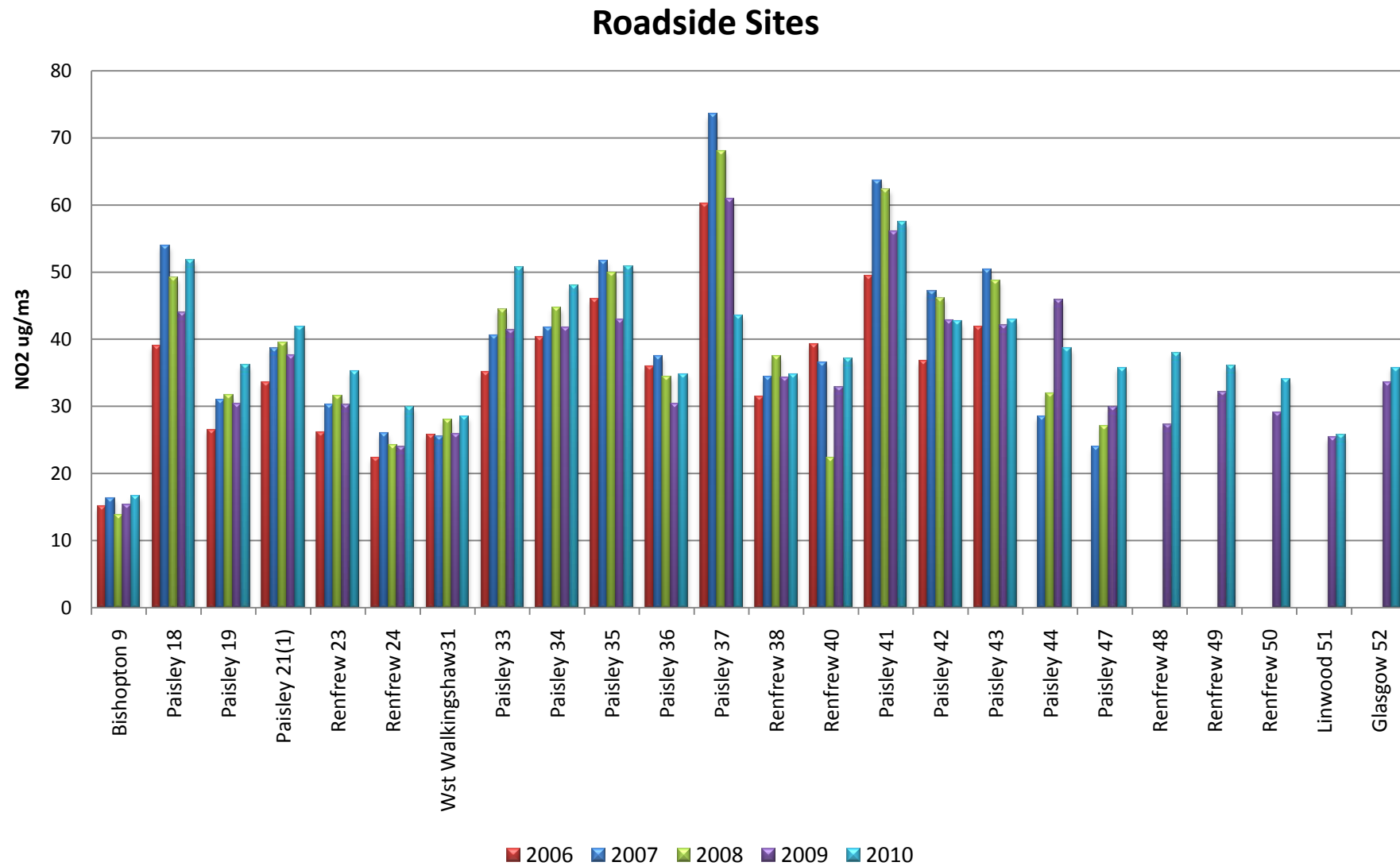
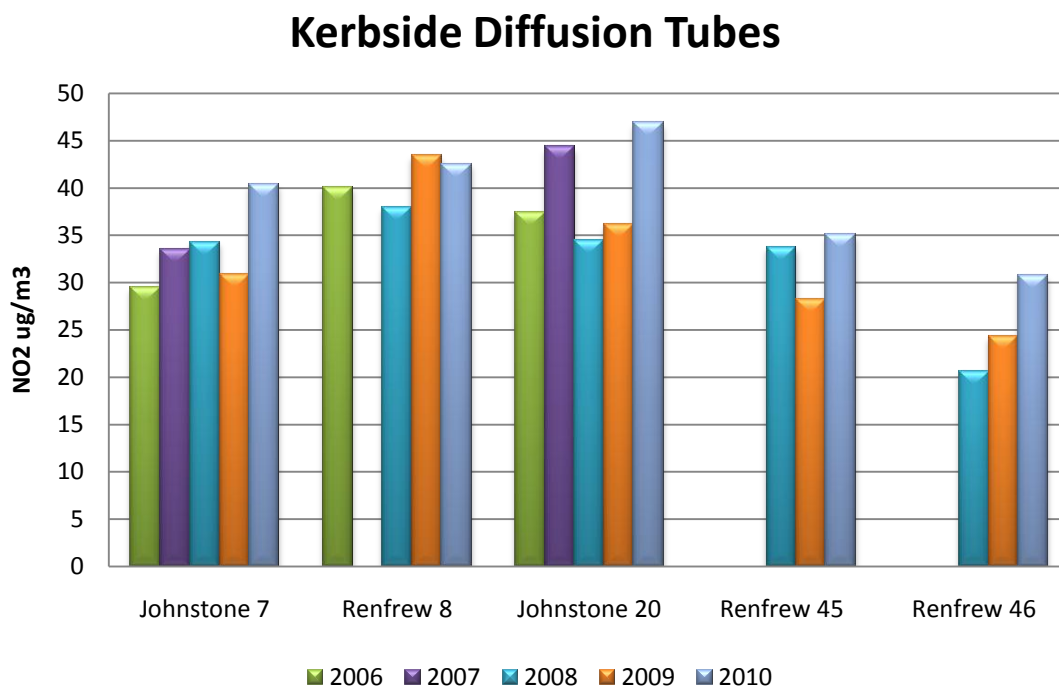


