2016 Air Quality Annual Progress Report for **ARGYLL AND BUTE COUNCIL**

In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management

June 2016

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Date	**6 July 2016**
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Executive Summary: Air Quality in Our Area

Air Quality in Argyll and Bute

Argyll and Bute is an area with over 75% classified as remote[1] and a population which is widely distributed. There are no towns with a population exceeding 16000 and industries tend to be geographically diverse and related to the natural assets of the area. Forestry and agriculture are prevalent inland, whilst in coastal areas there are a number of distilleries, fish farms and fishing businesses. Large scale industry is absent and this is reflected by the number and nature of industries regulated by SEPA under the Pollution Prevention and Control regime. Tourism makes a significant and important contribution to the Argyll and Bute economy and is responsible for higher summer-time traffic flows in some areas.

Modelling of sources of nitrogen dioxide and particulates is presented in Figures 8 and 9 and shows that background concentrations are very low. In the absence of industry hotspots the major potential source of pollution that may impact on human health is that produced by motor vehicles. However, traffic flows tend to reflect the low and dispersed population but a network of nitrogen dioxide diffusion tubes is maintained to monitor those areas deemed to be subject to higher concentrations. Reference to the measured annual trends in Figures 1 to 4 shows that nitrogen dioxide levels are well below the annual objective and trends are either level or falling at all sites where tubes have been established long enough for relationships to be plotted.

The shift to install small to medium-sized biomass boilers at schools and commercial premises has continued. Technical details supporting planning applications are subject to scrutiny and evaluation to ensure that air quality objectives are not likely to be compromised.

Actions to Improve Air Quality

Air quality in Argyll and Bute is considered to be generally very good and complies with all the air quality objectives listed in Table 1. The Council has not identified any areas where air quality objectives may be under threat and where consequent action is required to improve air quality

Local Priorities and Challenges

Although no specific priorities or challenges have been identified Argyll and Bute Council will continue to monitor nitrogen dioxide at the points described in this report. Work to assess air quality impacts of proposed developments will be undertaken and where necessary mitigation measures will be required to protect air quality.

How to Get Involved

Copies of reports relating to air quality including monitoring results may be found at https://www.argyll-bute.gov.uk/planning-and-environment/air-pollution-and-local-air-quality

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1. Local Air Quality Management

This report provides an overview of air quality in Argyll and Bute during 2016. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Progress Report (APR) is summarises the work being undertaken by Argyll and Bute Council to improve air quality and any progress that has been made.

Table 1.1 – Summary of Air Quality Objectives in Scotland

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Nitrogen dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µg/m^3	Annual mean	31.12.2005
Particulate Matter (PM_{10})	50 µg/m^3, not to be exceeded more than 7 times a year	24-hour mean	31.12.2010
	18 µg/m^3	Annual mean	31.12.2010
Particulate Matter ($PM_{2.5}$)	10 µg/m^3	Annual mean	31.12.2020
Sulphur dioxide (SO_2)	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005
Benzene	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

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Lead	0.25 µg/m^3	Annual Mean	31.12.2008

2. Actions to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12 months, setting out measures it intends to put in place in pursuit of the objectives.

Argyll and Bute Council currently does not have any AQMAs and this current and the series of past annual assessments suggests that it will be not be necessary to declare any AQMAs in the future.

3. Air Quality Monitoring Data and Comparison with Air Quality Objectives

3.1 Summary of Monitoring Undertaken

3.1.1 Non-Automatic Monitoring Sites

Argyll and Bute Council undertook non- automatic (passive) monitoring of NO_2 at 10 sites during 2015. Table A.1 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

3.2 Individual pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for annualisation and bias. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.2 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3.

For diffusion tubes, the full 2015 dataset of monthly mean values is provided in Appendix B.

The results show that for all sites annual mean concentrations of NO_2 are all well below the annual objective. Where the run of results allows a trend to be plotted it can be seen that the annual concentrations appear to be falling or remaining steady.

3.2.2 Particulate Matter (PM_{10})

Argyll and Bute Council does not monitor PM_{10}

3.2.3 Particulate Matter ($PM_{2.5}$)

Argyll and Bute Council does not monitor $PM_{2.5}$.

3.2.4 Sulphur Dioxide (SO_2)

Argyll and Bute Council does not monitor sulphur dioxide.

3.2.5 Carbon Monoxide, Lead and 1,3-Butadiene

Argyll and Bute Council does not monitor carbon monoxide, lead or 1,3 butadiene

4. New Local Developments

Since the publication of the 2015 Updating and Screening Assessment[2] there have been no new developments which would be likely to substantially affect air quality and where an air quality assessment as part of an Environmental Statement would be required.

4.1 Road Traffic Sources

Argyll and Bute Council confirms that there are no roads or features in the following list that are new or newly identified that would require further assessment:

- Narrow congested streets with residential properties close to the kerb.
- Busy streets where people may spend one hour or more close to traffic.
- Roads with a high flow of buses and/or HGVs.
- Junctions.
- New roads constructed or proposed
- Roads with significantly changed traffic flows.
- Bus or coach stations.

4.2 Other Transport Sources

Argyll and Bute Council confirms that there none of the following that are new or newly identified that would warrant further assessment:

- Airports.
- Locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m.
- Locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m.
- Ports for shipping.

4.3 Industrial Sources

Argyll and Bute Council confirms that there none of the following that are new or newly identified that would warrant further assessment:

- **Industrial installations:** new or proposed installations for which an air quality assessment has been carried out.
- **Industrial installations:** existing installations where emissions have increased substantially or new relevant exposure has been introduced.
- **Industrial installations:** new or significantly changed installations with no previous air quality assessment.
- Major fuel storage depots storing petrol.
- Petrol stations.
- Poultry farms.

4.4 Commercial and Domestic Sources

Since the 2015 USA was prepared planning consent has been granted for a number of biomass boilers to be installed. The installations are listed in Table 4.1 below.

