

APPENDIX 2

Part IV Environment Act 1995

Detailed Assessment of nitrogen dioxide – (July 2016)

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

Date (July 2016)

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|--------------------------------|--|
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Air Quality

DETAILED ASSESSMENT OF NITROGEN DIOXIDE – (xx 2016)

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SUMMARY

This document has been produced in response to the requirements of the Welsh Government for review and assessment of air quality. The 2014 Detailed Assessment of air quality concluded that a Detailed Assessment was necessary at Victoria Gardens, Neath.

Measurements have shown that the only location having relevant exposure where the annual averaged AQO was breached was No. 1 Victoria Gardens (40.7 ug/m^3). However, this exceedance is marginal and is based upon the use of the NO₂ with distance calculator spreadsheet. This will have introduced an additional degree of uncertainty over and above that introduced by the use of diffusion tubes (albeit in triplicate) at No. 3 Victoria Gardens.

The aim of the Detailed Assessment is to establish with reasonable certainty whether there is a likelihood that AQOs are not being achieved. It is considered that this result is not sufficient in this regard and that an AQMA will not be declared at this time.

The Council therefore intends to deploy diffusion tubes in triplicate at No. 1 Victoria Gardens using circular clips which will allow deployment without the need for ladders. This will overcome the previous health and safety limitation on monitoring at this location and will eliminate the additional uncertainty introduced by the NO₂ with distance calculator spreadsheet. A further Detailed Assessment of NO₂ shall then be carried out on 2016 data.

Introduction

The Government and Devolved Administrations have adopted two Air Quality Objectives for nitrogen dioxide. An annual mean concentration of $40 \mu\text{g}/\text{m}^3$ and a 1-hour mean concentration of $200 \mu\text{g}/\text{m}^3$ not to be exceeded more than 18 times per year. Both objectives are to be achieved by the end of 2005.

In addition, the first Air Quality Daughter Directive also sets limit values for nitrogen dioxide, which have been translated into UK legislation. A 1-hour limit of $200 \mu\text{g}/\text{m}^3$ applies, not to be exceeded by more than 18 times per year. An annual mean limit value of $40 \mu\text{g}/\text{m}^3$ also applies, both to be achieved by the 1st January 2010.

Summary of recent investigations and developments

The 2010 Air Quality Progress Report identified that a detailed assessment was required for nitrogen dioxide (NO_2) at Pontardawe Post Office and at Victoria Gardens, Neath.

The 2011 detailed assessment was carried out using more diffusion tubes and this confirmed a potential problem at both locations. As a consequence of these findings it was decided that continuous analysers would be deployed to provide more reliable data for a decision on whether a declaration of AQMAs needed to be made. Both analysers were deployed in July 2012.

It was not possible to site the continuous analyser at the frontage of the Post Office due to a lack of space and health & safety considerations. The nearest location where this could be located was the nearby old bus stop, which is less than 5 metres from the diffusion tube on the frontage of the Post Office. It became clear that results at the continuous monitor were significantly lower than those at the frontage of the Post Office. Consequently, diffusion tubes were deployed in triplicate on the monitor.

It was impossible to locate the analyser at the frontage of 1, Victoria Gardens, given the very narrow pavement. An attempt was therefore made to set up the instrument in the front garden of No. 3 next door. However the owner of the property withdrew permission for use of the garden shortly after the equipment was deployed, so another site had to be found. The location on the pavement near the lights had sufficient room and had no safety issues.

In order to try to avoid the need for declaration of an AQMA at Pontardawe, steps were taken to try to reduce pollution levels at the Post Office. The bus stop was relocated approximately 55 metres further up the hill beyond the houses at 10 & 12 Swansea Road. Pollution from buses can be considerable and there were also reports of buses idling so relocation of the bus stop was aimed at reducing pollution levels at the Post Office.

At the same time, double yellow lines were extended outside the Post Office. The aim was to discourage parking outside, which tends to cause tailbacks and congestion as the road is not wide enough for vehicles to pass parked cars if there is queuing at the lights.

Detailed assessment of nitrogen dioxide

An extra two parking spaces were provided off road at the new bus stop with the further goal of reducing congestion. All of these works were completed in March 2013.

In addition, the sequencing of the traffic lights was reviewed in October 2011 in order to try to reduce queuing up Swansea Road past the Post Office.

The Council has not used modelling to determine pollution levels as it is less accurate than monitoring. Instead diffusion tubes have been deployed at relevant locations and a local bias adjustment factor has been employed based upon three continuous analysers co-located with diffusion tubes.

The interim 2012 detailed assessment showed that neither the annual averaged Air Quality Objective ($40 \mu\text{g}/\text{m}^3$) nor the hourly averaged AQO ($200\mu\text{g}/\text{m}^3$) for nitrogen dioxide were exceeded at sites near Pontardawe Post Office.

Continuous measurements of NO_2 at Victoria Gardens, Neath showed that the hourly averaged AQO was complied with. The annual averaged AQO was also complied with at all sites where diffusion tubes were deployed. However, a single property at 1 Victoria Gardens ($41.7 \mu\text{g}/\text{m}^3$) was predicted to exceed the annual averaged AQO when NO_2 levels were calculated with the "distance from roads spreadsheet". This exceedance was considered to be quite marginal and was based upon less than a year's worth of data. It was therefore considered that bias adjustment factors would have been less reliable than would have been the case for a full year of data. Consequently an AQMA was not declared at that stage. Rather, a detailed assessment would be repeated with a full year's worth of data.

A detailed assessment for the calendar year of 2014 showed that neither the annual averaged Air Quality Objective ($40 \mu\text{g}/\text{m}^3$) nor the hourly averaged AQO ($200\mu\text{g}/\text{m}^3$) for nitrogen dioxide were exceeded at sites near Victoria Gardens, Neath. Although, a single property at 1 Victoria Gardens ($39.8 \mu\text{g}/\text{m}^3$) was close to, but did not exceed the annual averaged AQO when NO_2 levels when calculated with the "distance from roads spreadsheet".

Detailed assessment of nitrogen dioxide

Monitoring sites

Automatic monitoring sites

Nitrogen dioxide is continuously measured at Pontardawe Post Office, at Victoria Gardens in Neath and at Margam Fire Station (AURN).

Figure 1. Nitrogen dioxide monitoring locations



However, this detailed assessment deals only with data from Neath as NO₂ levels at the other locations have not necessitated a detailed assessment.