Chart 2.4c Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Kerbside Diffusion Tube Monitoring Sites.

Typically, measured NO₂ concentrations within Renfrewshire have not followed national trends set out in the technical guidance, which implies a decrease in NO₂ concentrations. The NO₂ diffusion tubes located at all locations have generally shown an increase in measured concentrations since 2006.

PM₁₀

Details of measured annual mean and 24-hour mean PM₁₀ concentrations in 2010 are presented in Tables 2.7 and 2.8 respectively. No data are presented for Gordon Street during 2007 as the data capture was only 12%.

Table 2.7 Results of PM₁₀ Automatic Monitoring: Comparison with Annual Mean Objective

Site ID	Analyser	Within AQMA?	Data Capture for monitoring period %	Data Capture for full calendar year 2010 %	Annual mean concentrations (µg/m ³)			
					2007	2008	2009	2010
Gordon St	TEOM FDMS	Y	76	76	n/a	15	18	21
St James	TEOM FDMS	Y	100	23	n/a	n/a	n/a	23*

* less than 3 months data, therefore data not annualised

Table 2.8 Results of PM₁₀ Automatic Monitoring: Comparison with 24-hour Mean Objective

Site ID	Location	Within AQMA?	Data Capture for monitoring period ^a %	Data Capture 2010 %	Number of Exceedences of daily mean objective (50 µg/m ³)			
					2007	2008	2009	2010
Gordon St	Gordon St	Y	76	76	N/A	1	5	11
St James	St James	Y	100	23	N/A	N/A	N/A	8

During 2010 measured concentrations at both Gordon Street and St James exceeded the 2010 annual mean objective. There were 11 and 8 recorded exceedences of the 24-hour mean NAQS objective at both sites, respectively.

Measured PM₁₀ concentrations during 2010 indicate that urban PM₁₀ concentrations within Paisley town centre are exceeding both PM₁₀ objectives and the decision to declare an AQMA for PM₁₀ remains valid.

2.2.2 Sulphur Dioxide

Renfrewshire Council historically monitored SO₂ concentrations at Glasgow Airport however, as monitoring data indicated a continued decline in measured concentrations in line with national trends, monitoring was ceased. Historic measured concentrations were substantially below the objective level.

2.2.3 Benzene

Renfrewshire Council does not monitor for Benzene.

2.2.4 Other pollutants monitored

Renfrewshire Council does not undertake monitoring for any other pollutants.

2.2.5 Summary of Compliance with NAQS Objectives

Automatic monitoring data from Central Road and Gordon Street breached both the 1-hour and the annual mean NO₂ NAQS objectives. No exceedence of the annual mean objective and nine exceedences of the 1 hour mean objective were recorded at Glasgow Airport automatic monitoring site.

Although measured concentrations at Central Road are still breaching both NO₂ objectives the annual mean has reduced from 90 µg/m³ to 52 µg/m³ and the number of exceedences of the 1-hour objective has decreased from 760 to 43. Although this is based on a 6 month monitoring period these results indicate that the traffic improvements made to Central Road have greatly improved air quality in that area. It should be noted that this site is at a location with no relevant public exposure for the annual mean objective and is solely used as a bus stop with no nearby sensitive properties. The Council will continue to monitor NO₂ levels within Central Road.

There were twelve diffusion tube monitoring locations where exceedences of the NO₂ annual mean objective were measured. Of the twelve sites four are not located within the Paisley Town Centre AQMA.