Table 4.1 New biomass boilers >50kW

Site	Rating kW	Stack Height	Building Height	Effective Stack Height	Stack Diameter
Ardlussa, Jura	200	5.5	4.0	2.5	0.25
Ardrishaig School	80	8.0	6.0	3.3	0.21
Argyll Hotel Inveraray	298	5.4	4.0	2.4	0.25
Glencruitten Hostel	201	11.0	9.0	3.3	0.26
Inveraray School	201	6.0	4.5	2.5	0.24
Kilcreggan School	130	6.5	5.5	1.7	0.24
Lochgilphead Joint Campus	800	10.0	8.0	3.3	0.5
Mount Stuart House	550	7.0	5.9	1.8	0.5
Park School	201	8.0	6.5	2.5	0.26
Portsonachan Hotel	205	5.8	4.8	1.7	0.25
Rosneath School	80	6.6	6.0	1.0	0.21
Tarbert Academy	300	11.0	10.0	1.7	0.31
Tobermory School	250	5.0	3.4	3.3	0.31
Tiree School	250	10.0	9.0	1.7	0.31

The boilers listed in table 4.1 were assessed in accordance with the guidance contained in Box 5.8 LAQM.TG(09)[4]. Emission rates were estimated based on the maximum thermal capacity of the boiler and the emission factors provided for PM_{10} and NO_2.Where emission factors were not made available then the factors prescribed for acceptance for RHI payments i.e. PM_{10} - 30g/GJ and NO_2 - 150 g/GJ. Background concentrations for 2016 were obtained from the Scottish Air Quality Archive[5]. A summary of the results from each site are presented in Tables 4.2, 4.3 and 4.4. It should be noted that the PM_{10} screening assessment has been made against the more stringent annual mean objective.

Table 4.2. Biomass boilers – assessment against annual mean PM_{10} objective

Site	Adjusted emission rate g/s	Threshold emission rate g/s	Progress to detailed assessment?
Ardlussa, Jura	0.0003	0.0029	No
Ardrishaig School	0.0003	0.0037	No
Argyll Hotel Inveraray	0.0009	0.0029	No
Glencruitten Hostel	0.0003	0.0037	No

Inveraray School	0.0003	0.0030	No
Kilcreggan School	0.0002	0.0022	No
Lochgilphead Joint Campus	0.0017	0.0037	No
Mount Stuart House	0.0022	0.0036	No
Park School	0.0002	0.0030	No
Portsonachan Hotel	0.0004	0.0022	No
Rosneath School	0.0003	0.0013	No
Tarbert Academy	0.0004	0.0022	No
Tobermory School	0.0003	0.0037	No
Tiree School	0.0003	0.0022	No

Table 4.3. Biomass boilers – assessment against annual mean NO_2 objective

Site	Adjusted emission rate g/s	Threshold emission rate g/s	Progress to detailed assessment?
Ardlussa, Jura	0.0008	0.0029	No
Ardrishaig School	0.0001	0.0037	No
Argyll Hotel Inveraray	0.0007	0.0029	No
Glencruitten Hostel	0.0004	0.0037	No
Inveraray School	0.0003	0.0030	No
Kilcreggan School	0.0002	0.0022	No
Lochgilphead Joint Campus	0.0032	0.0037	No
Mount Stuart House	0.0022	0.0036	No
Park School	0.0003	0.0030	No
Portsonachan Hotel	0.0004	0.0022	No
Rosneath School	0.0001	0.0013	No
Tarbert Academy	0.0007	0.0022	No
Tobermory School	0.0005	0.0037	No
Tiree School	0.0005	0.0022	No

Table 4.4. Biomass boilers – assessment against 24 hour NO_2 objective

Site	Adjusted emission rate g/s	Threshold emission rate g/s	Progress to detailed assessment?
Ardlussa, Jura	0.0061	0.0095	No
Ardrishaig School	0.0010	0.0325	No
Argyll Hotel Inveraray	0.0051	0.0266	No
Glencruitten Hostel	0.0027	0.0325	No
Inveraray School	0.0026	0.0273	No
Kilcreggan School	0.0017	0.0220	No
Lochgilphead Joint Campus	0.0242	0.0325	No

Mount Stuart House	0.0170	0.0402	No
Park School	0.0026	0.0273	No
Portsonachan Hotel	0.0030	0.0220	No
Rosneath School	0.0010	0.0176	No
Tarbert Academy	0.0052	0.0220	No
Tobermory School	0.0042	0.0325	No
Tiree School	0.0042	0.0220	No

Using the guidance provided in LAQM.TG16[6] it has been concluded that there are no areas considered to be at risk of objectives being exceeded due to cumulative impacts of multiple biomass/domestic combustion installations.

4.5 New Developments with Fugitive or Uncontrolled Sources

There are no new potential major sources of fugitive or uncontrolled emissions of particulate matter. There are a number of new un-metalled access roads associated with forestry extraction or windfarm construction that are of a temporary nature and are hard surfaced with graded and rolled aggregate. These roads are invariably remote, inherently damp and do not threaten to cause breaches of PM_{10} or $PM_{2.5}$ objectives. The Council does not propose to carry out individual assessments of these sources unless particular circumstances indicate that it would be appropriate.

5. Planning Applications

Planning consent was granted for a 19MW combined heat and power (CHP) plant in Lochgilphead in May 2016. Planning consent was granted for a CHP plant on the same site in 2008, but the boundary of the site has been amended slightly, prompting a new application. The design of plant has also changed from conventional steam boiler/turbine to synthetic gas production which is used to fuel a series of gas engines driving separate generator sets. The design of equipment has not been finalised until the conclusion of a tender process. Conditions have been added to the consent which requires the submission of an air quality assessment when the final plant design is known. An update will be provided where necessary in future reports.

6. Conclusions and Proposed Actions

6.1 Conclusions from New Monitoring Data

The graphs in Figures 1 to 4 continue to show a steady or falling trend in those areas monitored by nitrogen dioxide diffusion tubes and all sites are well below the annual mean objective. There is therefore no requirement to undertake a Detailed Assessment.

6.2 Conclusions relating to New Local Developments

The majority of new local developments with a potential to impact on air quality have been related to the installation of biomass boilers. Each application has been subject to the recognised screening assessment procedure and none have been found to warrant a more detailed appraisal. A CHP plant in Lochgilphead was granted planning consent which requires the assessment of air quality impact when the plant design is finalised.

6.3 Proposed Actions

Argyll and Bute Council will continue to monitor the concentrations of nitrogen dioxide at those sites contained in this report. Results of monitoring and other air quality assessment work will be presented in the next Annual Progress Report due in 2017.

