# Annual Progress Report (APR)


2019 Air Quality Annual Progress Report (APR) for
Renfrewshire Council

In fulfilment of Part IV of the
Environment Act 1995

Local Air Quality Management

June 2019

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# Executive Summary: Air Quality in Our Area

## Air Quality in Renfrewshire Council

There are currently three Air Quality Management Areas (AQMAs) within Renfrewshire; these are located within Paisley Town Centre, Johnstone High Street and Renfrew Town Centre. The AQMAs have been declared due to exceedances of the air quality objective (AQO) levels for nitrogen dioxide ($NO_2$) and particulate matter ($PM_{10}$, Paisley only). Compared to five years ago, the monitored concentrations of both $NO_2$ and $PM_{10}$ have gradually fallen across Renfrewshire.

Concentrations of the annual mean and short term objectives for $NO_2$, $PM_{10}$ and $PM_{2.5}$ recorded at all automatic monitoring sites during 2018 were below AQO levels. In May 2018, $PM_{10}$ monitoring at the automatic monitoring site on St. James Street, Paisley was stopped, and the monitoring site analysers were changed to measure $PM_{2.5}$ concentrations.

Of the sixty-two diffusion tube monitoring sites across Renfrewshire, there was one exceedance of the $NO_2$ annual mean AQO recorded in 2018. The exceedance of 40.8µg/$m^3$ (following bias adjustment and distance correction) was recorded at a site within the Renfrew Town Centre AQMA.

Within the Paisley Town Centre AQMA there were no exceedances of any AQOs where relevant pollutant monitoring is completed ($NO_2$ and $PM_{10}$). The AQMA has been declared for annual mean and short term $NO_2$ exceedances, and for annual mean $PM_{10}$ exceedances. There have now been four consecutive years where compliance of the relevant AQOs has been achieved. A further years' worth of monitoring data will be collated before consideration will be given to the possible amendment or revocation of the Paisley Town Centre AQMA.

Upon review of the monitoring data from 2018 it was concluded that there is no requirement to proceed to additional Detailed Assessments for any area of the Council.

## Actions to Improve Air Quality

An updated Renfrewshire Air Quality Action Plan (AQAP) was published in March 2019 which has been approved by the Council Board and statutory consultees including the Scottish Government and Scottish Environment Protection Agency

(SEPA). This new plan incorporates all three current AQMAs and replaces the 2014 Paisley Town Centre AQAP. The plan sets out measures the Council will take forward to help improve air quality throughout Renfrewshire. Some measures are specific to a particular AQMA and some are generic measures aimed at delivering Renfrewshire wide air quality improvements.

Sixteen measures are documented within the revised AQAP and they address the following topic areas:

- Freight and delivery management;
- Policy guidance and development control;
- Promoting low emission transport;
- Promoting travel alternatives;
- Public information;
- Transport planning and infrastructure;
- Traffic management;
- Alternatives to private vehicle use; and
- Vehicle fleet efficiency.

**Local Priorities and Challenges**

The proposed actions and LAQM requirements for Renfrewshire Council are as follows:

- Progression of the two City Deals projects which will bring significant new road infrastructure including the Renfrew North Development Road (RNDR). This road will reduce traffic volume through Renfrew Town Centre resulting in improved air quality levels, in particular at the area of current exceedance of the $NO_2$ annual mean AQO on Inchinnan Road;
- Continue to upgrade the Councils fleet of vehicles and complete the implementation of phase 2 of the Pool Car Scheme;
- Publish a Corporate Travel Plan;

- Raise awareness of air pollution at a local level through vehicle anti-idling campaigns and undertake a roadshow event at Renfrewshire House on 2019 Clean Air Day which promotes sustainable travel planning;
- Assess the 2019 monitoring data within the Paisley Town Centre AQMA when available with consideration to revoking/amending the AQMA based upon the results;
- Continue to review all air quality assessments that are submitted as part of planning applications in relation to possible impacts upon local air quality;
- Continue to monitor $NO_2$, $PM_{10}$ and $PM_{2.5}$ at all relevant locations throughout Renfrewshire; and
- Submit the 2020 Annual Progress Report.

**How to Get Involved**

The general public can find out more about air quality and how to get involved on the Renfrewshire Council web site at http://www.renfrewshire.gov.uk/airquality, current and historic pollution levels and up to date forecasts are available at http://www.scottishairquality.co.uk/, and further details on the 2019 Clean Air Day are available at https://www.cleanairday.org.uk/clean-air-scotland.

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# 1. Local Air Quality Management

This report provides an overview of air quality in the Renfrewshire Council administrative area during 2018. 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 its area, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance of an air quality objective 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) summarises the work being undertaken by Renfrewshire Council to improve air quality and any progress that has been made.

The air quality objectives (AQOs) applicable in Scotland are summarised in Table 1.1.

**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 |

| Pollutant | Air Quality Objective | | Date to be achieved by |
|---|---|---|---|
| | Concentration | Measured as | |
| **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** | 0.25 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 a measured exceedance or identified likely exceedance of an AQO. 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.

Details of the AQMAs declared by Renfrewshire Council can be found in Table 2.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at:

http://www.scottishairquality.co.uk/laqm/aqma?id=382

There are currently no changes proposed to the existing AQMAs. There has now been a 4 year period (2015, 2016, 2017 and 2018), where there has been no measured exceedances of the $NO_2$ and $PM_{10}$ AQOs within the Paisley AQMA. A further years' worth of monitoring data will be collated before consideration will be given to the possible amendment or revocation of the Paisley Town Centre AQMA.

**Table 2.1 – Declared Air Quality Management Areas**

| AQMA Name | Pollutants and Air Quality Objectives | City / Town | Description | Action Plan |
|---|---|---|---|---|
| Paisley Town Centre (PTC) | • $NO_2$ annual mean<br>• $NO_2$ 1-hour mean<br>• $PM_{10}$ annual mean | Paisley | An area encompassing a large part of central Paisley and extending a short distance along some radial roads | Renfrewshire Council Air Quality Action Plan 2019 to be implemented in 2019 |
| Johnstone High Street | • $NO_2$ annual mean | Johnstone | From the junction of High Street and Peockland Place; thence along High Street to the junction of Barrochan Road and Napier Street. | Renfrewshire Council Air Quality Action Plan 2019 to be implemented in 2019 |

| AQMA Name | Pollutants and Air Quality Objectives | City / Town | Description | Action Plan |
|---|---|---|---|---|
| Renfrew Town Centre | • $NO_2$ annual mean<br>• $NO_2$ 1-hour mean | Renfrew | From the junction of Paisley Road, Inchinnan Road, Hairst Street and Glebe Street; thence along Glebe Street to property number 4 Glebe St; thence along Paisley Road to the junction of Donaldson Drive; thence along Inchinnan Road to the junction of Longcroft Drive; thence along Hairst Street to the junction with Canal Street and High Street; thence along Canal St to the junction with Ferry Road. | Renfrewshire Council Air Quality Action Plan 2019 to be implemented in 2019 |

## 2.2 Progress and Impact of Measures to address Air Quality in Renfrewshire Council

Renfrewshire Council has taken forward a number of measures during the current reporting year of 2018 in pursuit of improving local air quality. The 2019 Renfrewshire AQAP incorporates the three existing AQMAs and supersedes the previous 2014 Paisley Town Centre AQAP. Within the 2019 Renfrewshire AQAP, 16 measures have been documented to help improve air quality across Renfrewshire. Priorities include tackling emissions from congestion, promoting low emission transport, and encouraging sustainable travel alternatives.

The proposed action measures address the following topic areas:

- Freight and delivery management;
- Policy guidance and development control;

- Promoting low emission transport;
- Promoting travel alternatives;
- Public information;
- Transport planning and infrastructure;
- Traffic management;
- Alternatives to private vehicle use; and
- Vehicle fleet efficiency.

The measures that are documented within the 2019 Renfrewshire AQAP are presented in Table 2.2 with additional information on some of the measures provided after the table.

## Table 2.2 – Progress on Measures to Improve Air Quality

| Measure No. | Measure | Category | Lead Authority | Planning Phase | Implementation Phase | Key Performance Indicator | Relevant AQMA & Target Pollution Reduction | Progress to Date | Estimated Completion Date & Costs | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | **Glasgow City Region City Deal Projects**<br><br>- Clyde Waterfront & Renfrew Riverside Project (CWRR)<br><br>- Glasgow Airport Investment Area Project (GAIA) | Transport Planning and Infrastructure<br><br>Traffic Management<br><br>Promoting Travel Alternatives | Scottish Government & Local Authorities (LAs) across the region.<br><br>The decision-making body is the Glasgow City Region Cabinet.<br><br>The Renfrewshire projects are led within the Council by Communities, Housing and Planning Services City Deals Section. | March 2017 – proposal of Application Notices submitted.<br><br>April to May 2017 – consultation with Elected Members/ Community Councils/ public.<br><br>June 2017 - submission of planning applications (GAIA 'Core' 17/0485/PP, GAIA 'Cycleway' 17/0487/PP & CWRR 17/0486/PP). | **GAIA**<br>Nov 2017 – planning consent granted<br><br>June 2019 – start of construction.<br><br>Dec 2020 – complete construction; roads & bridges open<br><br>**CWRR**<br><br>Nov 2018 – planning consent granted (by Scottish Ministers)<br><br>Jan 2020 – start of construction<br><br>Summer 2022 – complete construction; roads & bridges open | Various – reduced traffic volume through Renfrew Town Centre following construction of Renfrew North Development Road (as part of the CWRR project) and reduced congestion and journey times.<br><br>KPIs may be measured via:<br>- % change in traffic flow: annual traffic counts on key commuter routes<br>- % improvement in journey times<br>- % reduction in queue lengths | **Renfrew AQMA**<br>The AQAs conclude that pollutant concentrations at receptors due to traffic flow changes from the developments will be below AQO levels. The 2020 baseline concentrations vs 2020 with CWRR development will result in a minor to moderate beneficial impact on air quality levels (reduction of up to 3.9ugm$^3$) measured at the 3 DTs on Inchinnan Road. A reduction of 3 ugm$^3$ is expected at DT No.8 where there is a current exceedance (40.8 ugm$^3$ in 2018). Reference should be made to the AQAs for full details. | Planning permission granted for both developments.<br><br>For the GAIA, tender contracts were awarded in spring 2019 and works to commence on site summer 2019.<br><br>For the CWRR, the tender contract is expected to be published summer 2019 and contract awarded Jan 2020 with works to commence on site Jan 2020 also. | GAIA 2020<br>CWRR 2022<br><br>City Deal funding from the UK and Scottish Governments will be unlocked in 5-year funding blocks. The formal process for agreeing the release of funding will be a series of 5-yearly Gateway Reviews. If the City Deal meets agreed outputs and outcomes at each review, the full £1 billion of funding from the UK and Scottish Governments will be unlocked. | Refer to section 3.1.7 of the 2019 Renfrewshire Council AQAP for further details on this measure. |

| Measure No. | Measure | Category | Lead Authority | Planning Phase | Implementation Phase | Key Performance Indicator | Relevant AQMA & Target Pollution Reduction | Progress to Date | Estimated Completion Date & Costs | Comments |
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| **2** | **Upgrades & Improvements to the Council's Urban Traffic Control (UTC) system**<br><br>- Identification of faults within the Council's UTC SCOOT system, repair/ replacement of defective loops, validation of traffic signals & PROM updates to traffic controllers to ensure full optimisation of traffic signals in order to reduce congestion. | **Traffic Management** (UTC, congestion management) | Environment & Infrastructure - Roads Section | Jan/Feb 2017 preparation and advertising of tender.<br><br>March 2017 award of tender. | May 2017 to Nov 2017 | An effective SCOOT system may reduce traffic delay by an average of 20%. Peak time congestion is an issue within the AQMAs. If this can be reduced, then traffic would flow more freely resulting in a reduction in emissions.<br><br>Data in relation to traffic congestion pre and post SCOOT updates will be compared to identify the level of improvement achieved.<br><br>KPIs may be measured via:<br>- reduction in congestion monitored by an increase in overall speed through the junctions.<br>- % improvement in journey times<br>-improved traffic flow. | **Paisley & Johnstone AQMA**<br><br>Paisley – 9 traffic signal sites repaired and validated on the Paisley Town Centre (PTC) ring road. The PTC source apportionment analysis confirmed that congestion contributes to pollutant levels to varying degrees dependant on location within the AQMA.<br><br>Johnstone – 2 sites on High St repaired and validated. | Defective loops repaired/replaced in June 2017.<br><br>Validation of traffic signals & PROM updates completed in November 2017. | Physical works completed November 2017. Evaluation post works to be undertaken following a full year of operation for comparison against annual air quality levels. A comparison of 2017 air pollutant data with 2018 pollutant data in the locality of the traffic signal sites will be undertaken in 2019 once 2018 data is available.<br><br>Cost - £31,500 provided through Scottish Government AQAP grant funding process. | Additional information on this measure is provided in the 2019 Renfrewshire Council AQAP<br><br>Further information regarding an upgrade of the overall UTC system is provided following this table. |

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| **3** | **Council Fleet Improvements**<br><br>- Continue to improve the standard of fleet | **Promoting Low Emission Transport** (Company vehicle procurement - Prioritising uptake of low emission vehicles) | Environment & Infrastructure – Fleet Solutions and Social Transport | Ongoing. There is an annual vehicle replacement programme whereby vehicles at the end of their service life are replaced with an improved EURO standard or an electric alternative.<br><br>The Council fleet consists of approx 500 vehicles of which >70% are of EURO V or VI standard.<br><br>There are approx 80 HGV vehicles, 32 of which are EURO VI standard with the remaining 48 being of EURO V standard. The EURO V HGVs are prioritised for replacement with EURO VI vehicles. | Ongoing<br><br>In 2016/17 12 HGVs were replaced with EURO VI standard.<br><br>Further 12 EURO V HGVs replaced with EURO VI HGVs during 2017/18 (10 HGV lorries and 2 buses). | Reduces number of polluting vehicles, operational running costs of vehicles and $CO_2$ emissions across entire Council area.<br><br>Existing Council KPIs:<br>- 2017/18 twelve EURO V HGVs will be replaced with EURO VI standard vehicles<br>- amount of $CO_2$ emitted by vehicle fleet<br><br>KPIs may also be measured via:<br>-an annual review of Council vehicle fleet inventory in order to track year on year improvements which can then be reported in AQAP updates. | **All AQMAs, council wide air quality improvements.**<br><br>Reduces overall environmental impact of vehicles.<br><br>Paisley – the Council's transport depot is located within the Paisley AQMA therefore all vehicles travelling to and from the depot will go through the AQMA in addition to operating within it. The Council's HQ is also located within the Paisley AQMA. Several thousand employees work from this location. | Approximately 32 HGVs are currently EURO VI standard. | Ongoing.<br><br>The Council will continue to improve the standard of fleet and introduce greener vehicles where opportunities and funding permits.<br><br>Full replacement of HGV fleet with minimum EURO VI vehicles by 2022 at latest.<br><br>Funded via the Council's Vehicle Replacement Capital Programme. | See measure no.4 which deals specifically with electric vehicle numbers within the fleet. |

| Measure No. | Measure | Category | Lead Authority | Planning Phase | Implementation Phase | Key Performance Indicator | Relevant AQMA & Target Pollution Reduction | Progress to Date | Estimated Completion Date & Costs | Comments |
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| **4** | **Council Fleet Improvements**<br><br>- Increase numbers of electric vehicles (EVs) & associated charging infrastructure<br><br>- EV Fleet Strategy Feasibility Study | **Promoting Low Emission Transport** (Company vehicle procurement prioritising uptake of low emission vehicles & Procuring alternative refuelling infrastructure to promote low emission vehicles, EV recharging) | Environment & Infrastructure – Fleet Solutions and Social Transport | Ongoing. First Council EVs and charging points purchased and installed in 2012.<br><br>The Council currently have 41 EVs (cars/vans) in the fleet.<br><br>An EV Fleet Strategy feasibility study has been completed to determine the maximum no. of EVs that could replace current diesel fleet vehicles. There is the potential for up to 200 EV vehicles to be purchased over the following 3/4 years subject to funding. | Ongoing<br><br>The Council have worked in partnership with Transport Scotland to purchase an additional 48 EVs (30 cars & 18 vans) with delivery between June and Nov 2019 which will take the EV fleet total to 89. The cars will support the Sustainable Travel Project (see measure No.6). The 18 vans will arrive end of 2019 and will replace fossil-fuelled vans. 19 EV Charing Units (38 Charging Bays) will be installed during 2019 in publicly accessible council car parks in Paisley, Johnstone, Renfrew, Bridge of Weir and Houston. In addition, there have been 23 charging bays recently installed in Renfrewshire House to support the new EV pool cars. | Existing Council KPIs:<br>-% of the vehicle fleet which uses alternative fuels i.e. electricity (2018/19 target was 9% and we achieved 10%). Target for 2019/20 is 21%<br><br>- amount of $CO_2$ emitted by vehicle fleet. | **All AQMAs, council wide air quality improvements.**<br><br>By acting to reduce its own emissions through the uptake of low emissions technology and vehicles, the Council will hopefully encourage other vehicle users to consider greener fuel options. | Electric fleet planned to increase from 41 EVs to 89 in 2019.<br>There are currently 25 council operated charging points. This will increase to 63 in 2019.<br>The EV Fleet Strategy has been completed and the conclusions presented to the Council Board meeting in March 2019 with implementation of aspects of this expected 2019. | Ongoing.<br><br>The Council will continue to introduce EVs & charging points where opportunities and funding permits. As technology evolves the Council will extend the EV Fleet Strategy to include all vehicles including HGVs and buses.<br>Costs –<br>EV car costs variable. Funded via the Council's Replacement Vehicle Programme, Transport Scotland Switched on Fleets funding and the Scottish Gov't AQAP grant.<br>Chargers cost from £5k to £40k to install.<br>Funding mainly from Transport Scotland & Scottish Gov't AQAP Grant. | |

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| **5** | **Masternaut Connect Fleet Telemetric System**<br><br>- Upgrade of fleet tracking telemetric system fitted to all Council vehicles to optimise utilisation of fleet. The tracking system allows close monitoring of movement and operating status of all fleet vehicles. | **Freight and Delivery Management** (Route management plans/ Strategic routing strategy for HGV's)<br><br>**Vehicle Fleet Efficiency** (other) | Environment & Infrastructure – Fleet Solutions and Social Transport | Masternaut was originally installed in all council vehicles in 2009-10. This was upgraded to a newer Masternaut Connect version early 2017 which provides an easier reporting system and focuses in more detail on driver behaviour, vehicle utilisation etc.<br><br>Procurement process undertaken during 2016 and awarded at the end of 2016 following approval by Council Board. | System effective from 1st April 2017.<br><br>Dedicated member of staff employed from Autumn 2018 to work with the Masternaut system to provide regular reports and identify problem areas e.g. low mileage users, excessive idling. Mileage of EV vehicles will also be monitored to ensure EV vehicles are being used to their optimum. | Improved scheduling and routing of journeys via optimising vehicle movements and increased utilisation of fleet thus reducing the no. of vehicles in operation.<br><br>Reduction of idling is also a key area to reduce fuel and maintenance costs & to lower emissions. Masternaut is able to monitor vehicle idling times and this is a specific area that will be monitored and addressed.<br><br>KPIs may be measured via:<br>-reduction in vehicle fleet numbers due to identification of underutilisation of vehicles.<br>-reduction of idling times<br>- improvements in driver behaviour e.g. harsh braking/ acceleration. | **All AQMAs, council wide air quality improvements.**<br><br>The new Masternaut provides an easier reporting system which may allow calculations to be undertaken on emissions reductions. This will be reviewed once the system has been fully operational for a period of time. | System operational from April 2017.<br><br>Dedicated member of staff employed from Autumn 2018. | Operational and ongoing. | |

| Measure No. | Measure | Category | Lead Authority | Planning Phase | Implementation Phase | Key Performance Indicator | Relevant AQMA & Target Pollution Reduction | Progress to Date | Estimated Completion Date & Costs | Comments |
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| **6** | **Introduction of Council Sustainable Travel Planning Scheme**<br><br>- Supply high mileage users with council cars and introduce a fleet of pool vehicles to replace business mileage for employees.<br><br>- Pool bikes are available for staff to use to carry out Council business.<br><br>-Encouraging staff to walk or use public transport where appropriate to carry out Council business. | **Alternatives to Private Vehicle Use** (Car clubs/sharing schemes)<br><br>**Promoting Low Emission Transport** | Environment & Infrastructure - Transport Section | Phase 1 of the Sustainable Travel Planning Scheme was introduced across several teams within Environment & Infrastructure during 2017/18. This involved 35 vehicles being available for use to staff within this Service. Staff require to use the fleet cars in replacement of their own cars.<br><br>Phase 2 will involve pool cars being available for all other relevant staff members across Services in Renfrewshire House.<br><br>Phase 3 will look at the feasibility of locating pool vehicles at other Council buildings. | Phase 1 – introduced Oct 2018.<br><br>Phase 2 – introduced Jan 2019 and ongoing.<br><br>Prior to the formal introduction of pool cars, a trial pool car scheme was undertaken in 2016/17 with one EV pool car being available for use by the Environmental Improvements Section within Communities, Housing and Planning Services. The purchase of this vehicle was funded via the Scottish Gov't AQAP grant fund.<br><br>With regard to the pool bikes, the aim is to increase awareness of these to staff through further advertising. The Corporate Travel Plan & Roadshow event will assist with this (see measure No.14). | In theory the introduction of pool cars generally sees a reduction of approx 20% in business mileage.<br><br>KPIs may be measured via:<br>-reduction in annual mileage undertaken per Service/Team since scheme implementation. | **All AQMAs, council wide air quality improvements.**<br><br>Renfrewshire House, the Council's HQ is situated within the Paisley AQMA therefore business trips undertaken by staff based here will start and end within the Paisley AQMA.<br><br>Target pollution reduction may potentially be measured via:<br>-An annual review of the reduction in mileage and the equivalent 'savings' in emissions. | Ongoing.<br><br>Phase 1 of the Sustainable Travel Planning Scheme was introduced in October 2018 and is complete.<br><br>Phase 2 of the Sustainable Travel Planning Scheme was introduced in January 2019 and is ongoing. | A feasibility study for phase 3 of the Sustainable Travel Planning Scheme will commence summer 2019. | The introduction of the Sustainable Travel Planning Scheme will mean that officers no longer require to use their own car for work purposes. From experience this leads to officers travelling into work by alternative means e.g. train, cycling as observed from the trial of the EV pool car by the Environmental Improvements team.<br><br>By end of 2019 all pool cars based at Renfrewshire House will be EVs as discussed in measure No.4. |

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| **7** | **ECO Stars (Efficient and Cleaner Operations) Fleet Recognition Scheme**<br><br>**-** A fuel management and operational efficiency support programme aimed at operators of goods vehicles, vans, buses, taxis and coaches. | **Vehicle Fleet Efficiency** (Fleet efficiency and recognition schemes) | Communities, Housing and Planning Services - Environmental Improvements Section | Scheme was initiated on a small scale during 2016/17.<br><br>Scottish Gov't funding received to fully implement during 2017/18 & 2018/19.<br><br>Procurement process undertaken Winter 2017. | Full scheme implemented April 2018. | KPIs may be measured via: -membership numbers & numbers of vehicles within scheme.<br><br>Total no. of members as of end of 2018 – 92<br><br>Total no. of vehicles operated by those members - 4564 | **All AQMAs, council wide air quality improvements.** | Scheme first initiated at the end of 2016 on a small-scale trial period. 10 members established during this time.<br><br>Continuation of scheme during 2017/18 and into 2019. | Will be ongoing.<br><br>Current scheme funded until June 2019.<br><br>Fully funded via the Scottish Government AQAP fund, no cost to council.<br><br>2016/17 £9,000<br><br>2018/19 £22,500 | Additional information on this measure is provided in the 2019 Renfrewshire Council AQAP |

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| **8** | **Renfrewshire Council's Local Transport Strategy**<br><br>- Publication of a new Local Transport Strategy (LTS) to replace the Council's 2007 LTS will be undertaken. | **Policy Guidance and Development Control** (Other policy) | Communities, Housing and Planning Services - Policy & Regeneration<br><br>Environment & Infrastructure - Roads Section | The Council's 2007 LTS sets out key objectives and vision for transport over 10-20 yrs. A refresh was undertaken in Feb 2017 providing an update on the Council's achievements to date. A new Renfrewshire LTS will be prepared following publication of the new National and Regional Transport Strategies which are currently under review. | New Renfrewshire LTS will be produced following publication of the new National and Regional Transport Strategies. The new LTS will identify short, medium and long term priorities that contribute towards relevant local, regional and national transport targets and goals.<br><br>Renfrewshire Council are a stakeholder as part of the Regional Transport Strategy review and we are currently in communication with SPT in this regard. | The 2007 LTS contains measures relevant to AQ e.g. development of a transport strategy for Paisley town centre (measure no.9 of this AQAP). Progress against these is detailed within the Feb 2017 refreshed LTS.<br><br>The new LTS will provide detailed aims and actions with specific KPIs associated with these.<br><br>In addition the following KPIs may be relevant:<br>- % change in traffic flow: annual traffic counts on key commuter routes<br>- % improvement in journey times<br>- % reduction in queue lengths. | **All AQMAs, council wide air quality improvements.**<br><br>Any potential target pollution reduction will be dependent on the proposed new/updated action measures within the Renfrewshire Local Transport Strategy. | A refresh of the Renfrewshire LTS was undertaken Feb 2017 but awaiting publication of the new National and Regional Transport Strategies before a new Renfrewshire LTS will be prepared. | To be determined | Refer to section 3.1.2 of the 2019 Renfrewshire Council AQAP for further details on this measure. |

| Measure No. | Measure | Category | Lead Authority | Planning Phase | Implementation Phase | Key Performance Indicator | Relevant AQMA & Target Pollution Reduction | Progress to Date | Estimated Completion Date & Costs | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| **9** | **Paisley Town Centre Transportation Improvements**<br><br>- aim is to allow Paisley to reach a vision for a more connected and accessible place with significant environmental and AQ benefits.<br><br>- Undertake a feasibility study of potential transport interventions for Paisley Town Centre e.g. reinstating two-way traffic flows, amending key junctions, review of lining & signage and trial removal of certain traffic lights on ring road. | **Policy Guidance and Development Control** (Other policy)<br><br>**Traffic Management** (Congestion management) | Environment & Infrastructure - Roads Section | Procurement process for consultant to undertake feasibility study undertaken and awarded the beginning of 2017.<br><br>First draft of the feasibility study produced which establishes initial proposals and reports on potential areas of improvement, their technical feasibility, benefits and deliverability.<br><br>The development of a Transport Strategy for Paisley Town Centre (PTC) was identified as a key action within the Renfrewshire LTS and PTC 2016-2026 Action Plan. The conclusions of this feasibility study may feed into any PTC Transport Strategy. | Ongoing. The proposed options are intentionally high level, providing ideas of key potential transport interventions for Paisley. Some of these measures will now be developed from the current concept phase taking into account traffic modelling and allowing for appropriate assessment, design and eventual delivery.<br><br>The conclusions will then be subject to senior management review, Board approval and consultation with stakeholders before any decisions are made on potential action measures.<br><br>Implementation of final proposals will thereafter be subject to identification of funding streams. | The following KPIs may be relevant:<br>- % change in traffic flow: annual traffic counts on key commuter routes<br>-improved flow in traffic<br>- % reduction in queue lengths<br>-overall reduction in congestion<br>-% improvement in journey times<br>-% improvement in bus journey times<br>-improved connectivity and accessibility within the town centre. | **Paisley AQMA**<br><br>In terms of target pollution reduction, it is recognised that the future implementation of recommended interventions may have a significant impact on traffic movement throughout Paisley town centre and therefore air quality. A requirement of the next phase of this study will be modelling the effect on air quality from proposed interventions. | The draft feasibility study details a programme of phased interventions covering the short, medium and long term.<br><br>An update has been provided after this table with regards to a short to medium term programme of works that has been identified and will be prioritised and taken forward within 2019/20 & 2020/21. | Whilst a prioritised programme of works has been identified for the short to medium term, further modelling has yet to be undertaken and a timeline for implementation of the measures yet to be decided.<br><br>Some long-term improvements are also identified in line with the PTC 10yr Action Plan, but these require further investigation.<br><br>The feasibility study has been funded via SPT. Funding of any future proposed measures will be subject to availability of capital funding with the potential of funding from external partners also e.g. SPT. | Refer to the additional updated text following this table and section 3.1.5 of the 2019 Renfrewshire Council AQAP for further details on this measure. |

| Measure No. | Measure | Category | Lead Authority | Planning Phase | Implementation Phase | Key Performance Indicator | Relevant AQMA & Target Pollution Reduction | Progress to Date | Estimated Completion Date & Costs | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| **10** | **Johnstone Town Centre Transportation Improvements** | **Policy Guidance and Development Control** (Other policy)<br><br>**Traffic Management** (Parking enforcement on Highway) | Environment & Infrastructure - Roads Section<br><br>Communities, Housing and Planning Services - Development Management, Policy & Regeneration and Community Safety Wardens | Ongoing.<br><br>An initial survey of Johnstone Town Centre has been undertaken with traffic management issues/problem areas identified.<br><br>Initial infrastructure improvements proposed e.g. review of TRO yellow line restrictions and effective enforcement of these, new parking signage and relocation of bus stops. | A final implementation plan requires to be developed and implemented in a phased basis following approval. | The following KPIs may be relevant:<br>- % change in traffic flow: annual traffic counts on key commuter routes<br>- % improvement in journey times<br>- % reduction in queue lengths | **Johnstone AQMA**<br><br>Any potential target pollution reduction will be dependent on the proposed action measures within the final implementation plan. | Ongoing. As per information within the Planning Phase. | Implementation of measures will be subject to approval and capital funding but expected to be complete by 2019/20. | Refer to section 3.1.6 of the 2019 Renfrewshire Council AQAP for further details on this measure. |

| Measure No. | Measure | Category | Lead Authority | Planning Phase | Implementation Phase | Key Performance Indicator | Relevant AQMA & Target Pollution Reduction | Progress to Date | Estimated Completion Date & Costs | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| **11** | **Improvements in the Bus Fleet Standard** | **Vehicle Fleet Efficiency** (Promoting Low Emission Public Transport) | Renfrewshire Council Environment & Infrastructure and Communities, Housing and Planning Services in consultation with local bus operators and SPT | Consultation with local bus operators and SPT still to be undertaken | Subject to consultation outcomes | KPIs may be measured via:<br>-% of buses meeting set EURO standard | Johnstone AQMA primarily but possibly Council wide benefits.<br><br>The Air Quality Action Plan Support 2017 Study by AECOM identified interventions around bus operations as the most effective way of reducing emissions in the short term within the Johnstone AQMA to levels below air quality objectives. From the scenarios considered, the greatest reduction was from upgrading all buses to Euro VI emission standard. Implementing this measure would result in a reduction of 1.6ug/$m^3$ at the diffusion tube location (DT No. 59) where the 2018 bias adjusted and distance corrected concentration was 39.6 µg/$m^3$. | An initial meeting was held in April 2019 with the management of the largest bus operator in Renfrewshire and staff from Renfrewshire Council to discuss the AQAP and potential improvements in bus operations. Further engagement is required. | To be determined | Once consultation on this measure has taken place, the Council will require considering how this is implemented and taken forward. It is anticipated this will be a voluntary measure with the cooperation of local bus operators.<br><br>Refer to section 3.3 of the 2019 Renfrewshire Council AQAP for further details on this measure. |

| Measure No. | Measure | Category | Lead Authority | Planning Phase | Implementation Phase | Key Performance Indicator | Relevant AQMA & Target Pollution Reduction | Progress to Date | Estimated Completion Date & Costs | Comments |
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| **12** | **Vehicle Idling Awareness Raising**<br><br>- Regular targeted campaigns to raise awareness regarding idling vehicles & air pollution. Campaigns aimed at specific categories of drivers or in areas where vehicles idle unnecessarily e.g. schools, bus terminals, taxi ranks or in response to complaints | **Traffic Management** (Anti-idling enforcement)<br><br>**Public Information** (via other mechanisms) | Renfrewshire Community Safety Partnership; Communities, Housing and Planning Services Safety Wardens and Environment & Infrastructure Service | General idling awareness campaigns have been ongoing since 2011. | A new School Parking Campaign was introduced in April 2018 aimed at road safety around schools including safe parking and an anti-idling message. This will be rolled out to all 49 primary schools within Renfrewshire by the end of 2019/20. Each school will get three banners and every pupil will receive a school parking pledge leaflet which contain a message regarding no idling around schools. A second phase of the campaign will consider potentially closing off surrounding roads around selected primary schools. A feasibility study for this is currently being undertaken. | Improves overall awareness of fuel efficiency & environmental impacts of vehicles particularly at areas of sensitive receptors e.g. primary schools.<br><br>However, an effective awareness raising campaign may actually increase the number of complaints received.<br><br>Also need to be aware that cold weather can affect personal preferences to idle engines. | All AQMAs<br><br>Measure is more an awareness raising tool however it is also a useful measure to prevent vehicles idling and stopping in inappropriate places that may cause congestion, which is a significant cause of emissions generated in the AQMA. The measure can be used where necessary to reduce congestion and keep traffic flowing. | Our new School Parking Campaign has been introduced at 7 primary schools in Renfrewshire as of June 2019 and will be rolled out to every primary school in Renfrewshire by end of 2019/20. | Ongoing measure.<br><br>The School Parking Campaign has been funded internally by Communities, Housing and Planning Services and Environment & Infrastructure Services. | The use of Fixed Penalty Notices has historically not been adopted by the Council. Instead drivers are requested to turn their engines off voluntarily. However the Council are now looking at the potential to adopt this power in order to issue notices to idling drivers. This will be subject to a review of staff resources and then Board approval. A review is expected during 2020/21. |