Measured concentrations at the monitoring site Renfrew 17 which is located close to the M8 continues to be above the NO₂ annual mean objective. The measured concentrations at additional tubes (numbers 48 – Glensax Drive & 49 – Tanar Way), which were located within this vicinity in September 2009, and Renfrew 17 were all adjusted to determine the annual mean concentration at the nearest receptor. The adjusted annual mean concentrations indicate that the objective is close to and is being exceeded at residential properties close to the M8, Renfrew. These new monitoring results agree with the predicted exceedences in the 2009 Detailed Assessment of Renfrew.

The Council has recently purchased (following receipt of funding from the Scottish Government) a new monitoring station to monitor both NO₂ and PM₁₀ within this area. However the identification of a suitable site for the station is proving to be very problematic and further delays are anticipated.

Measured concentrations at diffusion tubes in Hairst Street, Renfrew and High Street Johnstone were also above the annual mean objective. However as these three sites are kerbside sites it was appropriate to calculate the NO₂ concentration at the nearest receptor building facade. These new mean values indicate that the NO₂ annual mean is below the objective. A Detailed Assessment in 2009 was undertaken of both Renfrew and Johnstone in 2009 which indicated that there was no requirement for an AQMA at that time for both areas. Hairst Street in Renfrew has undergone major reconstruction of the road layout and therefore the diffusion tube Hairst Street 8 is no longer located at a site with relevant exposure and will be relocated to a more appropriate location. The Council intend to continue monitoring at the sites in High St, Johnstone and the relocated site in Hairst St, Renfrew.

During 2010, the measured annual mean PM₁₀ concentration at both Gordon Street and St James monitoring sites in Paisley town centre were in excess of the 2010 annual mean objective. Both sites also breached the 24-hour mean PM₁₀ objective as they recorded exceedences in excess of the permitted seven.

Renfrewshire Council has examined the results from monitoring in the district. With the exception of locations close to the M8 in Renfrew, measured concentrations outside of the AQMA are all below the objectives at relevant locations, therefore there is no need to proceed to a Detailed Assessment. As a Detailed Assessment of Renfrew has been carried out it is not considered necessary to proceed at this time to another DA for this area however monitoring results will continue to be reviewed. The identification of a suitable site adjacent to the M8 in Renfrew for the recently purchased NO₂ and PM₁₀ automatic monitors is ongoing.

3 New Local Developments

Updated data on local emissions sources were collated from Planning and Roads Services of Renfrewshire Council, the Scottish Environment Protection Agency (SEPA) and Transport Scotland.

3.1 Road Traffic Sources

Renfrewshire Council Roads Services advised that there were no new or significantly changed road traffic sources, as per the screening criteria, that have not been previously assessed. It was determined that there have been no significant changes to emissions from traffic sources within the Renfrewshire Council area since the 2010 Progress Report.

3.2 Other Transport Sources

There have been no newly identified emissions from rail, shipping or aircraft operations within the Renfrewshire Council area since the 2009 Updating and Screening Assessment.

3.3 Industrial Sources

SEPA were consulted in relation to any changed processes identified in the public registers. There have been no significant changes to existing process emissions and no new industrial sources identified.

3.4 Commercial and Domestic Sources

Renfrewshire Council Planning Services were consulted with regards to any new or changed commercial and domestic sources. No new areas of domestic fuel burning were identified.

3.5 New Developments with Fugitive or Uncontrolled Sources

SEPA were consulted in relation to any changed waste, landfill or quarry processes identified in the public registers. Two new applications were received during 2010 and are detailed in Table 3.2.

Table 3.2 Details of Part A processes granted during 2010

AUTHORISATION REFERENCE	SITE ADDRESS DETAILS	STATUS	STATUS DATE	ORGANISATION NAME	AUTHORISED ACTIVITIES
PPC/A/1020313	Royal Ordnance plc Station Road Bishopton PA7 5NJ	Granted	26/01/2011	BAE SYSTEMS PROPERTIES LTD	5.2.a
PPC/A/1036720	Turningshaw Road Houston Renfrewshire PA6 7BP	Granted	06/05/2010	W.H.Malcolm	5.2.b

Application PPC/A/1036720 is for an existing process therefore there are no new emission sources. The application for the site in Bishopton although granted it is not expected that the site will be fully operational for some time. Any impact the emissions from this site will have on air quality will be assessed in the 2012 Updating and Screening Assessment.

Renfrewshire 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

Renfrewshire Council does not have a local or regional air quality strategy.

5 Planning Applications

A review of planning applications granted since the 2010 Progress Report was carried out in order to identify any developments which may have a significant impact upon the local air quality.

The major developments identified by the Council's Planning Services are listed in Table 5.1.

Table 5.1 Details of planning applications with potential air quality impacts

Development Description	Location
10/0440/PP - Park Mains High School, Park Mains, Erskine - Demolition of old school and rebuild of new school with new possible CHP boiler. Granted 01/09/10.	Erskine
10/0906/PP - Demolition of existing Sports Centre and erection of Linwood Community Sports Hub etc including new boilers and CHP plant.	Linwood
11/0092/PP - This is an amendment plan to a previous application for the demolition and redevelopment of Linwood Town Centre and erection of superstore, shops, library, housing association offices, car parking etc, Land at Hart St, Linwood.	Linwood

It was concluded from the emission data and AQ assessments received with these applications that no further assessment was required.