Appendix A: Monitoring Results

Table A.1 – Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?
N1	George Street 1, Oban	Roadside	185921	729942	NO_2	N	5	2	No
N2	George Street 2, Oban	Roadside	185870	730319	NO_2	N	0	9	No
N3	George Street 3, Oban	Roadside	185880	730250	NO_2	N	0	9	No
N4	Argyll Street, Dunoon	Roadside	217324	676984	NO_2	N	6	3	No
N5	Main St, Campbeltown	Roadside	171918	620330	NO_2	N	0	3	No
N6	Colchester Sq, Lochgilphead	Roadside	186222	687940	NO_2	N	0	2	No
N7	Inverneil	Rural Background	186048	729293	NO_2	N	3	N/A	No
N8	East Princes St, Helensburgh	Roadside	229919	682287	NO_2	N	4	2	No

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?
N9	Main Road, Cardross	Roadside	234350	677771	NO_2	N	6	2	No
N10	Sinclair Street Helensburgh	Roadside	231925	704478	NO_2	N	3	2	No

(1) 0 if the monitoring site is at a location of exposure (e.g. installed on/adjacent to the façade of a residential property).

(2) N/A if not applicable.

Table A.2 – Annual Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
					2011	2012	2013	2014	2015
N1	Roadside	Diffusion Tube	100	100	23.9	22.9	22.7	20.7	20.8
N2	Roadside	Diffusion Tube	100	100	24.1	24.1	26.9	26.2	23.0
N3	Roadside	Diffusion Tube	100	100	21.2	22.2	26.3	22.4	23.3
N4	Roadside	Diffusion Tube	100	100	15.0	15.0	18.3	14.6	14.1
N5	Roadside	Diffusion Tube	100	100	17.8	17.5	16.5	14.5	16.0
N6	Roadside	Diffusion Tube	100	100	10.1	23.4	19.5	14.7	18.1
N7	Rural B'ground	Diffusion Tube	100	100	2.5	2.6	2.9	1.8	1.9
N8	Roadside	Diffusion Tube	100	100	15.6	13.3	14.3	12.4	12.0
N9	Roadside	Diffusion Tube	100	100	14.2	13.8	16.0	13.1	13.2
N10	Roadside	Diffusion Tube	100	92	19.2	19.4	19.7	14.9	16.9

Notes: Exceedences of the NO_2 annual mean objective of 40µg/m3 are shown in **bold**.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedence of the NO_2 1-hour mean objective are shown in **bold and underlined.**

(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per LAQM.TG(16) if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure 1. Graph of Annual NO_2 trends – Oban, Lorn and Isles Area