Detailed assessment of nitrogen dioxide

Table 1. NO₂ monitoring station details

| Site ID | Site Name | Site Type | X OS Grid Reference | Y OS Grid Reference | Inlet Height (m) | Pollutants Monitored | In AQMA? | Monitoring Technique | Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure) | Distance to Kerb of Nearest Road (m) (N/A if not applicable) | Does this Location Represent Worst-Case Exposure? |
|----------------|------------------|------------------|----------------------------|----------------------------|-------------------------|-----------------------------|-----------------|-----------------------------|---|---|--|
| VG2 | Victoria Gardens | Roadside | 275471 | 197183 | 1.4 | NO ₂ | N | Chemiluminescence | Y (21) | 1 | N |

Detailed assessment of nitrogen dioxide

Figure 2 - NOx analyser on Cimla Road



NOx
analyser

Figure 3 – View across junction to Victoria Gardens



3 Victoria
Gardens

1 Victoria
Gardens

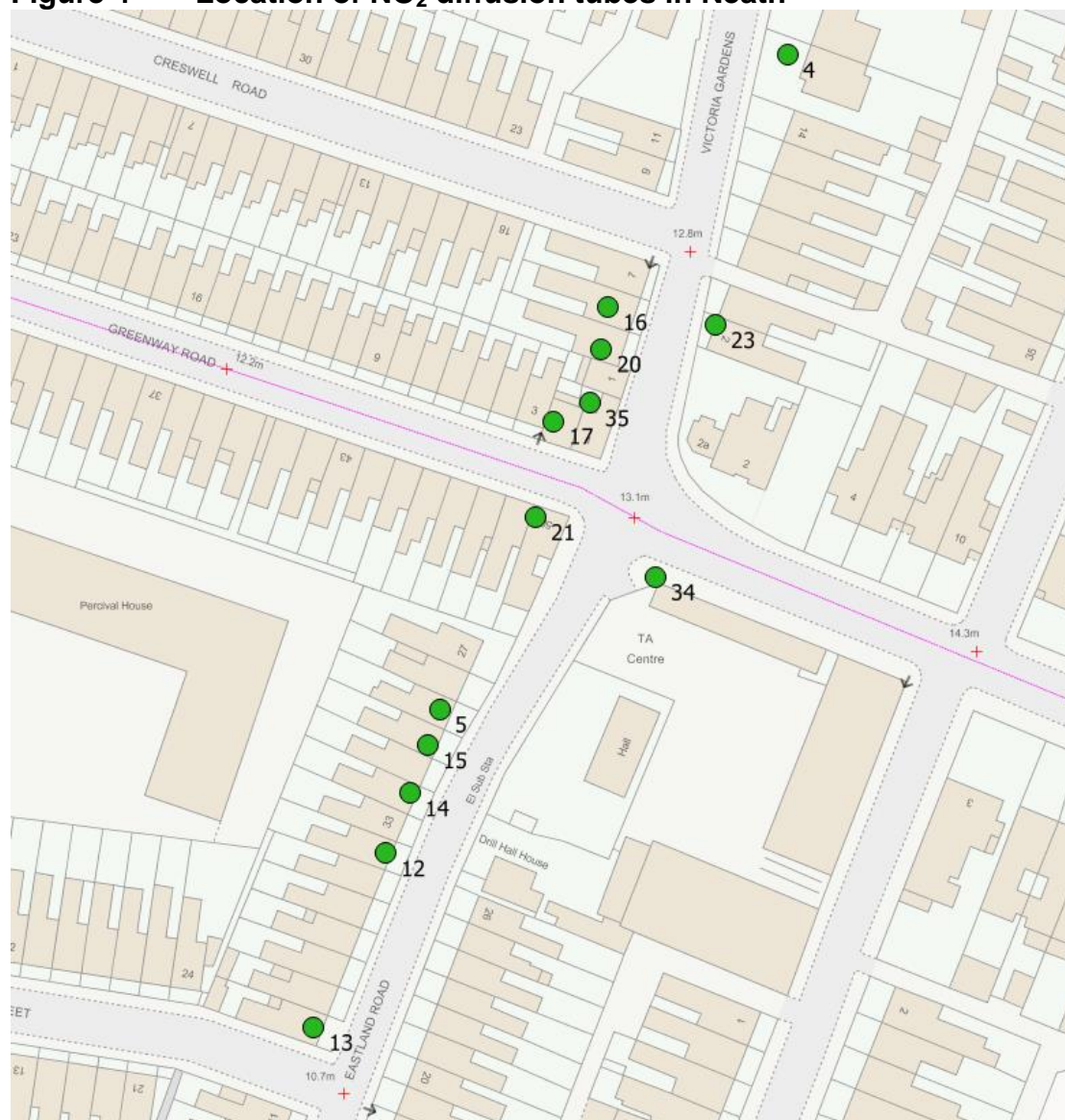
Detailed assessment of nitrogen dioxide

Diffusion tube monitoring sites

Nitrogen dioxide is measured at a variety of locations using passive diffusion tubes. The tubes are exposed for one month and are provided and analysed by ESG at Didcot. The tubes are prepared using acetone:triethanolamine (50:50) and are subject to intercomparison quality assurance tests as part of the Workplace Analysis Scheme for Proficiency (WASP).

This report deals only the sites in the vicinity of Victoria Gardens, Neath.

Figure 4 Location of NO₂ diffusion tubes in Neath



Detailed assessment of nitrogen dioxide

Table 2. Details of Non- Automatic Monitoring Sites

| Site ID | Site Name | Site Type | X OS Grid Reference | Y OS Grid Reference | Site Height (m) | Pollutants Monitored | In AQMA? | Is Monitoring Co-located with a Continuous Analyser (Y/N) | Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure) | Distance to Kerb of Nearest Road (m) (N/A if not applicable) | Does this Location Represent Worst-Case Exposure? |
|----------------|---------------------------|------------------|----------------------------|----------------------------|------------------------|-----------------------------|-----------------|--|---|---|--|
| 4 | 8 Victoria Gardens, Neath | Roadside | 275494 | 197272 | 1.5 | NO ₂ | N | N | Y (2m) | 4.5 m | N |
| 5 | 28 Eastland Road, Neath | Roadside | 275420 | 197161 | 1.5 | NO ₂ | N | N | Y (0m) | 4 m | N |
| 12 | 34 Eastland Road, Neath | Roadside | 275427 | 197139 | 1.5 | NO ₂ | N | N | Y (0m) | 4 m | N |
| 13 | 40 Eastland Road, Neath | Roadside | 275415 | 197110 | 1.5 | NO ₂ | N | N | Y (0m) | 4 m | N |