| Measure No. | Measure | Category | Lead Authority | Planning Phase | Implementation Phase | Key Performance Indicator | Relevant AQMA & Target Pollution Reduction | Progress to Date | Estimated Completion Date & Costs | Comments |
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| **13** | **Vehicle Emissions Testing**<br><br>- programme of roadside vehicle emissions testing of private vehicles in accordance with the Road Traffic (Vehicle Emissions) (Fixed Penalty) (Scotland) Regulations 2003.<br><br>**This measure ceased in March 2018 in accordance with the Scottish Government's preference for air quality funding to be focused on vehicle idling reduction and educational awareness.** | **Vehicle Fleet Efficiency** (Testing vehicle emissions) | Renfrewshire Council's Community Safety Partnership; Community Safety Wardens & Police Scotland with assistance from Glasgow City Council, East Renfrewshire Council & North Lanarkshire Council's taxi enforcement and emissions testing officers. | An awareness raising and communication strategy would be undertaken prior to testing. This included:<br>-publication of a public notice and press release in local and national press<br>-information letters and idling leaflets sent to bus, taxi and large transport businesses operating within Renfrewshire<br>-information being made available on the Council's website.<br><br>All drivers stopped & tested were given a Renfrewshire Council "Don`t Be An Idler" information leaflet and explanatory letter. | From 2011 to March 2018. | Improves overall awareness of fuel efficiency & environmental impacts of vehicles. Reduces numbers of polluting vehicles. | **All AQMAs**<br><br>The testing location was chosen to be within or as close to the AQMAs as possible.<br><br>Target pollution reduction would be minimal but measure was an effective awareness raising tool. | Testing would be undertaken over two days twice a year from 2011 to March 2018.<br><br>Where vehicles failed relevant emissions standards, drivers were issued with a fixed penalty notice. However, where the driver presented a MOT test certificate within 14 days indicating that the fault had been repaired and vehicle exhaust emissions complied with current legislation then the notice was deemed to be complied with.<br><br>A test undertaken in October 2017 resulted in 432 vehicles being tested with 3 FPNs served for failing the emissions test. | Measure has now ceased.<br><br>Funding was previously via the Scottish Government Air Quality grant funding. | |

| Measure No. | Measure | Category | Lead Authority | Planning Phase | Implementation Phase | Key Performance Indicator | Relevant AQMA & Target Pollution Reduction | Progress to Date | Estimated Completion Date & Costs | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| **14** | **Renfrewshire Council Corporate Travel Plan** | **Promoting Travel Alternatives** (Workplace Travel Planning) | Communities, Housing and Planning Services – Environmental Improvements Section | The Scottish Government's Cleaner Air for Scotland Strategy requires LAs with AQMAs to prepare a corporate travel plan that is consistent with its AQAP.<br><br>A procurement process was undertaken at the end of 2018 and a consultant instructed to commence the development of this measure. | Ongoing.<br><br>A consultant was instructed at the end of 2018 and has undertaken site visits to relevant council offices as part of the project. A staff commuter survey will be issued end of June to determine current transport modes etc. A Travel Planning/Clean Air Day Roadshow event will be held 20 June to coincide with Clean Air Day. Renfrewshire Council staff will be in attendance to provide travel planning advice, info on pool cars etc. Dr Bikes and Scotrail will also be in attendance. A staff commuter challenge will be undertaken in August 2019. Staff travel directories and a final travel plan will then be prepared and published. | KPIs will be an integral part of the Travel Plan and will be determined during development of the plan.<br><br>KPIs may be measured via:<br>-the overall distance travelled by Council staff per year on company business.<br>-the percentage of travel by staff using public transport per year. | **All AQMAs, council wide air quality improvements.** | As per the implementation phase. | September 2019<br><br>Funding was granted from the Scottish Government's 2018/19 AQAP grant to cover the cost of this measure. | |

| Measure No. | Measure | Category | Lead Authority | Planning Phase | Implementation Phase | Key Performance Indicator | Relevant AQMA & Target Pollution Reduction | Progress to Date | Estimated Completion Date & Costs | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| **15** | **Renfrewshire Council Cycle Strategy & Action Plan**<br><br>**-** The strategy contains a Cycling Action Plan which sets out a programme of activities and network interventions for the coming ten years including upgrades and expansion of cycle networks, upgrading the Council's facilities for cyclists and updating the Council's Travel Plan. | **Promoting Travel Alternatives** (Promotion of cycling) | Environment & Infrastructure - Roads Section | 2014-2016 | The Cycle Strategy was approved by Board in Dec 2016.<br><br>Measures contained within the action plan will be implemented dependant on funding. | KPIs are detailed within the Cycle Strategy and Action Plan.<br><br>Currently there is a low level of everyday cycle use within Renfrewshire and so the KPI focus is on a small number of key targets to be achieved by 2025. For example<br>-3% of all journeys to work being made by bicycle<br>-% of children travelling to school by bicycle<br>-% of primary schools offered Bikeability Level 2 training. | **All AQMAs, council wide air quality improvements.**<br><br>The strategy identifies areas of improvement required on existing cycle routes, areas of potential expansion of the cycle network and methods to encourage increased cycle usage. Action measures associated with these have been identified, prioritised and timelines provided.<br><br>The target pollution reduction will be non-measureable. | Upgrade and development of the cycling network is ongoing as per the strategy priorities. | Ongoing<br><br>Funding is applied for each financial year from the Scottish Government under the Cycling, Walking and Safer Streets fund. At least 36% of this fund has to be allocated to cycling including for example infrastructure or design works. | Refer to section 3.1.8 of the 2019 Renfrewshire Council AQAP for further details on this measure. |

| Measure No. | Measure | Category | Lead Authority | Planning Phase | Implementation Phase | Key Performance Indicator | Relevant AQMA & Target Pollution Reduction | Progress to Date | Estimated Completion Date & Costs | Comments |
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| **16** | **Renfrewshire Council Staff Cycling Incentives**<br><br>**- Staff Cycle to Work Scheme** Council employees can participate in this Government approved salary sacrifice scheme which allows them to purchase a bike with tax free benefits.<br><br>**This measure is currently on hold pending a review by the Council's HR to determine feasibility of offering this to staff. The review will be complete by end of 2019.** | **Promoting Travel Alternatives** (Promotion of cycling) | Environment & Infrastructure | | Ongoing | KPIs may be measured via:<br>-% of employees participating in scheme and who regularly travel to work by cycle<br>-usage of the hire bikes | **All AQMAs, council wide air quality improvements.** | Cycle to work scheme last open to employees Oct 2016. | Ongoing | |

## Additional Information on Action Measures

Measure No. 1 - Glasgow City Region City Deal Projects

Further details provided in Section 4 New Local Developments.

Measure No. 2 - Upgrades & Improvements to the Council's Urban Traffic Control (UTC) System

Renfrewshire Council is responsible for the maintenance of all signalled traffic junctions and pedestrian crossings within its boundary. In total there are currently 175 installations of which 64 sites are connected to an urban traffic control (UTC) system.

The UTC system was installed to monitor and control 64 of those sites (21 of which use SCOOT vehicle actuation software) and 15 use CCTV cameras for traffic monitoring.

Concerns about the current condition of the UTC system and other roadside equipment and street furniture led the Council to appoint a consultant to prepare an asset management plan in May 2018. A contract to upgrade the UTC system is currently out to tender for a programme of works over the next 3 to 4 years. Further details of this will be provided within the 2020 APR update.

Control strategies, such as the UTC system, can reduce congestion generally or manage standing queues in specific locations providing the potential to improve air quality. Both the initial configuration of traffic signals and the maintenance of their operation can help achieve this goal.

Measure No.3 & 4 - Council Vehicle Fleet Improvements

Renfrewshire Council has an annual vehicle replacement programme whereby vehicles at the end of their service life are replaced with an improved EURO class vehicle or an electric alternative. During 2018 the number of Council heavy good vehicles (HGVs) with EURO VI standard increased from around 20 to 32. Full replacement of the HGV fleet with minimum EURO VI vehicles will be undertaken by 2022 at latest.

In terms of electric vehicles (EVs) and associated charging infrastructure, the Council aim to increase the number of these on an annual basis. In 2018, the Council

increased their EVs (cars/vans) fleet from 28 to 42, and plan on further increasing the fleet to a total of 89 EVs in 2019. These will replace existing diesel LGVs. An additional 5 new EV charging points were installed during 2018 bringing the total council operated charging points to 25. An additional 38 charging bays are planned to be installed within publicly accessible car parks during 2019 in Paisley, Johnstone, Renfrew, Bridge of Weir and Houston.

Measure No. 5 - Masternaut Connect Fleet Telemetrics System

The fleet tracking telemetric system fitted to all Council vehicles was upgraded in 2017 and has been effective since 1st April that year. The tracking system allows close monitoring of movement and operating status of all fleet vehicles. A dedicated member of staff was employed in Autumn 2018 to work with the Masternaut system to provide regular reports and identify problem areas e.g. low mileage users and excessive idling.

Measure No. 6 - Introduction of Council Sustainable Travel Planning Scheme (including pool car and bike scheme)

The Council have split this scheme into three phases. Phase 1 was introduced in October 2018, which involved a fleet of 35 vehicles being available for use to staff within one service of the council, the Environment & Infrastructure Service, instead of using personal cars. Phase 2 was introduced early 2019 and is still currently ongoing, involving pool cars being available for use of staff members across all services in Renfrewshire House.

Phase 3 involves looking at the feasibility of locating pool vehicles at other Council buildings out with Renfrewshire House. This feasibility study is planned to commence in summer 2019.

Pool bikes for business use are also available and awareness raising of this scheme to staff will be undertaken.

Measure No. 7 - ECO Stars (Efficient and Cleaner Operations) Fleet Recognition Scheme

A fuel management and operational efficiency support programme aimed at operators of goods vehicles, vans, buses, taxis and coaches. The scheme was first initiated at the end of 2016 on a small scale trial period, during which 10 members were established. Scottish Government AQAP funding has been received to fully

implement the scheme during 2018/19. This is a measure that will allow local businesses with a fleet of vehicles to get involved in potentially improving air quality at a local level.

Measure No. 8 - Renfrewshire's Local Transport Strategy

Renfrewshire's Local Transport Strategy (LTS) was approved in 2007 setting out a vision for transport over a 10-20 year timeframe and which supports the wider economic, environmental and social objectives of the Council. A key objective of the strategy is to ensure a healthy and sustainable environment. There are several specific aims relevant to improving air quality. These include the following:

- The Council will continue to develop strategies for travel planning and parking which reduces the growth of trips by private car and achieves a modal shift to walking, cycling, public transport and car sharing thus having a positive impact upon air quality and climate change;
- The Council will strive to achieve the most efficient operation of the road network to minimise delays for road users, particularly for public transport;
- The Council will develop transport actions for Paisley specifically which support and complement the wider economic regeneration strategy, improve accessibility, particularly for cycling, walking and public transport, minimise congestion around the Paisley Town Centre ring road and enhance the street environment; and
- The Council will prioritise development to sustainable locations in transport terms.

A review and refresh of the Local Transport Strategy was undertaken in February 2017 to provide an update on the Council's achievements against the actions set out in the 2007 Strategy. Another updated LTS for Renfrewshire will be produced following publication of the new National and Regional Transport Strategy which are currently under review. Renfrewshire Council are a stakeholder as part of the Regional Transport Strategy review and we are currently in communication with SPT in this regard.

Given that road transport is a significant contributor to local pollutant levels within Renfrewshire, this new Renfrewshire LTS and any key specific measures it may

contain will play a significant role in improving air quality across Renfrewshire. This has therefore been included as an action measure within the 2019 AQAP.

Measure No. 9 - Paisley Town Centre Transportation Improvements

A feasibility study of potential transport interventions to enable Paisley Town Centre to become a more connected and accessible place was undertaken in 2017/18. A review of the conclusions of this has identified short to medium term transport and traffic works that would significantly improve the connectivity of the Town Centre, create more of a pedestrian focus and present a more positive image to visitors, whilst encouraging nearby residents to walk and cycle to their town centre. A proposed programme of works has been identified which includes enhancements for pedestrians and cyclists at four key Gateway junctions. The Gateways considered to be of the highest priority for upgrade are listed below:

- Mill St / Glasgow Road Gateway
- Mill St / Lonend Gateway
- Canal St / Causeyside St Gateway
- Renfrew Rd / Weir St / Incle St Gateway

There are several benefits with the redesign of these Gateway junctions to the town centre, as detailed below. It is now intended to move to detailed design stage and then implementation for these changes:

- Safety benefits for vehicular traffic due to minimising opposed turns;
- Increased safety and crossing benefits for pedestrians and cyclists as crossing points are simplified with desire lines made more efficient;
- A reduction in perceptions of the town centre being a difficult place to walk or cycle to from surrounding communities;
- Public space benefits providing opportunities to upgrade the public realm in key Gateway locations, for instance immediately in front of St Mirin's Cathedral

Longer Term Feasibility Study:

In addition to the identified short to medium term improvements, a feasibility study is being scoped out in relation to the longer-term changes that could make significant

improvements to the road network within and around Paisley Town Centre. The results of this study and any recommendations for change and improvement will be reported to a future Council Policy Board meeting for approval.

Measure No. 10 - Johnstone Town Centre Transportation Improvements

An initial survey of Johnstone Town Centre has been undertaken which identifies better traffic management to improve traffic flow along the High Street corridor as a key action, as well as improvements to gateways and strengthening pedestrian links to the town centre. The main traffic issue in Johnstone is congestion exacerbated by traffic signal operations and illegal parking. It is therefore proposed that the yellow line restrictions in the town centre be reviewed and, where necessary, amendments to existing restrictions proposed. It is also proposed to erect new parking signage and undertake some minor infrastructure works.

Measure No.11 - Improvements in the Bus Fleet Standard

The Council are looking at the possibility of local bus operators voluntarily upgrading the Euro standards of their buses operating within the Council's AQMAs in order to decrease emissions from bus operations. An initial meeting was held in April 2019 with the management of the largest bus operator in Renfrewshire and staff from Renfrewshire Council to discuss the AQAP and potential improvements in bus operations. Further engagement is required.

Measure No. 12 - Vehicle Idling Awareness Raising

General idling awareness campaigns have been ongoing within Renfrewshire since 2011. The Council are now planning for regular targeted campaigns to raise awareness regarding idling vehicles and air pollution specifically at schools. A new School Parking Campaign was introduced in April 2018 aimed at road safety around schools including safe parking and an anti-idling message. The campaign has been introduced into 7 primary schools in Renfrewshire as of June 2019 and will be rolled out to every primary school in Renfrewshire by end of 2019/20.

Measure No. 14 - Renfrewshire Council Corporate Travel Plan

The Scottish Government's Cleaner Air for Scotland Strategy requires local authorities with AQMAs to prepare a corporate travel plan that is consistent with its AQAP. Funding from the Scottish Government's 2018/19 AQAP grant was received to assist with the production of such a plan and a consultant instructed at the end of

2018. Site visits to relevant council offices have already been undertaken and a staff commuter survey will be issued end of June to determine current transport modes, barriers to more sustainable travel etc. A Travel Planning/Clean Air Day Roadshow event will be held on 20 June within Renfrewshire House to coincide with Clean Air Day. Renfrewshire Council staff will be in attendance to provide travel planning advice, information on pool cars, pool bikes, travel maps etc. Dr Bikes and Scotrail will also be in attendance. A staff commuter challenge will be undertaken in August 2019 and staff travel directories and a final travel plan prepared and published autumn 2019.

Measure No. 15 & 16 - Renfrewshire Council Cycle Strategy, Action Plan & Staff Initiatives

The Renfrewshire Cycling Strategy 2016 – 2025 aims to increase cycling use within Renfrewshire. The strategy considers infrastructure and attitudes to cycling as existing and makes recommendations to achieve a step change. The key features to deliver step change are associated with improving and expanding the existing cycling infrastructure, providing better signage and network information, promoting and marketing cycle usage and running events to emphasis the benefits of cycling.

The strategy contains a Cycling Action Plan which sets out a programme of activities and network interventions for the coming ten years including upgrades and expansion of cycle networks, upgrading the Council's facilities for cyclists and updating the Council's Travel Plan. Upgrades and development of the cycling network are ongoing as per the strategy priorities.

The Council also has a 'Try Bikes' scheme which provides a pool of bikes for business travel by employees. However the Council's Staff Cycle to Work Scheme, whereby staff can purchase a bike through a salary sacrifice arrangement, is currently on hold pending a review by the Council's HR to determine the feasibility of offering this measure to staff again. The review will be complete by end of 2019.

Clean Air Day

Renfrewshire Council will be holding a sustainable travel roadshow in Renfrewshire House on Thursday 20th June to coincide and help promote Clean Air Day 2019. As part of the preparation of a Corporate Travel Plan a staff survey will be launched the same week to identify current staff travel behaviours and whether there are any

barriers to staff commuting to work by more sustainable modes. The roadshow event will be used to promote Clean Air Day, to encourage staff to complete the travel survey and to provide advice in relation to any staff travel related queries. There will be local walking and cycling maps available, information on bus routes and information on the ongoing roll out of pool cars across council Services and the Council's pool bikes scheme. There will also be an opportunity to test drive an electric pool car. In addition, Scotrail will be attending to provide information on their Smartcard system and Dr Bikes mechanics will be set up on the walkway to Renfrewshire House to perform free MOT checks on staff bikes.

This is a valuable awareness raising event to encourage people to consider environmentally friendly modes of transport and think about how their individual actions impact on the environment. Further information regarding the 2019 Clean Air Day can be found online at https://www.cleanairday.org.uk/clean-air-scotland.

### 2.3 Cleaner Air for Scotland

Cleaner Air for Scotland – The Road to a Healthier Future (CAFS) is a national cross-government strategy that sets out how the Scottish Government and its partner organisations propose to reduce air pollution further to protect human health and fulfil Scotland's legal responsibilities as soon as possible. A series of actions across a range of policy areas are outlined, a summary of which is available at https://www.gov.scot/Publications/2015/11/5671/17. Progress by Renfrewshire Council against relevant actions within this strategy is demonstrated below.

#### 2.3.1 Transport – Avoiding travel – T1 - All local authorities should ensure that they have a corporate travel plan (perhaps within a carbon management plan) which is consistent with any local air quality action plan.

A Corporate Travel Plan is currently being produced by Renfrewshire Council and should be complete by autumn 2019.

#### 2.3.2 Climate Change – Effective co-ordination of climate change and air quality policies to deliver co-benefits – CC2

Scottish Government expects any Scottish local authority which has or is currently developing a Sustainable Energy Action Plan to ensure that air quality considerations are covered.

Renfrewshire Council's existing Carbon Management Plan was published in 2014 with a target carbon reduction of 36% set for the end of the financial year 2019/20. This target has already been surpassed, reaching 45% reduction in 2018 which equates to more than 24,000 tonnes of $CO_2$. This has been achieved through a range of measures including introducing new and replacement electric cars for the council fleet, installation of LED lighting in schools and street lighting, and diverting waste going to landfill. The council will continue to work to reduce emissions as far as possible and a new Carbon Management Plan will be introduced in 2020 to set future targets.

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

This section sets out the monitoring that has taken place across Renfrewshire, both in 2018 and in previous years, and how monitored concentrations of $NO_2$, $PM_{10}$ and $PM_{2.5}$ compare with the AQOs.

## 3.1 Summary of Monitoring Undertaken

Air pollutant monitoring was undertaken at four automatic sites and 62 passive sites during 2018 for three pollutants: $NO_2$, $PM_{10}$ and $PM_{2.5}$. The majority of the monitoring remained as it was in 2017, but the following changes were made:

Discontinued Monitoring Sites

- Renfrew38 Diffusion Tube Site at Paisley Road, Renfrew.

Newly Installed Monitoring Sites

- Paisley89 Diffusion Tube Site at Abercorn St, Paisley.

The discontinued diffusion tube monitoring site (Renfrew38) was removed due to the tube reporting consistently low concentrations of $NO_2$. Therefore, it was been identified that $NO_2$ concentrations at this location were not of concern.

Details of the new diffusion tube site (Paisley89) are highlighted in green within Table A.3.

Trend graphs for all monitoring locations presenting up to 5 years of monitoring data are presented in Appendix A. The results presented have been annualised and bias adjusted where applicable but are not distance corrected.

### 3.1.1 Automatic Monitoring Sites

This section sets out what monitoring has taken place and how local concentrations of the main air pollutants compare with the objectives.

Renfrewshire Council undertook automatic (continuous) monitoring at four sites during 2018. Table A.1 in Appendix A shows the details of the sites. National monitoring results are available at http://www.scottishairquality.co.uk/.

All four of the automatic monitors are part of the Scottish Air Quality Database network, whereby monitoring data is managed by Ricardo Energy and Environment to the same procedures and standards as AURN monitoring sites.

Maps showing the location of the monitoring sites are provided in Appendix A at Figure A.1, Figure A.2 and Figure A.3. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

### 3.1.2 Non-Automatic Monitoring Sites

Renfrewshire Council undertook non - automatic (passive) monitoring of $NO_2$ at 62 sites during 2018. Table A.2 in Appendix A provides details of the sites.

Maps showing the location of the monitoring sites are provided in Appendix A. 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.3 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/$m^3$.

Annual mean $NO_2$ concentrations recorded at all automatic monitoring sites in 2018 were below the annual average AQO.

There was only one exceedance of the annual mean AQO (40.8µg/$m^3$ following bias adjustment and distance correction) at a diffusion tube located within an existing AQMA; namely Renfrew8 (Renfrew Town Centre AQMA). There were no exceedances recorded within the Paisley Town Centre AQMA or the Johnstone High Street AQMA, although the concentration at Johnstone59 (High Street, Johnstone) was close to the objective level at 39.6µg/$m^3$ (it is worth noting that exposure here is at first floor height rather than ground floor).

There were no measured exceedances of the annual mean AQO at any of the diffusion tube monitoring locations outside of the existing AQMAs (following bias adjustment and distance correction).

For diffusion tubes, the full 2018 dataset of monthly mean values is provided in Appendix B.

Table A.4 in Appendix A compares the ratified continuous monitored $NO_2$ hourly mean concentrations for the past 5 years with the air quality objective of 200µg/$m^3$, not to be exceeded more than 18 times per year. No exceedances of the hourly mean air quality objective for $NO_2$ were recorded at any of the automatic monitoring sites.

Compliance with the annual mean and short term $NO_2$ AQOs was therefore achieved within the Paisley Town Centre AQMA in 2018. The highest concentration recorded within the Paisley AQMA was at the diffusion tube site Paisley35 (Old Sneddon Street, Paisley) with a level of 34.7µg/$m^3$ (it is worth noting that exposure here is at first floor height rather than ground floor).

There have now been four continuous years where the AQOs have been achieved within the Paisley Town Centre AQMA. It is proposed that following completion of monitoring within 2019, all monitoring data will be reviewed and compared over a five year period. Once the review has been completed, consideration will be given to the possible amendment or revocation of the existing Paisley AQMA.

### 3.2.2 Particulate Matter ($PM_{10}$)

Figure A.20 – Automatic Monitoring Sites - Annual Mean $NO_2$ Concentration Trends

**Figure A.21 – Passive Diffusion Tube Monitoring Sites – Annual Mean $NO_2$ Concentration Trends: Graph 1**

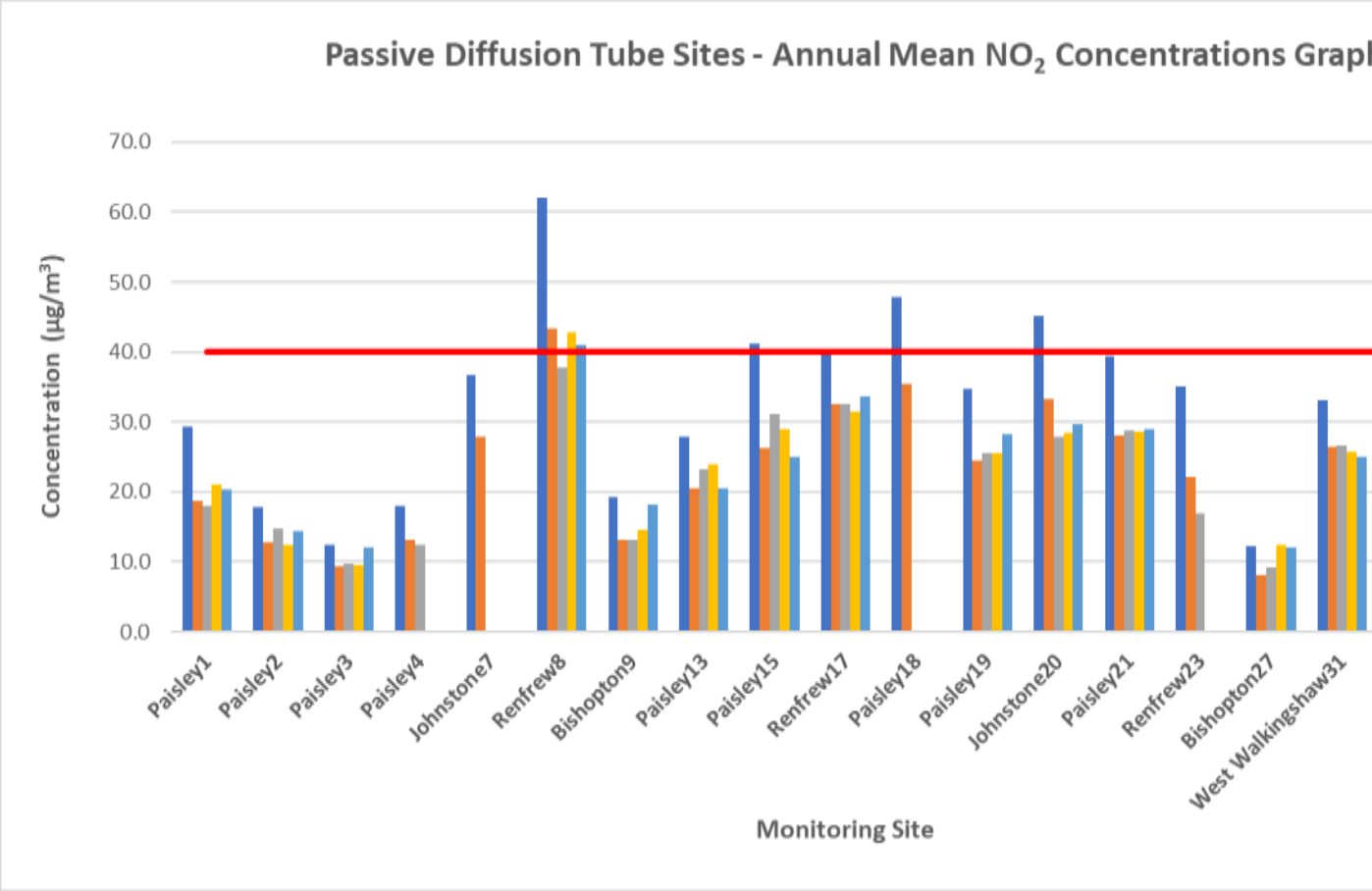



**Figure A.22 – Passive Diffusion Tube Monitoring Sites – Annual Mean $NO_2$ Concentration Trends: Graph 2**

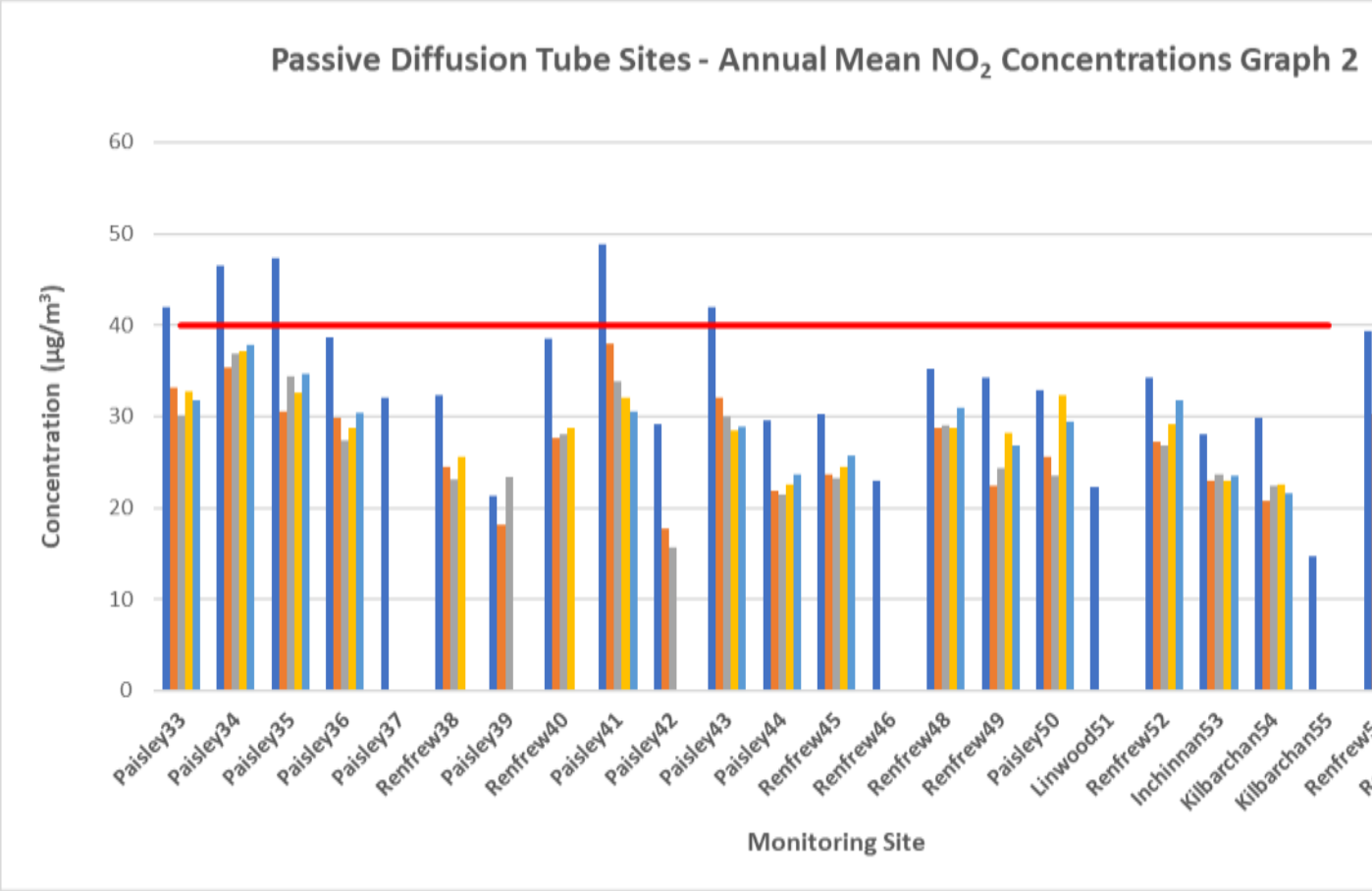



**Figure A.23 – Passive Diffusion Tube Monitoring Sites – Annual Mean $NO_2$ Concentration Trends: Graph 3**

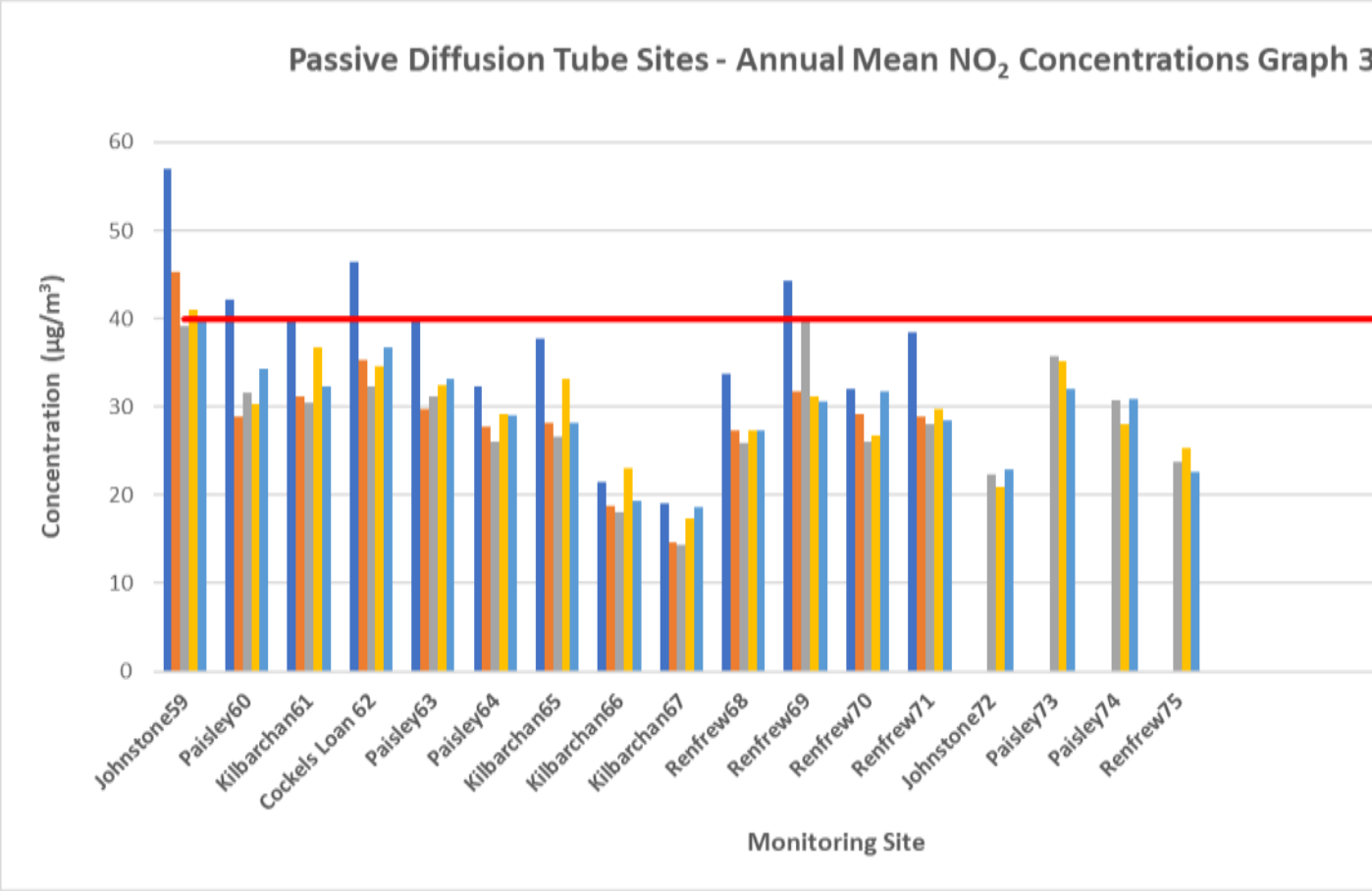

Passive Diffusion Tube Sites - Annual Mean NO2 Concentrations Graph 3
Concentration (µg/m³)
60
50
40
30
20
10
0
Johnstone59
Paisley60
Kilbarchan61
Cockels Loan 62
Paisley63
Paisley64
Kilbarchan65
Kilbarchan66
Kilbarchan67
Renfrew68
Renfrew69
Renfrew70
Renfrew71
Johnstone72
Paisley73
Paisley74
Renfrew75
Monitoring Site