6 Air Quality Planning Policies

Renfrewshire Council does not currently have any air quality planning policies. The Council recently completed an internal Air Quality Planning Guidance document. The guidance document is currently at final consultation stage within the Council. It is hoped that this document will be finalised by September 2011.

7 Local Transport Plans and Strategies

Renfrewshire Council's Local Transport Strategy was updated in 2007, air quality is not considered within this document.

8 Implementation of Action Plans

Renfrewshire Council declared the Paisley Town Centre AQMA in August 2009 and are currently working towards completing their action plan.

9 Conclusions and Proposed Actions

9.1 Conclusions from New Monitoring Data

Automatic monitoring data from Central Road and Gordon Street breached both the 1 hour and the annual mean NO₂ NAQS objectives. Glasgow Airport automatic monitoring site recorded no exceedences of the annual mean objective and nine exceedences of the 1 hour mean objective.

Although measured concentrations at Central Road are still breaching both NO₂ objectives the measured annual mean concentration has reduced from 90 µg/m³ to 52 µg/m³ and the number of exceedences of the 1-hour objective has decreased from 760 to 43. Although this is based on a 6 month monitoring period these results indicate that the traffic improvements made to Central Road have greatly improved air quality in that area. The council will continue to monitor NO₂ levels within Central Road. It should be noted that this site is at a location with no relevant public exposure for the annual mean objective and is solely used as a bus stop with no nearby residential properties.

There were twelve diffusion tube monitoring locations where exceedences of the NO₂ annual mean objective were measured. Of the twelve sites four are not located within the Paisley Town Centre AQMA.

Measured concentrations at the monitoring site Renfrew 17 which is located close to the M8 continues to be above the NO₂ annual mean objective. The measured concentrations at additional tubes (numbers 48 – Glensax Drive & 49 – Tanar Way), which were located within this vicinity in September 2009, and Renfrew 17 were all adjusted to determine the annual mean concentration at the nearest receptor. The adjusted annual mean concentrations indicate that the objective is close to and is being exceeded at residential properties close to the M8, Renfrew. These new monitoring results agree with the predicted exceedences in the 2009 Detailed Assessment of Renfrew.

The Council has recently purchased (following receipt of funding from the Scottish Government) a new monitoring station to monitor both NO₂ and PM₁₀ at a location close to the residential properties adjacent to the M8, Renfrew. However the identification of a suitable site for the station is proving to be problematic and further delays are anticipated.

Measured concentrations at diffusion tubes in Hairst Street, Renfrew and High Street Johnstone were also above the annual mean objective. However as these three sites (one at Hairst St, two at High St) are kerbside sites it was appropriate to calculate the NO₂ concentration at the nearest receptor building facade. These new mean values indicate that the NO₂ annual mean is below the objective. Both of these sites had a Detailed Assessment in 2009 carried out on them which indicated that there was no requirement for an AQMA at that time. Hairst Street in Renfrew has undergone major reconstruction therefore the diffusion tube Hairst Street 8 is no longer located in a site with relevant exposure and will be relocated to a more appropriate location. The

Council intend to continue monitoring at the sites in High St, Johnstone and relocated site in Hairst St, Renfrew.

During 2010, the measured annual mean PM₁₀ concentration at both Gordon Street and St James monitoring sites in Paisley town centre were in excess of the 2010 annual mean objective. Both sites also breached the 24-hour mean PM₁₀ objective as they recorded exceedences in excess of the permitted seven. Both locations are within the Paisley Town Centre AQMQ.

9.2 Conclusions relating to New Local Developments

A review of all new local developments was undertaken and it was concluded that there was no need to proceed to a Detailed Assessment.

9.3 Other Conclusions

Renfrewshire Council intend to release their internal Air Quality Planning Guidance document by September 2011.

9.4 Proposed Actions

A new automatic monitoring station measuring both NO_x and PM₁₀ will be located at a location close to the M8 in Renfrew to determine if it is necessary to declare an AQMA.

There is no requirement to proceed to a Detailed Assessment for any pollutant contained within the NAQS.

The next LAQM requirement for Renfrewshire Council will be submission of their Paisley Town Centre Draft Action Plan.

Appendices

Appendix A: QA/QC Data

Appendix B: Figures

Appendix A: QA:QC Data

Diffusion Tube Bias Adjustment Factors

The laboratory analysis of the passive diffusion tubes used by the Council is undertaken by Glasgow Scientific Services. Glasgow Scientific Services is a UKAS accredited laboratory with documented Quality Assurance/Quality Control (QA/QC) procedures for diffusion tube analysis. The laboratory prepares the diffusion tubes using the 20% triethanolamine (TEA) in water method.