Detailed assessment of nitrogen dioxide

| Site ID | Site Name | Site Type | X OS Grid Reference | Y OS Grid Reference | Site Height (m) | Pollutants Monitored | In AQMA? | Is Monitoring Co-located with a Continuous Analyser (Y/N) | Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure) | Distance to Kerb of Nearest Road (m) (N/A if not applicable) | Does this Location Represent Worst-Case Exposure? |
|---------|---------------------------|-----------|---------------------|---------------------|-----------------|----------------------|----------|---|--|--|---|
| 14 | 32 Eastland Road, Neath | Roadside | 275431 | 197149 | 1.5 | NO ₂ | N | N | Y (0m) | 4 m | N |
| 15 | 30 Eastland Road, Neath | Roadside | 275434 | 197157 | 1.5 | NO ₂ | N | N | Y (0m) | 4 m | N |
| 16 | 5 Victoria Gardens, Neath | Roadside | 275464 | 197230 | 1.5 | NO ₂ | N | N | Y (0m) | 3.5 m | Y |
| 17 | 1 Greenway Road, Neath | Roadside | 275455 | 197211 | 2.0 | NO ₂ | N | N | Y (0m) | 1 m | Y |

Detailed assessment of nitrogen dioxide

| Site ID | Site Name | Site Type | X OS Grid Reference | Y OS Grid Reference | Site Height (m) | Pollutants Monitored | In AQMA? | Is Monitoring Co-located with a Continuous Analyser (Y/N) | Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure) | Distance to Kerb of Nearest Road (m) (N/A if not applicable) | Does this Location Represent Worst-Case Exposure? |
|---------|---------------------------|-----------|---------------------|---------------------|-----------------|----------------------|----------|---|--|--|---|
| 20 | 3 Victoria Gardens, Neath | Roadside | 275463 | 197223 | 1.5 | NO ₂ | N | N | Y (0m) | 3.5 m | Y |
| 21 | 50 Greenway Road, Neath | Roadside | 275452 | 197195 | 2.0 | NO ₂ | N | N | Y (0m) | 1 m | Y |
| 23 | 4 Victoria Gardens, Neath | Roadside | 275482 | 197227 | 1.5 | NO ₂ | N | N | Y (0m) | 3.5 m | Y |
| 34 | Lights at Cimla Junction | Roadside | 275472 | 197185 | 1.4 | NO ₂ | N | Y | Y (20m) | 1.5 m | N |

Comparison of Monitoring Results with Air Quality Objectives

Table 3 Results of Automatic Monitoring for NO₂: Comparison with Annual Mean Objective

| Site ID | Site Type | Within AQMA? | Valid Data Capture for Monitoring Period % ^a | Valid Data Capture 2015 % ^b | Annual Mean Concentration (µg/m ³) | | | | |
|---------|-----------|--------------|---|--|--|--------------------|--------------------|--------------------|-------------------|
| | | | | | 2011* ^c | 2012* ^c | 2013* ^c | 2014* ^c | 2015 ^c |
| VG2 | Roadside | N | 99 | 99 | - | 51 | 42 | 42 | 40 |

In bold, exceedence of the NO₂ annual mean AQS objective of 40µg/m³

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

^b i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)

^c Means should be “annualised” as in Boxes 7.9 and 7.10 of LAQM.TG16, if valid data capture is less than 75%

* Annual mean concentrations for previous years are optional

Figure 5 – Trends in Annual Mean NO₂ Concentrations Measured at Victoria Gardens Monitoring Site

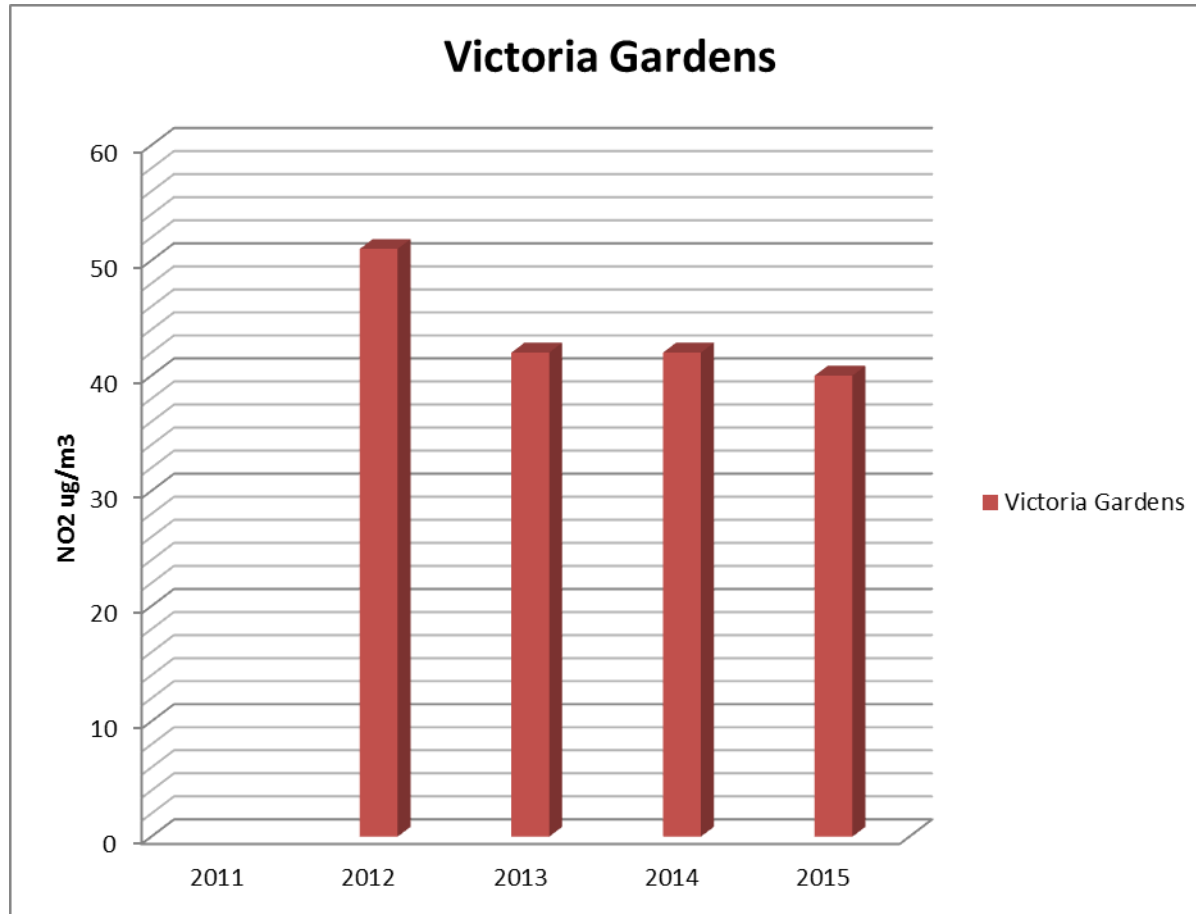


Table 4 Results of Automatic Monitoring for NO₂: Comparison with 1-hour Mean Objective

| Site ID | Site Type | Within AQMA? | Valid Data Capture for Monitoring Period % ^a | Valid Data Capture 2015 % ^b | Number of Hourly Means > 200µg/m ³ | | | | |
|---------|-----------|--------------|---|--|---|--------------------|--------------------|--------------------|-------------------|
| | | | | | 2011* ^c | 2012* ^c | 2013* ^c | 2014* ^c | 2015 ^c |
| VG2 | Roadside | N | 99 | 99 | - | 0 (142) | 0 | 0 | 0 |