**Figure A.24 – Passive Diffusion Tube Monitoring Sites – Annual Mean $NO_2$ Concentration Trends: Graph 4**

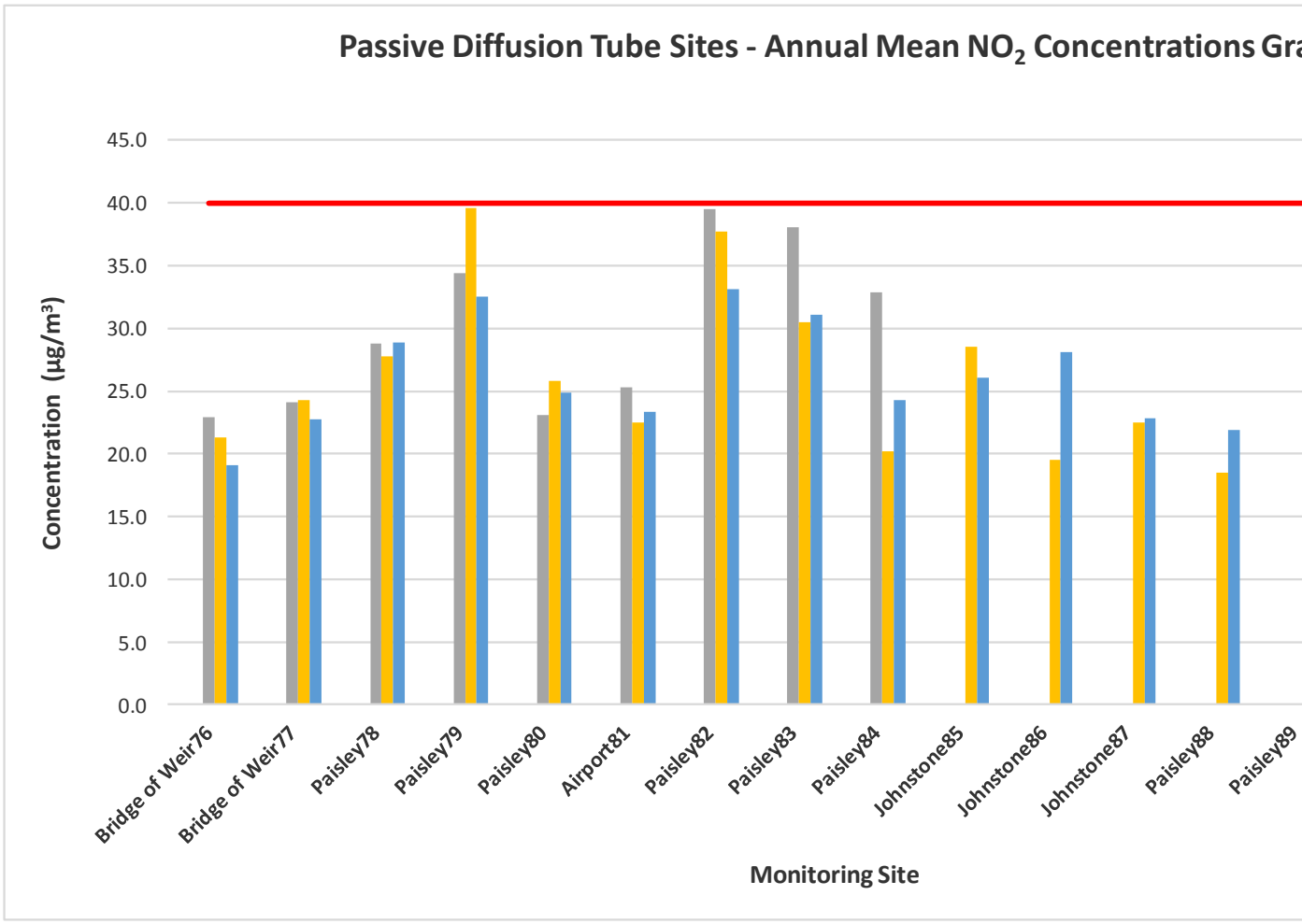



Table A.5 in Appendix A compares the ratified and adjusted monitored $PM_{10}$ annual mean concentrations for the past 5 years with the air quality objective of 18µg/m$^3$.

Table A.6 in Appendix A compares the ratified continuous monitored $PM_{10}$ daily mean concentrations for the past 5 years with the air quality objective of 50µg/m$^3$, not to be exceeded more than 7 times per year.

Annual mean $PM_{10}$ concentrations recorded at all automatic monitoring sites were below the annual mean AQO in 2018.

There was one exceedance of the $PM_{10}$ short-term objective recorded at the Cockels Loan, Paisley monitoring site during 2018, and one exceedance at the High Street, Johnstone monitoring site (as seen in Table A.7). This is below the objective limit of seven exceedances per year. There were no further exceedances recorded during 2018 at any other automatic monitoring site.

### 3.2.3 Particulate Matter ($PM_{2.5}$)

Table A.7 in Appendix A compares the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past 5 years with the air quality objective of 10µg/$m^3$.

The St. James Street, Paisley monitor commenced monitoring for $PM_{2.5}$ in May 2018, therefore there was an incomplete year of monitoring and the data had to be annualised in order to estimate an annual mean concentration. The annualised measured concentration was substantially below the AQO level. Monitoring is ongoing throughout 2019 and further analysis will be given to the more robust annual mean concentration.

From the monitoring results obtained (Table A.7), there were no exceedances of the annual AQO for $PM_{2.5}$ at any of the monitoring sites.

### 3.2.4 Sulphur Dioxide ($SO_2$)

Renfrewshire Council does not currently monitor $SO_2$ within the Council area. Historically $SO_2$ was measured at the Glasgow Airport monitoring station however, due to the concentrations recorded being substantially below the AQO, monitoring of $SO_2$ was discontinued at the monitoring site at the end of 2007.

### 3.2.5 Carbon Monoxide, Lead and 1,3-Butadiene

Renfrewshire Council does not currently monitor carbon monoxide, lead or 1,3-Butadiene concentrations within the Council area. No significant sources of these pollutants have been identified in previous rounds of Review and Assessment.

# 4. New Local Developments

Two planning applications that were outlined in Section 2.2 of the 2017 Annual Progress Report were submitted to the Council in July 2017; the Clyde Waterfront and Renfrew Riverside (CWRR) and Glasgow Airport Investment Area Projects (GAIA). The two projects are part of a wider City Deal generation project that consists of 20 infrastructure projects across the Glasgow City Region. The £1.13bn City Deal has been designed to create thousands of new jobs, improve public transport and connectivity; and deliver significant economic growth through investment within Renfrewshire. Planning permission has now been granted for both applications and works for the GAIA and CWRR projects are expected to commence in summer 2019 and January 2020 respectively. They provide significant new roads infrastructure within Renfrewshire that will provide a positive impact on air quality in certain areas. They are therefore listed as action measure No.1 within the 2019 Renfrewshire Air Quality Action Plan. Further information on these is provided below.

Glasgow Airport Investment Area (17/0485/PP)

The GAIA project will help facilitate the creation of a world class business and commercial location focussed around Glasgow Airport. The project will deliver infrastructure and environmental improvements, all aimed at improving connections between the Westway, Inchinnan and Airport Business Parks, including the realignment of Abbotsinch Road, a new crossing over the White Cart Water, improved links for cyclists and pedestrians, including a new pedestrian and cycle bridge across the Black Cart.

As well as enabling the continued growth and expansion of Glasgow Airport and surrounding businesses, this investment in infrastructure will help to make Renfrewshire a more attractive, vibrant and sustainable place to live and work by better connecting communities and businesses. Work is expected to start on site in the summer of 2019 with construction to be complete in 2020.

An EIA was submitted as part of the planning application including air quality and traffic impact assessments. The air quality assessment confirms there will be changes in traffic flows on the local road network following construction of the new infrastructure outlined above and as development takes place, however local air quality pollutant concentrations at sensitive receptors will be below statutory air quality objectives. In addition, no new receptors will be introduced into an area of

existing poor air quality. The assessment therefore concludes there will be no negative effects in relation to air quality as a result of the proposed development.

There was however the potential for the GAIA project to affect local air quality during the construction phase, therefore the following condition has been recommended:

- No works shall commence on site until the applicant has produced a Construction Environmental Management Plan (CEMP) which has been submitted to, and approved by, the Planning Authority. The plan shall set out how potential dust arising during development of the site will be managed to prevent or minimise emissions during these works. The plan shall take cognisance of the Institute of Air Quality Management (IAQM) 2014 document 'Guidance on the Assessment of Dust from Demolition and Construction' in assessing dust impact risk and where necessary identify appropriate mitigation measures.

Clyde Waterfront and Renfrew Riverside Investment Project (17/0486/PP)

The CWRR project will see the construction of a new bridge across the River Clyde connecting the communities of Renfrew, Yoker and Clydebank. Proposals also include the construction of new roads and cycle routes aimed at opening up access to development sites and providing an alternative route around Renfrew Town Centre.

The new bridge will accommodate vehicles, pedestrians and cyclists with work expected to commence in January 2020 and be complete in 2022.

Construction of the Renfrew North Development Road will provide an alternative route avoiding Renfrew Town Centre. This will optimise the operation of the local road network resulting in improved traffic flows in and around Renfrew Town centre and improved journey time reliability. A cycleway will also be provided on both sides of the new Development Road.

An EIA was submitted as part of the planning application for the new infrastructure which included air quality and traffic impact assessments. While the findings predict an increase in traffic at certain locations within Renfrew as development takes place, in terms of the Town Centre AQMA, construction of the Renfrew North Development Road will result in a positive impact on air quality levels on Inchinnan Road where the highest levels of $NO_2$ within the AQMA are currently measured by the Council.

The air quality assessment predicts that local air quality pollutant concentrations at sensitive receptors as a result of traffic flow changes will be below statutory air quality objectives. In addition, no new receptors will be introduced into an area of existing poor air quality. The assessment therefore concludes there will be no negative effects in relation to air quality as a result of the proposals. This is also the case when considering the CWRR project cumulatively with the GAIA project.

There was however the potential for the CWRR project to affect local air quality during the construction phase, therefore the following condition has been recommended:

- No works shall commence on site until the applicant has produced a CEMP which has been submitted to, and approved by, the Planning Authority. The plan shall set out how potential dust arising during development of the site will be managed to prevent or minimise emissions during these works. The plan shall take cognisance of the IAQM 2014 document 'Guidance on the Assessment of Dust from Demolition and Construction' in assessing dust impact risk and where necessary identify appropriate mitigation measures.

Glasgow Airport Access Project (AAP)

A third major project that is part of the wider City Deal; the Glasgow Airport Access Project (AAP) is currently being developed with a full planning application not yet completed.

The AAP will provide a direct link between Glasgow Central Station, Paisley Gilmour Street Station and Glasgow Airport. A new state-of-the-art system is proposed to carry passengers on specially designed tram-trains using both the existing railway network and a new light spur from Paisley to the airport. The tram-train model was chosen as the preferred option after an appraisal established it offered the greatest opportunity of encouraging people to travel to and from the airport via public transport.

The AAP will support the continued expansion of Glasgow Airport and consolidate and extend the benefits of the other two City Deals infrastructure projects in Renfrewshire. It will help to open up the City Region, enabling growth and unlocking Renfrewshire's economic potential. The project will be delivered jointly by

Renfrewshire Council and Glasgow City Council and involve key stakeholders including Glasgow Airport, Transport Scotland and Network Rail.

Due to technical complexities and constraints involved, the AAP has a significantly longer development process, with construction expected to start in 2022 and operation of services by 2025.

An Environmental Impact Assessment (EIA) will be completed and submitted as part of the planning application for the AAP. Upon receipt, the impacts upon air quality will be reviewed by the Council and conditions recommended where required.

### 4.1 Road Traffic Sources

Three planning applications have been received by Renfrewshire Council during 2018 that have been identified as having the potential to change traffic flows on the road network within Renfrewshire. Two of the applications relate to residential developments with associated car parking, and the third application was for a primary school. Air quality assessments were completed for all 3 applications and these have been reviewed by Renfrewshire Council. Details on each application are presented in Table 5.1.

### 4.2 Other Transport Sources

A review has been undertaken of local transport sources and it is confirmed that there are no new or significantly changed other transport sources, including:

- 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; and
- Ports for shipping.

### 4.3 Industrial Sources

Abercorn Street (18/0737/PP)

One industrial planning application was received by Renfrewshire Council during 2018, relating to electricity generation facilities. An air quality assessment has been completed for the application and has been reviewed by Renfrewshire Council. Details on the industrial application are presented in Table 5.1.

### 4.4 Commercial and Domestic Sources

Renfrewshire Council confirms that there are no new or significantly changed commercial and domestic sources, including:

- Areas where the combined impact of several biomass combustion sources may be relevant;
- Areas where domestic solid fuel burning may be relevant; and
- Combined Heat and Power (CHP) plant.

### 4.5 New Developments with Fugitive or Uncontrolled Sources

Renfrewshire Council confirms that there are no new or significantly changed fugitive or uncontrolled sources, including:

- Landfill sites;
- Quarries;
- Unmade haulage roads on industrial sites;
- Waste transfer stations, etc; and
- Other potential sources of fugitive particulate matter emissions.

# 5. Planning Applications

This section summarises the planning applications for which air quality assessments were required aside from the City Deal applications, and those for which Renfrewshire Council carried out screening assessments.

The applications and outcomes are summarised in Table 5.1.

**Table 5.1 – Details of Planning Applications Requiring Air Quality Assessments or Screening Assessments**

| Planning Application Reference | Data Submitted by the Applicant | Screening Assessment Completed by Renfrewshire Council | Outcome |
|---|---|---|---|
| **17/0682/PP - Former Arnotts Store, Smithhills Street, Paisley**<br><br>Erection of residential development comprising 26 flats with associated parking and landscaping | Air quality assessment submitted with planning application | - | The conclusions of the assessment were accepted, and permission granted in July 2018 with planning conditions relating to the requirement for a site specific Dust Management Plan in order to mitigate against emissions to air from the construction phase of the development. |
| **18/0211/PP - Johnstone Hospital, Bridge of Weir Road, Linwood, Paisley**<br><br>Erection of 110 two storey dwelling houses, associated landscaping, infrastructure and associated works | Air quality assessment submitted with planning application | - | The conclusions of the assessment were accepted, and permission granted in January 2019. |
| **18/0737/PP 142 Abercorn Street, Paisley, PA3 4DF**<br><br>Erection of a gas-powered electricity generation facility with associated access and fencing | Air quality assessment submitted with planning application | - | The conclusions of the assessment were accepted, and permission granted in February 2019 with planning conditions relating to a restriction of annual operating hours to protect air quality. |

| Planning Application Reference | Data Submitted by the Applicant | Screening Assessment Completed by Renfrewshire Council | Outcome |
|---|---|---|---|
| **16/0294/PP Main Building, St Paul's Primary School, Orchy Crescent, Paisley, PA2 0NN**<br><br>Erection of primary school with pre-5 and adult learning centres, formation of access, parking, landscaping, boundary treatments, lighting, all weather pitch and associated works. | Air quality assessment was submitted in Jan 2018 | - | The conclusions of the assessment were accepted. |

# 6. Conclusions and Proposed Actions

## 6.1 Conclusions from New Monitoring Data

There was one measured exceedance of the $NO_2$ annual mean AQO (40.8µg/$m^3$ following bias adjustment and distance correction) recorded in 2018 in Renfrewshire. The exceedance was recorded at the diffusion tube Renfrew8, (15 Inchinnan Road, Renfrew) within the Renfrew Town Centre AQMA. There were no exceedances within either the Paisley Town Centre AQMA or the Johnstone High Street AQMA.

There were no measured exceedances of either the annual $PM_{10}$ or $PM_{2.5}$ AQOs at any monitoring locations during 2018. There was one exceedance of the $PM_{10}$ short-term objective recorded at the Cockels Loan, Paisley monitoring site and one exceedance at the High Street, Johnstone monitoring site. These exceedances are therefore below the AQO limit of 7 times per year per site.

Within the Paisley Town Centre AQMA there were no exceedances of any AQOs where relevant pollutant monitoring is completed ($NO_2$ and $PM_{10}$). The AQMA has been declared for annual mean and short term $NO_2$ exceedances, and for annual mean $PM_{10}$ exceedances. There have now been four consecutive years where all of these AQOs have been compiled with. Once 2019 monitoring data becomes available and has been assessed, consideration will be given to the possible amendment or revocation of the Paisley Town Centre AQMA.

An updated Renfrewshire AQAP was published in March 2019 which has been approved by the Council Board and statutory consultees including the Scottish Government and Scottish Environment Protection Agency (SEPA). This new plan incorporates all three current AQMAs and replaces the 2014 Paisley Town Centre AQAP. The plan sets out measures the Council will take forward to help improve air quality throughout Renfrewshire. Some measures are specific to a particular AQMA and some are generic measures which will offer Renfrewshire wide air quality improvements. By implementing this Action Plan the Council is striving to meet statutory air quality objectives and support the improvement of air quality within Renfrewshire as a whole. This is integral to the Council's Local Outcome Improvement Plan, supporting the aim to make Renfrewshire a fairer, more inclusive place where all our people, communities and businesses thrive.

## 6.2 Conclusions relating to New Local Developments

Renfrewshire Council is satisfied that any new developments likely to have an impact upon local air quality, or potentially introduce new receptors into areas of poor air quality have been adequately assessed during the planning process. Processes and guidance notes are in place to ensure that prospective developers and Renfrewshire Council Planning Officers have clear instructions on what information is required in relation to certain types of development, especially biomass, and when to request more detailed information on the potential impacts of the proposals.

## 6.3 Proposed Actions

The proposed actions and LAQM requirements for Renfrewshire Council are as follows:

- Progression of the two City Deals projects which will bring significant new road infrastructure including the Renfrew North Development Road. This road will reduce traffic volume through Renfrew town centre resulting in improved air quality levels, in particular at the area of current exceedance of $NO_2$ levels on Inchinnan Rd.;
- Continue to improve the Councils fleet of vehicles and complete the implementation of phase 2 of the Pool Car Scheme;
- Publish a Corporate Travel Plan;
- Raise awareness of air pollution at a local level through vehicle anti idling campaigns and undertake a roadshow event at Renfrewshire House on 2019 Clean Air Day which promotes sustainable travel planning;
- Assess the 2019 monitoring data within the Paisley Town Centre AQMA when available with consideration to revoking/amending the AQMA based upon the results;
- Continue to review all air quality assessments that are submitted as part of planning applications in relation to possible impacts upon local air quality;
- Continue to monitor $NO_2$, $PM_{10}$ and $PM_{2.5}$ at all relevant locations throughout Renfrewshire; and
- Submit the 2020 Annual Progress Report.

## Appendix A: Monitoring Results

### Table A.1 – Details of Automatic Monitoring Sites

| Site ID | Site Name | Site Type | X OS Grid Ref | Y OS Grid Ref | Pollutants Monitored | In AQMA? | Monitoring Technique | Distance to Relevant Exposure (m) (1) | Distance to kerb of nearest road (m) (2) | Inlet Height (m) |
|---|---|---|---|---|---|---|---|---|---|---|
| Gordon Street, Paisley | | Roadside | 248316 | 663612 | $NO_2$; $PM_{10}$ | Y | Chemiluminescent; FDMS | 6.5 | 10 | $NO_x$ – 2.2<br>$PM_{10}$ – 2.4 |
| St James Street, Paisley (4) | | Roadside | 248173 | 664320 | $PM_{10}$; $PM_{2.5}$ | Y | FDMS | 0 | 4 | 2.35 |
| Cockels Loan | | Roadside | 250463 | 665934 | $NO_2$; $PM_{10}$ | N | Chemiluminescent; FDMS | 5 | 18 | $NO_x$ – 2.2m<br>$PM_{10}$ – 2.8 |
| High Street, Johnstone | | Roadside | 242984 | 663178 | $PM_{10}$; $PM_{2.5}$ | Y | FIDAS 200 | 0.5 (3) | 2.9 | 1.9 |

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

(2) N/A if not applicable.

(3) The distance of 0.5m is to the façade of the closest building, there are commercial units at ground level and residential on the first floor.

(4) Site St James Street - monitoring equipment at this site was changed from monitoring $PM_{10}$ to monitoring $PM_{2.5}$ on the 04/05/18.

The locations of the automatic monitoring sites are presented in Figures A.1, A.2 and A.3

**Figure A.1 – Automatic Monitoring Site Locations – Paisley**

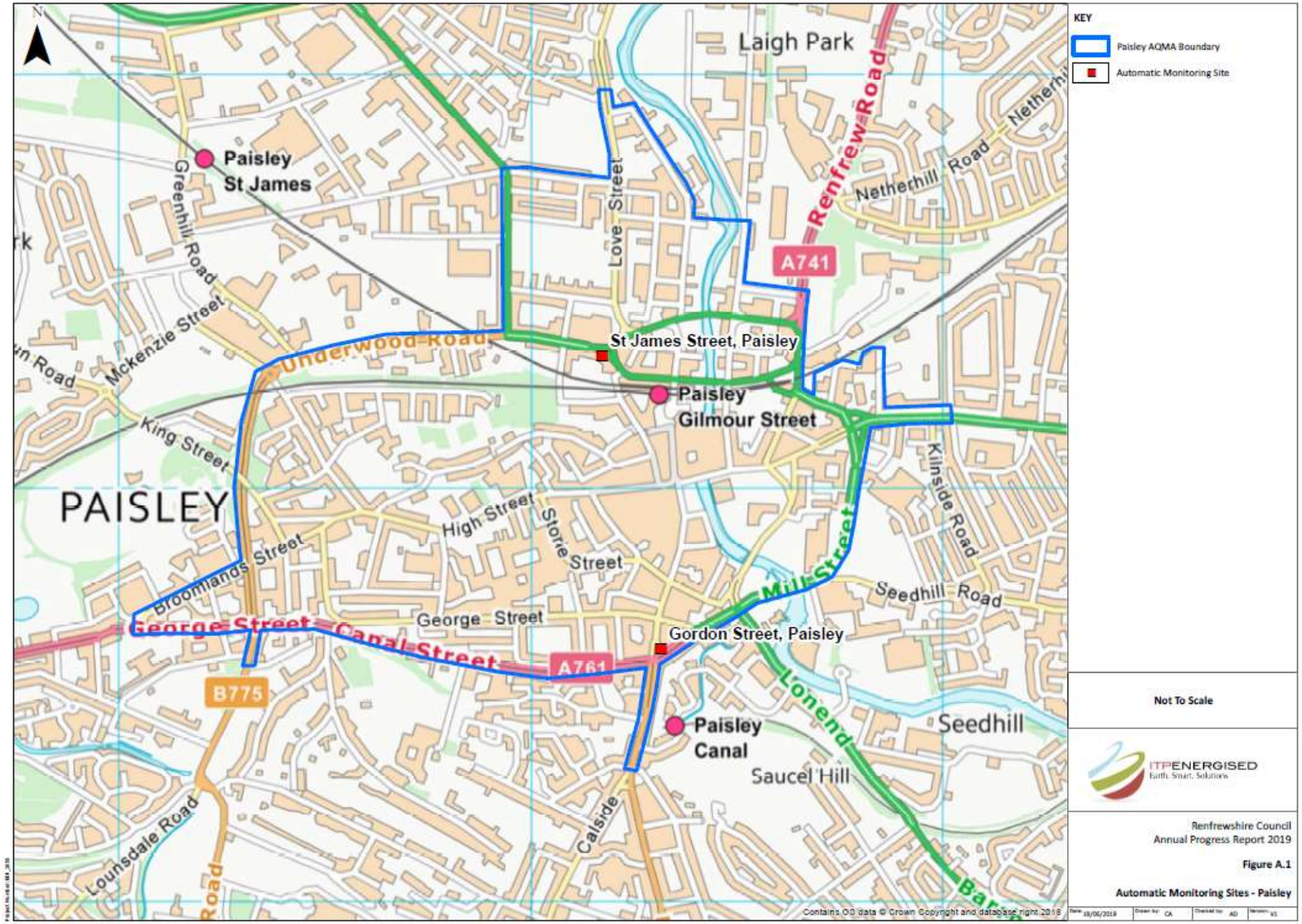


**Figure A.2 – Automatic Monitoring Site Locations - Renfrew**

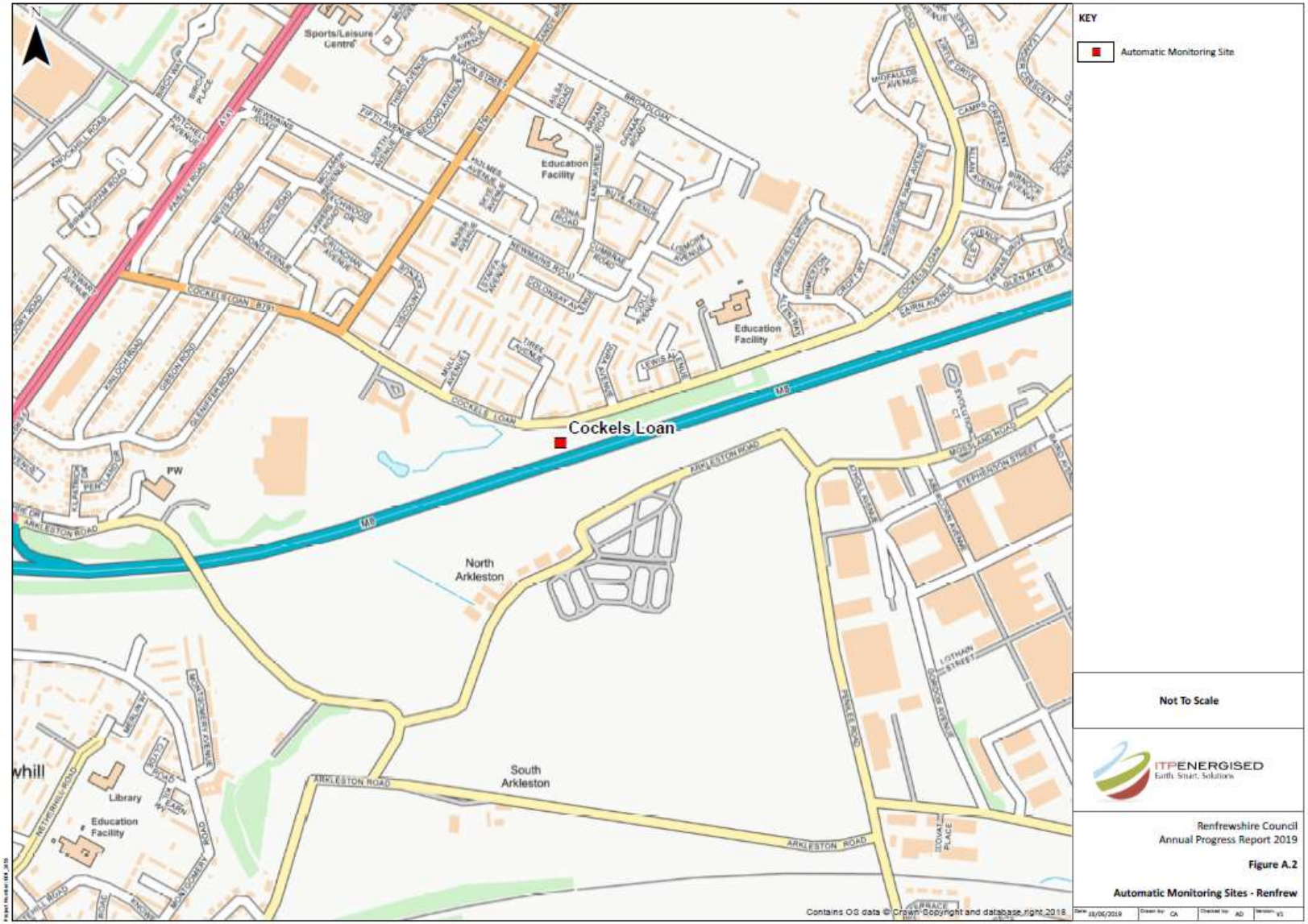


**Figure A.3 – Automatic Monitoring Site Locations – Johnstone**

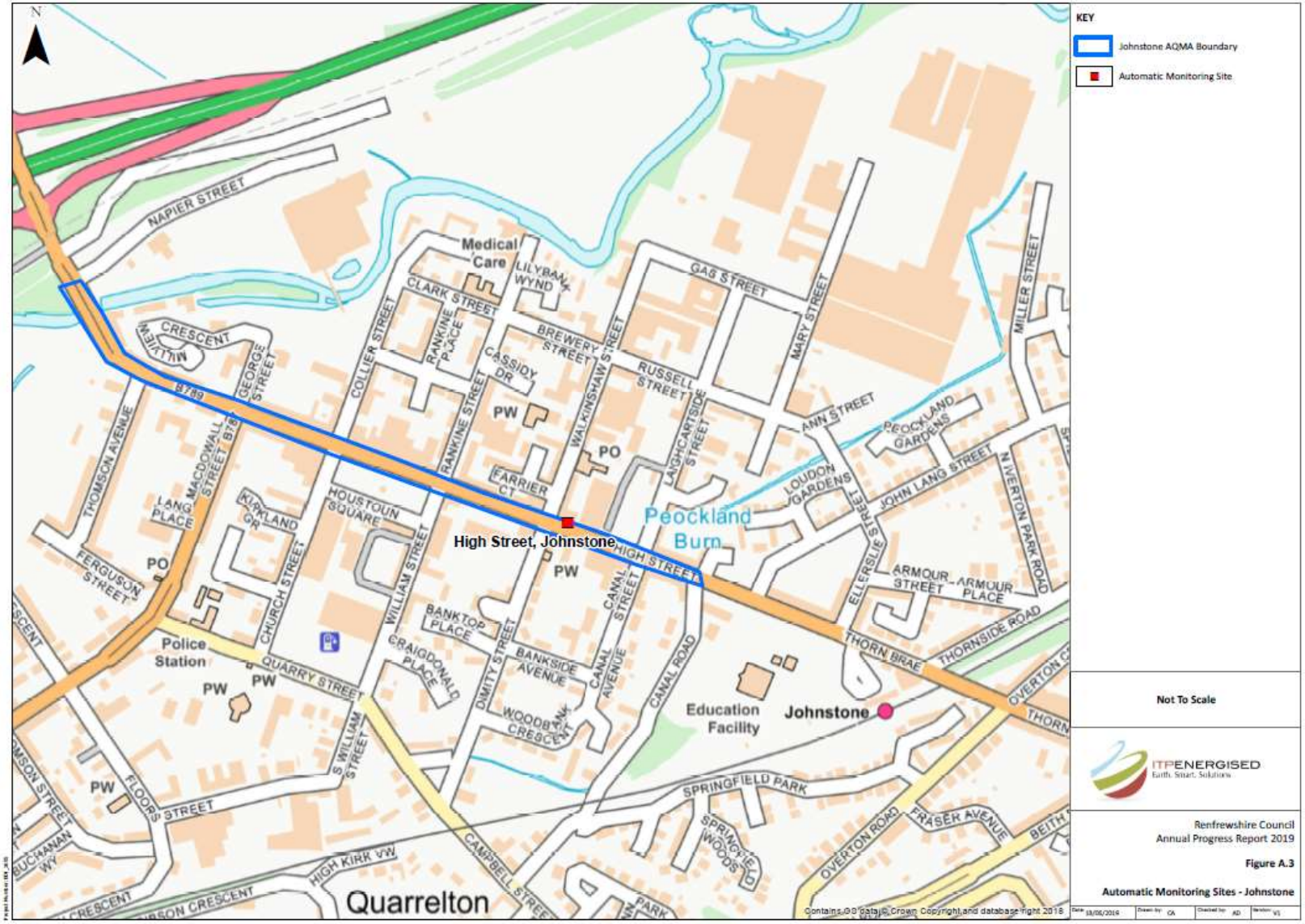


**Table A.2 – Details of Non-Automatic Monitoring Sites**

| 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? |
|---|---|---|---|---|---|---|---|---|---|
| Paisley1 | Gilmour St, Paisley | Urban Centre | 248350 | 664082 | $NO_2$ | Y | N/A | 68 | N |
| Paisley2 | Oakshaw St, Paisley | Urban Background | 247925 | 664052 | $NO_2$ | Y | 11 | 35 | N |
| Paisley3 | Lochfield Dr, Paisely | Urban Background | 249004 | 662142 | $NO_2$ | N | 8 | 1.5 | N |
| Renfrew8 | 15 Inchinnan Rd, Renfrew | Kerbside | 250589 | 667547 | $NO_2$ | Y | 0.1 | 2.6 | N |
| Bishopton9 | Station Rd, Bishopton | Roadside | 243975 | 670545 | $NO_2$ | N | 13 | 3 | N |
| Paisley13 | Greenock Rd, Paisley | Urban Background | 247371 | 665674 | $NO_2$ | N | -12 | 23 (M8) | N |
| Paisley15 | Montgomery Dr, Paisley | Urban Background | 249185 | 665713 | $NO_2$ | N | 4.3 | 1.6 (11.5 to M8 slip-road) | N |
| Renfrew17 | Tanar Way, Renfrew | Roadside | 251524 | 666287 | $NO_2$ | N | 0 | 29 (M8) | N |
| Paisley19 | Linwood Rd, Johnstone | Roadside | 245701 | 663604 | $NO_2$ | N | 5 | 2.5 | N |
| Johnstone20 | High St, Johnstone | Kerbside | 242675 | 663286 | $NO_2$ | Y | 0.45 | 1.4 | N |