Glasgow Scientific Services public analyst participates in the AEA inter-comparison scheme, with bias correction factors calculated and applied annually. The laboratory analyses results from co-location studies at various locations.

The laboratory co-location factors are presented in Table A.1.

Table A.1 Details of the 2010 bias correction factors for NO₂ diffusion tubes (v03/10)

Site Name	Study duration	Tube precision	Bias correction factor
Marylebone Road Intercomparison	12	G	1.10
Glasgow City Council	9	P	1.10
Glasgow City Council	10	P	0.97
Glasgow City Council	12	P	1.12
Glasgow City Council	11	G	1.20
Overall factor from Glasgow Scientific Services co-location studies			1.1

Factor from Local Co-location Studies (if available)

Site Name	Study duration	Tube precision	Bias correction factor
Glasgow Airport	12	G	1.06
Gordon Street	12	G	1.00
Overall factor from Renfrewshire Council			1.03

Discussion of Choice of Factor to Use

Renfrewshire Council have chosen to use the local bias adjustment factor. The laboratory bias adjustment factor is mainly made up of results from monitoring undertaken by Glasgow City Council. Three of the five co-location studies had poor precisions whilst both of Renfrewshire Council's studies showed good precision. It was felt that using the local adjustment factor would prevent any over-estimate of the NO₂ concentrations within the Renfrewshire Council area.

PM₁₀ Monitoring Adjustment

Renfrewshire Council operate a TEOM FDMS which meets the equivalence criteria therefore no adjustment factor was required.

Short-term to Long-term Data adjustment

Renfrewshire Council had a number of sites where data capture was less than the desired 75%. These sites required adjustment to calculate long-term mean concentrations. An adjustment factor was calculated for each diffusion tubes using all other diffusion tube results for the Renfrewshire Council area where the data capture rate was 100%. A summary table of the adjustment factors used is presented below:-

Site	% Data capture	Factor
Renfrew 24	67	1.02
Paisley 41	25	0.67
Paisley 42	67	1.05

QA/QC of automatic monitoring

AEA Technology currently carries out all data ratification on behalf of the Scottish Government for Renfrewshire Council. This consists of:

- polling the data on a daily basis; and
- 6 month site audits.

The Council also employ the services of a consultant to manage the day to day running of the automatic sites which include liaison between the Council and the service departments to help maintain a high data capture rate. This has meant that any analyser faults are picked up as quickly as possible and analyser down time and subsequent data loss is kept to a minimum.

The Council also carry out monthly site visits to change filters and carry out manual calibrations on the NO_x analysers. Each NO_x analyser also carries out an automatic calibration overnight daily. The automatic calibrations are used by AEA to scale and ratify the data.

The Council also carry out all filter changes on their TEOM/FDMS analysers.

QA/QC of diffusion tube monitoring

Glasgow Scientific Services is a UKAS accredited laboratory with documented Quality Assurance/Quality Control (QA/QC) procedures for diffusion tube analysis. Glasgow Scientific Services participates in the WASP scheme that is managed by the Health & Safety Laboratory and a monthly intercomparison exercise that is managed by AEA. The performance of Glasgow Scientific Services in the WASP scheme for January 2009 – January 2010 is shown below.

	Performance on basis of RPI, OLD CRITERIA, best 4 out of the 5 rounds 104-108	Performance on basis of RPI, NEW CRITERIA, best 4 out of the 5 rounds 104-108
Glasgow scientific services	Good	Good

Appendix B:

Figure 1: AQMA boundary

Figure 2: Automatic monitoring station locations

Figure 3: NO₂ diffusion tube location – Paisley

Figure 4: NO₂ diffusion tube location – Paisley AQMA

Figure 5: NO₂ diffusion tube location – Renfrew

Figure 6: NO₂ diffusion tube location – Johnstone



Council Boundary

 AQMA boundary




Renfrewshire
Council

Project Progress Report 2011

Title Paisley Town Centre AQMA

Created by JS Project Manager BS Reviewer Date June 2011

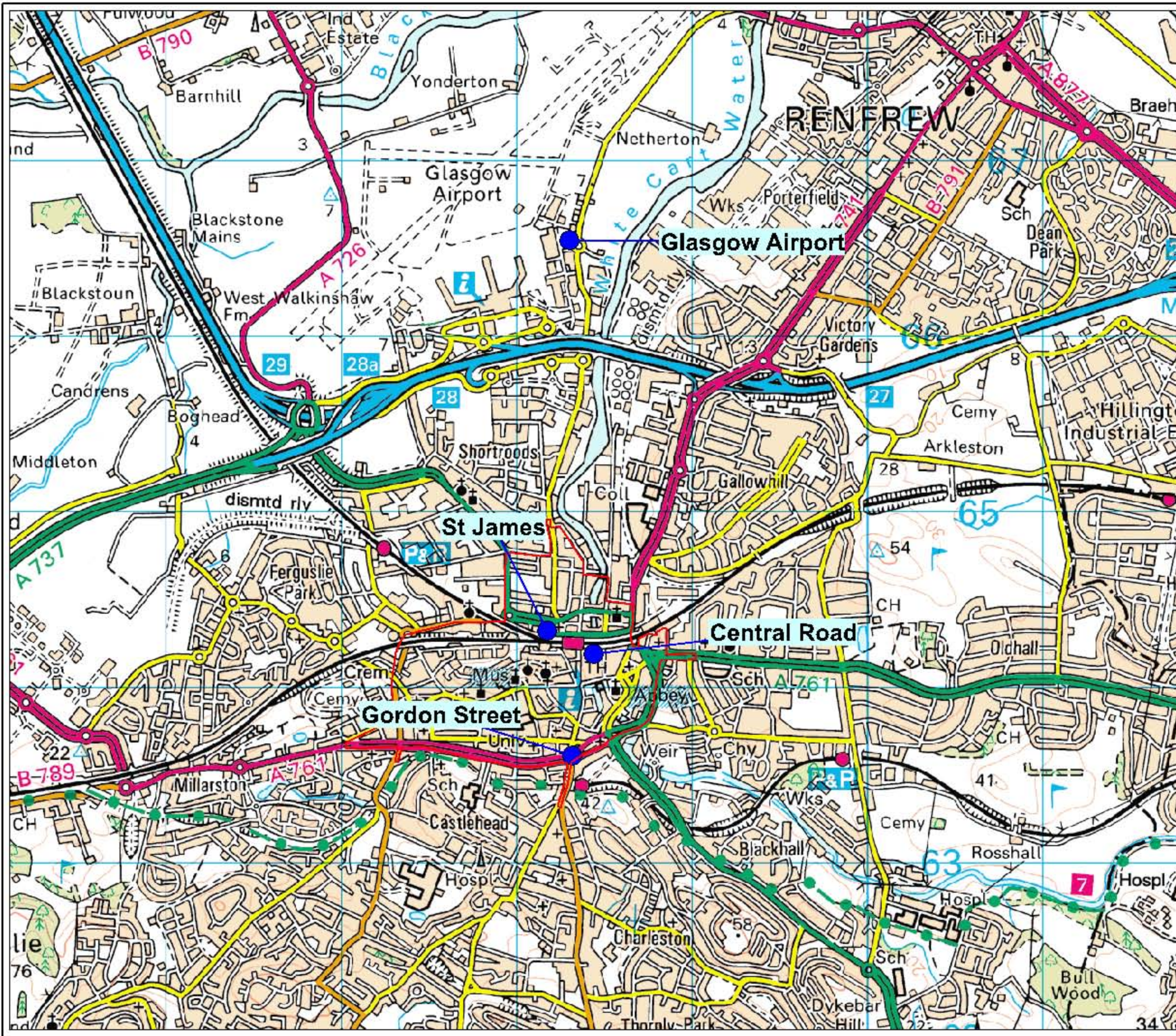
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LEGEND

Automatic Monitoring Sites



AQMA boundary



NOTES

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Automatic Monitoring Site
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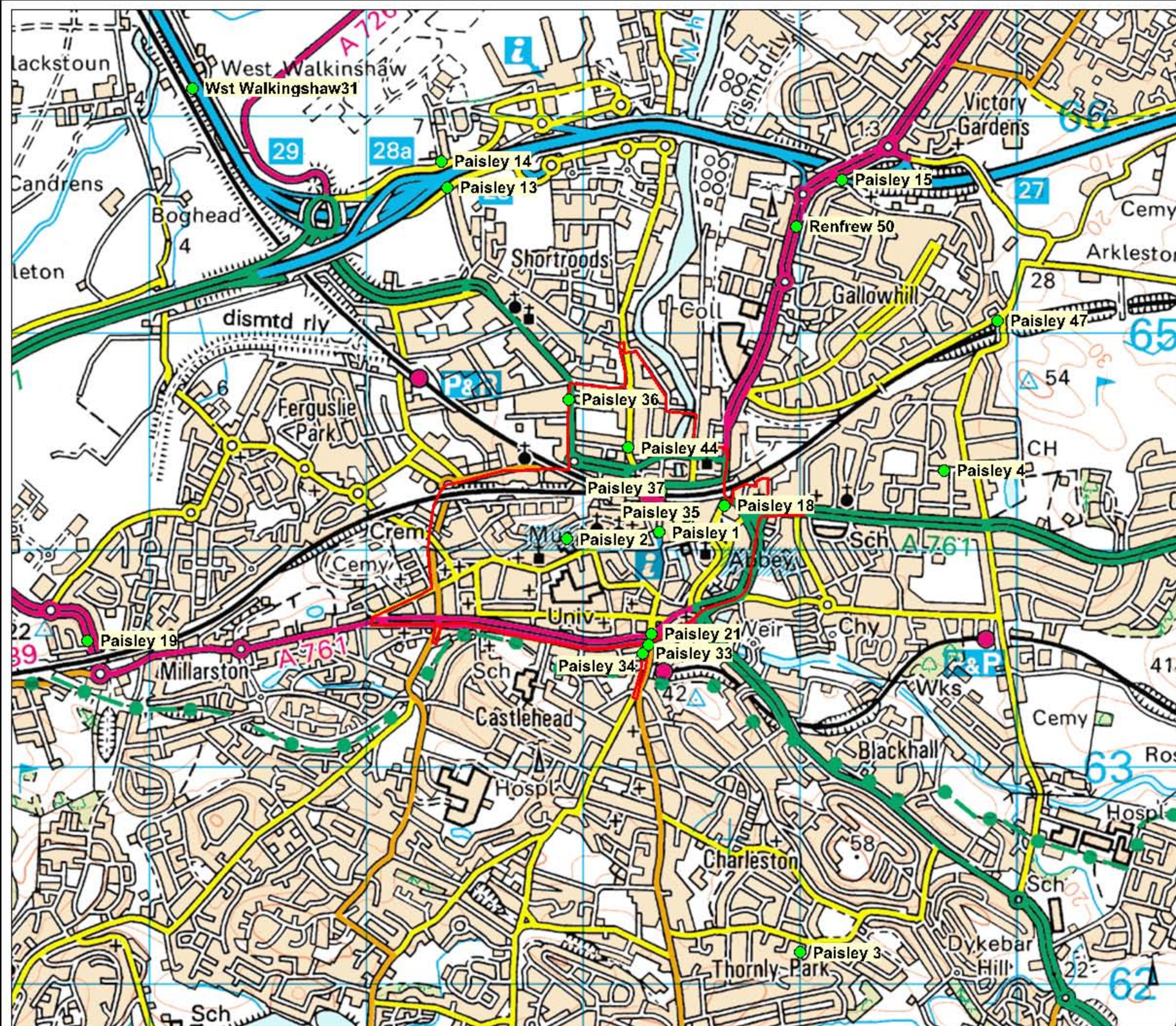
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AQMA Boundary