In bold, exceedence of the NO₂ hourly mean AQS objective (200µg/m³ – not to be exceeded more than 18 times per year)

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

^b i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)

^c If the data capture for full calendar year is less than 90%, include the 99.8th percentile of hourly means in brackets

* Number of exceedences for previous years is optional

Table 5 Results of NO₂ Diffusion Tubes 2013

| Site ID | Location | Site Type | Within AQMA? | Triplicate or Co-located Tube | Full Calendar Year Data Capture 2015 (Number of Months or %) ^a | 2015 Annual Mean Concentration (µg/m³) - Bias Adjustment factor = 0.80 ^b |
|----------------|---------------------------|------------------|---------------------|--------------------------------------|--|---|
| 4 | 8 Victoria Gardens, Neath | Roadside | N | N | 12 | 25.7 |
| 5 | 28 Eastland Road, Neath | Roadside | N | N | 12 | 29.6 |
| 12 | 34 Eastland Road, Neath | Roadside | N | N | 12 | 28.9 |
| 13 | 40 Eastland Road, Neath | Roadside | N | N | 12 | 26.2 |
| 14 | 32 Eastland Road, Neath | Roadside | N | N | 12 | 30.1 |

Detailed assessment of nitrogen dioxide

| Site ID | Location | Site Type | Within AQMA? | Triplicate or Co-located Tube | Full Calendar Year Data Capture 2015 (Number of Months or %) ^a | 2015 Annual Mean Concentration ($\mu\text{g}/\text{m}^3$) - Bias Adjustment factor = 0.80 ^b |
|---------|---------------------------|-----------|--------------|-------------------------------|---|--|
| 15 | 30 Eastland Road, Neath | Roadside | N | N | 12 | 29.8 |
| 16 | 5 Victoria Gardens, Neath | Roadside | N | N | 12 | 32.8 |
| 17 | 1 Greenway Road, Neath | Roadside | N | N | 12 | 33.9 |
| 20 | 3 Victoria Gardens, Neath | Roadside | N | Triplicate | 12 | 34.1 |
| 21 | 50 Greenway Road, Neath | Roadside | N | N | 12 | 39.5 |

Detailed assessment of nitrogen dioxide

| Site ID | Location | Site Type | Within AQMA? | Triplicate or Co-located Tube | Full Calendar Year Data Capture 2015 (Number of Months or %) ^a | 2015 Annual Mean Concentration ($\mu\text{g}/\text{m}^3$) - Bias Adjustment factor = 0.80 ^b |
|---------|---------------------------|-----------|--------------|-------------------------------|---|--|
| 23 | 4 Victoria Gardens, Neath | Roadside | N | N | 12 | 27.4 |
| 34 | Lights at Cimla Junction | Roadside | N | Triplicate and Co-located | 12 | 46.6 |

In bold, exceedence of the NO₂ annual mean AQS objective of 40 $\mu\text{g}/\text{m}^3$

Underlined, annual mean > 60 $\mu\text{g}/\text{m}^3$, indicating a potential exceedence of the NO₂ hourly mean AQS objective

^a Means should be “annualised” as in Boxes 7.9 and 7.10 of LAQM.TG16, if full calendar year data capture is less than 75%

^b If an exceedence is measured at a monitoring site not representative of public exposure, NO₂ concentration at the nearest relevant exposure should be estimated based on the “[NO₂ fall-off with distance](http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html)” calculator (<http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html>), and results should be discussed in a specific section. The procedure is also explained in paragraphs 7.77 to 7.79 of LAQM.TG16.

Table 6 Results of NO₂ Diffusion Tubes (2008 to 2012)