| 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? |
|---|---|---|---|---|---|---|---|---|---|
| Paisley21 | Causeyside St, Paisley (Triplicate) | Roadside | 248316 | 663612 | $NO_2$ | Y | -6.3 | 9.9 | Y |
| Bishopton27 | Rossland Gardens, Bishopton | Suburban | 243183 | 671188 | $NO_2$ | N | 6 | 2 | N |
| West Walkingshaw31 | West Walkinshaw (Triplicate) | Roadside | 246189 | 666141 | $NO_2$ | N | -14 | 17 (M8) | N |
| Paisley33 | 76 Causeyside St, Paisley | Roadside | 248277 | 663524 | $NO_2$ | Y | 1.1 | 2.9 | N |
| Paisley34 | 63 Causeyside St, Paisley | Roadside | 248303 | 663566 | $NO_2$ | Y | 3 | 0.7 | N |
| Paisley35 | Old Sneddon St, Paisley | Roadside | 248360 | 664272 | $NO_2$ | Y | 0.4 | 3.4 | N |
| Paisley36 | Caledonia St, Paisley | Roadside | 247948 | 664774 | $NO_2$ | Y | 4.5 | 3.3 | N |
| Renfrew40 | Hairst St, Renfrew | Roadside | 250763 | 667631 | $NO_2$ | Y | 0.25 | 6.2 | N |
| Paisley41 | Smithhills St (West), Paisley | Roadside | 248463 | 664175 | $NO_2$ | Y | 16 | 5 | N |

| 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? |
|---|---|---|---|---|---|---|---|---|---|
| Paisley43 | Smithhills St (East), Paisley | Roadside | 248481 | 664153 | $NO_2$ | Y | 0 | 2.5 | N |
| Paisley44 | Love St, Paisley | Roadside | 248209 | 664474 | $NO_2$ | Y | 0.2 | 2.2 | N |
| Renfrew45 | Xscape. Renfrew | Kerbside | 251803 | 667365 | $NO_2$ | N | 18 | 2 | N |
| Renfrew48 | Glen Sax Dr, Renfrew | Roadside | 251264 | 666217 | $NO_2$ | N | -22 | 45 (M8) | N |
| Renfrew49 | Tanar Way 2, Renfrew | Roadside | 251462 | 666326 | $NO_2$ | N | 9 | 85 (M8) | N |
| Paisley50 | Renfrew Rd, Paisley | Roadside | 248985 | 665494 | $NO_2$ | N | 7 | 12 | N |
| Renfrew52 | Glasgow Rd 2, Renfrew | Roadside | 251515 | 666955 | $NO_2$ | N | 4 | 3 | N |
| Inchinnan53 | Old Greenock Rd, Inchinnan | Roadside | 248154 | 668832 | $NO_2$ | N | 9 | 1.5 | N |
| Kilbarchan54 | Easwald Bank, Kilbarchan | Roadside | 241059 | 662743 | $NO_2$ | N | 4.5 | 1.2 | N |
| Renfrew56 | Paisley Rd, Renfrew | Roadside | 250579 | 667488 | $NO_2$ | Y | 3.5 | 4.5 | N |
| Renfrew57 | Paisley Rd, Renfrew | Roadside | 250597 | 667473 | $NO_2$ | Y | 1.2 | 6 | N |

| 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? |
|---|---|---|---|---|---|---|---|---|---|
| Renfrew58 | Glebe St, Renfrew | Roadside | 250667 | 667448 | $NO_2$ | N | 4.5 | 2.8 | N |
| Johnstone59(5) | High St, Johnstone | Roadside | 242656 | 663281 | $NO_2$ | Y | 0.1 | 1.7 | N |
| Paisley60 | Underwood Rd, Paisley | Roadside | 247525 | 664326 | $NO_2$ | Y | 7.8 | 0.5 | N |
| Kilbarchan61 | High Barholm, Kilbarchan | Roadside | 240584 | 663007 | $NO_2$ | N | 0.1 | 1 | N |
| Cockels Loan 62 | Cockels Loan, Renfrew (Triplicate) | Roadside | 250463 | 665934 | $NO_2$ | N | 5 | 18 | Y |
| Paisley63 | Renfrew Rd, Paisley | Roadside | 249159 | 665710 | $NO_2$ | N | 6.8 | 3.7 | N |
| Paisley64 | Montgomery Rd, Paisley | Roadside | 249202 | 665708 | $NO_2$ | N | 8.8 | 0.15 | N |
| Kilbarchan65 | High Barholm, Kilbarchan | Roadside | 240599 | 663000 | $NO_2$ | N | 0.4 | 2 | N |
| Kilbarchan66 | High Barholm, Kilbarchan | Roadside | 240573 | 663021 | $NO_2$ | N | 0.4 | 1.6 | N |
| Kilbarchan67 | High Barholm, Kilbarchan | Roadside | 240512 | 663027 | $NO_2$ | N | 1.8 | 3 | N |

| 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? |
|---|---|---|---|---|---|---|---|---|---|
| Renfrew68 | Paisley Rd, Renfrew | Roadside | 250522 | 667419 | $NO_2$ | N | 0.2 | 3 | N |
| Renfrew69 | Incinnan Rd, Renfrew | Roadside | 250537 | 667602 | $NO_2$ | Y | 0.1 | 2.9 | N |
| Renfrew70 | Incinnan Rd, Renfrew | Roadside | 250599 | 667561 | $NO_2$ | Y | 4.5 | 3.7 | N |
| Renfrew71 | Braille Drive, Renfrew | Roadside | 251729 | 666360 | $NO_2$ | N | 0 | 25 (M8) | N |
| Johnstone72 | High St, Johnstone | Roadside | 243080 | 663140 | $NO_2$ | Y | 0.45 | 3 | N |
| Paisley73 | Lawn St, Paisley | Roadside | 248566 | 664072 | $NO_2$ | Y | 0.45 | 3 | N |
| Paisley74 | Causeyside St, Paisley | Roadside | 248313 | 663621 | $NO_2$ | Y | 0.19 | 1.95 | N |
| Renfrew75 | Canal St, Renfrew | Roadside | 250853 | 667747 | $NO_2$ | Y | 0.19 | 3.3 | N |
| Bridge of Weir76 | Main Rd, Bridge of Weir | Roadside | 238899 | 665488 | $NO_2$ | N | 0.17 | 5 | N |
| Bridge of Weir77 | Main Rd / Houston Rd, Bridge of Weir | Roadside | 238570 | 665892 | $NO_2$ | N | 0.15 | 4.73 | N |
| Paisley78 | Neilston Rd, Paisley | Roadside | 248339 | 662575 | $NO_2$ | N | 0.15 | 2.26 | N |

| 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? |
|---|---|---|---|---|---|---|---|---|---|
| Paisley79 | Incle St, Paisley | Roadside | 248632 | 664212 | $NO_2$ | Y | 0.18 | 2.8 | N |
| Paisley80 | Glasgow Rd, Paisley | Roadside | 249653 | 664123 | $NO_2$ | N | 1.9 | 2.1 | N |
| Airport81 | Glasgow Airport | Roadside | 247346 | 665805 | $NO_2$ | N | 32 | 33 (M8) | N |
| Paisley82 | Well Street, Paisley | Roadside | 247513 | 664024 | $NO_2$ | Y | 0.2 | 2.27 | N |
| Paisley83 | Wellmeadow St, Paisley | Roadside | 247671 | 663913 | $NO_2$ | Y | 0.4 | 3.32 | N |
| Paisley84 | Ferry Village, Renfrew | Kerbside | 251254 | 667876 | $NO_2$ | N | 18 | 0.5 | N |
| Johnstone85 | High St, Johnstone | Roadside | 242622 | 663306 | $NO_2$ | Y | 0.62 | 1.1 | N |
| Johnstone86 | High St, Johnstone | Roadside | 242495 | 663358 | $NO_2$ | Y | 0.14 | 2.7 | N |
| Johnstone87 | High St, Johnstone | Roadside | 243117 | 663127 | $NO_2$ | Y | 0.35 | 3 | N |
| Paisley88 | Hawkhead Road, Paisley | Roadside | 249850 | 663991 | $NO_2$ | N | 7 | 2.05 | N |
| Paisley89 | Abercorn St Paisley | Roadside | 248467 | 664303 | $NO_2$ | Y | 0.14 | 3.5 | N |

(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.

Note: Sites that are highlighted in green are new sites that have commenced monitoring in 2018