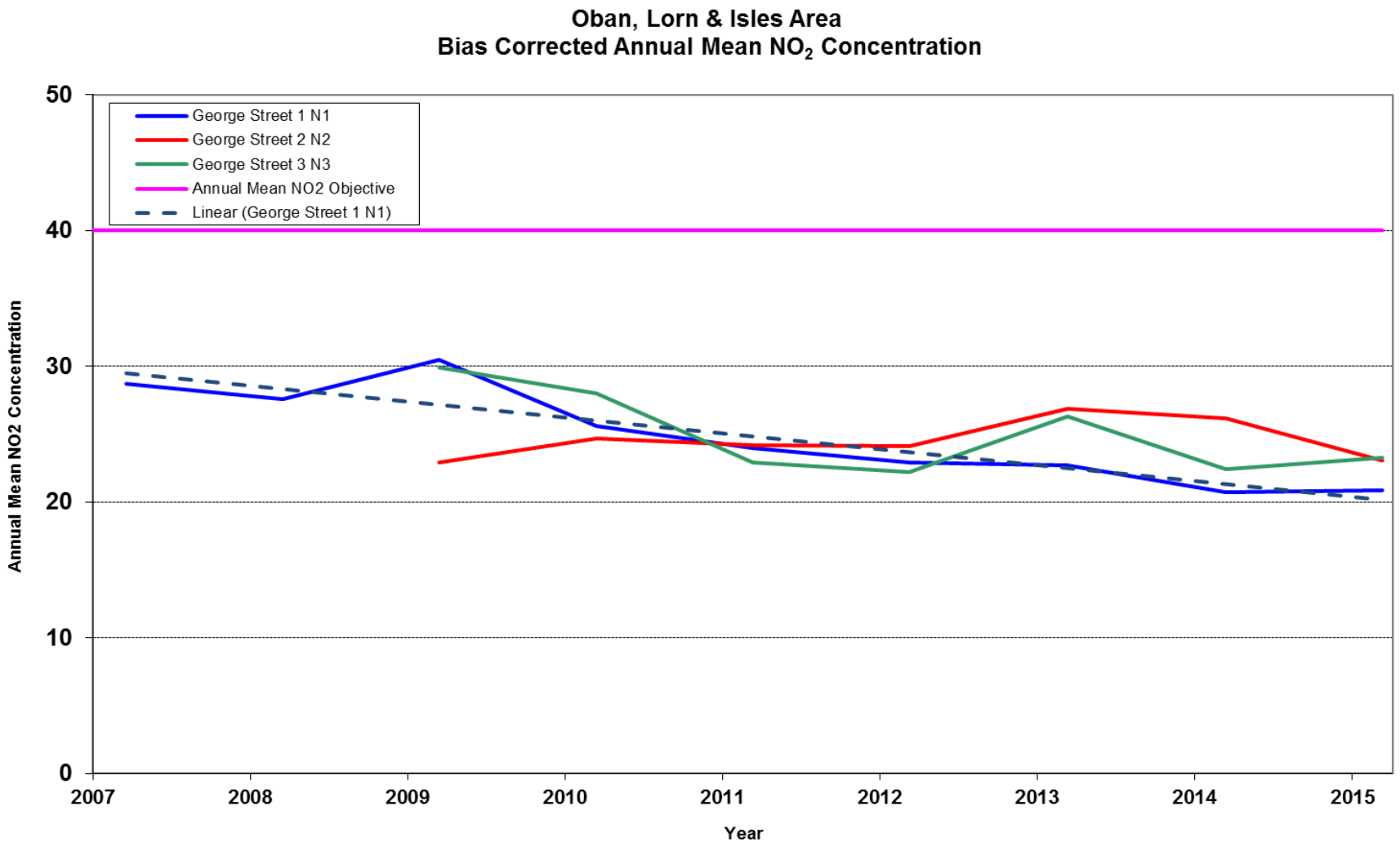


Figure 2. Graph of Annual NO_2 trends – Bute and Cowal Area

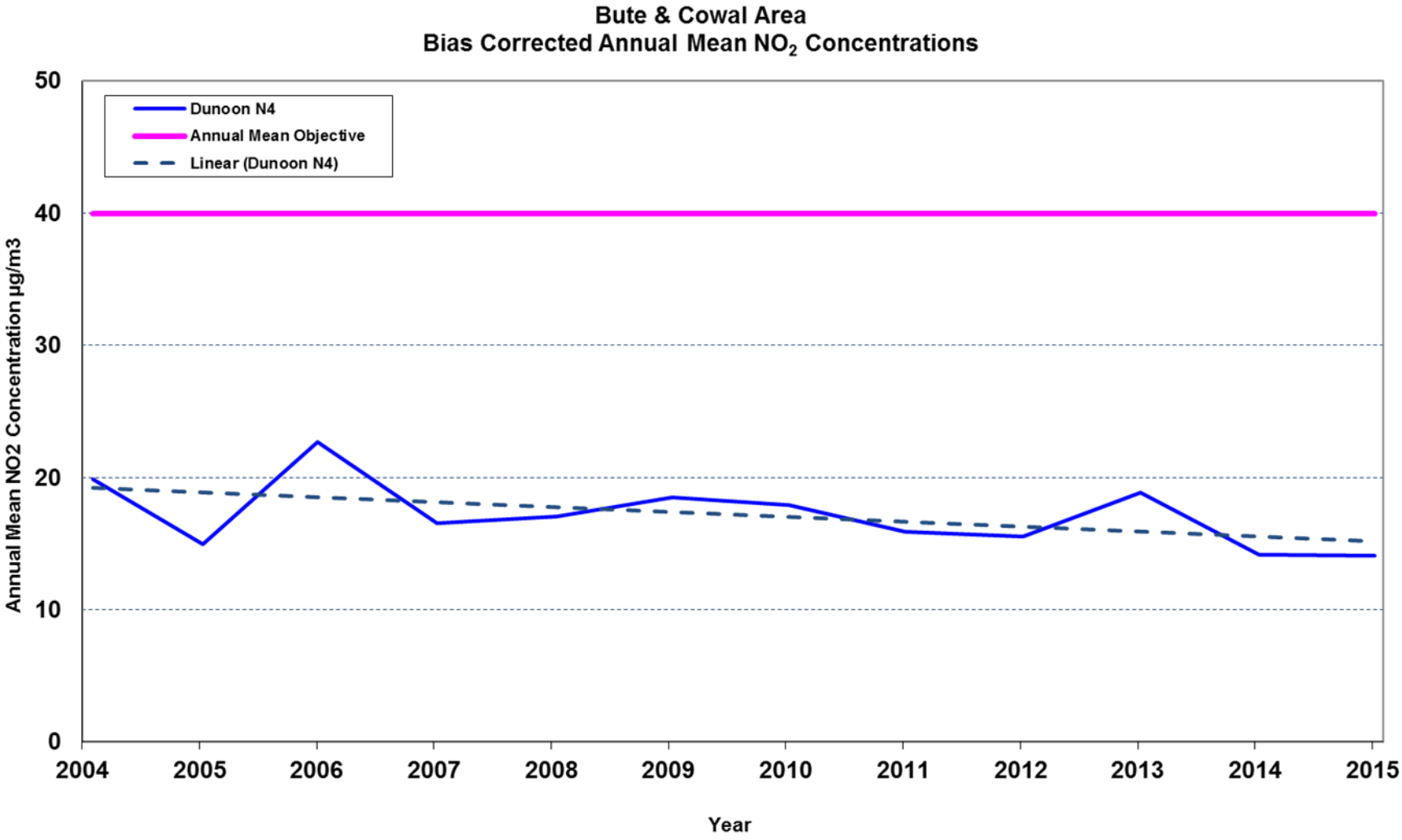


Figure 3. Graph of Annual NO_2 trends – Mid Argyll and Islay Area

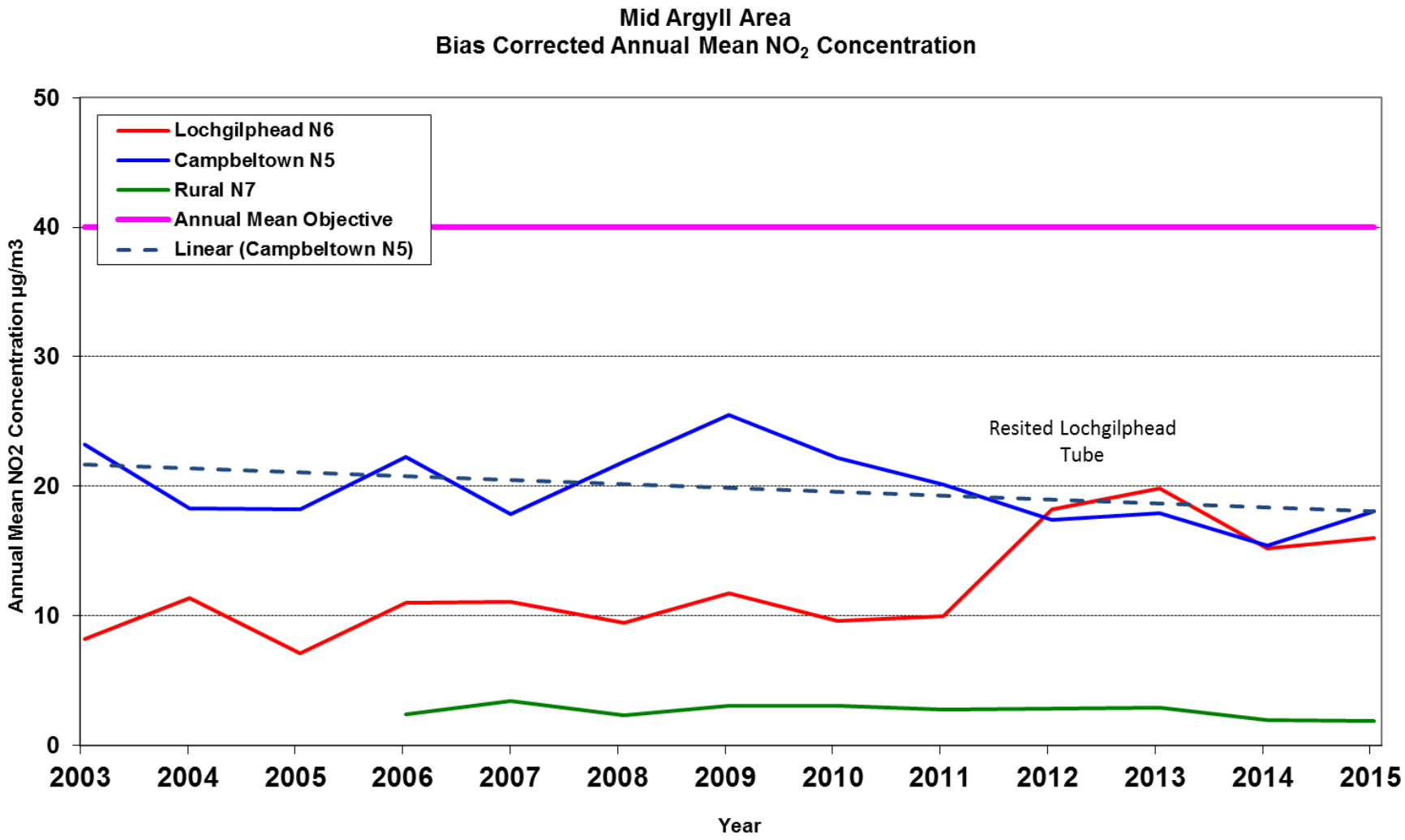
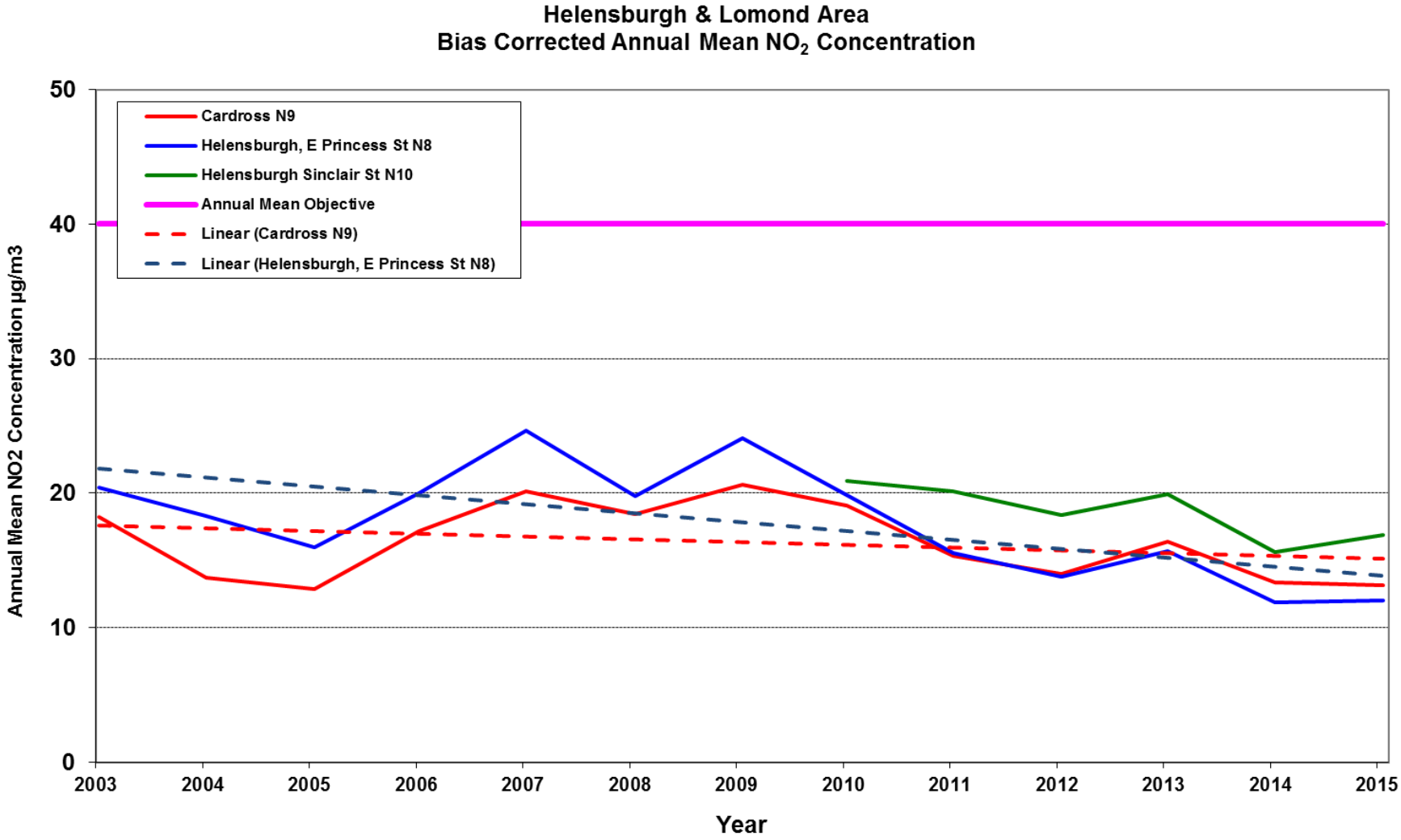


Figure 4 Graph of Annual NO_2 trends – Helensburgh and Lomond Area



Appendix B: Full Monthly Diffusion Tube Results for 2015

Table B.1 – NO_2 Monthly Diffusion Tube Results for 2015

Site ID	NO_2 Mean Concentrations (µg/m^3)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (1)
N1	28.1	25.6	14.1	15.9	24.3	18.8	19.8	20.2	23.3	26.6	14.4	24.1	21.3	20.8