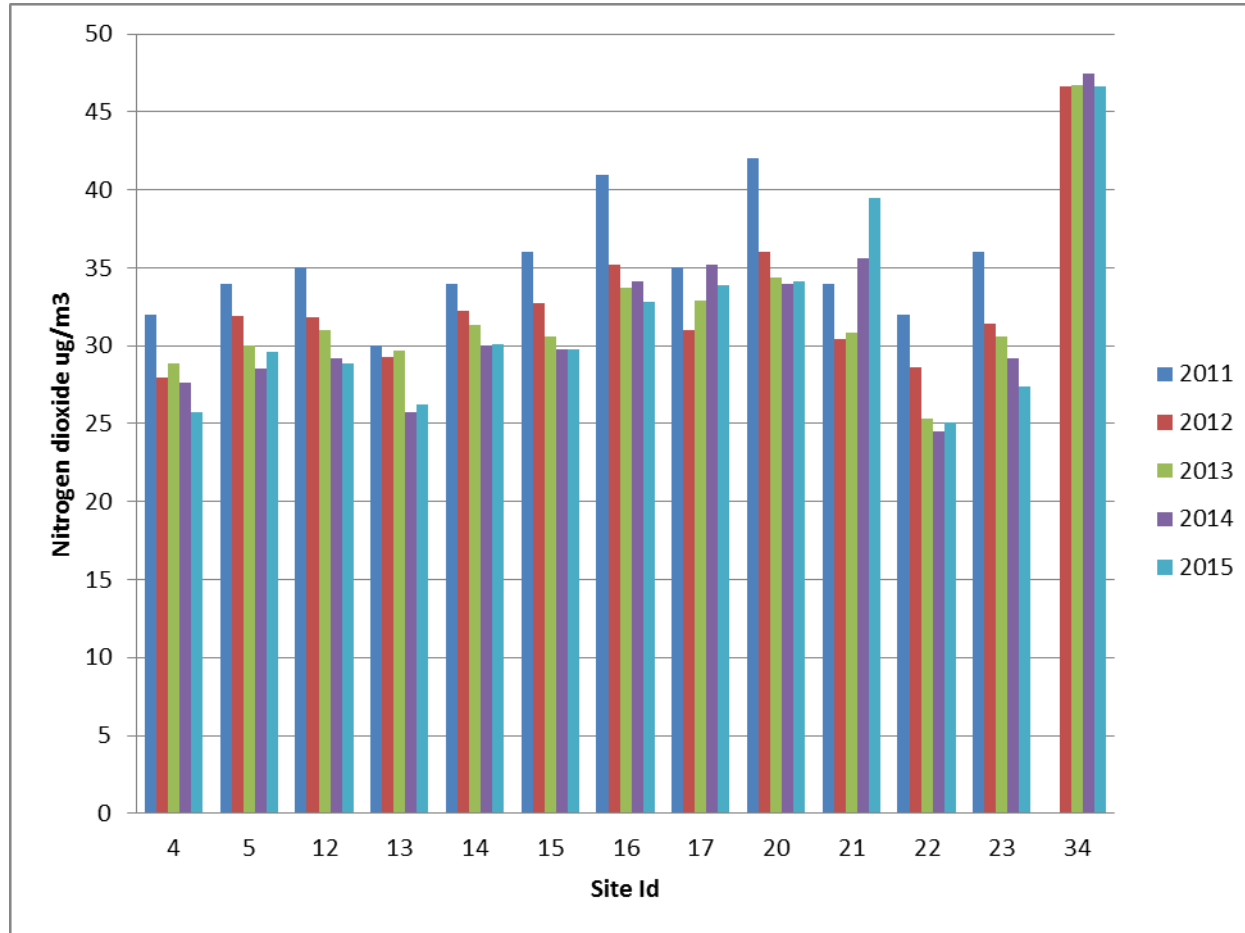
| Site ID | Site Type | Within AQMA? | Annual Mean Concentration ($\mu\text{g}/\text{m}^3$) - Adjusted for Bias ^a | | | | |
|---------|-----------|--------------|---|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| | | | 2011 (Bias Adjustment Factor = 0.83) | 2012 (Bias Adjustment Factor = 0.79) | 2013 (Bias Adjustment Factor = 0.75) | 2014 (Bias Adjustment Factor = 0.78) | 2015 (Bias Adjustment Factor = 0.80) |
| 4 | Roadside | N | 32 | 28.0 | 28.9 | 27.6 | 25.7 |
| 5 | Roadside | N | 34 | 31.9 | 30.0 | 28.5 | 29.6 |
| 12 | Roadside | N | 35 | 31.8 | 31.0 | 29.2 | 28.9 |
| 13 | Roadside | N | 30 | 29.3 | 29.7 | 25.7 | 26.2 |
| 14 | Roadside | N | 34 | 32.2 | 31.3 | 30.0 | 30.1 |
| 15 | Roadside | N | 36 | 32.7 | 30.6 | 29.8 | 29.8 |
| 16 | Roadside | N | 41 | 35.2 | 33.7 | 34.1 | 32.8 |
| 17 | Roadside | N | 35 | 31.0 | 32.9 | 35.2 | 33.9 |
| 20 | Roadside | N | 42 | 36.0 | 34.4 | 34.0 | 34.1 |
| 21 | Roadside | N | 34 | 30.4 | 30.8 | 35.6 | 39.5 |
| 23 | Roadside | N | 36 | 31.4 | 30.6 | 29.2 | 27.4 |
| 34 | Roadside | N | - | 46.6 | 46.7 | 47.5 | 46.6 |

In bold, exceedence of the NO₂ annual mean AQS objective of 40 $\mu\text{g}/\text{m}^3$

Underlined, annual mean > 60 $\mu\text{g}/\text{m}^3$, indicating a potential exceedence of the NO₂ hourly mean AQS objective

^a Means should be “annualised” as in Boxes 7.9 and 7.10 of LAQM.TG16, if full calendar year data capture is less than 75%

Figure 6 – Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Diffusion Tube Monitoring Sites



Detailed assessment of nitrogen dioxide

The sites that have failed to meet the annual averaged air quality objective during the last five years have been some of those located at Victoria Gardens or Pontardawe Post Office.

Monitoring at 1 Victoria Gardens had to cease on account of health & safety concerns since the pavement was very low and narrow and it was considered to be dangerous to use the ladder to exchange the tubes. The property next door at 3, Victoria Gardens continues to be measured and is used to estimate NO₂ levels at No.1 Victoria Gardens. Therefore it is necessary to estimate the pollution level at this property using the “NO₂ with distance from roads calculator” spreadsheet.


No. 3 is set back approximately 3.5 metres from the kerb, whereas the frontage at No. 1 faces directly onto the pavement.

The background maps spreadsheet for NO₂ for Neath Port Talbot for the year of 2015 was downloaded from <http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2011> . The nearest location to the junction at Victoria Gardens and Cimla Road was defined by the coordinates 275500, 197500. The background NO₂ concentration at this location is 14.6 µg/m³.

The data entered into the spreadsheet is shown below:

Detailed assessment of nitrogen dioxide

Figure 7- Screenshot of NO₂ with distance calculator spreadsheet

This calculator allows you to predict the annual mean NO₂ concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph. 

Enter data into the yellow cells

| | | | |
|---------------|---|------|-------------------|
| Step 1 | How far from the KERB was your measurement made (in metres)? (Note 1) | 3.5 | metres |
| Step 2 | How far from the KERB is your receptor (in metres)? (Note 1) | 1 | metres |
| Step 3 | What is the local annual mean background NO ₂ concentration (in µg/m ³)? (Note 2) | 14.6 | µg/m ³ |
| Step 4 | What is your measured annual mean NO ₂ concentration (in µg/m ³)? (Note 2) | 34.1 | µg/m ³ |
| Result | The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor (Note 3) | 40.7 | µg/m ³ |

Note 1: In some cases the term "kerb" may be taken to be the edge of the trafficked road - see the FAQ at <http://laqm2.defra.gov.uk/FAQs/Monitoring/Location/index.htm> for further details. Distances should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (in practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at www.airquality.co.uk, or alternatively from a nearby monitor in a background location.

Note 3: The calculator follows the procedure set out in Box 2.3 of LAQM TG(09). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

Issue 4: 25/01/11. Created by Dr Ben Marner; Approved by Prof Duncan Laxen. Contact: benmarner@aqiconsultants.co.uk

This shows that the annual averaged air quality objective at 1 Victoria Gardens did not comply with the air quality objective i.e. 40.7 µg/m³.

Monitoring has been carried out at several properties in the vicinity of the junction, therefore dispersion modelling is considered to be unnecessary for purposes of identifying the geographical area of any potential exceedance.

Conclusion

Measurements have shown that the only location having relevant exposure where the annual averaged AQO was breached was No. 1 Victoria Gardens (40.7 ug/m³). However, this exceedance is marginal and is based upon the use of the NO₂ with distance calculator spreadsheet. This will have introduced an additional degree of uncertainty over and above that introduced by the use of diffusion tubes (albeit in triplicate) at No. 3 Victoria Gardens.

The aim of the Detailed Assessment is to establish with reasonable certainty whether there is a likelihood that AQOs are not being achieved. It is considered that this result is not sufficient in this regard and that an AQMA will not be declared at this time.