**Figure A.4 – Diffusion Tube Monitoring Site Locations – Paisley Central**

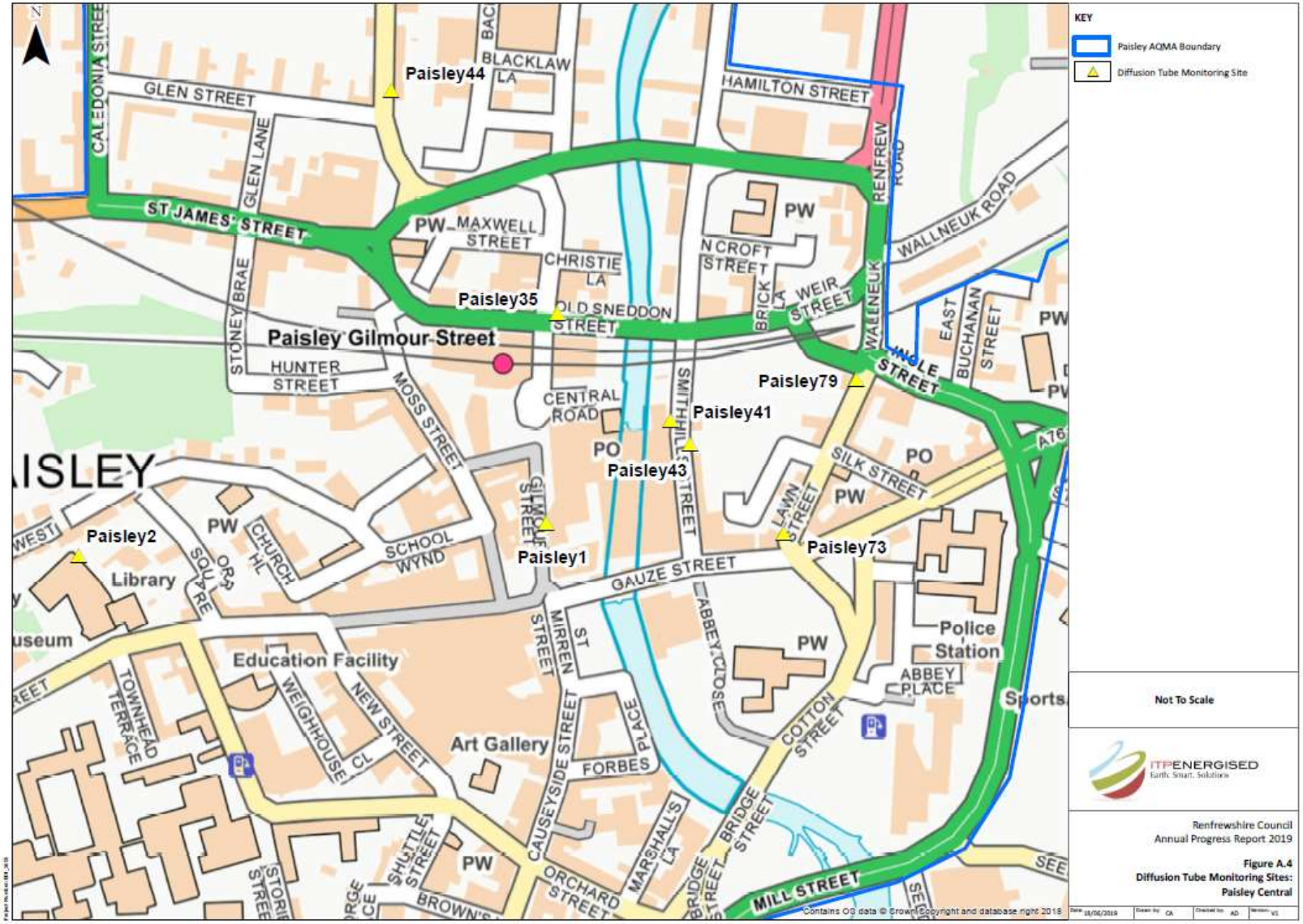


**Figure A.5 – Diffusion Tube Monitoring Site Locations – Paisley North**

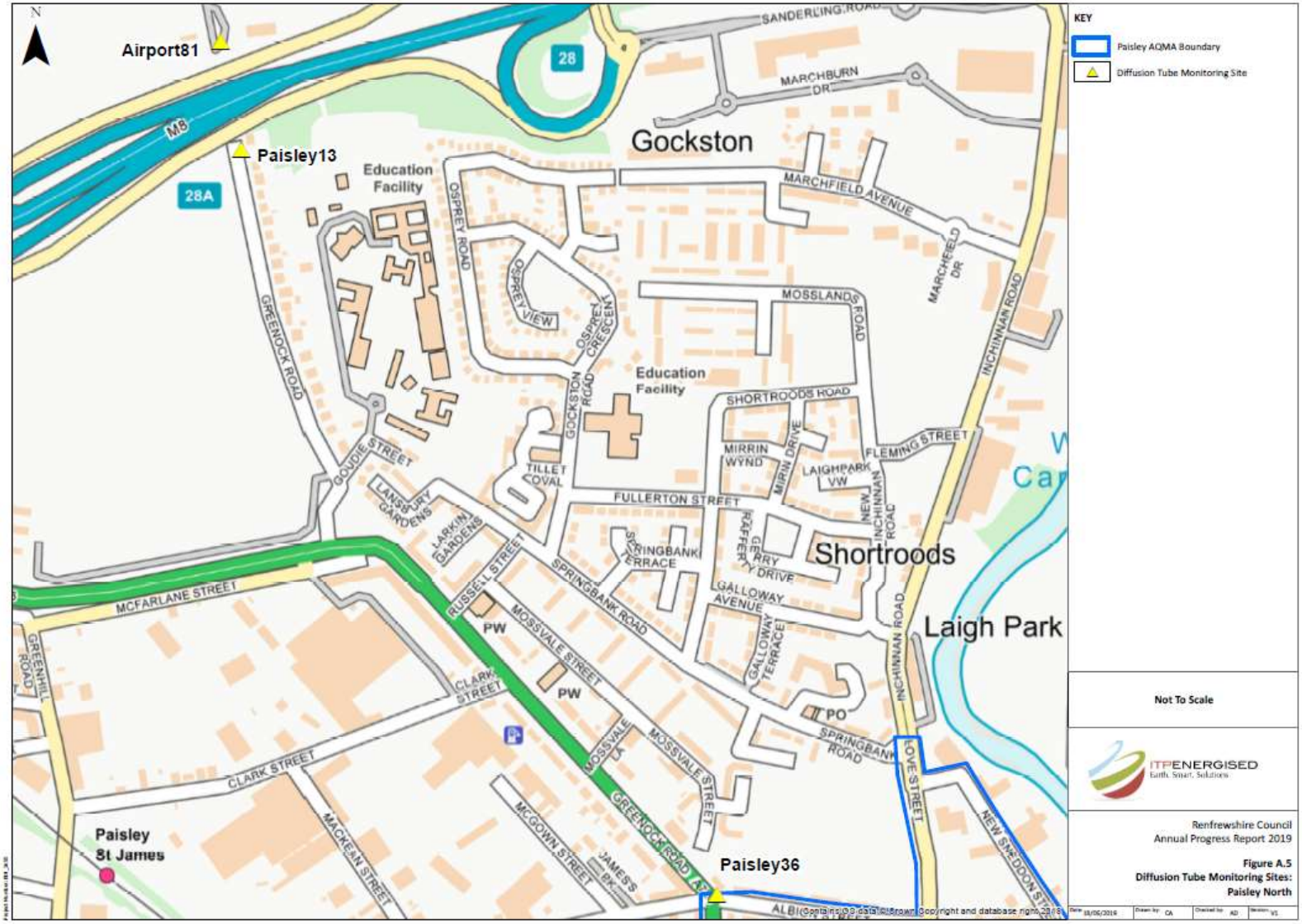


**Figure A.6 – Diffusion Tube Monitoring Site Locations – Paisley North-East**

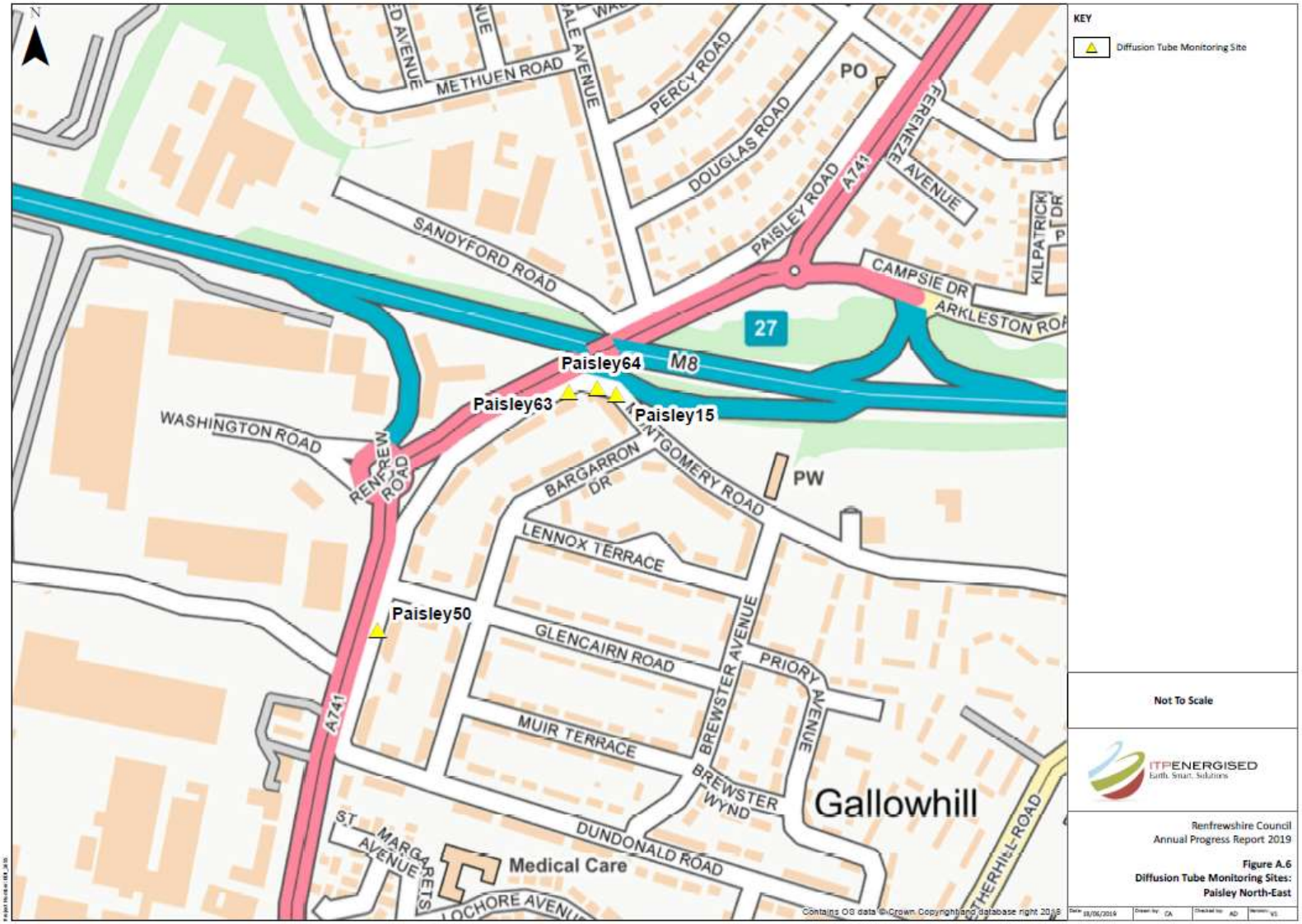


**Figure A.7– Diffusion Tube Monitoring Site Locations – Paisley East**

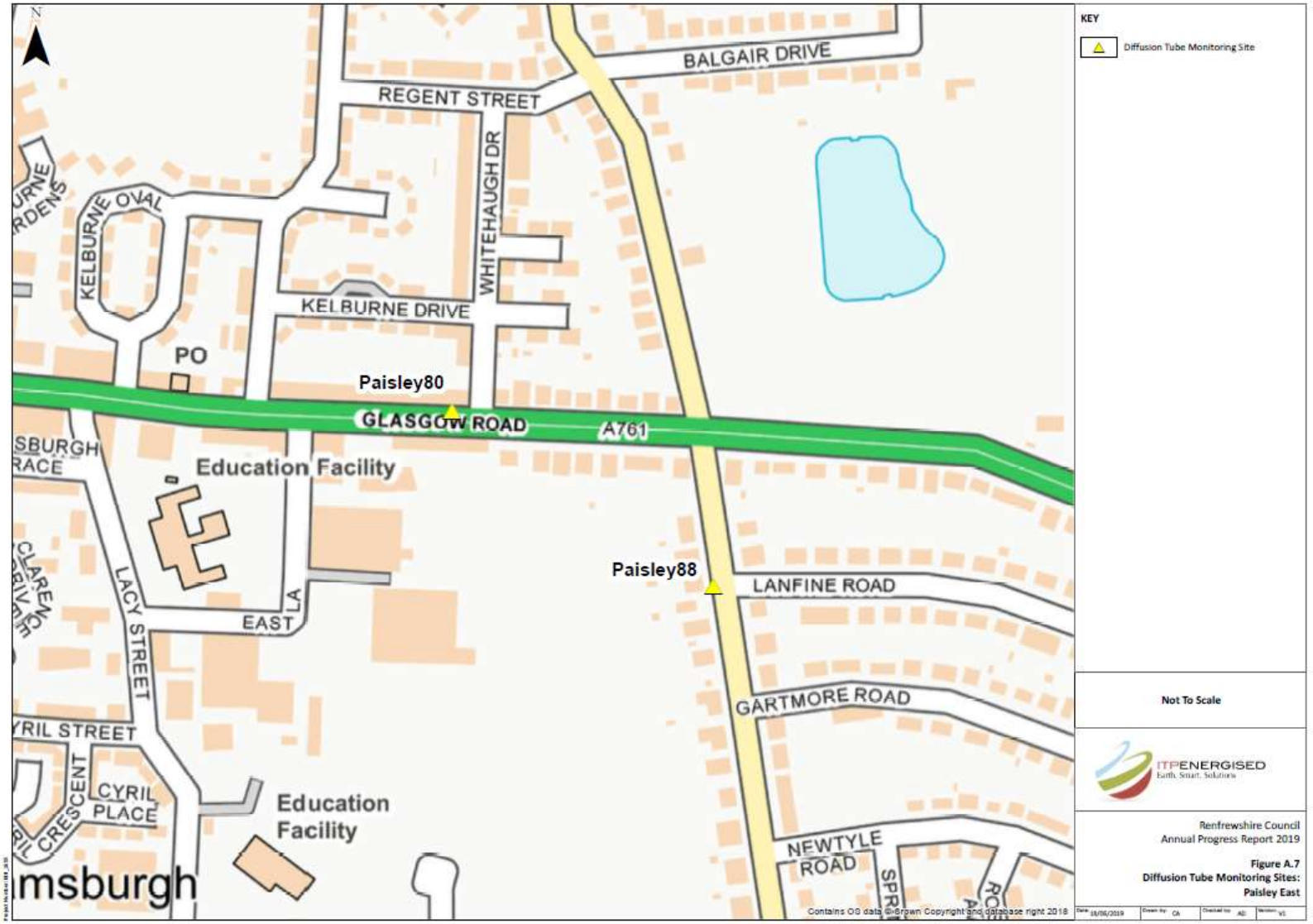


**Figure A.8– Diffusion Tube Monitoring Site Locations – Paisley South**

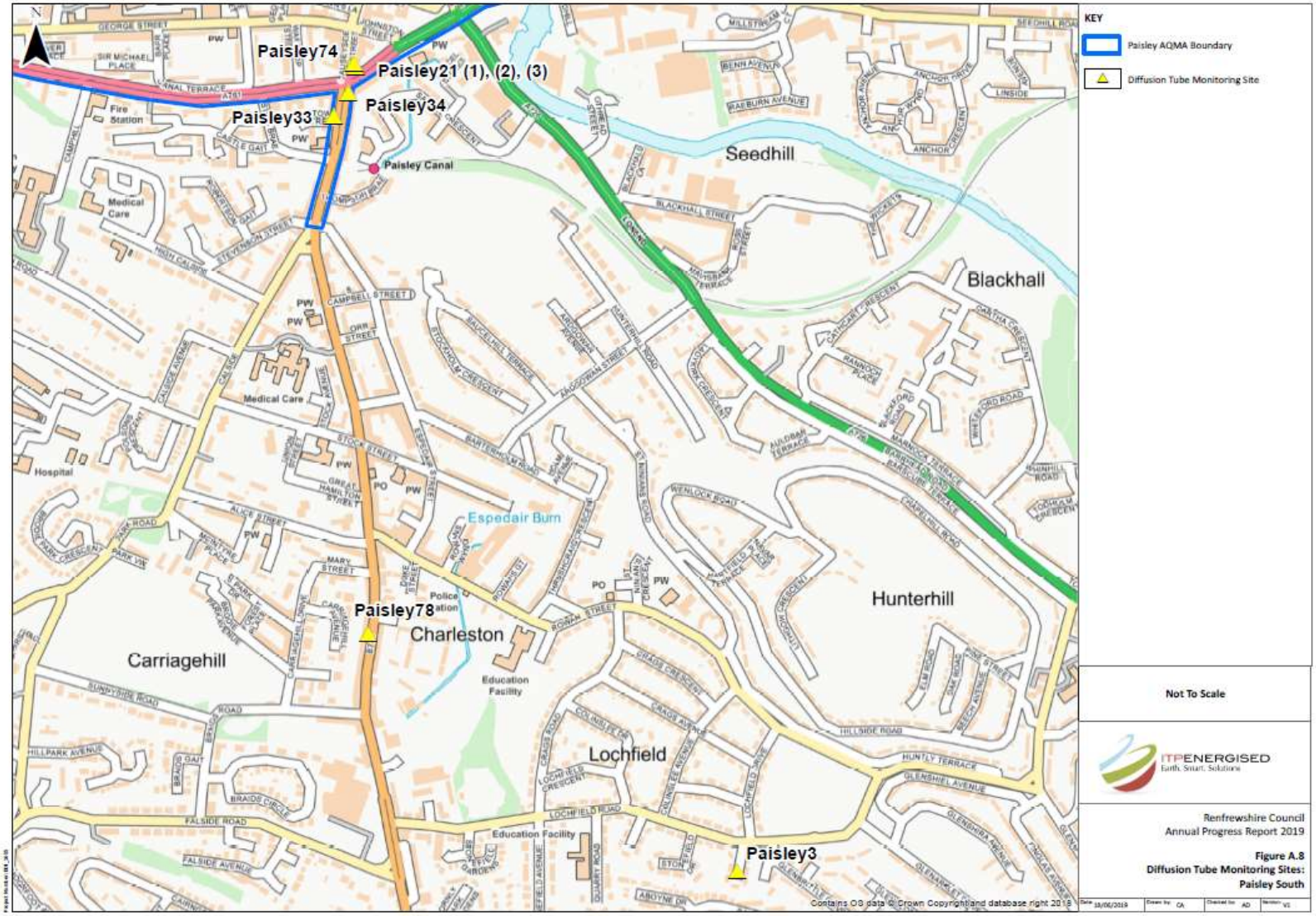


**Figure A.9– Diffusion Tube Monitoring Site Locations – Paisley West**

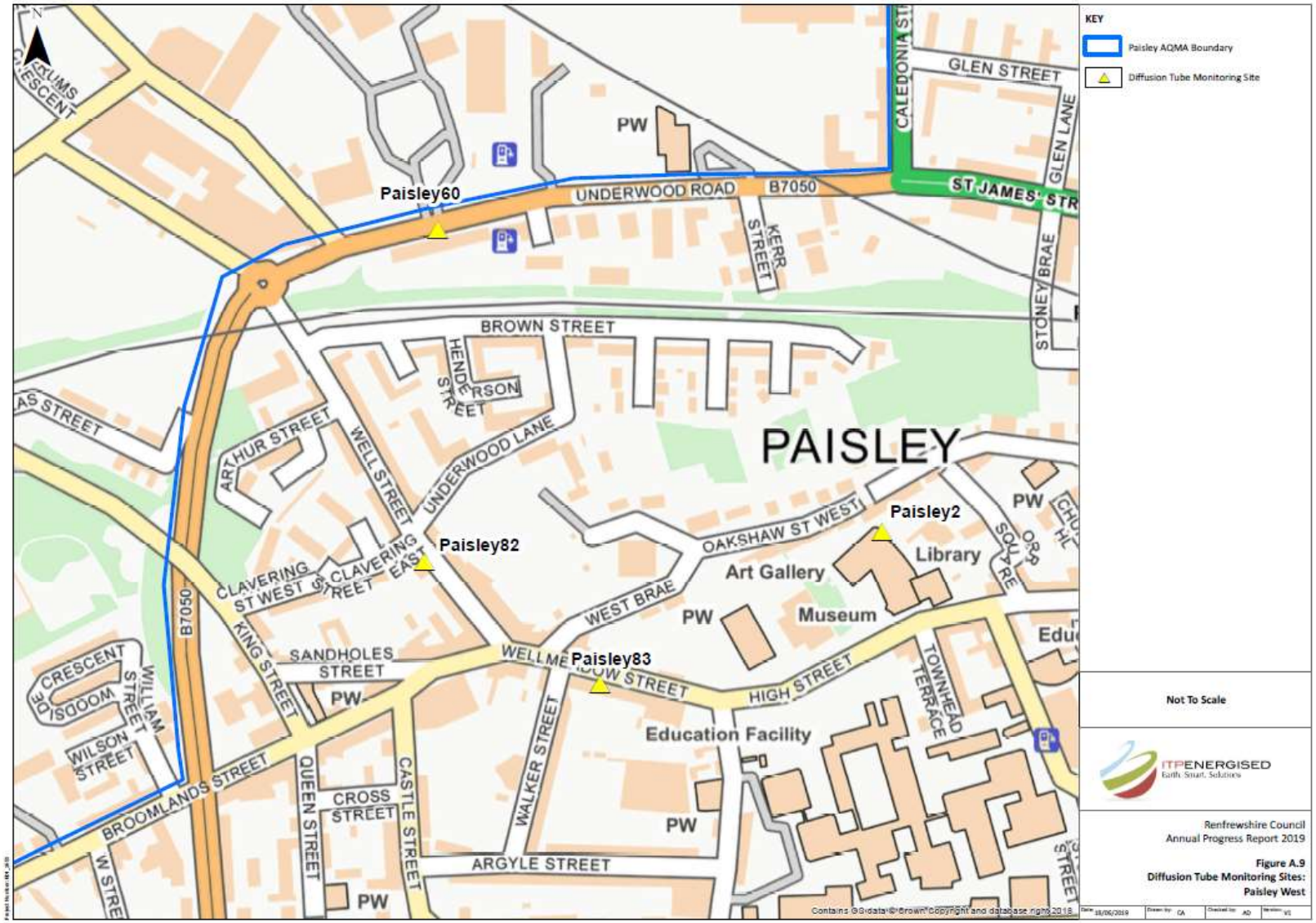


**Figure A.10– Diffusion Tube Monitoring Site Locations – Paisley South-West**

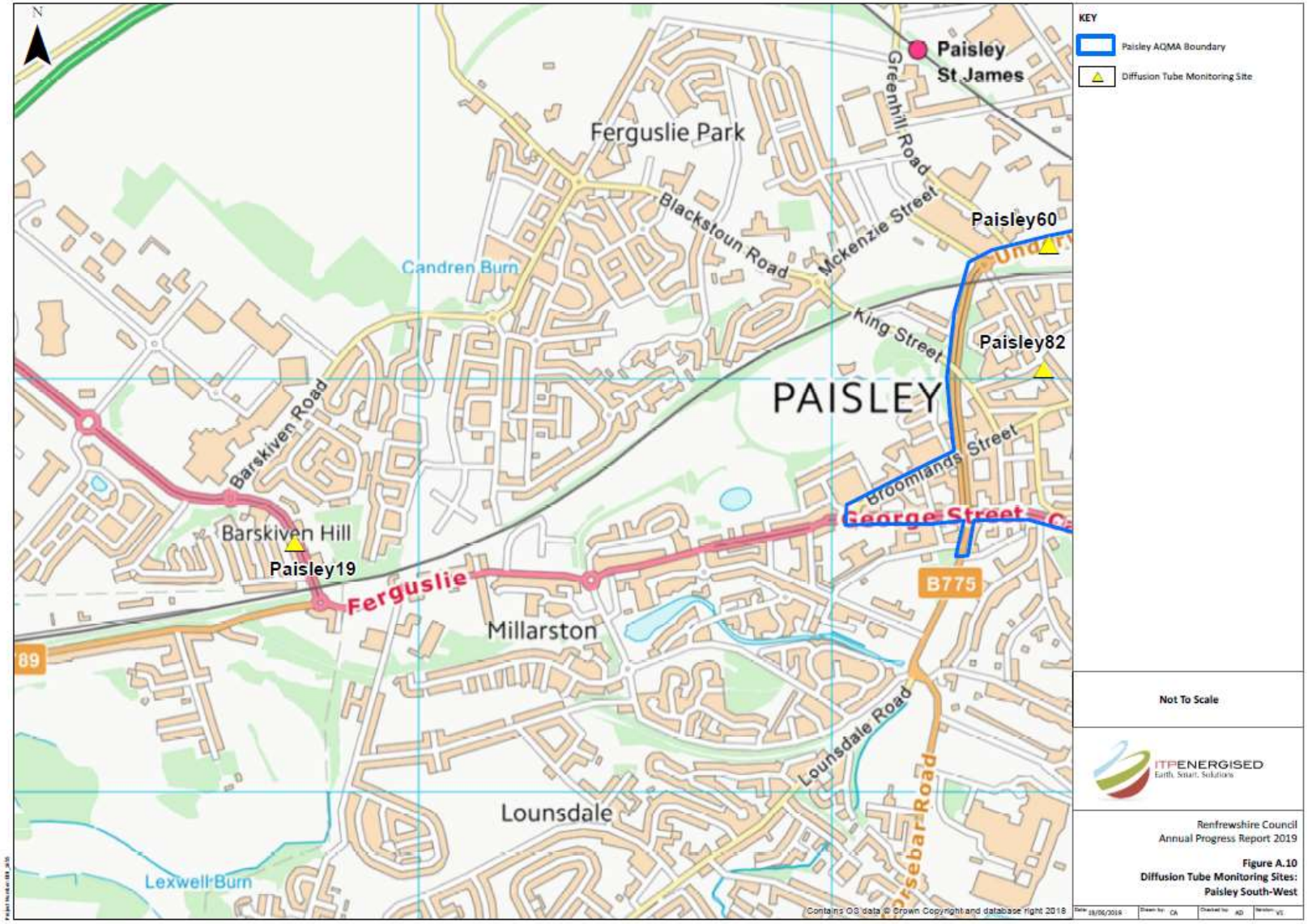


**Figure A.11– Diffusion Tube Monitoring Site Locations – Johnstone**

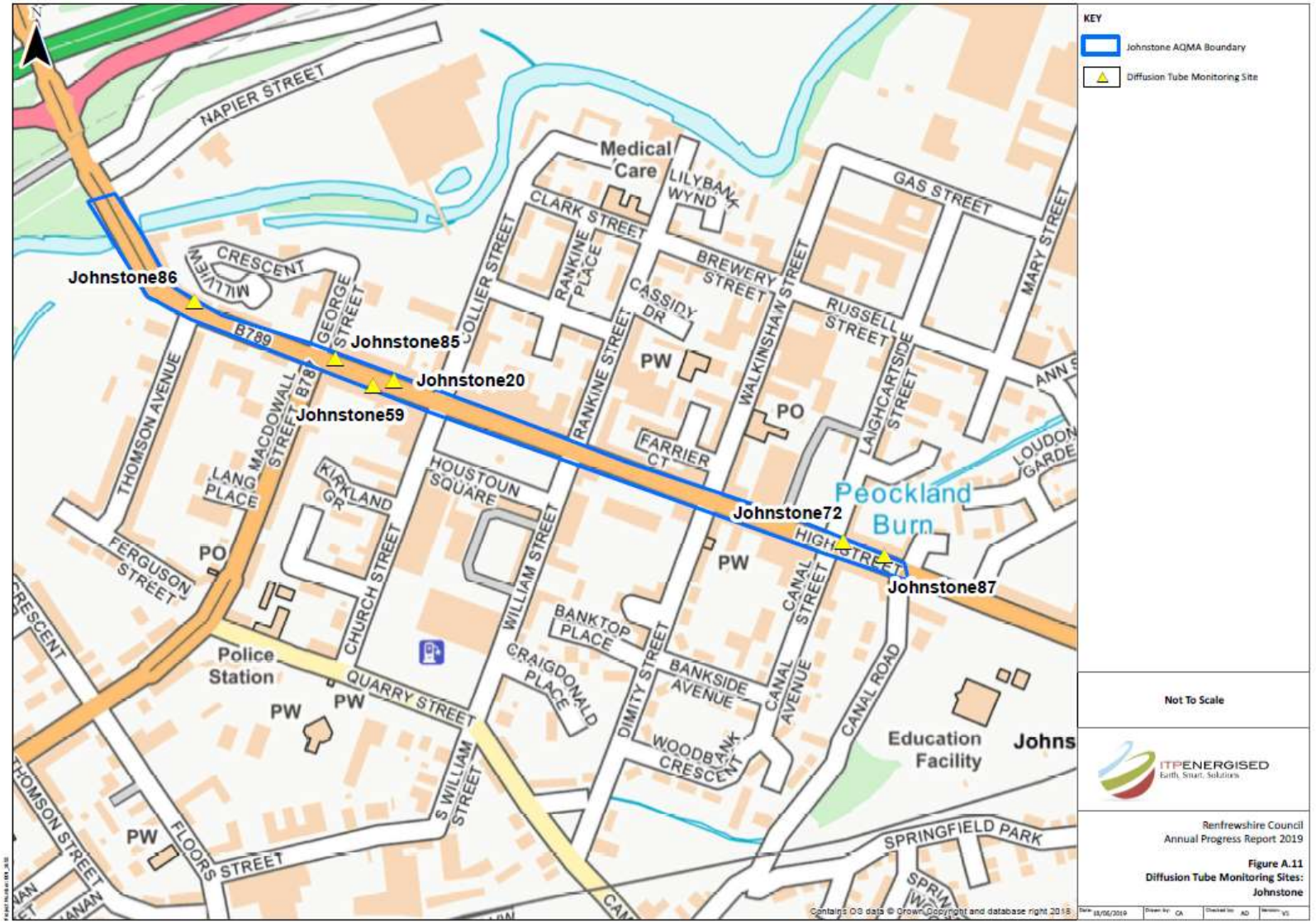


**Figure A.12– Diffusion Tube Monitoring Site Locations – Kilbarchan**

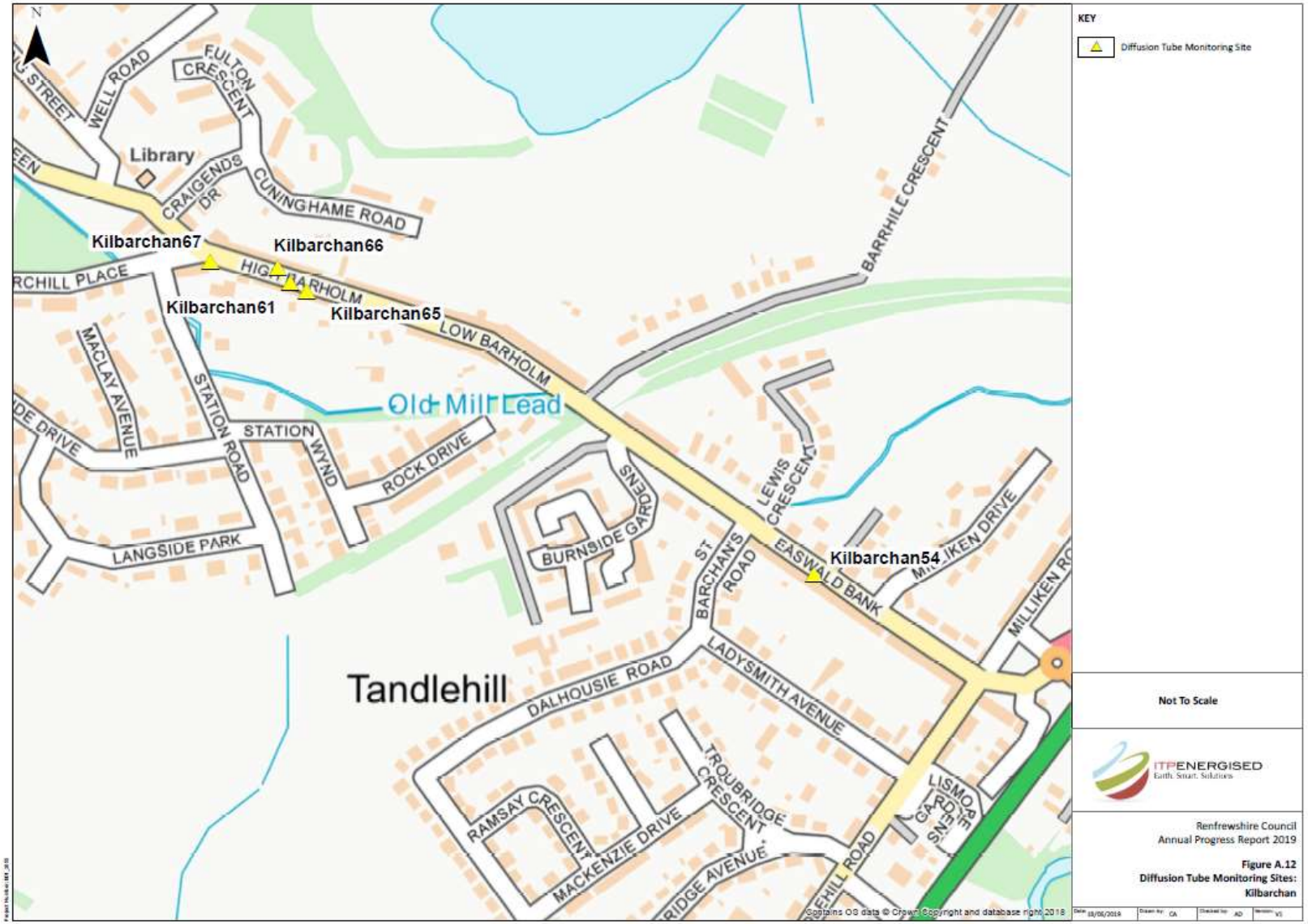


**Figure A.13– Diffusion Tube Monitoring Site Locations – Bridge of Weir**

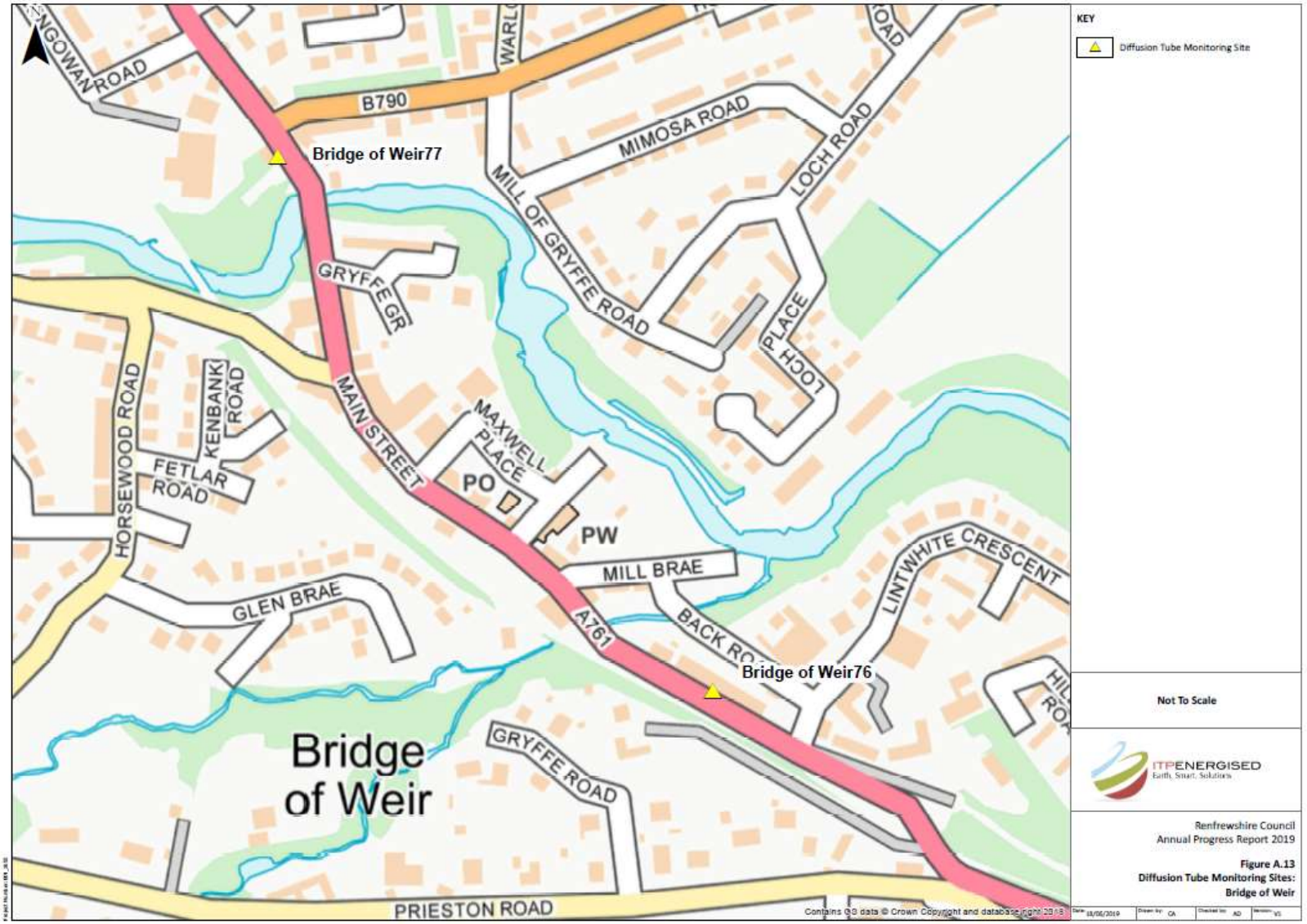


**Figure A.14– Diffusion Tube Monitoring Site Locations – West Walkingshaw**

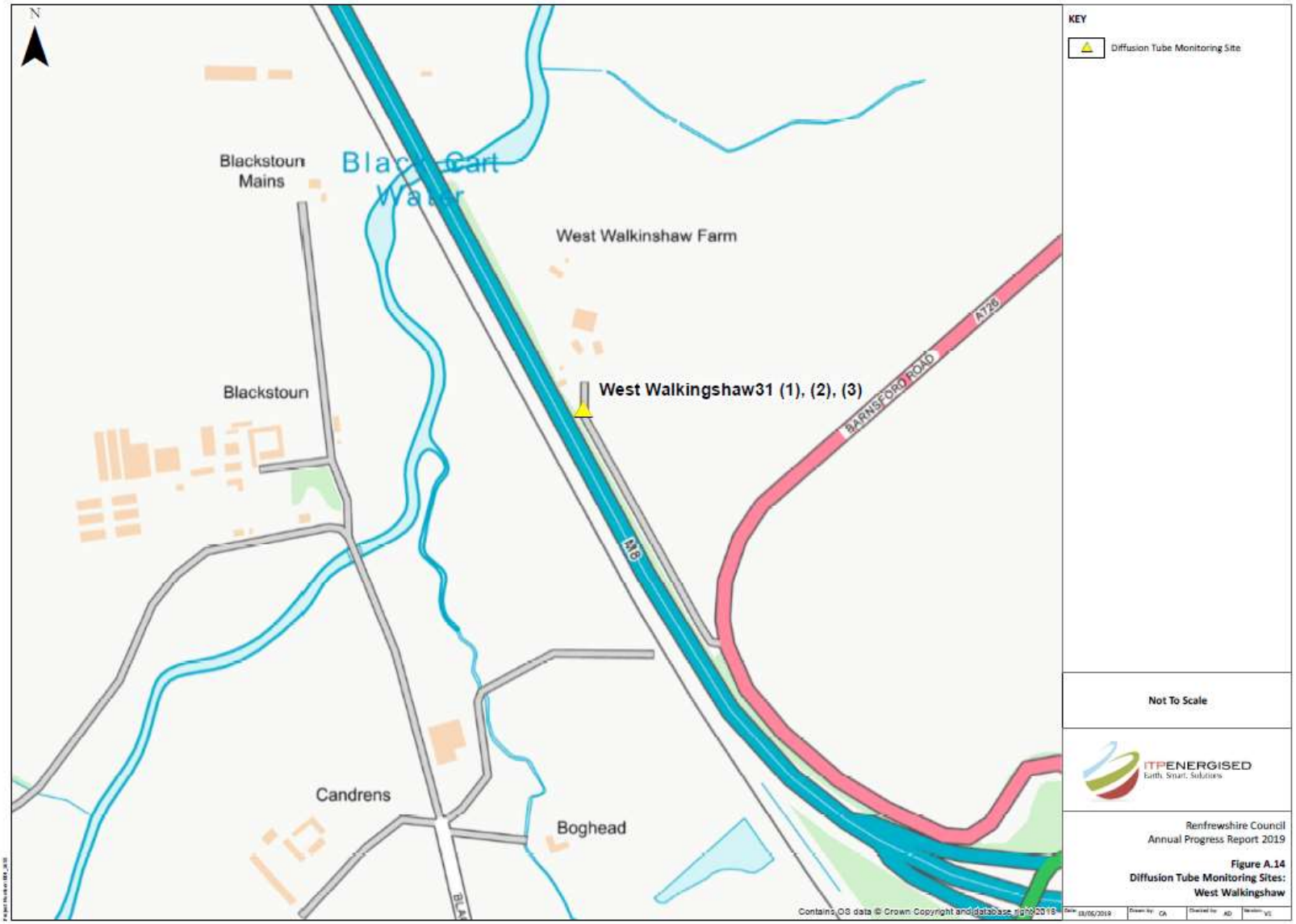


**Figure A.15– Diffusion Tube Monitoring Site Locations – Renfrew South**

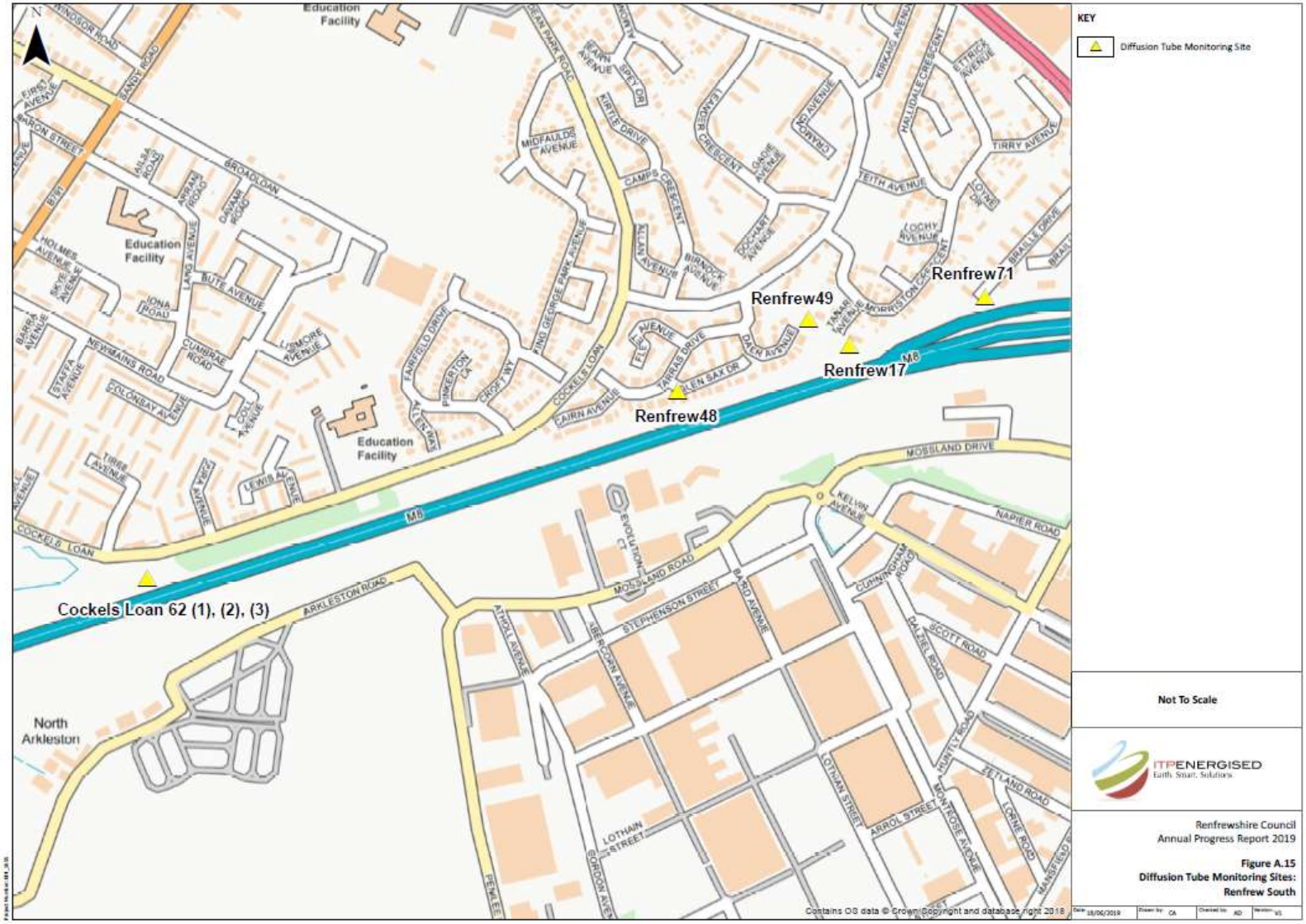


**Figure A.16– Diffusion Tube Monitoring Site Locations – Renfrew South-East**

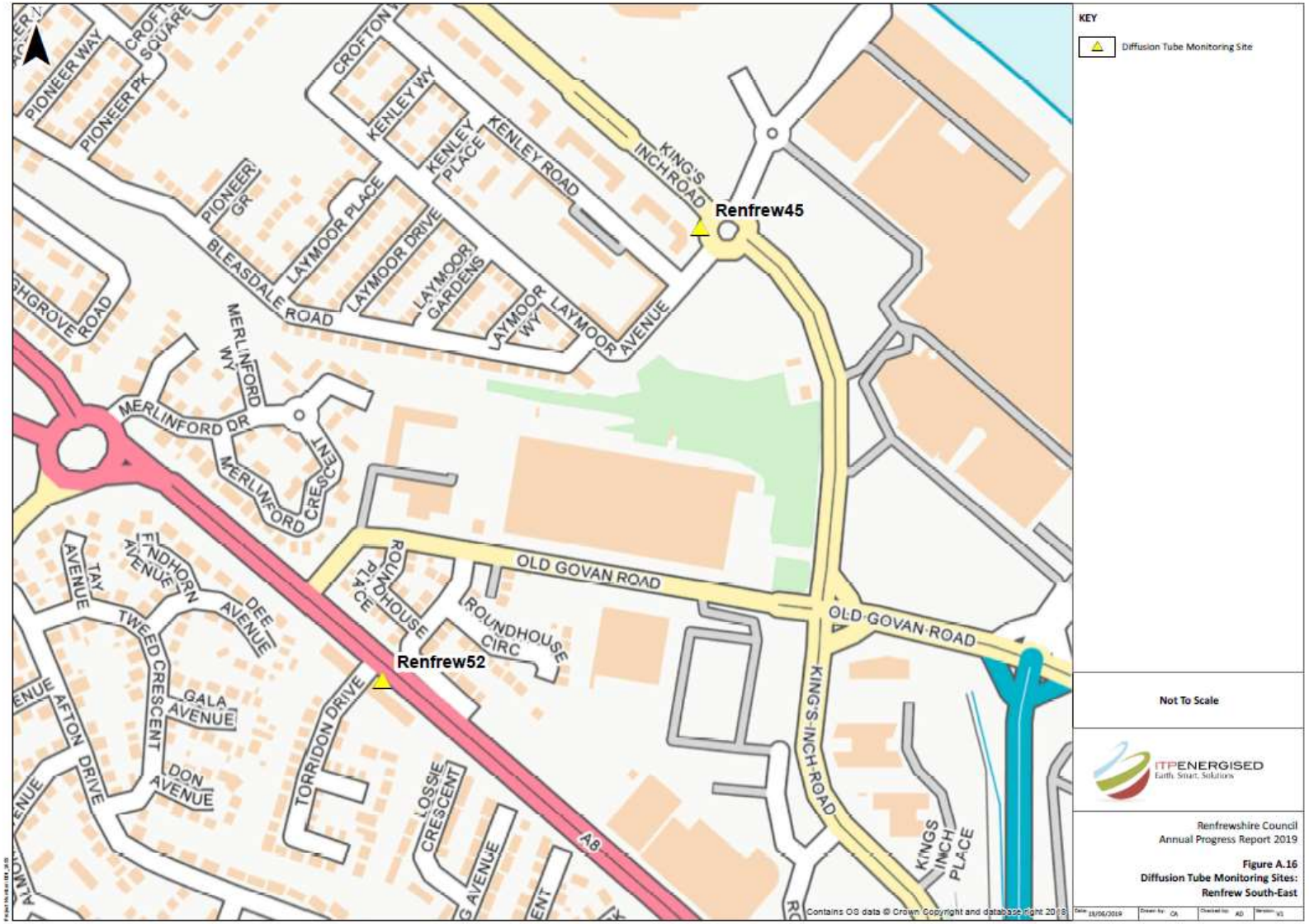


**Figure A.17– Diffusion Tube Monitoring Site Locations – Renfrew Centre**

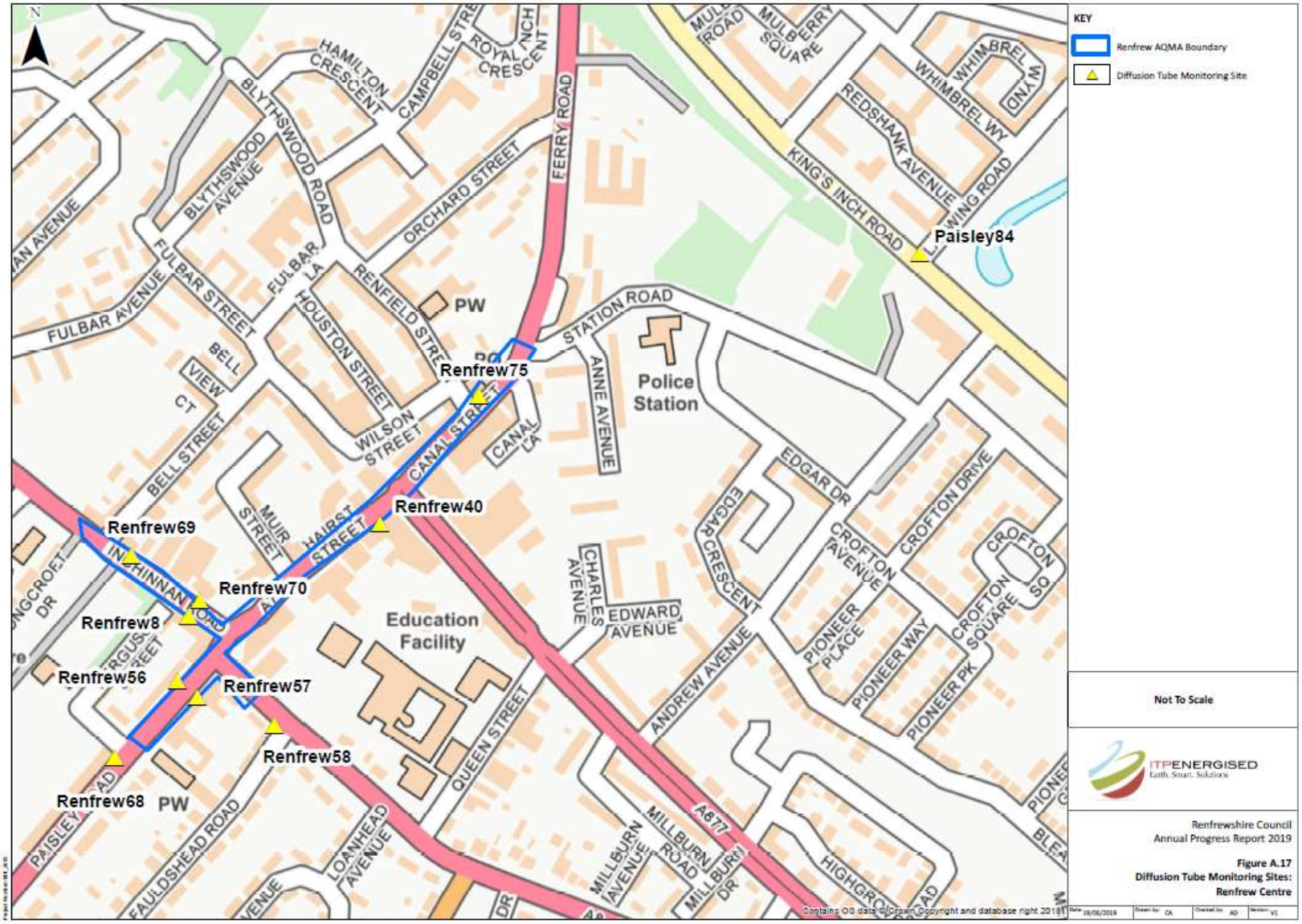


**Figure A.18– Diffusion Tube Monitoring Site Locations – Inchinnan**

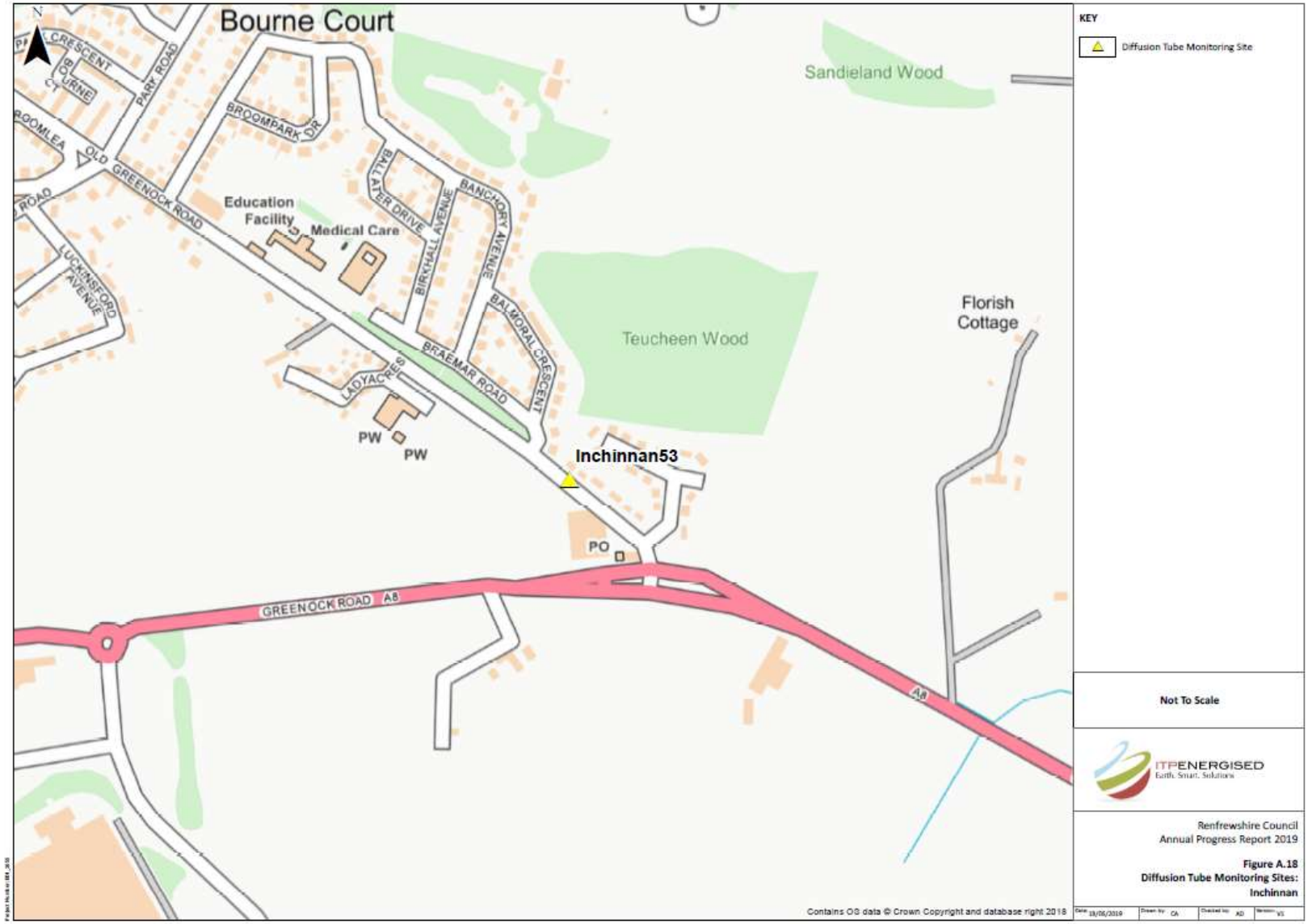


**Figure A.19– Diffusion Tube Monitoring Site Locations – Bishopton**

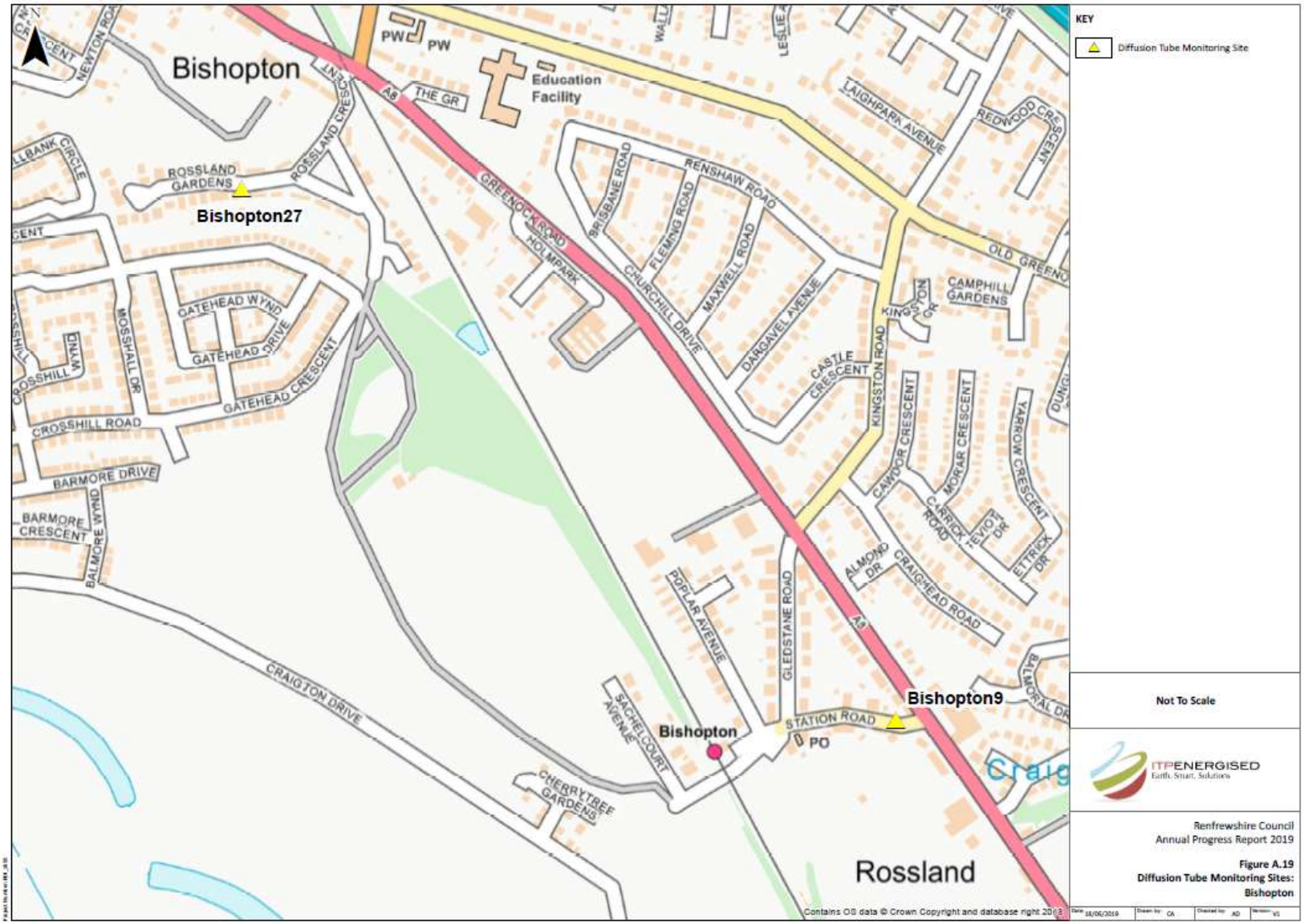


**Table A.3 – Annual Mean $NO_2$ Monitoring Results**

| Site ID | Site Type | Monitoring Type | Valid Data Capture for Monitoring Period (%) (1) | Valid Data Capture 2018 (%) (2) | $NO_2$ Annual Mean Concentration ($\mu g/m^3$) (3)(4) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2014 | 2015 | 2016 | 2017 | 2018 |
| Gordon Street, Paisley | Roadside | Automatic | 93% | 93% | 28 | 27 | 30 | 27.4** | 31.5 |
| Cockels Loan | Roadside | Automatic | 96% | 96% | 34 | 36 | 34 | 32.1 | 31.6 |
| Paisley1 | Urban Centre | Passive | 92% | 92% | 29.4 | 18.8 | 18 | 21.1 | 20.3 |
| Paisley2 | Urban Background | Passive | 100% | 100% | 17.8 | 12.7 | 14.8 | 12.5 | 14.4 |
| Paisley3 | Urban Background | Passive | 100% | 100% | 12.4 | 9.3 | 9.8 | 9.5 | 12.0 |
| Renfrew8 | Kerbside | Passive | 100% | 92% | **62.0 (61.6)** | **43.4 (43.2)** | 37.8 | **42.8** (42.5)** | **41.1 (40.8)** |
| Bishopton9 | Roadside | Passive | 100% | 100% | 19.2 | 13.1 | 13.2 | 14.5 | 18.13 |
| Paisley13 | Roadside | Passive | 100% | 100% | 27.9 (30.6) | 20.5 (21.3) | 23.2 (26.7) | 24.0 (26.8) | 20.5 (22.1) |
| Paisley15 | Roadside | Passive | 100% | 100% | **41.2** (36.2) | 26.2 | 31.1 | 28.9 | 24.9 |
| Renfrew17 | Roadside | Passive | 100% | 100% | **40.0 (42.1)** | 32.5 (34.1) | 32.5 | 31.5 | 33.7 |
| Paisley19 | Roadside | Passive | 100% | 100% | 34.8 | 24.5 | 25.5 | 25.6 | 28.3 |
| Johnstone20 | Kerbside | Passive | 100% | 100% | **45.2** | 33.2 | 27.8 | 28.5 | 29.7 |
| Paisley21 | Roadside | Passive | 100% | 100% | 39.4 **(48.1)** | 28 (31.6) | 28.8 (35.0) | 28.6 | 28.9 (34.5) |
| Bishopton27 | Suburban | Passive | 100% | 100% | 12.3 | 8.1 | 9.1 | 12.4 | 12.0 |
| West Walkingshaw31 | Roadside | Passive | 100% | 92% | 33.1 **(44.6)** | 26.4 (32.8) | 26.6 (39.2) | 25.8 (35.9) | 25.1 (35.0) |

| Site ID | Site Type | Monitoring Type | Valid Data Capture for Monitoring Period (%) [1] | Valid Data Capture 2018 (%) [2] | $NO_2$ Annual Mean Concentration ($\mu g/m^3$) [3][4] | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2014 | 2015 | 2016 | 2017 | 2018 |
| Paisley33 | Roadside | Passive | 100% | 100% | **42.0 (40.0)** | 33.2 | 30.1 | 32.8 | 31.7 |
| Paisley34 | Roadside | Passive | 100% | 100% | **46.5 (36.9)** | 35.4 | 36.9 | 37.1 (29.8) | 37.89 (30.4) |
| Paisley35 | Roadside | Passive | 100% | 100% | **47.3 (46.5)** | 30.5 | 34.4 | 32.6 | 34.7 |
| Paisley36 | Roadside | Passive | 100% | 100% | 38.7 | 29.8 | 27.4 | 28.7 | 30.4 |
| Renfrewshire40 | Roadside | Passive | 92% | 92% | 38.5 | 27.6 | 28.1 | 28.7 | 27.4 |
| Paisley41 | Roadside | Passive | 100% | 100% | **48.8** (36.5) | 37.9 | 33.8 | 32.1 | 30.6 |
| Paisley43 | Roadside | Passive | 92% | 92% | **41.9 (41.9)** | 32.1 | 30 | 28.5 | 28.9 |
| Paisley44 | Roadside | Passive | 100% | 100% | 29.5 | 21.8 | 21.5 | 22.5 | 23.6 |
| Renfrew45 | Kerbside | Passive | 92% | 92% | 30.2 | 23.6 | 23.2 | 24.5 | 25.8 |
| Renfrew48 | Roadside | Passive | 100% | 100% | 35.2 (38.3) | 28.7 (30.7) | 29.0 (31.3) | 28.7 (33.6) | 30.9 (37.5) |
| Renfrew49 | Roadside | Passive | 100% | 100% | 34.2 | 22.4 | 24.3 | 28.2 | 26.8 |
| Paisley50 | Roadside | Passive | 100% | 100% | 32.9 | 25.6 | 23.5 | 32.3 | 29.4 |
| Renfrew52 | Roadside | Passive | 100% | 100% | 34.3 | 27.2 | 26.8 | 29.1 | 31.8 |
| Inchinnan53 | Roadside | Passive | 100% | 100% | 28.1 | 22.9 | 23.6 | 23 | 23.6 |
| Kilbarchan54 | Roadside | Passive | 100% | 100% | 29.9 | 20.7 | 22.4 | 22.6 | 21.6 |
| Renfrew56 | Roadside | Passive | 100% | 100% | 39.3 | 30.2 | 30.6 | 30.6 | 30.3 |
| Renfrew57 | Roadside | Passive | 100% | 100% | 37.8 | 24 | 22.3 | 26 | 24.1 |
| Renfrew58 | Roadside | Passive | 100% | 100% | 26.5 | 18.5 | 20.7 | 20.8 | 21.7 |
| Johnstone59 | Roadside | Passive | 92% | 92% | **57.0 (56.4)** | **45.3 (45.0)** | 39.1 | **41.0 (40.6)** | **40.0** (39.6)[5] |

| Site ID | Site Type | Monitoring Type | Valid Data Capture for Monitoring Period (%) [1] | Valid Data Capture 2018 (%) [2] | $NO_2$ Annual Mean Concentration (µg/m$^3$) [3][4] | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2014 | 2015 | 2016 | 2017 | 2018 |
| Paisley60 | Roadside | Passive | 100% | 100% | **42.2** (28.9) | 28.9 | 31.6 | 30.3 | 34.4 |