N2	21.1	28.9	12.0	19.4	27.9	26.1	21.2	23.7	27.3	36.7	20.1	17.8	23.5	23.0
N3	25.2	30.5	14.4	14.6	23.6	25.2	23.4	22.4	26.7	36.9	21.7	20.3	23.7	23.3
N4	13.8	18.7	9.1	11.2	13.0	14.6	13.4	13.6	17.7	25.4	9.9	12.5	14.4	14.1
N5	14.5	18.1	8.6	9.0	15.0	19.8	15.3	16.6	21.8	28.8	37.1	17.1	18.5	18.1
N6	18.6	19.9	8.3	8.9	14.6	19.5	16.2	16.6	22.1	22.5	16.8	11.8	16.3	16.0
N7	2.2	2.1	1.6	2.7	1.7	2.3	1.6	1.7	1.9	2.2	1.4	1.9	1.9	1.9
N8	18.6	18.8	7.2	5.4	10.3	10.8	8.8	8.5	15.0	21.4	10.4	12.0	12.3	12.0
N9	15.0	19.9	6.8	2.7	11.3	13.3	13.7	15.2	14.0	23.6	17.5	8.4	13.5	13.2
N10	20.2	23.2	11.2	9.1	15.7	17.7	13.7		22.3	25.0	17.2	14.3	17.2	16.9