The Council therefore intends to deploy diffusion tubes in triplicate at No. 1 Victoria Gardens using circular clips which will allow deployment without the need for ladders. This will overcome the previous health and safety limitation on monitoring at this location and will eliminate the additional uncertainty introduced by the NO₂ with distance calculator spreadsheet. A further Detailed Assessment of NO₂ shall then be carried out on 2016 data.

Appendix A: QA/QC Data

Diffusion Tube Bias Adjustment Factors

NO₂ diffusion tubes are sourced from the Environmental Scientifics Group and are prepared using 50% TEA in acetone. The bias adjustment factor of 0.78 was used for 2014, as derived from a co-location study at three locations.

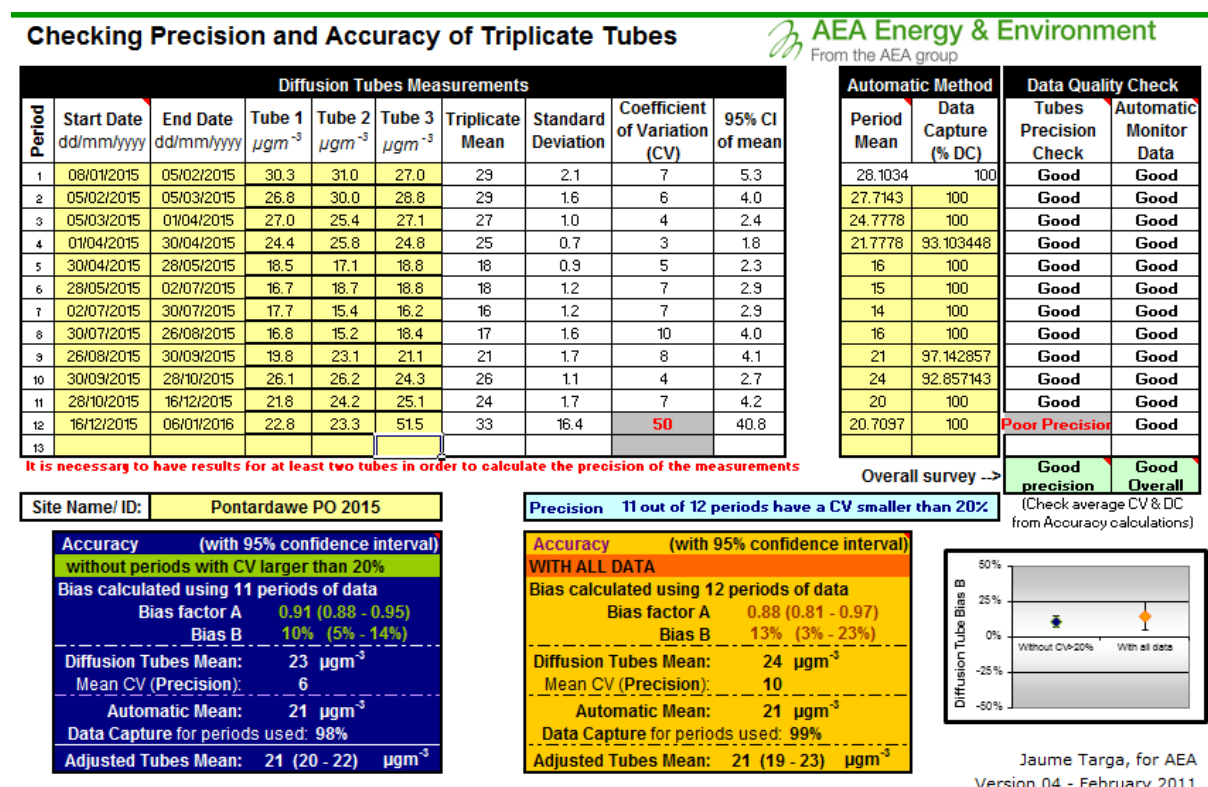
Factor from Local Co-location Studies (if available)

Continuous analysers were co-located with triplicate diffusion tubes at Port Talbot Fire Station, Pontardawe Swansea Road and Victoria Gardens.

Defra has provided a spreadsheet to facilitate the calculation of local bias adjustment factors. The spreadsheet used can be found at this location:

<http://laqm.defra.gov.uk/bias-adjustment-factors/local-bias.html>

Figure A1 – Pontardawe Post Office - Bias adjustment spreadsheet -



Detailed assessment of nitrogen dioxide

Figure A2 – Port Talbot Fire Station - Bias adjustment spreadsheet -

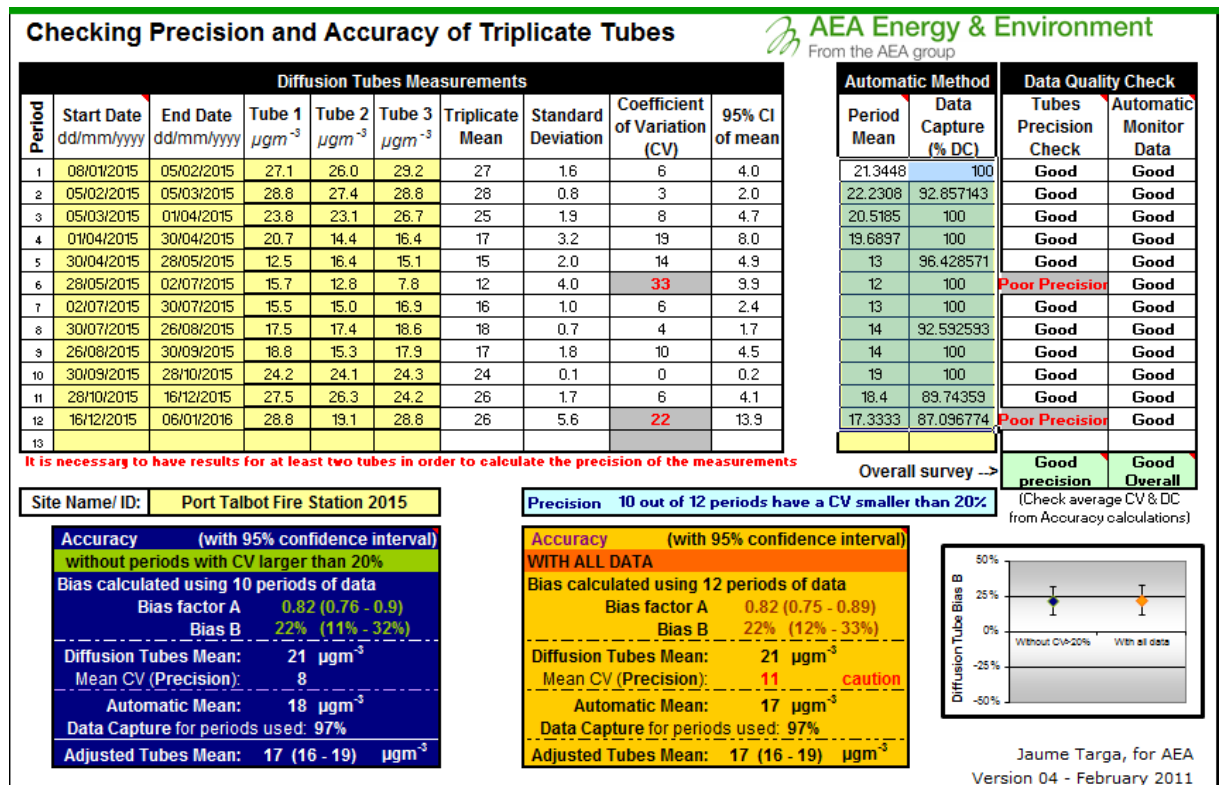
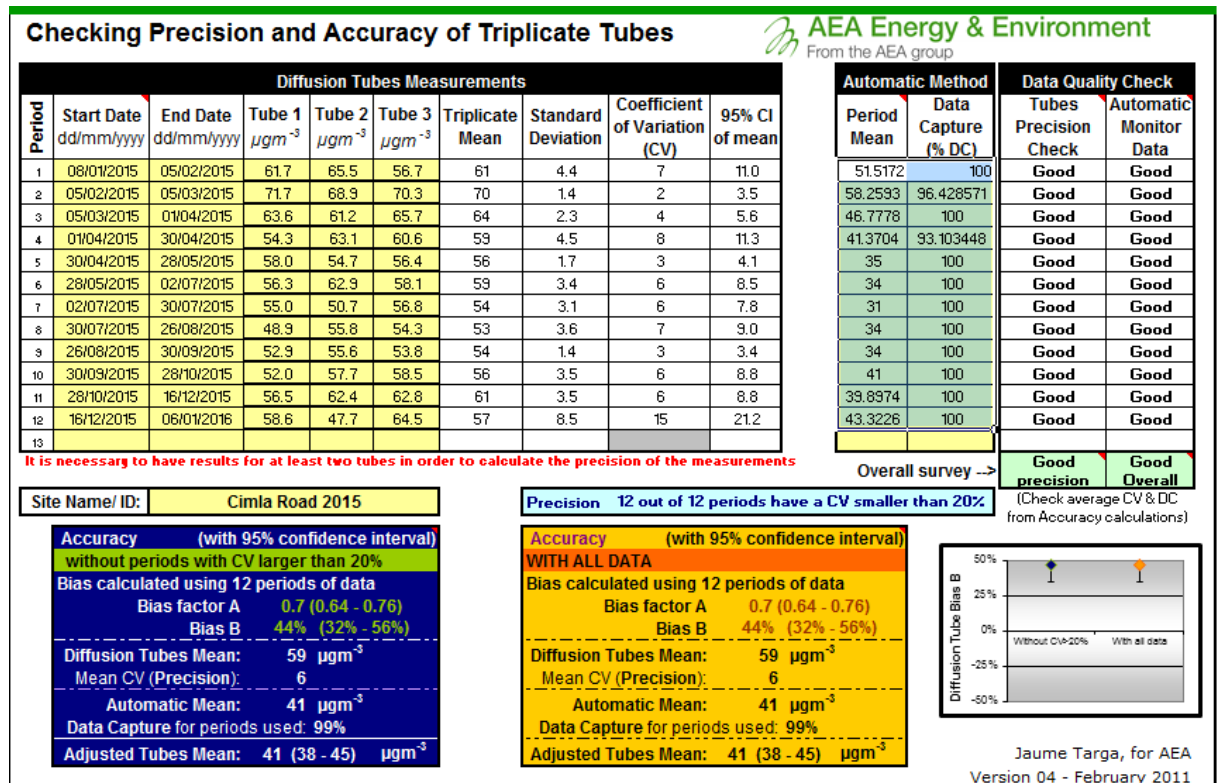


Figure A3 – Cimla Road - Bias adjustment spreadsheet -



Detailed assessment of nitrogen dioxide

The locally derived bias adjustment factor of 0.80 is derived from the average of the three sites e.g. $(0.88 + 0.82 + 0.7) / 3$.

PM Monitoring Adjustment

No PM adjustment was required for PM₁₀ analysers operated by Neath Port Talbot County Borough Council as FDMS TEOMs were used in all cases.

Short-term to Long-term Data adjustment

No data was lost in monitoring diffusion tube sites during 2015. Consequently, no long-term data adjustment was necessary.

QA/QC of automatic monitoring

The AURN site is subject to the quality control procedures of the network. Neath Port Talbot County Borough Council staff act as Local Site Operator, carrying out calibrations on an approximately fortnightly basis. There are regular site audits and validation and ratification are carried out by AURN staff prior to dissemination of the data via <http://uk-air.defra.gov.uk/>.

All PM₁₀ analysers are FDMS/TEOMs with C/B driers. No factors are applied to this data during the collection process. All equipment is covered by service and maintenance contracts with suppliers. These contracts provide for 6 monthly servicing and emergency callouts.

Monitoring stations are covered by a QA/QC contract with Ricardo-AEA which provides for two site audits per year and QA/QC of the data which is polled by AEAT and disseminated on the Welsh Air Quality Forum website. Data is subject to a similar QA/QC standard as the AURN.

QA/QC of diffusion tube monitoring

Harwell Scientifics have been shown to have good performance in respect of recent Wasp scheme analyses. Details of the most recent Wasp results can be viewed at the following Internet location:

[http://laqm.defra.gov.uk/documents/LAQM-WASP-Rounds-121--124-and-AIR-PT-Rounds-1-3-4-6-\(April-2013--February-2015\)-NO2-report.pdf](http://laqm.defra.gov.uk/documents/LAQM-WASP-Rounds-121--124-and-AIR-PT-Rounds-1-3-4-6-(April-2013--February-2015)-NO2-report.pdf)