Diffusion tubes



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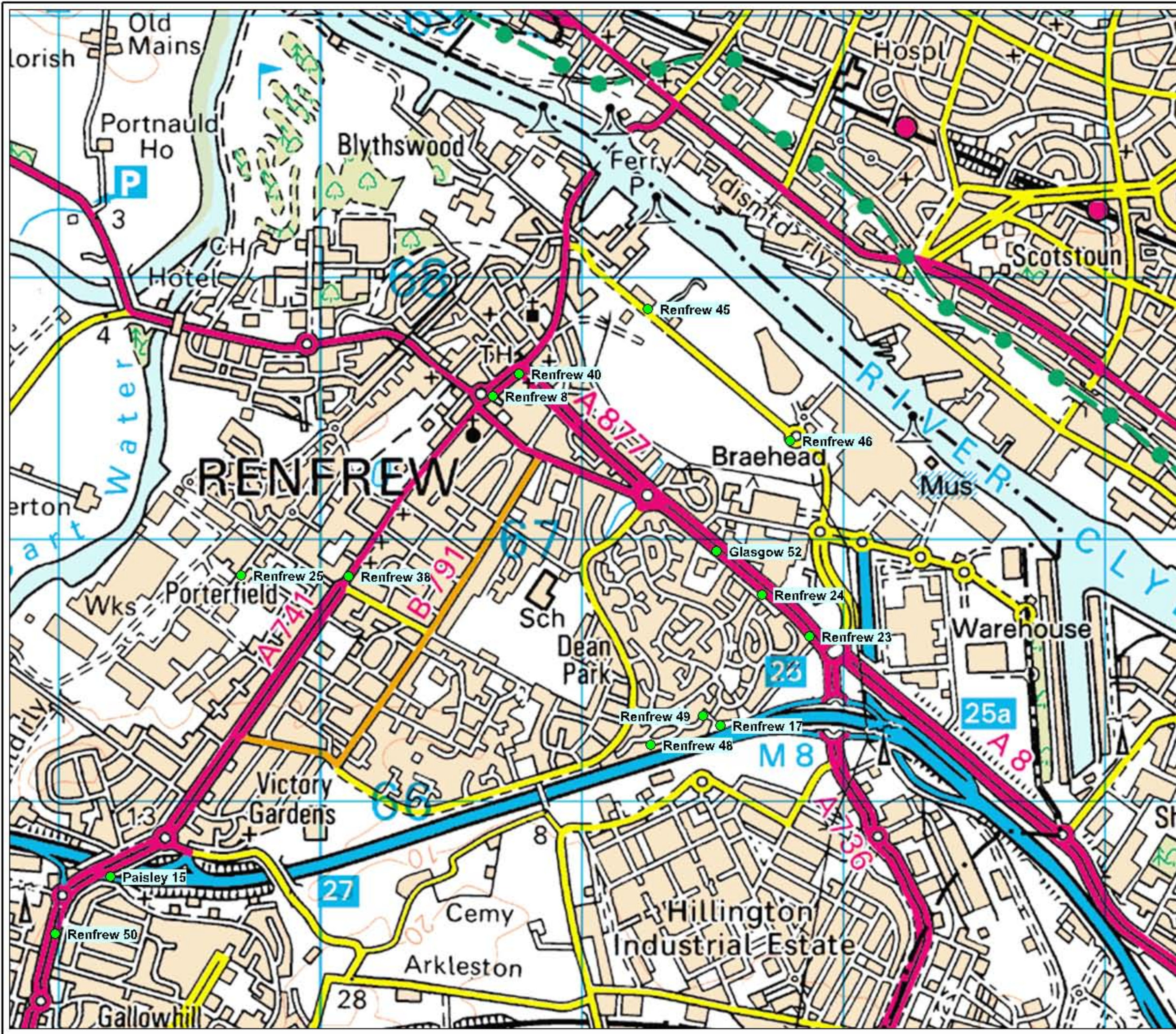
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Council Boundary