| Kilbarchan61 | Roadside | Passive | 100% | 100% | **40.3** (39.7) | 31.2 | 30.4 | 36.7 (36.1) | 32.4 |
| Cockels Loan 62 | Roadside | Passive | 92% | 92% | **46.4 (43.4)** | 35.3 | 32.3 | 34.6 | 36.8 (35.3) |
| Paisley63 | Roadside | Passive | 100% | 100% | **40.1** (35.5) | 29.7 | 31.2 | 32.5 | 33.2 |
| Paisley64 | Roadside | Passive | 100% | 100% | 32.3 | 27.8 | 26 | 29.2 | 29.0 |
| Kilbarchan65 | Roadside | Passive | 100% | 92% | 37.7 | 28.2 | 26.6 | 33.2 | 28.2 |
| Kilbarchan66 | Roadside | Passive | 100% | 100% | 21.5 | 18.7 | 18.1 | 23 | 19.3 |
| Kilbarchan67 | Roadside | Passive | 100% | 100% | 19.1 | 14.7 | 14.3 | 17.3 | 18.6 |
| Renfrew68 | Roadside | Passive | 100% | 100% | 33.8 | 27.3 | 25.9 | 27.3 | 27.4 |
| Renfrew69 | Roadside | Passive | 100% | 100% | **44.3 (44.0)** | 31.8 | 39.7 | 31.2 | 30.7 |
| Renfrew70 | Roadside | Passive | 83% | 83% | 32.0 | 29.2 | 26 | 26.8 | 31.7 |
| Renfrew71 | Roadside | Passive | 75% | 75% | 38.5 | 28.9 | 28.1 | 29.7 | 28.5 |
| Johnstone72 | Roadside | Passive | 92% | 92% | - | - | 22.3 | 20.9 | 22.9 |
| Paisley73 | Roadside | Passive | 92% | 92% | - | - | 35.8 | 35.1 | 32.0 |
| Paisley74 | Roadside | Passive | 100% | 100% | - | - | 30.8 | 28 | 30.9 |
| Renfrew75 | Roadside | Passive | 100% | 100% | - | - | 23.7 | 25.3 | 22.6 |
| Bridge of Weir76 | Roadside | Passive | 92% | 92% | - | - | 22.9 | 21.3 | 19.1 |
| Bridge of Weir77 | Roadside | Passive | 100% | 100% | - | - | 24.1 | 24.3 | 22.7 |
| Paisley78 | Roadside | Passive | 100% | 100% | - | - | 28.8 | 27.8 | 28.9 |
| Paisley79 | Roadside | Passive | 100% | 100% | - | - | 34.4 | 39.6 (39.2) | 32.5 |

| Site ID | Site Type | Monitoring Type | Valid Data Capture for Monitoring Period (%) (1) | Valid Data Capture 2018 (%) (2) | $NO_2$ Annual Mean Concentration (µg/m$^3$) (3)(4) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2014 | 2015 | 2016 | 2017 | 2018 |
| Paisley80 | Roadside | Passive | 100% | 100% | - | - | 23.1 | 25.8 | 24.9 |
| Airport81 | Roadside | Passive | 92% | 92% | - | - | 25.3 | 22.5 | 23.3 |
| Paisley82 | Roadside | Passive | 100% | 100% | - | - | 39.5 | 37.7 (37.2) | 33.2 |
| Paisley83 | Roadside | Passive | 100% | 100% | - | - | 38.1 | 30.5 | 31.1 |
| Paisley84 | Kerbside | Passive | 100% | 100% | - | - | 32.9 | 20.2 | 24.3 |
| Johnstone85 | Kerbside | Passive | 92% | 92% | - | - | - | 28.5 | 26.1 |
| Johnstone86 | Kerbside | Passive | 100% | 100% | - | - | - | 19.5 | 28.1 |
| Johnstone87 | Kerbside | Passive | 100% | 100% | - | - | - | 22.5 | 22.8 |
| Paisley88 | Kerbside | Passive | 100% | 100% | - | - | - | 18.5 | 21.9 |
| Paisley89 | Kerbside | Passive | 100% | 33% | - | - | - | - | 22.4* |

Notes: Exceedances of the $NO_2$ annual mean objective of 40µg/m$^3$ are shown in **bold**.

$NO_2$ annual means exceeding 60µg/m$^3$, indicating a potential exceedance 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.

(4) As per LAQM.TG(16) guidance distance correction has been applied to all concentrations above the $NO_2$ annual mean objective, and also those within 10% of the objective. Distance corrected $NO_2$ annual means are shown in brackets. Where a concentration has increased, the receptor is closer to the kerbside than the monitor. Those sites that are still exceeding 40µg/m$^3$ following distance correction are shaded in rose.

(5) Site Johnstone 59 – although site reading is close to annual mean objective of 40µg/m$^3$, exposure is at street level whereas there is no exposure to public until first floor level in this section of the High Street.

*- Annualised as per LAQM.TG(09) guidance.

**- Annualised as per LAQM.TG(16) guidance.

**Table A.4 – 1-Hour Mean $NO_2$ Monitoring Results**

| Site ID | Site Type | Monitoring Type | Valid Data Capture for Monitoring Period (%) (1) | Valid Data Capture 2018 (%) (2) | $NO_2$ 1-Hour Means > 200µg/m$^3$ (3) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2014 | 2015 | 2016 | 2017 | 2018 |
| Gordon Street | Roadside | Automatic | 92.9 | 92.9 | 0 | 0 | 0 | 3 (149) | 0 |
| Cockels Loan | Roadside | Automatic | 96.5 | 96.5 | - | 0 | 0 | 0 | 0 |

Notes: Exceedances of the $NO_2$ 1-hour mean objective (200µg/m$^3$ not to be exceeded more than 18 times/year) are shown in **bold.**

(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) If the period of valid data is less than 85%, the 99.8$^{th}$ percentile of 1-hour means is provided in brackets.

**Figure A.20 – Automatic Monitoring Sites - Annual Mean $NO_2$ Concentration Trends**

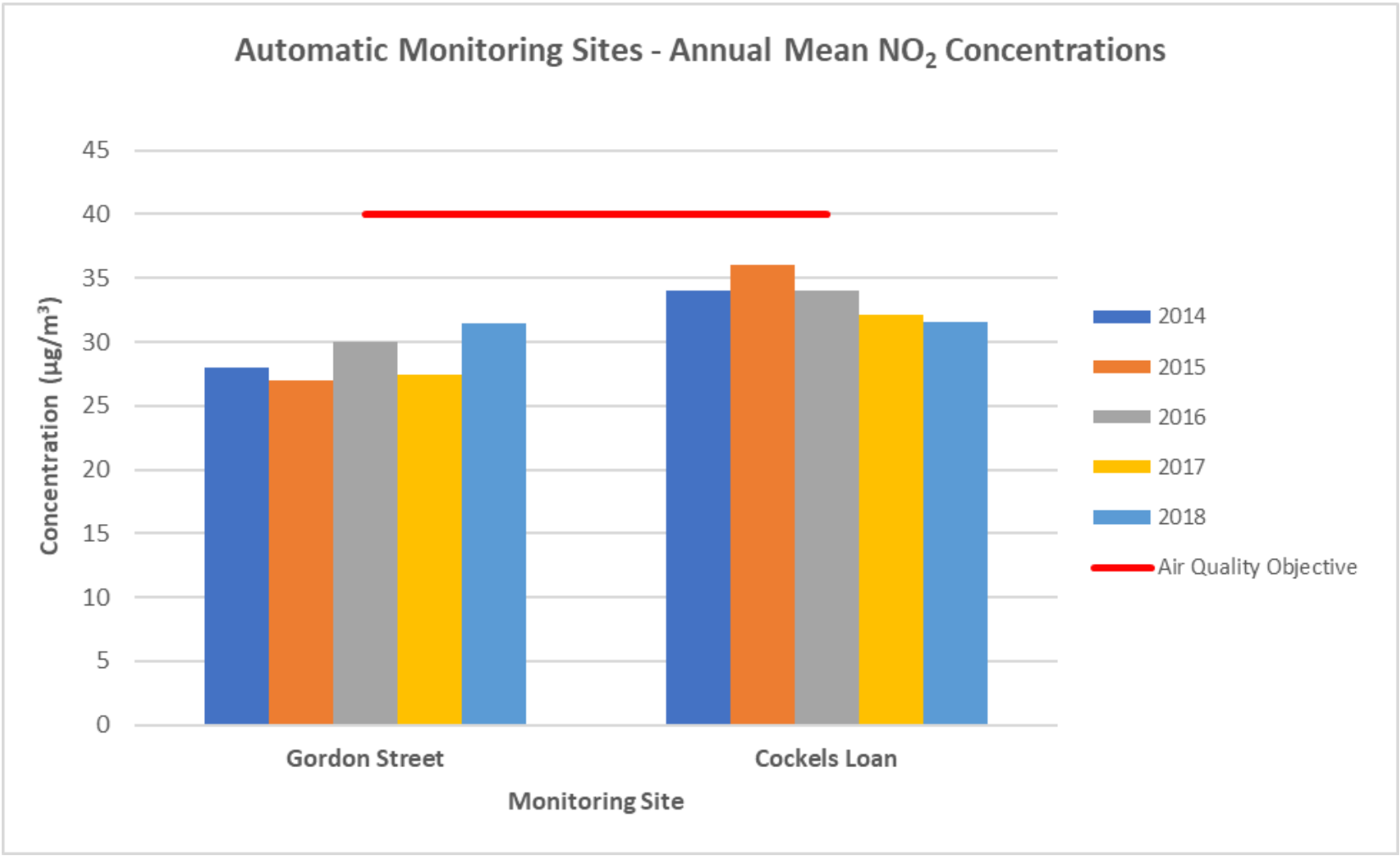


**Figure A.21 – Passive Diffusion Tube Monitoring Sites – Annual Mean $NO_2$ Concentration Trends: Graph 1**

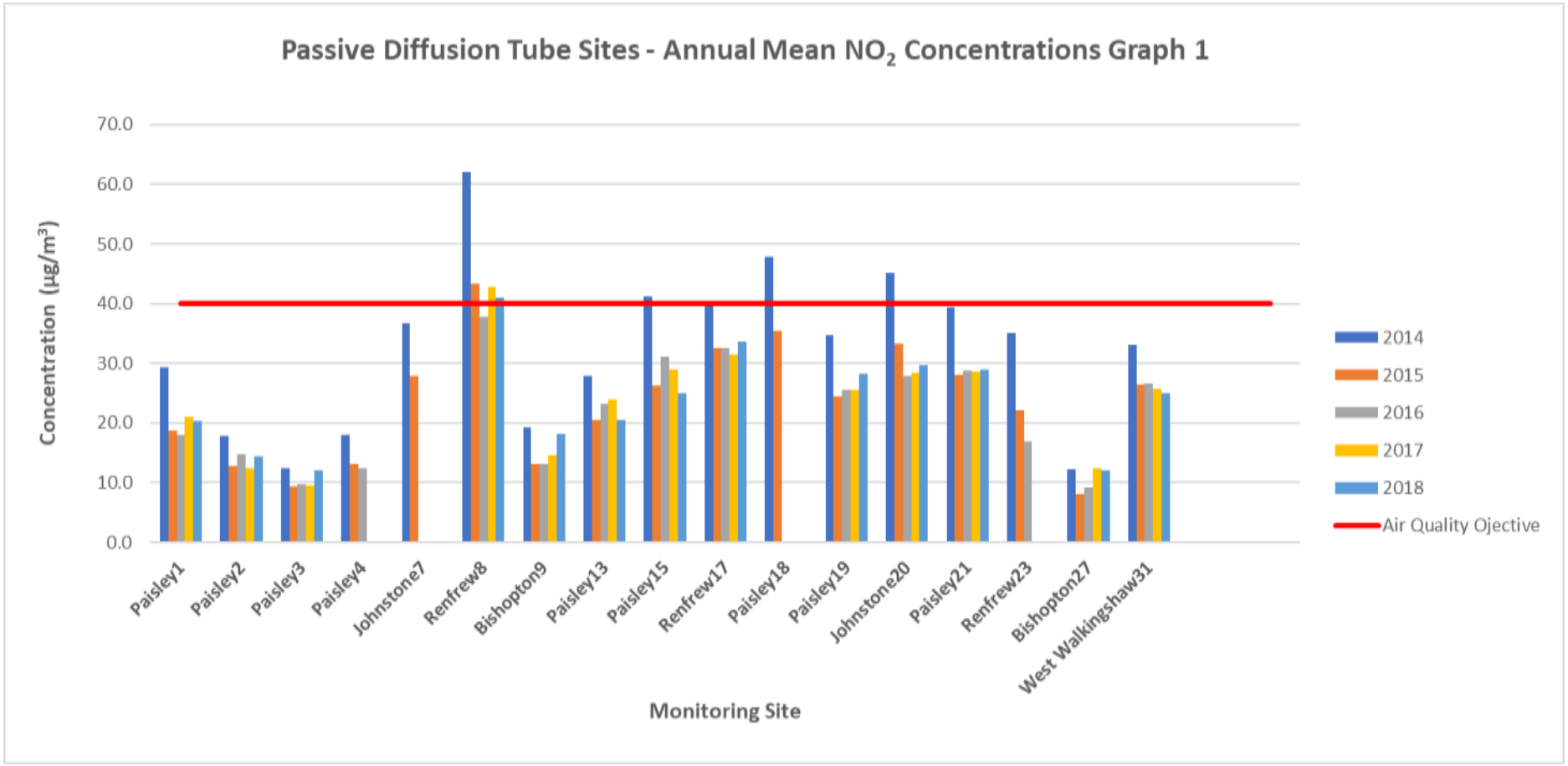


**Figure A.22 – Passive Diffusion Tube Monitoring Sites – Annual Mean $NO_2$ Concentration Trends: Graph 2**

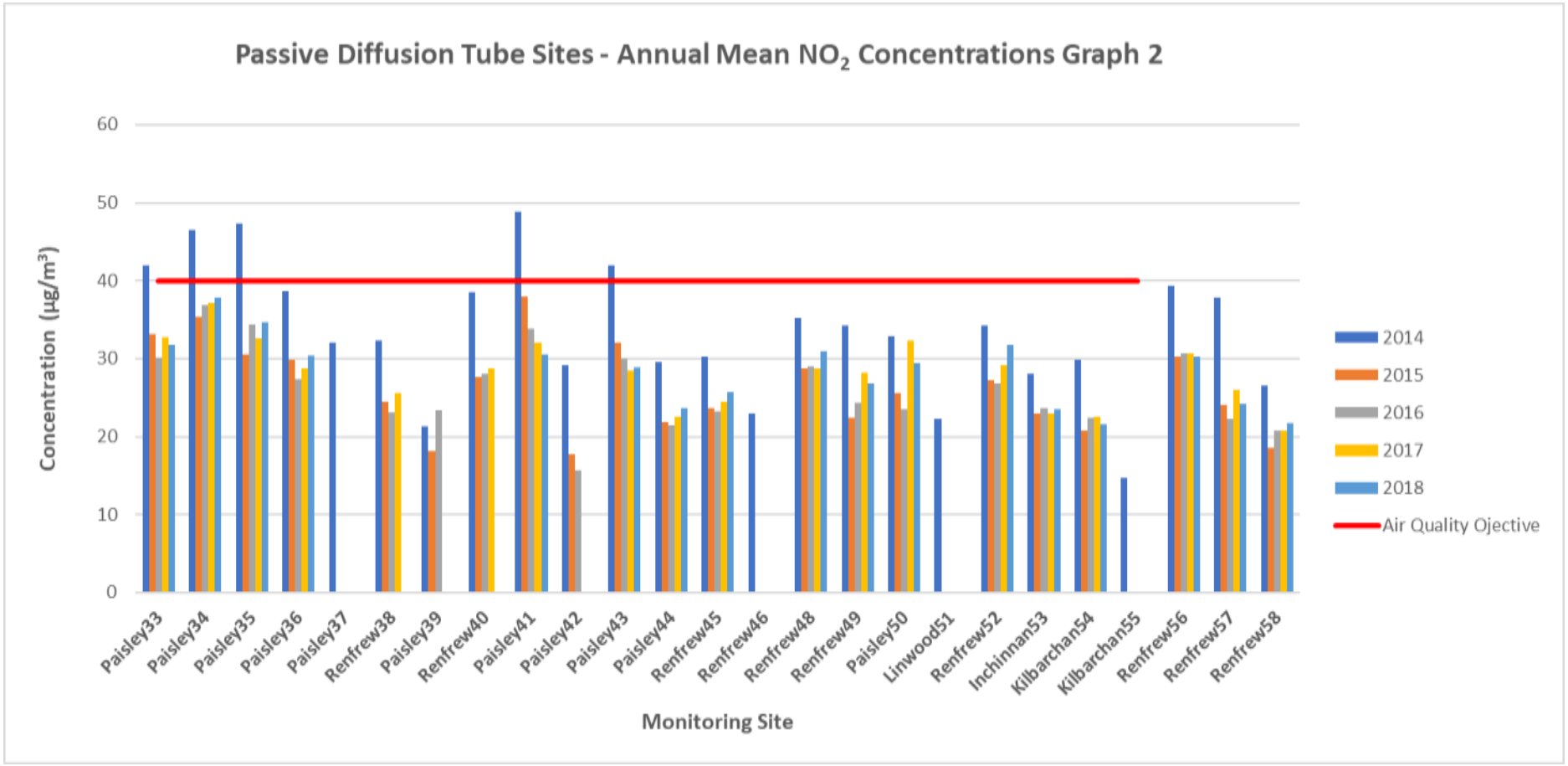


**Figure A.23 – Passive Diffusion Tube Monitoring Sites – Annual Mean $NO_2$ Concentration Trends: Graph 3**

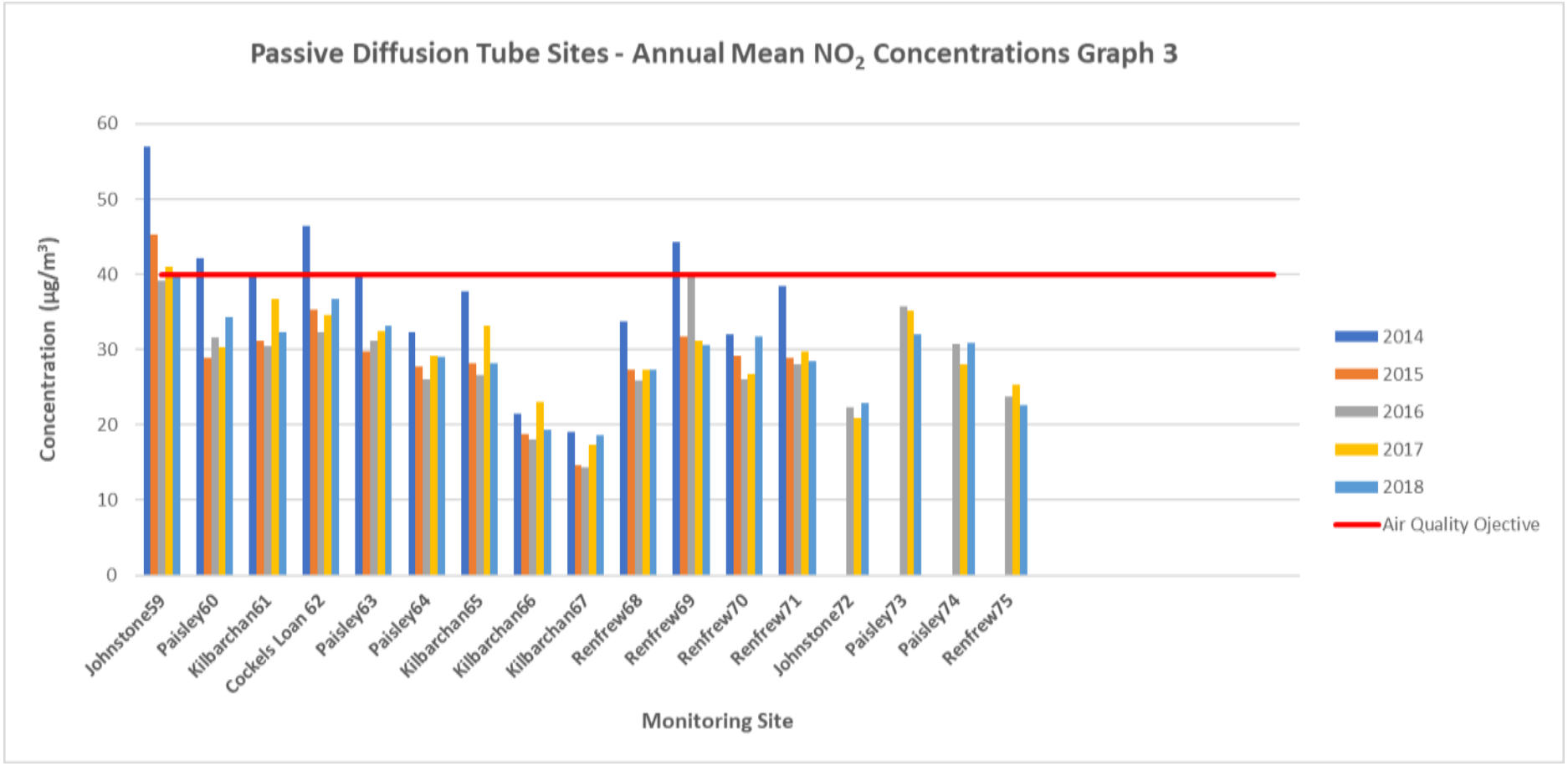


**Figure A.24 – Passive Diffusion Tube Monitoring Sites – Annual Mean $NO_2$ Concentration Trends: Graph 4**

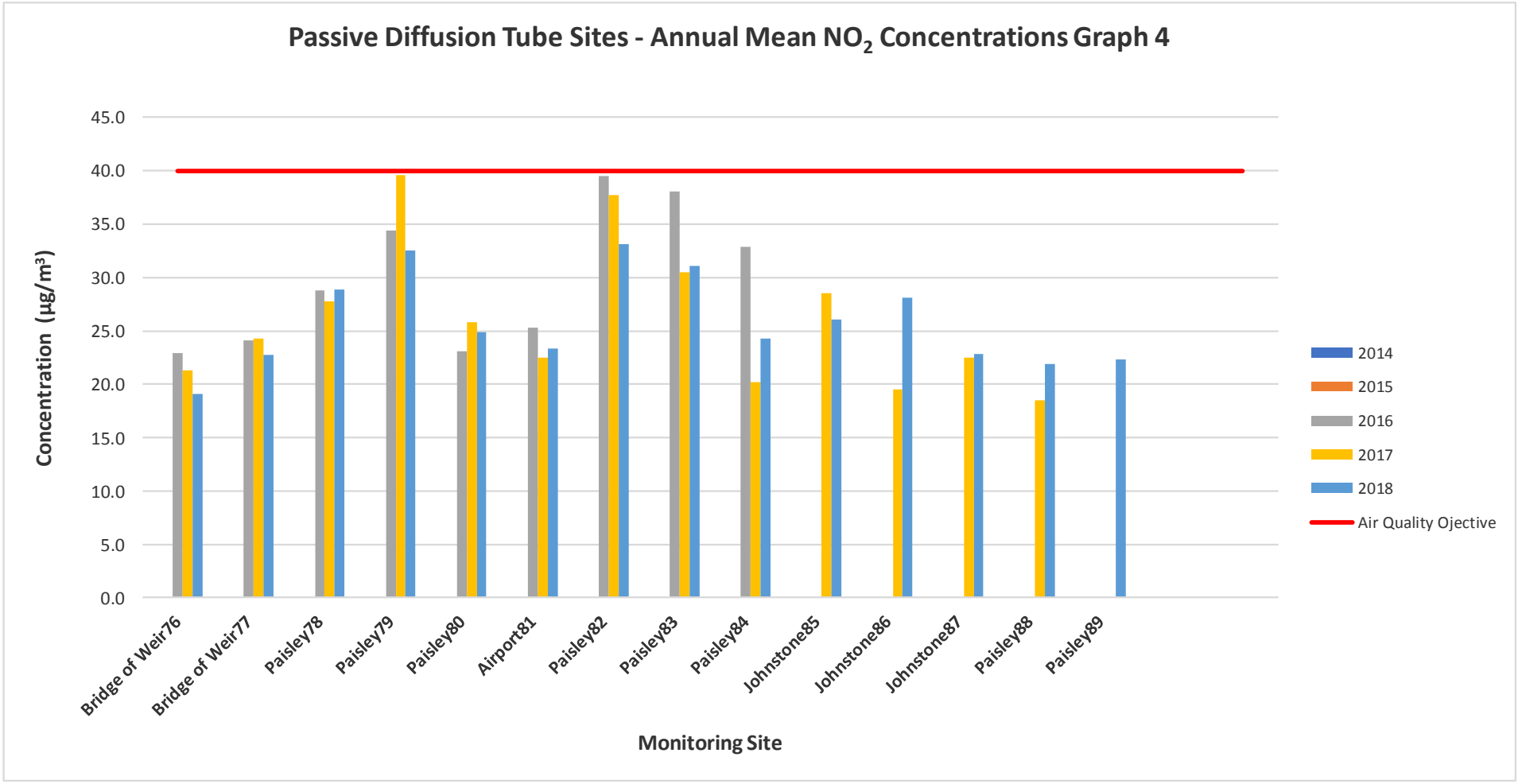


**Table A.5 – Annual Mean $PM_{10}$ Monitoring Results**

| Site ID | Site Type | Valid Data Capture for Monitoring Period (%) (1) | Valid Data Capture 2018 (%) (2) | $PM_{10}$ Annual Mean Concentration (µg/m$^3$) (3) | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | 2014 | 2015 | 2016 | 2017 | 2018 |
| Gordon Street | Roadside | 98.3 | 98.3 | **21.2*** | 15.2** | 14 | 14.7** | 12 |
| St James Street (4) | Roadside | 33.6 | 33.6 | 14.8 | 13 | 13 | 12.5 | 14** |
| Cockels Loan | Roadside | 97.8 | 97.8 | 16.2* | 13.1** | 14 | 13.6 | 16 |
| High St Johnstone | Roadside | 98.4 | 98.4 | - | - | - | 11.7** | 13 |

Notes: Exceedances of the $PM_{10}$ annual mean objective of 18µg/m$^3$ are shown in **bold.**

(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) All means have been "annualised" as per LAQM.TG(16), valid data capture for the full calendar year is less than 75%. See Appendix C for details.