Detailed assessment of nitrogen dioxide

Appendix B: Raw NO₂ Data

| Site Id | Month/Year | NO ₂ Conc ug |
|---------|------------|-------------------------|
| 4 | 1/2015 | 34.9 |
| 4 | 2/2015 | 41.9 |
| 4 | 3/2015 | 38.0 |
| 4 | 4/2015 | 34.0 |
| 4 | 5/2015 | 19.8 |
| 4 | 6/2015 | 26.7 |
| 4 | 7/2015 | 25.7 |
| 4 | 8/2015 | 28.0 |
| 4 | 9/2015 | 30.5 |
| 4 | 10/2015 | 41.7 |
| 4 | 11/2015 | 34.4 |
| 4 | 12/2015 | 32.4 |
| 5 | 1/2015 | 50.5 |
| 5 | 2/2015 | 51.3 |
| 5 | 3/2015 | 42.6 |
| 5 | 4/2015 | 32.3 |
| 5 | 5/2015 | 31.9 |
| 5 | 6/2015 | 30.1 |
| 5 | 7/2015 | 31.3 |
| 5 | 8/2015 | 27.5 |
| 5 | 9/2015 | 37.4 |
| 5 | 10/2015 | 41.5 |
| 5 | 11/2015 | 41.7 |
| 5 | 12/2015 | 28.4 |
| 12 | 1/2015 | 50.3 |
| 12 | 2/2015 | 48.6 |
| 12 | 3/2015 | 42.2 |
| 12 | 4/2015 | 34.6 |
| 12 | 5/2015 | 29.8 |
| 12 | 6/2015 | 29.6 |
| 12 | 7/2015 | 27.8 |
| 12 | 8/2015 | 29.4 |
| 12 | 9/2015 | 35.7 |
| 12 | 10/2015 | 39.9 |
| 12 | 11/2015 | 37.1 |
| 12 | 12/2015 | 31.5 |
| 13 | 1/2015 | 50.9 |
| 13 | 2/2015 | 44.5 |
| 13 | 3/2015 | 37.4 |
| 13 | 4/2015 | 29.2 |
| 13 | 5/2015 | 28.0 |

Detailed assessment of nitrogen dioxide

| Site Id | Month/Year | NO2 Conc ug |
|---------|------------|-------------|
| 13 | 6/2015 | 27.3 |
| 13 | 7/2015 | 25.9 |
| 13 | 8/2015 | 25.2 |
| 13 | 9/2015 | 30.9 |
| 13 | 10/2015 | 35.1 |
| 13 | 11/2015 | 31.3 |
| 13 | 12/2015 | 28.6 |
| 14 | 1/2015 | 55.7 |
| 14 | 2/2015 | 48.0 |
| 14 | 3/2015 | 45.9 |
| 14 | 4/2015 | 31.7 |
| 14 | 5/2015 | 30.9 |
| 14 | 6/2015 | 30.1 |
| 14 | 7/2015 | 30.5 |
| 14 | 8/2015 | 32.4 |
| 14 | 9/2015 | 36.1 |
| 14 | 10/2015 | 41.7 |
| 14 | 11/2015 | 39.9 |
| 14 | 12/2015 | 30.1 |
| 15 | 1/2015 | 49.5 |
| 15 | 2/2015 | 56.8 |
| 15 | 3/2015 | 45.1 |
| 15 | 4/2015 | 34.9 |
| 15 | 5/2015 | 31.3 |
| 15 | 6/2015 | 28.6 |
| 15 | 7/2015 | 31.5 |
| 15 | 8/2015 | 28.6 |
| 15 | 9/2015 | 34.9 |
| 15 | 10/2015 | 36.5 |
| 15 | 11/2015 | 40.3 |
| 15 | 12/2015 | 30.7 |
| 16 | 1/2015 | 54.0 |
| 16 | 2/2015 | 54.7 |
| 16 | 3/2015 | 45.5 |
| 16 | 4/2015 | 36.5 |
| 16 | 5/2015 | 35.5 |
| 16 | 6/2015 | 35.9 |
| 16 | 7/2015 | 31.1 |
| 16 | 8/2015 | 35.3 |
| 16 | 9/2015 | 40.1 |
| 16 | 10/2015 | 36.9 |
| 16 | 11/2015 | 47.4 |
| 16 | 12/2015 | 41.5 |

Detailed assessment of nitrogen dioxide

| Site Id | Month/Year | NO2 Conc ug |
|---------|------------|-------------|
| 17 | 1/2015 | 43.8 |
| 17 | 2/2015 | 53.2 |
| 17 | 3/2015 | 46.7 |
| 17 | 4/2015 | 43.0 |
| 17 | 5/2015 | 31.5 |
| 17 | 6/2015 | 34.9 |
| 17 | 7/2015 | 35.1 |
| 17 | 8/2015 | 34.6 |
| 17 | 9/2015 | 42.4 |
| 17 | 10/2015 | 47.6 |
| 17 | 11/2015 | 48.2 |
| 17 | 12/2015 | 49.9 |
| 20 | 1/2015 | 56.1 |
| 20 | 2/2015 | 50.1 |
| 20 | 3/2015 | 47.0 |
| 20 | 4/2015 | 40.3 |
| 20 | 5/2015 | 38.8 |
| 20 | 6/2015 | 37.6 |
| 20 | 7/2015 | 38.6 |
| 20 | 8/2015 | 35.7 |
| 20 | 9/2015 | 39.0 |
| 20 | 10/2015 | 40.1 |
| 20 | 11/2015 | 46.8 |
| 20 | 12/2015 | 44.9 |
| 21 | 1/2015 | 64.5 |
| 21 | 2/2015 | 64.1 |
| 21 | 3/2015 | 47.8 |
| 21 | 4/2015 | 46.3 |
| 21 | 5/2015 | 33.0 |
| 21 | 6/2015 | 38.6 |
| 21 | 7/2015 | 43.2 |
| 21 | 8/2015 | 45.5 |
| 21 | 9/2015 | 49.2 |
| 21 | 10/2015 | 55.3 |
| 21 | 11/2015 | 55.3 |
| 21 | 12/2015 | 53.4 |
| 23 | 1/2015 | 37.8 |
| 23 | 2/2015 | 39.9 |
| 23 | 3/2015 | 41.3 |
| 23 | 4/2015 | 33.2 |
| 23 | 5/2015 | 27.6 |
| 23 | 6/2015 | 28.6 |
| 23 | 7/2015 | 25.3 |

Detailed assessment of nitrogen dioxide

| Site Id | Month/Year | NO2 Conc ug |
|---------|------------|-------------|
| 23 | 8/2015 | 29.4 |
| 23 | 9/2015 | 32.3 |
| 23 | 10/2015 | 44.2 |
| 23 | 11/2015 | 38.8 |
| 23 | 12/2015 | 34.8 |
| 34 | 1/2015 | 61.2 |
| 34 | 2/2015 | 70.3 |
| 34 | 3/2015 | 63.4 |
| 34 | 4/2015 | 59.1 |
| 34 | 5/2015 | 56.3 |
| 34 | 6/2015 | 58.9 |
| 34 | 7/2015 | 54.1 |
| 34 | 8/2015 | 52.8 |
| 34 | 9/2015 | 54.0 |
| 34 | 10/2015 | 55.9 |
| 34 | 11/2015 | 60.5 |
| 34 | 12/2015 | 56.8 |