(1) See Appendix C for details on bias adjustment

Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC

Diffusion Tube Bias Adjustment Factors

Nitrogen dioxide diffusion tubes are supplied and analysed by Glasgow Scientific Services. The laboratory scored 100% in the WASP assessment covering the period of the reported sampling results. The preparation method used is 20% TEA in water and the 2015 bias adjustment factor of 0.98 was obtained from Spreadsheet Version 03_16[3]. No local co-location studies were available to produce bias adjustment factors.

QA/QC of diffusion tube monitoring

The NO_2 diffusion tubes are supplied and analysed by Glasgow Scientific Services and prepared by using 20% TEA in water. The duration of exposure is normally the 4/5 week period suggested by the calendar provided by Defra. Glasgow Scientific Services have adopted the procedures for preparation and analysis contained in the document "Diffusion Tubes for Ambient NO_2 Monitoring:- Practical Guidance." Section 3 of this document also provides the basis for the operation of the Council's diffusion tube network.

A bias adjustment factor was applied to the annual mean NO_2 concentrations for 2015. The factor of 0.98 was obtained from Spreadsheet Version Number 03_16 downloaded from http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html

Appendix D: Maps

Figure 5 Map of Population Distribution & A Roads

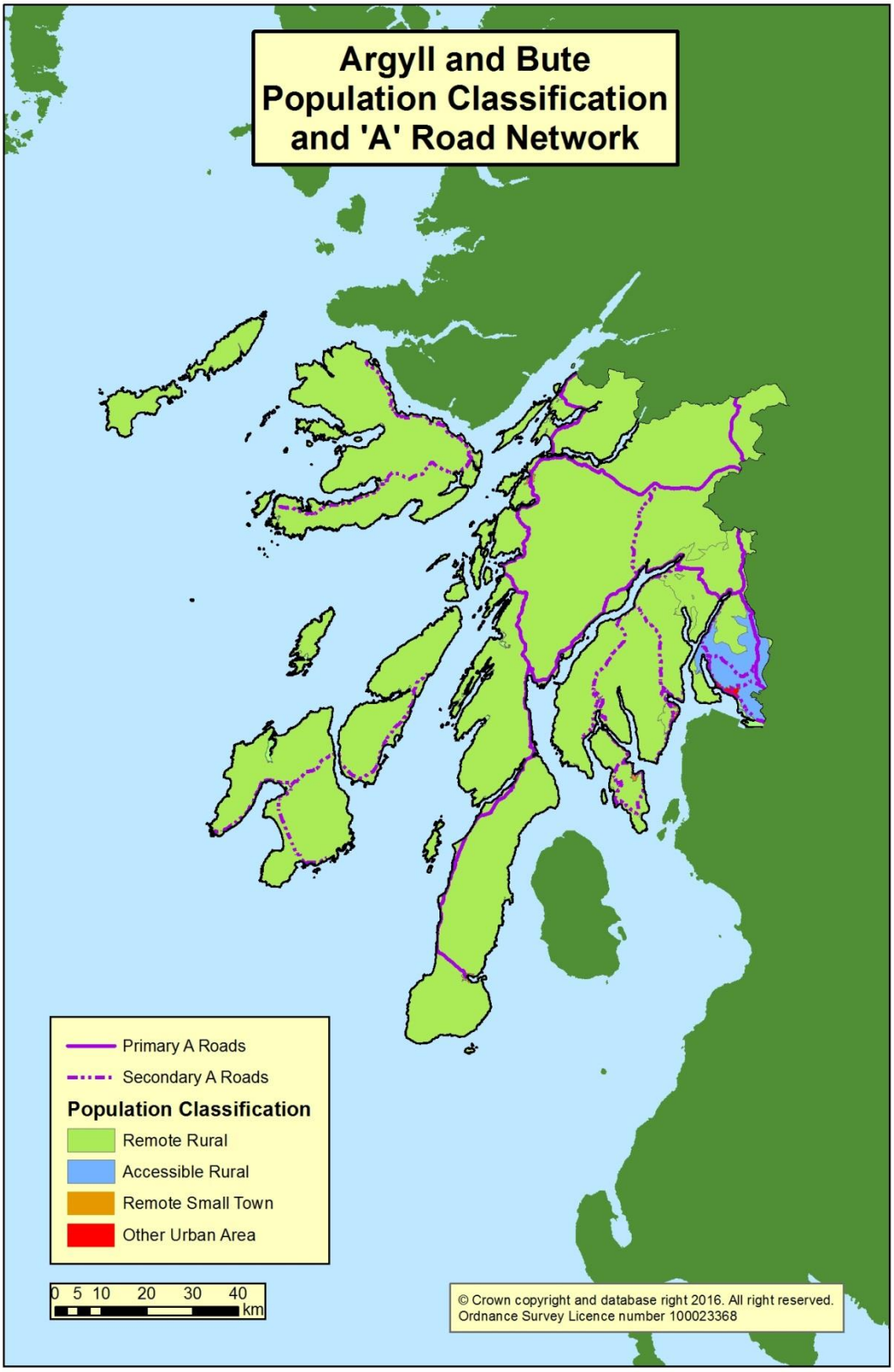


Figure 6 Map of Major Settlements

Figure 7 Map of Transport Routes

Figure 8 Map of Modelled Background NO_2 Annual Mean Concentrations

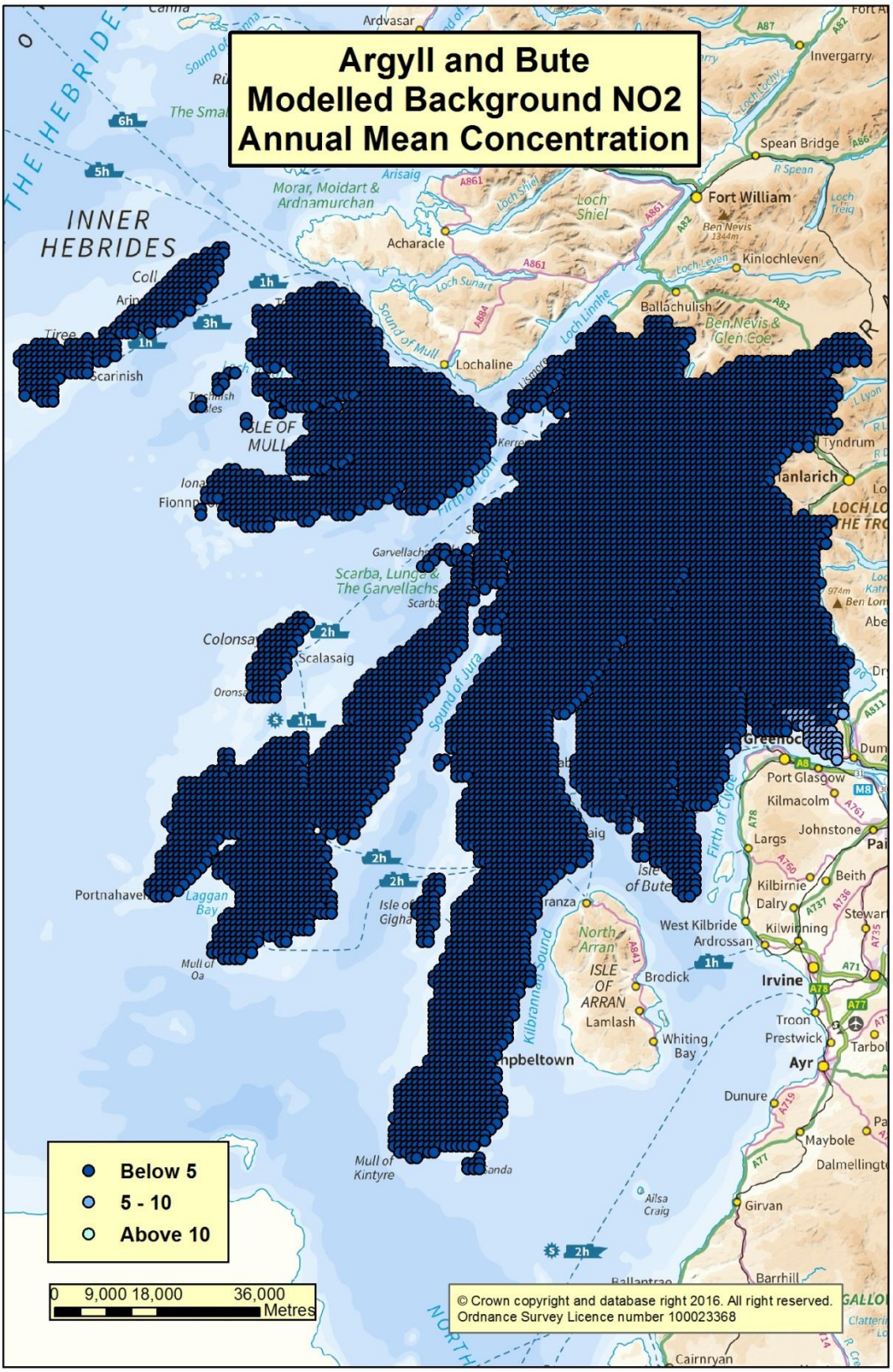


Figure 9 Map of Modelled Background PM10 Annual Mean Concentrations

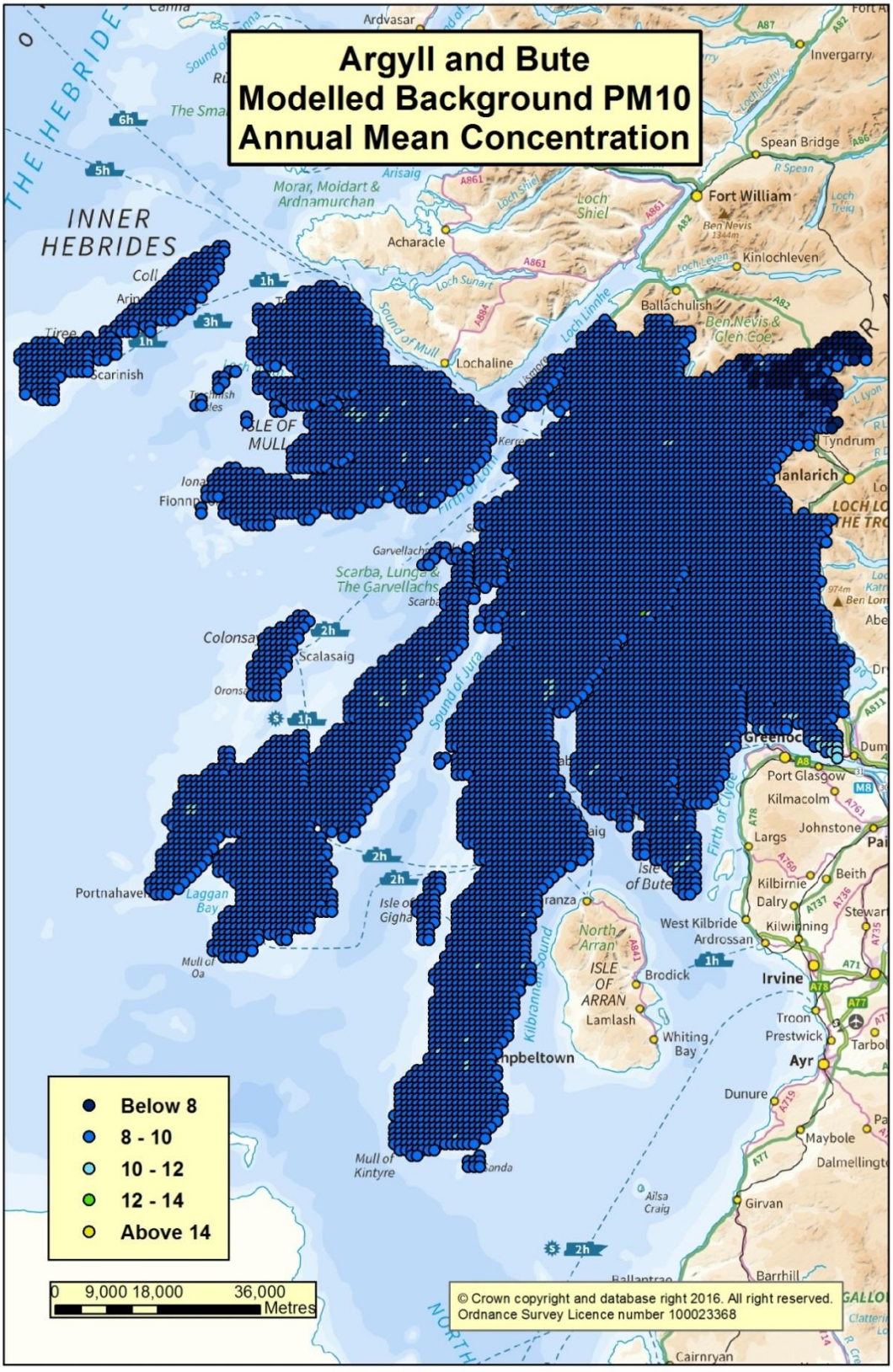


Figure 10 Map of Monitoring Locations

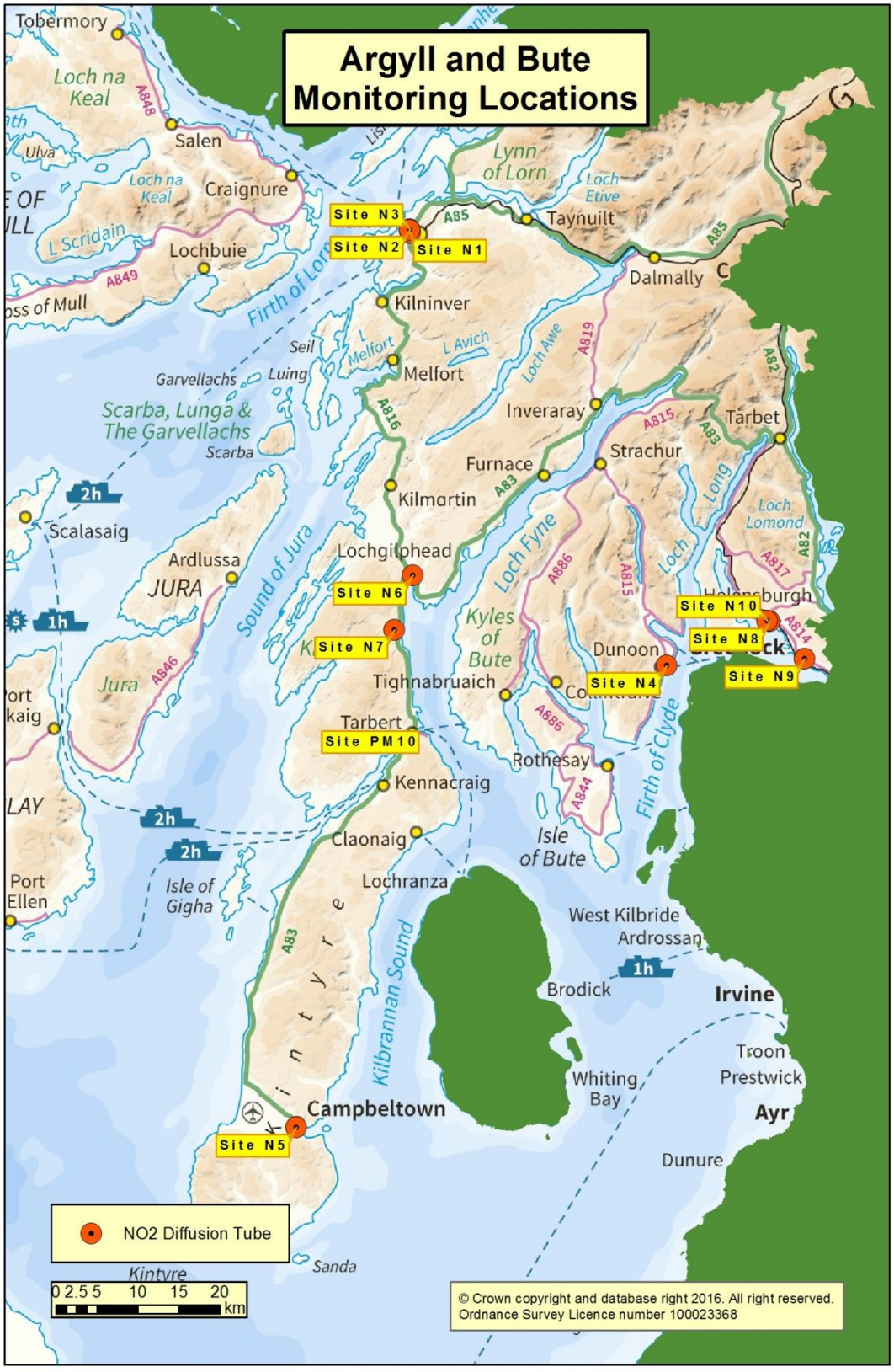


Figure 11 Map of Diffusion Tube Sites, Helensburgh

Figure 12 Map of Diffusion Tube Sites, Oban

Figure 13 Map of Diffusion Tube Sites, Helensburgh

Glossary of Terms

Please add a description of any abbreviation included in the ASR – An example is provided below.

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the LA intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
APR	Air quality Annual Progress Report
AURN	Automatic Urban and Rural Network (UK air quality monitoring network)
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide

References

(1) http://www.scotland.gov.uk/Topics/Statistics/About/Methodology/UrbanRuralClassification

(2) Argyll and Bute Council, Local Air Quality Management Updating Screening and Assessment, April 2015

(3) http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html

(4) Defra in partnership with the devolved administrations, Technical Guidance LAQM.TG(09), February 2009

(5) http://www.scottishairquality.co.uk/data/mapping?view=data

(6) Defra in partnership with the devolved administrations, Technical Guidance LAQM.TG(16), April 2016