(4) Site St James Street – monitoring equipment at this site was changed from monitoring $PM_{10}$ to monitoring $PM_{2.5}$ on the 04/05/18, therefore, data capture is very low.

*- Annualised as per LAQM.TG(09) guidance.
**- Annualised as per LAQM.TG(16) guidance.

**Table A.6 – 24-Hour Mean $PM_{10}$ Monitoring Results**

| Site ID | Site Type | Valid Data Capture for Monitoring Period (%) (1) | Valid Data Capture 2018 (%) (2) | $PM_{10}$ 24-Hour Means > 50µg/m$^3$ (3) | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | 2014 | 2015 | 2016 | 2017 | 2018 |
| Gordon Street | Roadside | 98.3 | 98.3 | 1 (49) | 0 (33) | 0 | 0 (36) | 0 |
| St James Street (4) | Roadside | 33.3 | 33.3 | 0 (42) | 1 | 0 | 0 | 0 |
| Cockels Loan | Roadside | 97.8 | 97.8 | 0 (43) | 3 | 1 (37) | 3 | 1 (73) |
| High St Johnstone | Roadside | 98.4 | 98.4 | - | - | - | 0 (25) | 1 (51) |

Notes: Exceedances of the $PM_{10}$ 24-hour mean objective (50µg/m$^3$ not to be exceeded more than 7 times/year) are shown in **bold.**

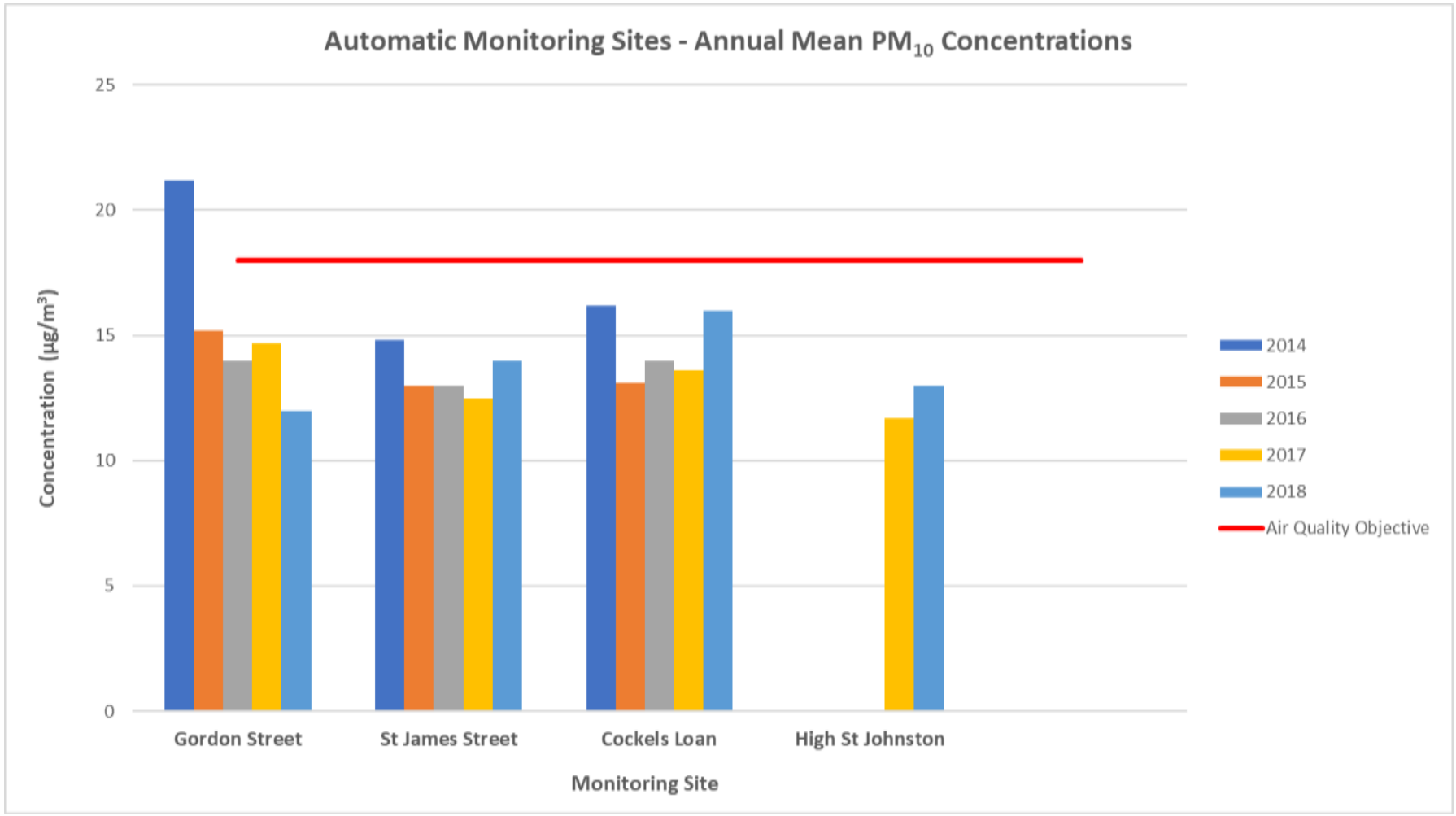
(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(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) If the period of valid data is less than 85%, the 98.1$^{st}$ percentile of 24-hour means is provided in brackets.

(4) Site St James Street – monitoring equipment at this site was changed from monitoring $PM_{10}$ to monitoring $PM_{2.5}$ on the 04/05/18, therefore, data capture is very low.

**Figure A.25 – Automatic Monitoring Sites – Annual Mean $PM_{10}$ Concentration Trends**



## Table A.7 – Annual Mean $PM_{2.5}$ Monitoring Results

| Site ID | Site Type | Valid Data Capture for Monitoring Period (%) (1) | Valid Data Capture 2018 (%) (2) | $PM_{2.5}$ Annual Mean Concentration ($\mu g/m^3$) (3) | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | 2014 | 2015 | 2016 | 2017 | 2018 |
| St James Street (4) | Roadside | 100 | 54.2 | - | - | - | - | 7.0* |
| High St Johnstone | Roadside | 98.4 | 98.4 | - | - | - | 7.1* | 7.0* |

Notes: Exceedances of the $PM_{10}$ annual mean objective of $10\mu g/m^3$ are shown in **bold.**

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

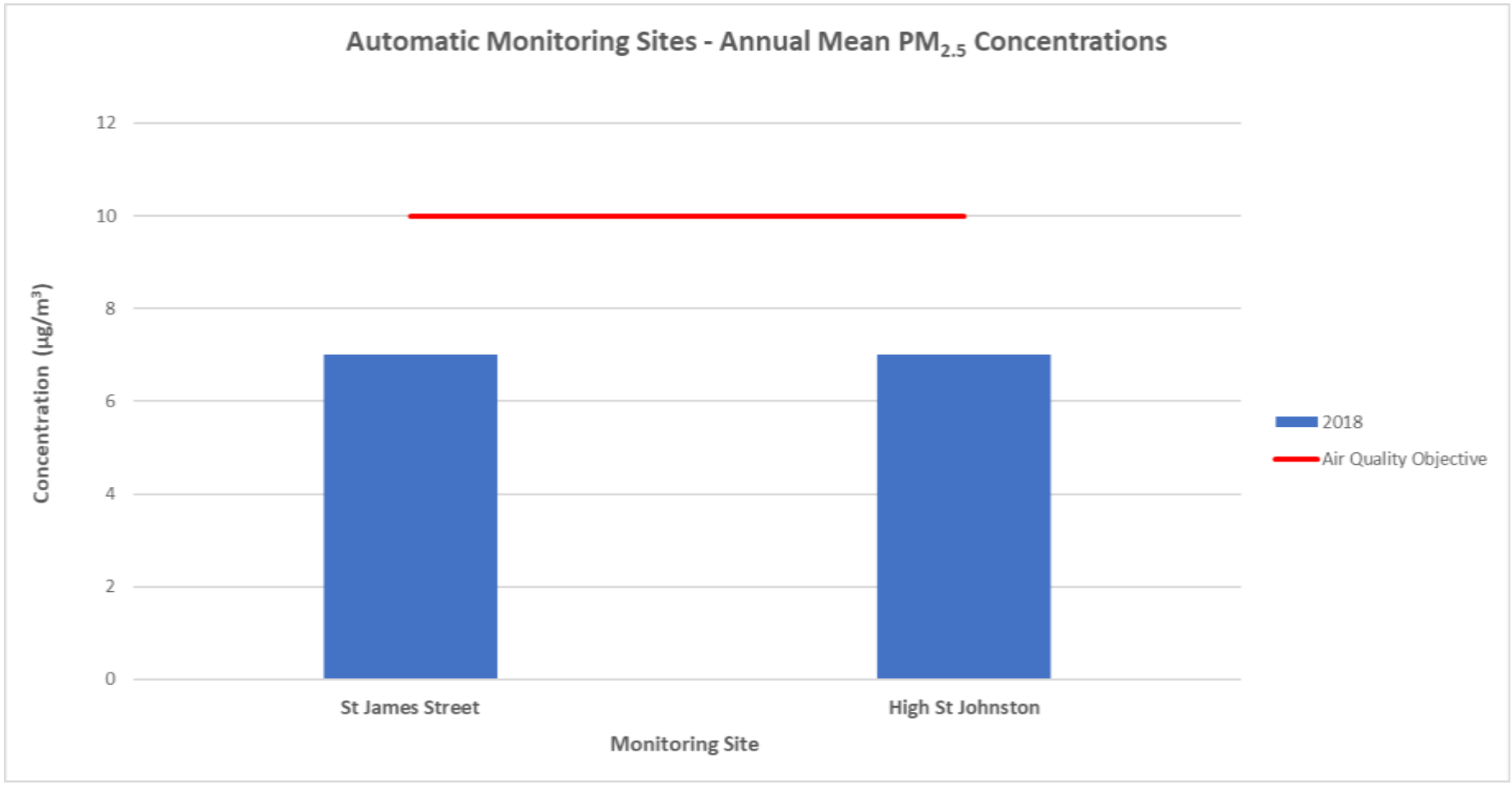
(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

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

(4) Site St James Street – monitoring equipment at this site was changed from monitoring $PM_{10}$ to monitoring $PM_{2.5}$ on the 04/05/18, therefore, data capture is very low.

*- Annualised as per LAQM.TG(16) guidance.

**Figure A.26 – Automatic Monitoring Sites – Annual Mean $PM_{2.5}$ Concentration Trends**



# Appendix B: Full Monthly Diffusion Tube Results for 2018

## Table B.1 – $NO_2$ Monthly Diffusion Tube Results for 2018

| 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) (2) |
| Paisley1 | NR | 32.9 | 31.0 | 24.9 | 12.7 | 12.8 | 12.9 | 10.3 | 7.5 | 25.1 | 36.2 | 36.7 | 22.1 | 20.32 |
| Paisley2 | 21.5 | 24.2 | 20.2 | 16.3 | 12.0 | 8.5 | 8.5 | 5.9 | 4.6 | 16.9 | 22.4 | 26.7 | 15.6 | 14.39 |
| Paisley3 (3) | 17.1 | 15.1 | 15.1 | 32.6 | 8.4 | 7.0 | 5.6 | 2.7 | 3.9 | 11.4 | 19.2 | 18.8 | 13.1 | 12.03 |
| Renfrew8 (4) | 40.7 | 58.7 | 43.8 | - | 33.4 | 37.3 | 34.7 | 46.5 | 41.3 | 41.2 | 54.1 | 59.0 | **44.6** | **41.1** |
| Bishopton9 (5) | 22.8 | 22.7 | 20.0 | 42.7 | 35.4 | 13.2 | 9.3 | 1.5 | 9.4 | 13.2 | 18.7 | 27.6 | 19.7 | 18.13 |
| Paisley13 | 24.0 | 29.7 | 30.6 | 15.7 | 14.3 | 24.7 | 21.0 | 14.5 | 16.6 | 25.3 | 22.0 | 28.8 | 22.3 | 20.49 |
| Paisley15 | 24.7 | 43.5 | 24.9 | 18.4 | 18.0 | 25.6 | 23.6 | 22.3 | 17.0 | 26.5 | 43.3 | 37.4 | 27.1 | 24.93 |
| Renfrew17 | 44.4 | 46.3 | 52.1 | 42.2 | 34.2 | 17.3 | 23.7 | 26.5 | 22.4 | 34.8 | 47.7 | 47.8 | 36.6 | 33.69 |
| Paisley19 | 37.7 | 35.2 | 47.8 | 35.3 | 38.6 | 19.5 | 21.1 | 20.3 | 14.4 | 22.2 | 38.7 | 38.6 | 30.8 | 28.32 |
| Johnstone20 | 40.2 | 45.8 | 39.0 | 30.0 | 28.8 | 27.4 | 23.9 | 18.3 | 17.4 | 31.3 | 43.3 | 41.4 | 32.2 | 29.65 |
| Paisley21 (1) | 43.5 | 36.3 | 42.5 | 35.6 | 25.4 | 18.0 | 19.7 | 22.6 | 17.3 | 35.8 | 39.9 | 41.8 | 31.5 | 29.01 |
| Paisley21(2) | 48.1 | 40.5 | 42.1 | 32.1 | 23.2 | 17.3 | 25.0 | 23.3 | 18.3 | 32.1 | 35.0 | 42.8 | 31.7 | 29.12 |
| Paisley21(3) | 46.1 | 42.4 | 36.8 | 38.1 | 27.1 | 16.2 | 19.5 | 20.5 | 16.1 | 33.2 | 35.2 | 40.8 | 31.0 | 28.52 |
| Bishopton27 | 17.1 | 18.4 | 13.9 | 9.3 | 32.5 | 3.0 | 6.0 | 5.5 | 3.8 | 8.4 | 16.6 | 22.3 | 13.1 | 12.0 |
| West Walkingshaw31 (1) (6) | 38.2 | 39.7 | 21.9 | 26.8 | - | 19.3 | 18.2 | 19.5 | 11.4 | 24.3 | 32.9 | 39.7 | 26.5 | 24.4 |
| West Walkingshaw31 (2) | 38.6 | 38.4 | 27.8 | 27.9 | 23.0 | 17.2 | 24.8 | 18.0 | 12.4 | 29.3 | 29.7 | 38.2 | 27.1 | 24.9 |
| West Walkingshaw31 (3) | 42.4 | 42.4 | 28.8 | 27.1 | 20.8 | 18.2 | 22.0 | 23.4 | 16.1 | 22.1 | 36.4 | 37.7 | 28.1 | 25.9 |
| Paisley33 | 46.5 | 45.1 | 38.7 | 31.5 | 22.9 | 32.5 | 27.7 | 27.1 | 18.3 | 39.2 | 41.6 | 42.7 | 34.5 | 31.7 |
| Paisley34 | 54.0 | 54.5 | 59.2 | 43.3 | 29.9 | 36.1 | 32.3 | 26.0 | 12.1 | 46.7 | 53.9 | 46.1 | **41.2** | 37.9 |
| Paisley35 | 54.7 | 48.6 | 41.2 | 26.9 | 39.8 | 30.3 | 26.7 | 23.6 | 18.9 | 42.7 | 48.7 | 49.8 | 37.7 | 34.7 |
| Paisley36 | 47.7 | 48.3 | 38.6 | 41.7 | 24.5 | 15.9 | 23.6 | 19.0 | 15.7 | 34.4 | 43.9 | 43.4 | 33.1 | 30.4 |

| 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) (2) |
| Renfrew40 | 44.2 | 45.5 | 34.7 | 30.6 | 16.7 | 17.6 | 18.9 | 23.0 | 21.5 | 33.5 | 41.5 | NR | 29.8 | 27.4 |
| Paisley41 | 47.6 | 47.0 | 34.9 | 34.7 | 19.6 | 19.7 | 24.2 | 24.1 | 24.9 | 39.3 | 41.9 | 40.8 | 33.2 | 30.6 |
| Paisley43 (7) | 40.3 | 39.3 | NR | 36.0 | 28.1 | 22.5 | 19.9 | 19.2 | 20.8 | 36.0 | 41.6 | 42.1 | 31.4 | 28.9 |
| Paisley44 | 34.0 | 33.0 | 35.0 | 29.8 | 32.8 | 10.1 | 12.9 | 11.8 | 11.8 | 19.7 | 37.5 | 39.4 | 25.7 | 23.6 |
| Renfrew45 | 42.8 | 33.8 | 33.1 | NR | 24.6 | 16.8 | 20.7 | 19.5 | 18.1 | 24.8 | 35.8 | 38.3 | 28.0 | 25.8 |
| Renfrew48 | 46.5 | 47.0 | 41.5 | 36.8 | 23.3 | 12.1 | 21.9 | 24.3 | 21.9 | 37.1 | 44.3 | 46.4 | 33.6 | 30.9 |
| Renfrew49 | 43.8 | 40.8 | 33.7 | 27.8 | 25.2 | 8.6 | 21.9 | 20.7 | 17.7 | 31.1 | 38.0 | 40.5 | 29.2 | 26.8 |
| Paisley50 | 45.7 | 46.2 | 36.1 | 35.9 | 25.8 | 19.6 | 21.3 | 23.7 | 17.8 | 32.5 | 40.2 | 38.8 | 32.0 | 29.4 |
| Renfrew52 | 47.5 | 48.2 | 36.0 | 35.1 | 28.9 | 15.7 | 24.0 | 27.7 | 25.6 | 37.7 | 40.3 | 47.6 | 34.5 | 31.8 |
| Inchinnan53 | 34.8 | 37.1 | 26.2 | 25.4 | 22.8 | 12.1 | 16.4 | 20.8 | 17.3 | 26.8 | 31.5 | 36.4 | 25.6 | 23.6 |
| Kilbarchan54 | 36.7 | 37.4 | 26.4 | 24.3 | 15.9 | 4.4 | 17.1 | 16.8 | 15.3 | 23.1 | 33.7 | 31.1 | 23.5 | 21.6 |
| Renfrew56 | 44.6 | 47.6 | 43.2 | 32.9 | 19.9 | 16.1 | 23.4 | 27.3 | 18.4 | 35.3 | 41.5 | 45.4 | 33.0 | 30.3 |
| Renfrew57 | 36.6 | 36.6 | 28.7 | 29.5 | 30.7 | 6.7 | 18.8 | 16.5 | 14.3 | 23.7 | 34.6 | 38.2 | 26.2 | 24.1 |
| Renfrew58 | 37.4 | 35.1 | 25.8 | 23.9 | 20.2 | 9.8 | 15.0 | 14.2 | 11.9 | 23.0 | 32.4 | 34.5 | 23.6 | 21.7 |
| Johnstonee59 (8) | 57.5 | 64.2 | 45.2 | 45.6 | 20.0 | 28.5 | 27.4 | NR | 35.3 | 41.1 | 57.0 | 56.2 | **43.5** | **40.0** |
| Paisley60 | 54.6 | 44.7 | 41.1 | 38.1 | 28.0 | 30.2 | 27.2 | 21.7 | 20.9 | 40.0 | 49.0 | 53.0 | 37.4 | 34.4 |
| Kilbarchan61 | 49.8 | 53.4 | 38.2 | 33.9 | 28.1 | 21.9 | 27.0 | 25.1 | 23.3 | 35.2 | 41.7 | 44.3 | 35.2 | 32.4 |
| Cockels Loan 62 (1) (9) | 54.4 | 50.1 | NR | 44.9 | 40.4 | 10.0 | 29.6 | 34.0 | 30.2 | 33.9 | 45.9 | 66.5 | **40.0** | 36.8 |
| Cockels Loan 62 (2) (9) | 56.5 | 51.6 | NR | 42.3 | 38.5 | 9.8 | 27.8 | 31.7 | 27.1 | 42.1 | 42.8 | 53.0 | 38.5 | 35.4 |
| Cockels Loan 62 (3) (9)(10) | - | 49.5 | NR | 36.2 | 35.8 | 12.2 | 27.5 | 28.9 | 28.7 | 43.8 | 50.9 | 54.4 | 36.8 | 33.9 |
| Paisley63 | 45.5 | 47.2 | 44.3 | 41.2 | 33.6 | 17.8 | 28.1 | 25.6 | 24.2 | 35.9 | 45.5 | 43.6 | 36.0 | 33.2 |
| Paisley64 | 41.3 | 44.3 | 32.6 | 36.6 | 33.7 | 21.3 | 19.8 | 20.3 | 16.1 | 32.0 | 38.5 | 42.1 | 31.6 | 29.0 |
| Kilbarchan65 (11) | - | 45.5 | 27.3 | 29.6 | 27.5 | 19.7 | 20.7 | 23.7 | 15.2 | 29.7 | 54.2 | 44.0 | 30.6 | 28.2 |
| Kilbarchan66 | 31.9 | 29.5 | 21.2 | 23.5 | 26.3 | 9.9 | 13.2 | 11.6 | 8.1 | 18.3 | 29.8 | 28.9 | 21.0 | 19.3 |
| Kilbarchan67 | 28.0 | 27.1 | 45.2 | 17.7 | 21.0 | 6.0 | 11.0 | 10.5 | 11.1 | 13.8 | 24.1 | 27.1 | 20.2 | 18.6 |
| Renfrew68 | 40.4 | 42.4 | 34.2 | 29.9 | 14.3 | 11.0 | 16.8 | 1.6 | 54.5 | 27.2 | 44.2 | 40.5 | 29.8 | 27.4 |
| Renfrew69 | 45.1 | 44.9 | 38.6 | 32.1 | 20.7 | 12.1 | 21.5 | 25.1 | 22.2 | 34.6 | 53.0 | 50.1 | 33.3 | 30.7 |
| Renfrew70 | 48.7 | 46.0 | 42.8 | 39.0 | 27.8 | 16.7 | 17.6 | 24.3 | NR | 36.0 | NR | 46.0 | 34.5 | 31.7 |

| 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) (2) |
| Renfrew71 | 48.5 | NR | NR | NR | 16.9 | 10.6 | 19.5 | 23.9 | 19.6 | 38.6 | 51.1 | 49.8 | 30.9 | 28.5 |
| Johnstonee72 | 35.8 | 31.2 | 34.8 | 29.7 | 22.2 | 15.4 | 19.8 | 14.5 | 11.6 | 20.7 | NR | 37.9 | 24.9 | 22.9 |
| Paisley73 | 48.8 | 45.7 | 38.5 | 36.1 | 31.7 | NR | 23.9 | 31.3 | 23.7 | 42.0 | 15.8 | 44.8 | 34.8 | 32.0 |
| Paisley74 | 45.3 | 44.4 | 42.4 | 45.8 | 37.1 | 16.1 | 23.7 | 22.4 | 16.8 | 40.1 | 25.4 | 43.0 | 33.5 | 30.9 |
| Renfrew75 | 33.8 | 19.4 | 27.1 | 26.7 | 22.2 | 9.2 | 17.3 | 21.2 | 14.4 | 29.4 | 33.8 | 40.5 | 24.6 | 22.6 |
| Bridge of Weir76 | 29.1 | NR | 27.6 | 27.8 | 15.6 | 8.6 | 13.6 | 14.3 | 15.4 | 21.8 | 23.0 | 31.7 | 20.8 | 19.1 |
| Bridge of Weir77 | 35.8 | 33.7 | 25.7 | 24.2 | 22.6 | 12.5 | 12.5 | 19.6 | 22.0 | 26.8 | 29.1 | 32.1 | 24.7 | 22.7 |
| Paisley78 | 50.3 | 47.0 | 34.4 | 30.1 | 17.7 | 10.9 | 21.5 | 22.5 | 25.0 | 40.4 | 35.9 | 41.1 | 31.4 | 28.9 |
| Paisley79 | 61.4 | 47.9 | 50.5 | 39.5 | 18.8 | 8.5 | 21.4 | 21.5 | 23.1 | 37.0 | 44.8 | 49.4 | 35.3 | 32.5 |
| Paisley80 | 37.6 | 40.2 | 32.8 | 26.6 | 15.1 | 14.7 | 22.4 | 17.6 | 16.3 | 32.3 | 31.4 | 37.6 | 27.1 | 24.9 |
| Airport81 | NR | 38.5 | 34.0 | 22.9 | 27.1 | 13.8 | 19.5 | 11.0 | 10.4 | 23.5 | 38.7 | 39.4 | 25.3 | 23.3 |
| Paisley82 | 22.7 | 49.7 | 42.3 | 20.8 | 23.8 | 17.4 | 24.7 | 14.5 | 19.3 | 30.4 | 74.7 | 92.2 | 36.0 | 33.2 |
| Paisley83 | 47.2 | 41.8 | 34.6 | 34.1 | 34.1 | 29.2 | 17.4 | 27.3 | 17.8 | 33.1 | 43.5 | 45.0 | 33.8 | 31.1 |
| Paisley84 | 34.7 | 32.0 | 42.9 | 19.6 | 15.6 | 23.5 | 24.8 | 17.6 | 15.2 | 24.3 | 31.3 | 35.5 | 26.4 | 24.3 |
| Johnstonee85 | 39.3 | 41.1 | 26.8 | 31.4 | 32.2 | 12.4 | 19.8 | 19.4 | 19.2 | 27.3 | 43.1 | NR | 28.4 | 26.1 |
| Johnstonee86 | 43.0 | 38.9 | 35.5 | 37.9 | 31.0 | 27.3 | 23.1 | 14.5 | 8.0 | 20.5 | 51.8 | 34.9 | 30.5 | 28.1 |
| Johnstonee87 | 25.3 | 30.5 | 27.7 | 26.0 | 21.7 | 24.8 | 18.3 | 14.9 | 10.2 | 22.9 | 45.9 | 29.3 | 24.8 | 22.8 |
| Paisley88 | 34.9 | 32.3 | 27.6 | 24.4 | 18.7 | 18.3 | 16.5 | 12.0 | 11.4 | 24.9 | 35.5 | 29.4 | 23.8 | 21.9 |
| Paisley89 | - | - | - | - | - | - | - | - | 29.4 | 42.6 | 40.5 | 38.8 | 24.3* | 22.4 |

Notes: Exceedances of the $NO_2$ annual mean objective of 40µg/m$^3$ are shown in **bold**.

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

(1) See Appendix C for details on bias adjustment
(2) Results have not been distance corrected.
(3) Site Paisley 3 – April reading of 32.6 µ/m$^3$ suspected to have been mixed in lab with April 9.9 µ/m$^3$ sample of site Renfrew 8, however, has been kept in to be conservative.

(4) Site Renfrew 8 – Low April reading of 9.9 µ/m$^3$ has been removed.
(5) Site Bishopton 9 – Low August reading of 1.5 µ/m$^3$ has been removed.
(6) Site West Walkingshaw 31 (1) – Error suspected in May reading of 7.9 µ/m$^3$ due to being uncharacteristically low. Therefore, May reading has been removed.
(7) Site Paisley 43 – April reading is for 2 months exposure as access to diffusion tube was not possible in March.
(8) Site Johnstone 59 – Although site reading is close to annual mean objective of 40 µ/m$^3$, exposure is at street level whereas there is no exposure to public until first floor level.
(9) Site Cockles Loan (1), (2) and (3) – April reading is for 2 months exposure as access to diffusion tube was not possible in March.
(10) Site Cockles Loan (3) – High April reading of 104 µ/m$^3$ has been removed.
(11) Site Kilbarchan 65 – High January reading of 96.4 µ/m$^3$ has been removed.

*- Annualised as per LAQM.TG(16) guidance

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

## Bias Correction Factor from Local Co-Location Studies

Two co-location studies were conducted within the Renfrewshire Council area during 2018 at sites where $NO_2$ concentrations were measured using automatic analysers. Bias factors have been calculated for each site. Details of the co-location factor calculations, including the precision checks are presented in Figures C.1 to C.2.

A summary of the calculated factors is presented in Table C.1. The bias factor from the national database is presented in Figure C.3.