 AQMA boundary


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Diffusion tubes



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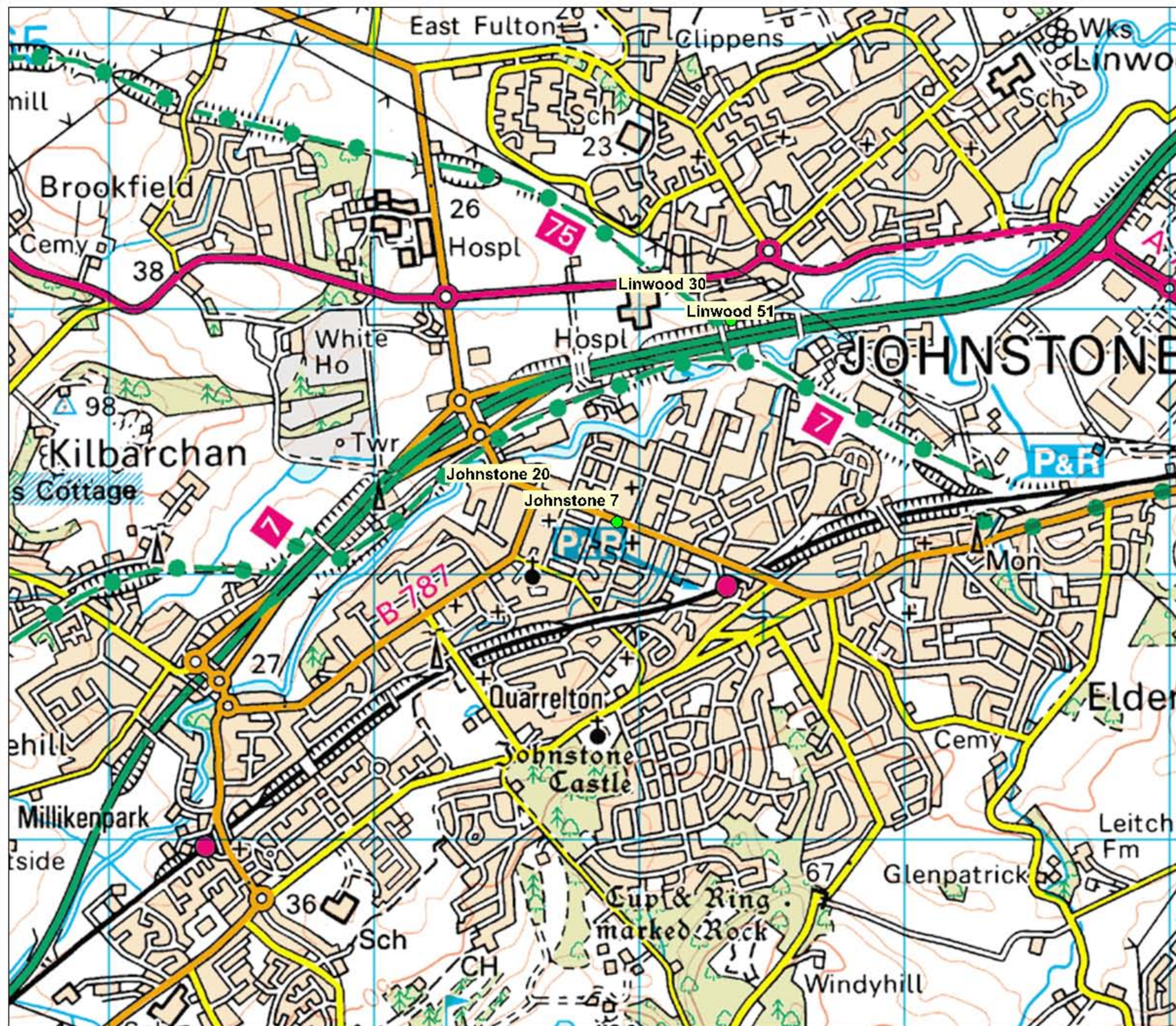
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AQMA Boundary



Diffusion tubes



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