### Figure C.1 Co-Location Study – Paisley 21 Gordon Street

**Checking Precision and Accuracy of Triplicate Tubes**

AEA Energy & Environment
From the AEA group

| Diffusion Tubes Measurements | | | | | | | | | | Automatic Method | | Data Quality Check | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Period | Start Date dd/mm/yyyy | End Date dd/mm/yyyy | Tube 1 µgm$^{-3}$ | Tube 2 µgm$^{-3}$ | Tube 3 µgm$^{-3}$ | Triplicate Mean | Standard Deviation | Coefficient of Variation (CV) | 95% CI of mean | Period Mean | Data Capture (% DC) | Tubes Precision Check | Automatic Monitor Data |
| 1 | 05/01/2018 | 29/01/2018 | 43.5 | 48.1 | 46.1 | 46 | 2.3 | 5 | 5.7 | 40 | 100 | Good | Good |
| 2 | 29/01/2018 | 27/02/2018 | 36.3 | 40.5 | 42.4 | 40 | 3.1 | 8 | 7.8 | 42 | 100 | Good | Good |
| 3 | 27/02/2018 | 26/03/2018 | 42.5 | 42.1 | 36.8 | 40 | 3.2 | 8 | 7.9 | 34 | 100 | Good | Good |
| 4 | 26/03/2018 | 30/04/2018 | 35.6 | 32.1 | 38.1 | 35 | 3.0 | 9 | 7.5 | 37 | 41 | Good | or Data Capture |
| 5 | 30/04/2018 | 04/06/2018 | 25.4 | 23.2 | 27.1 | 25 | 2.0 | 8 | 4.9 | 23 | 89 | Good | Good |
| 6 | 04/06/2018 | 02/07/2018 | 18.0 | 17.3 | 16.2 | 17 | 0.9 | 5 | 2.3 | 22 | 100 | Good | Good |
| 7 | 02/07/2018 | 30/07/2018 | 19.7 | 25.0 | 19.5 | 21 | 3.1 | 15 | 7.7 | 20 | 100 | Good | Good |
| 8 | 30/07/2018 | 05/09/2018 | 22.6 | 23.3 | 20.5 | 22 | 1.5 | 7 | 3.6 | 19 | 100 | Good | Good |
| 9 | 05/09/2018 | 04/10/2018 | 17.3 | 18.3 | 16.1 | 17 | 1.1 | 6 | 2.7 | 21 | 100 | Good | Good |
| 10 | 04/10/2018 | 01/11/2018 | 35.8 | 32.1 | 33.2 | 34 | 1.9 | 6 | 4.7 | 32 | 99 | Good | Good |
| 11 | 01/11/2018 | 06/12/2018 | 39.9 | 35.0 | 35.2 | 37 | 2.8 | 8 | 6.9 | 46 | 100 | Good | Good |
| 12 | 06/12/2018 | 10/01/2019 | 41.8 | 42.8 | 40.8 | 42 | 1.0 | 2 | 2.5 | 42 | 85 | Good | Good |
| 13 | | | | | | | | | | | | | |
| | | | | | | | | | | | | Good precision | Good Overall DC |

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Overall survey -->

(Check average CV & DC from Accuracy calculations)

| Site Name/ ID: | Paisley Gordon Street |
|---|---|

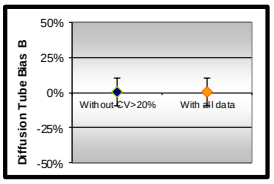
Precision: 12 out of 12 periods have a CV smaller than 20%

**Accuracy (with 95% confidence interval) without periods with CV larger than 20%**

Bias calculated using 11 periods of data
Bias factor A: 1 (0.91 - 1.11)
Bias B: 0% (-10% - 10%)
Diffusion Tubes Mean: 31 µgm$^{-3}$
Mean CV (Precision): 7
Automatic Mean: 31 µgm$^{-3}$
Data Capture for periods used: 98%
Adjusted Tubes Mean: 31 (28 - 34) µgm$^{-3}$

**Accuracy (with 95% confidence interval) WITH ALL DATA**

Bias calculated using 11 periods of data
Bias factor A: 1 (0.91 - 1.11)
Bias B: 0% (-10% - 10%)
Diffusion Tubes Mean: 31 µgm$^{-3}$
Mean CV (Precision): 7
Automatic Mean: 31 µgm$^{-3}$
Data Capture for periods used: 98%
Adjusted Tubes Mean: 31 (28 - 34) µgm$^{-3}$




Jaume Targa, for AEA
Version 04 - February 2011

If you have any enquiries about this spreadsheet please contact the LAQM Helpdesk at: LAQMHelpdesk@uk.bureauveritas.com

## Figure C.2 Co-Location Study – Cockels Loan

### Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

**Diffusion Tubes Measurements**

| Period | Start Date dd/mm/yyyy | End Date dd/mm/yyyy | Tube 1 µgm$^{-3}$ | Tube 2 µgm$^{-3}$ | Tube 3 µgm$^{-3}$ | Triplicate Mean | Standard Deviation | Coefficient of Variation (CV) | 95% CI of mean |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 05/01/2018 | 01/02/2018 | 54.4 | 56.5 | 104.0 | 72 | 28.1 | 39 | 69.7 |
| 2 | 01/02/2018 | 26/02/2018 | 50.1 | 51.6 | 49.5 | 50 | 1.1 | 2 | 2.7 |
| 3 | 26/02/2018 | | | | | | | | |
| 4 | | 04/05/2018 | 44.9 | 42.3 | 36.2 | 41 | 4.5 | 11 | 11.1 |
| 5 | 04/05/2018 | 05/05/2018 | 40.4 | 38.5 | 35.8 | 38 | 2.3 | 6 | 5.7 |
| 6 | 05/05/2018 | 03/07/2018 | 10.0 | 9.8 | 12.2 | 11 | 1.3 | 12 | 3.3 |
| 7 | 03/07/2018 | 31/07/2018 | 29.6 | 27.8 | 27.5 | 28 | 1.1 | 4 | 2.8 |
| 8 | 31/07/2018 | 04/09/2018 | 34.0 | 31.7 | 28.9 | 32 | 2.6 | 8 | 6.3 |
| 9 | 04/09/2018 | 03/10/2018 | 30.2 | 27.1 | 28.7 | 29 | 1.6 | 5 | 3.9 |
| 10 | 03/10/2018 | 31/10/2018 | 33.9 | 42.1 | 43.8 | 40 | 5.3 | 13 | 13.2 |
| 11 | 31/10/2018 | 06/12/2018 | 45.9 | 42.8 | 50.9 | 47 | 4.1 | 9 | 10.2 |
| 12 | 06/12/2018 | 08/01/2019 | 66.5 | 53.0 | 54.4 | 58 | 7.4 | 13 | 18.4 |
| 13 | | | | | | | | | |

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

| Automatic Method | | Data Quality Check | |
|---|---|---|---|
| Period Mean | Data Capture (% DC) | Tubes Precision Check | Automatic Monitor Data |
| 37 | 97 | Poor Precision | Good |
| 37 | 100 | Good | Good |
| 36 | 100 | | Good |
| 35 | 99 | Good | Good |
| 32 | 100 | Good | Good |
| 23 | 100 | Good | Good |
| 21 | 100 | Good | Good |
| 21 | 99 | Good | Good |
| 22 | 99 | Good | Good |
| 33 | 99 | Good | Good |
| 39 | 100 | Good | Good |
| 43 | 64 | Good | or Data Capture |
| | | | |
| Overall survey --> | | Good precision | Good Overall DC |

| Site Name/ ID: | Cockels Loan |
|---|---|

Precision: 10 out of 11 periods have a CV smaller than 20%

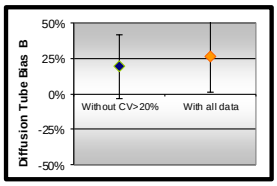
(Check average CV & DC from Accuracy calculations)

**Accuracy (with 95% confidence interval)**
**without periods with CV larger than 20%**
**Bias calculated using 9 periods of data**

| | | |
|---|---|---|
| Bias factor A | 0.83 (0.7 - 1.03) | |
| Bias B | 20% (-3% - 42%) | |
| Diffusion Tubes Mean: | 35 | µgm$^{-3}$ |
| Mean CV (Precision): | 8 | |
| Automatic Mean: | 29 | µgm$^{-3}$ |
| Data Capture for periods used: | 100% | |
| Adjusted Tubes Mean: | 29 (25 - 36) | µgm$^{-3}$ |

**Accuracy (with 95% confidence interval)**
**WITH ALL DATA**
**Bias calculated using 10 periods of data**

| | | |
|---|---|---|
| Bias factor A | 0.78 (0.65 - 0.97) | |
| Bias B | 29% (3% - 55%) | |
| Diffusion Tubes Mean: | 39 | µgm$^{-3}$ |
| Mean CV (Precision): | 11 | caution |
| Automatic Mean: | 30 | µgm$^{-3}$ |
| Data Capture for periods used: | 99% | |
| Adjusted Tubes Mean: | 30 (25 - 38) | µgm$^{-3}$ |




Jaume Targa, for AEA
Version 04 - February 2011

If you have any enquiries about this spreadsheet please contact the LAQM Helpdesk at: LAQMHelpdesk@uk.bureauveritas.com

## Figure C.3 Glasgow Scientific Services – National average bias adjustment factor 2016

### National Diffusion Tube Bias Adjustment Factor Spreadsheet

Spreadsheet Version Number: 03/19

Follow the steps below in the correct order to show the results of relevant co-location studies

Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods

Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet

This spreadsheet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use

This spreadsheet will be updated at the end of June 2019

The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory

Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.

Step 1: Select the Laboratory that Analyses Your Tubes from the Drop-Down List

Step 2: Select a Preparation Method from the Drop-Down List

Step 3: Select a Year from the Drop-Down List

Step 4: Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor shown in blue at the foot of the final column.

If you have your own co-location study then see 'Additional' tab. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@uk.bureauveritas.com or 0800 0327953

| Analysed By | Method | Year | Site Type | Local Authority | Length of Study (months) | Diffusion Tube Mean Conc. (Dm) (µgm$^{-3}$) | Automatic Monitor Mean Conc. (Cm) (µgm$^{-3}$) | Bias (B) | Tube Precision | Bias Adjustment Factor (A) (Cm/Dm) |
|---|---|---|---|---|---|---|---|---|---|---|
| Glasgow Scientific Services | 20% TEA in water | 2018 | R | East Dunbartonshire Council | 9 | 21 | 18 | 26.5% | G | 0.79 |
| Glasgow Scientific Services | 20% TEA in water | 2018 | R | East Dunbartonshire Council | 10 | 28 | 27 | 3.3% | G | 0.97 |
| Glasgow Scientific Services | 20% TEA in water | 2018 | R | East Dunbartonshire Council | 12 | 31 | 28 | 12.5% | P | 0.89 |
| Glasgow Scientific Services | 20% TEA in water | 2018 | KS | Marylebone Road Intercomparison | 12 | 86 | 85 | 1.3% | G | 0.99 |
| Glasgow Scientific Services | 20% TEA in water | 2018 | KS | Glasgow City Council | 12 | 64 | 59 | 7.3% | P | 0.93 |
| Glasgow Scientific Services | 20% TEA in water | 2018 | R | Glasgow City Council | 11 | 44 | 34 | 30.4% | P | 0.77 |
| Glasgow Scientific Services | 20% TEA in water | 2018 | R | Glasgow City Council | 12 | 32 | 29 | 9.8% | P | 0.91 |
| Glasgow Scientific Services | 20% TEA in water | 2018 | R | Glasgow City Council | 10 | 36 | 30 | 20.0% | P | 0.83 |
| Glasgow Scientific Services | 20% TEA in water | 2018 | UB | Glasgow City Council | 11 | 33 | 25 | 31.8% | P | 0.76 |
| Glasgow Scientific Services | 20% TEA in water | 2018 | | Overall Factor (9 studies) | | | | Use | | 0.86 |

**Table C.1: Summary of bias adjustment factors at $NO_2$ automatic monitoring sites 2018**

| Co-location Site | Tube Precision | Automatic data quality | Bias Factor (excluding periods with CV >25%) | Bias Factor (using all periods of data) |
|---|---|---|---|---|
| Cockels Loan Renfrew | Good Precision | Good Overall | 0.83 | 0.78 |
| Gordon Street, Paisley | Good Precision | Good Overall | 1 | 1 |
| | | | **AVERAGE** | **0.92** |
| From National Studies take from sites with Good Precision | | | **AVERAGE** | **0.916 (0.92)** |
| From National Studies take All studies | | | **AVERAGE** | **0.86** |

## Discussion of Choice of Bias Adjustment Factor to Use

In previous years up to the 2017 APR, the locally derived-factor was used. In the 2018 APR, the national factor was applied as the Gordon Street air quality monitor had poor data capture and the national factor was higher, therefore providing more conservative results. In 2018 the derived national factor for Glasgow Scientific Services (GSS) has 6 out of 9 results with poor precision. If the results for sites with good precision only are considered, the resulting adjustment factor is 0.92, the same as the locally derived factor.

This assessment has therefore used the locally derived factor of 0.92 for bias adjustment of monitored Annual Mean $NO_2$ by diffusion tubes.

## PM Monitoring Adjustment

All $PM_{10}$ measurements were made using TEOM analysers fitted with FDMS units. The measurements are therefore considered gravimetric equivalent and no adjustments have been applied to the data.

All TEOM FDMS data were fully ratified by Ricardo Energy and Environment to AURN standards. The certificates of ratified data are included in Figures C.4 to C.8.

**Figure C.4 Ratified Data from Ricardo Energy and Environment for Paisley Gordon Street**

# Air Pollution Report

Air Quality in Scotland

**1st January to 31st December 2018**

## Paisley Gordon Street (Site ID: PAI3)

**These data have been fully ratified**

Only relevant statistics for LAQM are presented in the table. Cells with - indicate no data available or calculated.

| Pollutant | NO µg/m³ | $NO_2$ µg/m³ | $NO_x$ as $NO_2$ µg/m³ | $PM_{10}$ µg/m³ |
|---|---|---|---|---|
| Number Days Low | - | 342 | - | 358 |
| Number Days Moderate | - | 0 | - | 0 |
| Number Days High | - | 0 | - | 0 |
| Number Days Very High | - | 0 | - | 0 |
| Max Daily Mean | 181 | 94 | 372 | 44 |
| Annual Max | 462 | 166 | 874 | 162 |
| Annual Mean | 29 | 31 | 76 | 12 |
| 98th Percentile of daily mean | - | - | - | 31 |
| 90th Percentile of daily mean | - | - | - | 22 |
| 99.8th Percentile of hourly mean | - | 128 | - | - |
| 98th Percentile of hourly mean | 160 | 90 | 331 | 37 |
| 95th Percentile of hourly mean | 101 | 75 | 228 | 30 |
| 50th Percentile of hourly mean | 17 | 25 | 51 | 10 |
| **% Annual data capture** | **92.87%** | **92.87%** | **92.87%** | **98.26%** |

**Instruments:** $PM_{10}$: FDMS TEOM (no correction)

All gaseous pollutant mass units are at 20°C and 1013mb. Particulate matter concentrations are reported at ambient temperature and pressure. $NO_X$ mass units are $NO_X$ as $NO_2$ µg m-3

**Note: For a strict comparison against the objectives there must be a data capture of 85% or greater throughout the calendar year.**

1 / 3

Report produced by Ricardo Energy & Environment

| Pollutant | Air Quality Standards (Scotland) Regulations 2010 | Exceedances | Days |
|---|---|---|---|
| PM10 particulate matter (Hourly measured) | daily mean > 50 microgrammes per metre cubed | 0 | 0 |
| PM10 particulate matter (Hourly measured) | Annual mean > 18 microgrammes per metre cubed | 0 | - |
| Nitrogen dioxide | Hourly Mean > 200 microgrammes per metre cubed | 0 | 0 |
| Nitrogen dioxide | Annual Mean > 40 microgrammes per metre cubed | 0 | - |

## Annual Graph

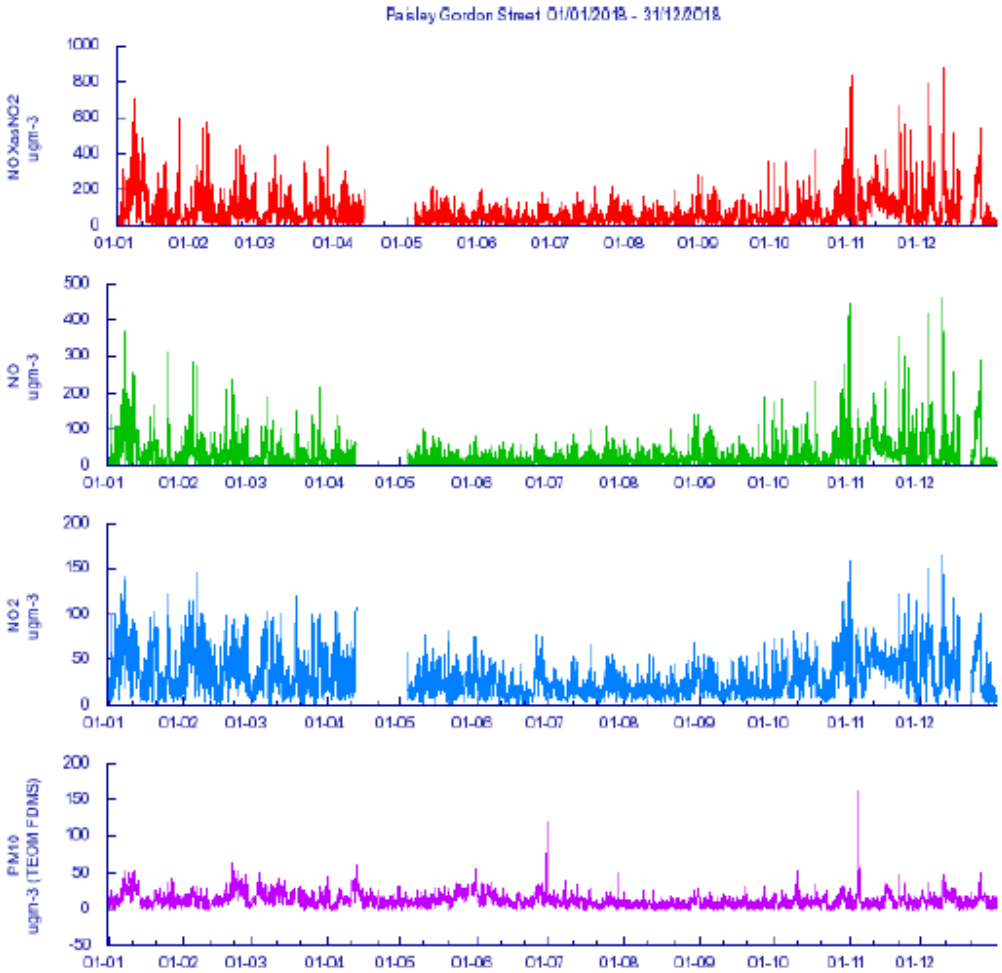


**Figure C.6 Ratified Data from Ricardo Energy and Environment for Cockels Loan**

# Air Pollution Report

**1st January to 31st December 2018**

Air Quality in Scotland

## Renfrew Cockels Loan (Site ID: REN1)

**These data have been fully ratified**

Only relevant statistics for LAQM are presented in the table. Cells with - indicate no data available or calculated.

| Pollutant | NO µg/m³ | $NO_2$ µg/m³ | $NO_x$ as $NO_2$ µg/m³ | $PM_{10}$ µg/m³ |
|---|---|---|---|---|
| Number Days Low | - | 355 | - | 352 |
| Number Days Moderate | - | 0 | - | 1 |
| Number Days High | - | 0 | - | 0 |
| Number Days Very High | - | 0 | - | 0 |
| Max Daily Mean | 240 | 84 | 411 | 73 |
| Annual Max | 523 | 173 | 895 | 282 |
| Annual Mean | 26 | 31 | 71 | 16 |
| 98th Percentile of daily mean | - | - | - | 39 |
| 90th Percentile of daily mean | - | - | - | 28 |
| 99.8th Percentile of hourly mean | - | 116 | - | - |
| 98th Percentile of hourly mean | 174 | 86 | 345 | 47 |
| 95th Percentile of hourly mean | 94 | 72 | 213 | 38 |
| 50th Percentile of hourly mean | 14 | 28 | 50 | 13 |
| **% Annual data capture** | **96.47%** | **96.47%** | **96.47%** | **97.80%** |

**Instruments:** $PM_{10}$: FDMS TEOM (no correction)

All gaseous pollutant mass units are at 20°C and 1013mb. Particulate matter concentrations are reported at ambient temperature and pressure. $NO_X$ mass units are $NO_X$ as $NO_2$ µg m-3

**Note: For a strict comparison against the objectives there must be a data capture of 85% or greater throughout the calendar year.**

1 / 3

Report produced by Ricardo Energy & Environment

| Pollutant | Air Quality Standards (Scotland) Regulations 2010 | Exceedances | Days |
|---|---|---|---|
| PM10 particulate matter (Hourly measured) | daily mean > 50 microgrammes per metre cubed | 1 | 1 |
| PM10 particulate matter (Hourly measured) | Annual mean > 18 microgrammes per metre cubed | 0 | - |
| Nitrogen dioxide | Hourly Mean > 200 microgrammes per metre cubed | 0 | 0 |
| Nitrogen dioxide | Annual Mean > 40 microgrammes per metre cubed | 0 | - |

## Annual Graph

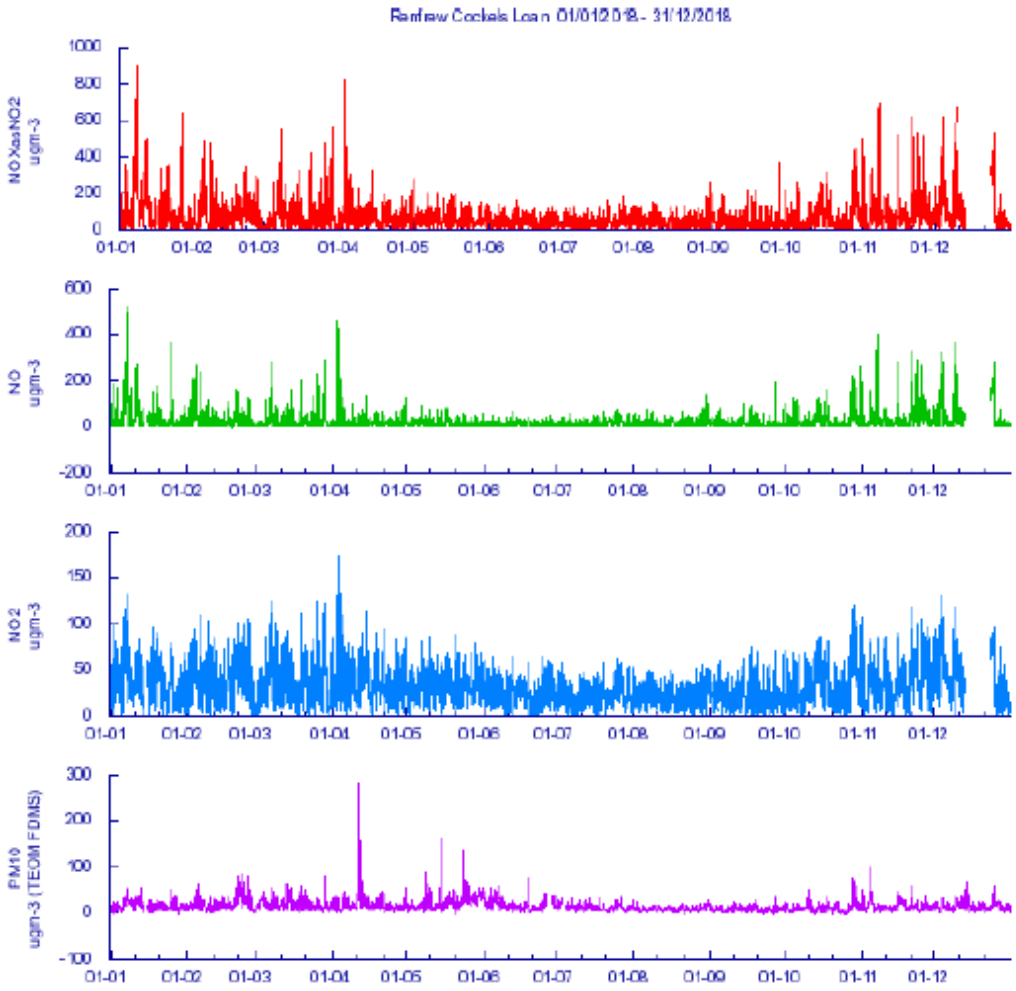


**Figure C.7 Ratified Data from Ricardo Energy and Environment for Paisley St James**

# Air Pollution Report

Air Quality in Scotland

## 1st January to 31st December 2018

## Paisley St James St (Site ID: PAI4)

**These data have been fully ratified**

Only relevant statistics for LAQM are presented in the table. Cells with - indicate no data available or calculated.

| Pollutant | $PM_{10}$ µg/m³ | $PM_{25}$ µg/m³ |
|---|---|---|
| Number Days Low | 121 | 187 |
| Number Days Moderate | 0 | 0 |
| Number Days High | 0 | 0 |
| Number Days Very High | 0 | 0 |
| Max Daily Mean | 35 | 32 |
| Annual Max | 63 | 93 |
| Annual Mean | 14 | 7 |
| 98th Percentile of daily mean | 31 | - |
| 90th Percentile of daily mean | 23 | - |
| 98th Percentile of hourly mean | 38 | 24 |
| 95th Percentile of hourly mean | 31 | 17 |
| 50th Percentile of hourly mean | 12 | 6 |
| **% Annual data capture** | **33.60%** | **54.18%** |

**Instruments:** $PM_{10}$: FDMS TEOM (no correction)

$PM_{25}$: FDMS TEOM (no correction)

All gaseous pollutant mass units are at 20°C and 1013mb. Particulate matter concentrations are reported at ambient temperature and pressure. $NO_X$ mass units are $NO_X$ as $NO_2$ µg m-3

**Note: For a strict comparison against the objectives there must be a data capture of 85% or greater throughout the calendar year.**

1 / 3

Report produced by Ricardo Energy & Environment

| Pollutant | Air Quality Standards (Scotland) Regulations 2010 | Exceedances | Days |
|---|---|---|---|
| PM10 particulate matter (Hourly measured) | daily mean > 50 microgrammes per metre cubed | 0 | 0 |
| PM10 particulate matter (Hourly measured) | Annual mean > 18 microgrammes per metre cubed | 0 | - |
| PM2.5 particulate matter (Hourly measured) | Annual mean > 12 microgrammes per metre cubed | 0 | - |

## Annual Graph

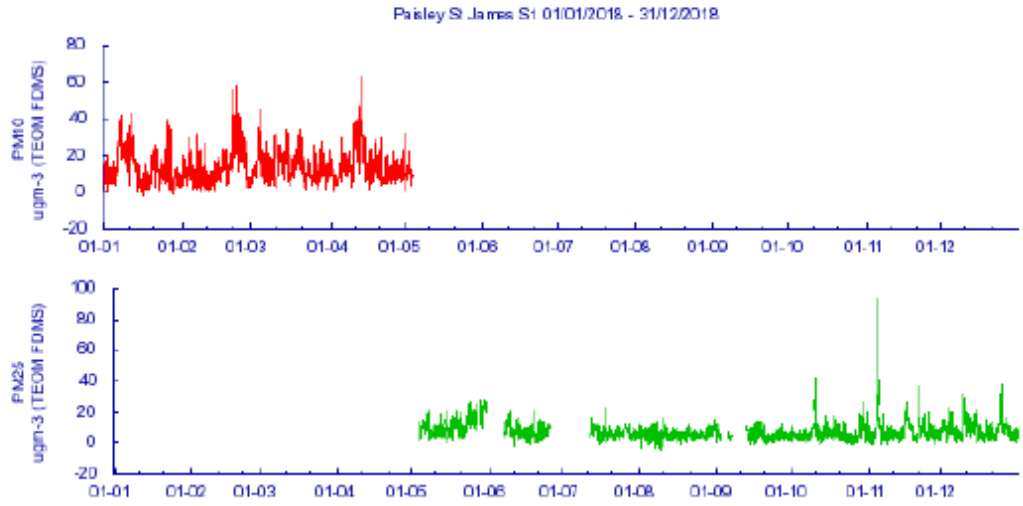


**Figure C.8 Ratified Data from Ricardo Energy and Environment for Johnstone High Street**

# Air Pollution Report

**1st January to 31st December 2018**

Air Quality in Scotland

## Renfrewshire Johnston (Site ID: REN02)

**These data have been fully ratified**

Only relevant statistics for LAQM are presented in the table. Cells with - indicate no data available or calculated.

| Pollutant | NO µg/m³ | $NO_2$ µg/m³ | $NO_x$ as $NO_2$ µg/m³ | $PM_{10}$ µg/m³ | $PM_{25}$ µg/m³ |
|---|---|---|---|---|---|
| Number Days Low | - | 0 | - | 358 | 358 |
| Number Days Moderate | - | 0 | - | 1 | 1 |
| Number Days High | - | 0 | - | 0 | 0 |
| Number Days Very High | - | 0 | - | 0 | 0 |
| Max Daily Mean | - | - | - | 51 | 41 |
| Annual Max | - | - | - | 179 | 147 |
| Annual Mean | - | - | - | 13 | 7 |
| 98th Percentile of daily mean | - | - | - | 35 | - |
| 90th Percentile of daily mean | - | - | - | 24 | - |
| 99.8th Percentile of hourly mean | - | - | - | - | - |
| 98th Percentile of hourly mean | - | - | - | 44 | 24 |
| 95th Percentile of hourly mean | - | - | - | 34 | 19 |
| 50th Percentile of hourly mean | - | - | - | 10 | 5 |
| **% Annual data capture** | **-** | **-** | **-** | **98.44%** | **98.44%** |

**Instruments:** $PM_{10}$: FIDAS

All gaseous pollutant mass units are at 20°C and 1013mb. Particulate matter concentrations are reported at ambient temperature and pressure. $NO_X$ mass units are $NO_X$ as $NO_2$ µg m-3

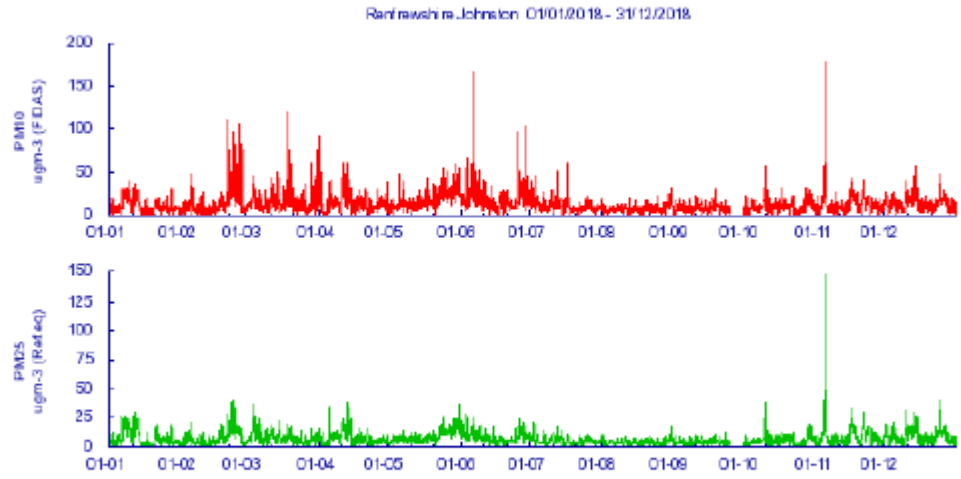
**Note: For a strict comparison against the objectives there must be a data capture of 85% or greater throughout the calendar year.**

1 / 3

Report produced by Ricardo Energy & Environment

| Pollutant | Air Quality Standards (Scotland) Regulations 2010 | Exceedances | Days |
|---|---|---|---|
| PM10 particulate matter (Hourly measured) | daily mean > 50 microgrammes per metre cubed | 1 | 1 |
| PM10 particulate matter (Hourly measured) | Annual mean > 18 microgrammes per metre cubed | 0 | - |
| PM2.5 particulate matter (Hourly measured) | Annual mean > 12 microgrammes per metre cubed | 0 | - |

## Annual Graph




### QA/QC of Diffusion Tube Monitoring

The diffusion tubes for the year 2018 were supplied and analysed by GSS, the tubes were prepared using the 20% TEA in water preparation method. All results have been bias adjusted and annualised (where required). GSS is a UKAS accredited laboratory and participates in the AIR-PT Scheme (a continuation of the Workplace Analysis Scheme for Proficiency (WASP)) for $NO_2$ tube analysis and the Annual Field Inter-Comparison Exercise. These provide strict performance criteria for participating laboratories to meet, thereby ensuring $NO_2$ concentrations reported are of a high calibre.

The latest AIR-PT results were as follows:

- AIR-PT AR023 (September to October 2018) – 100%
- AIR-PT AR024 (January to February 2018) – 100%
- AIR-PT AR025 (April to May 2018) – 100%
- AIR-PT AR027 (July to August 2018) – 50%

- AIR-PT AR028 (September to October 2018) – 100%
- AIR-PT AR030 (January to February 2019) – 100%

Over a rolling five round AIR-PT window, it is expected that 95% of laboratory results should be ≤+2. If this percentage is substantially lower than 95% for a particular laboratory, within this five round window, then one can conclude that the laboratory in question may have sources of error within their analytical procedure.

For the latest five round window 92% of GSS results were ≤+2 therefore the diffusion tube performance over this period has been assessed satisfactory.

**QA/QC of Automatic Monitoring**

Automatic monitoring of $NO_x$, $PM_{10}$ and $PM_{2.5}$ is completed within Renfrewshire Council using Chemiluminescence ($NO_x$), FDMS ($PM_{10}$) and Fidas ($PM_{10}$ and $PM_{2.5}$) analysers. All data is available in real-time, and following data dissemination is ratified by Ricardo Energy and Environment to AURN standards.

## Glossary of Terms

| 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

Local Air Quality Management Technical Guidance LAQM.TG(16). May 2016. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland

Local Air Quality Management Policy Guidance LAQM.PG(16). May 2016. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland

Renfrewshire Council (2017) Annual Progress Report

Air Quality in Scotland website (2018 data), available at http://www.scottishairquality.co.uk/

AEA_DifTPAB_v04.xls, available at http://laqm.defra.gov.uk/bias-adjustment-factors/local-bias.html

National Diffusion Tube Bias Adjustment Factor Spreadsheet version 03/19 available at https://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html

Defra LAQM helpdesk – https://laqm.defra.gov.uk/

Paisley Town Centre Air Quality Action Plan (2014)

Renfrewshire Council Local Transport Strategy (2007)

Paisley Town Centre Action Plan 2016 – 2026

Renfrewshire Council Carbon Management Plan 2014/15 – 2019/20

Renfrewshire Cycling Strategy 2016 – 2025