



Caerphilly County Borough Council 2017 Air Quality Progress Report

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

December, 2017

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Executive Summary

This report fulfils the requirements of the Local Air Quality Management process as set out in part IV of the Environment Act 1995, the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents. Results from monitoring in the Borough are presented and any potentially significant sources of air pollution are identified.

The Progress Report has not identified any significant changes in emissions sources in the Caerphilly CBC area. There have been no new relevant industrial installations and there are no significant commercial, domestic or fugitive sources of emissions.

Monitoring carried out in the Borough has not identified any exceedances of PM₁₀ and as such no further action is required in respect of this pollutant.

The report identifies 5 different locations within the non-automatic tube data across the Local Authority that exceeds the National Annual Air Quality Objective for Nitrogen Dioxide (NO₂). Of the five exceedances identified, 2 locations are situated within Caerphilly Town Centre Air Quality Management Area (AQMA) and 3 within Hafodyrynys AQMA. As a result, the current level of nitrogen dioxide within these areas will be dealt with via the Caerphilly Town Centre Action Plan and the Hafodyrynys Action Plan following the formal acceptance of the plan by Welsh Government. One other tube at Wattsville measured exactly 40µg/m³ in 2017, however the authority are currently investigating whether there are any 'quick fix' solutions that can reduce the level of nitrogen dioxide recorded as the measurement is confined to a very small area of the road, affecting only 2 properties. Furthermore, a M200A Chemiluminescent continuous analyser has been placed on Islwyn Road, Wattsville to further investigate the single exceedance recorded.

Further monitoring data will be reviewed within the 2018 Annual Progress Report to assess the effectiveness of the proposed interventions within both plans.

There have been no new roads constructed since the last round of review and assessment. Caerphilly County Borough Council has also considered:

- industrial installations
- commercial and domestic sources
- fugitive or uncontrolled sources

CCBC can confirm that there is no requirement for the Local Authority to proceed to a Detailed Assessment in relation to these matters at present.

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1 Introduction

1.1 Description of Local Authority Area

The County Borough of Caerphilly was created in 1996 as part of the reorganization of local government. It occupies approximately 28,000 hectares of the South Wales Valleys with a population of around 170,000. It stretches over 40km between the Urban Centres of Cardiff and Newport in the South and the Brecon Beacons to the North taking in all parts of the valleys of the rivers Rhymney, Sirhowy and Ebbw. It contains some 50 distinct towns and villages, many (particularly in the North) are linear settlements located on the valley floors. The largest settlement is Caerphilly itself situated in the South West corner of the County Borough; this forms part of the locally known “Caerphilly Basin” that also includes Bedwas, Machen, Rudry, Abertridwr, Senghenydd, Trecenydd, Penrheol and Energlyn. Other significant settlements include Bargoed, Blackwood, Newbridge, Risca and Ystrad Mynach.

Historically the County Borough of Caerphilly was a major source of heavy industry and coal mining. The main sources of air pollution today arise from heavy traffic flow particularly in the Caerphilly and Hafodyrynys areas, where there is frequent queuing and congestion. The White Street, Bartlett Street, Ton-y-Felin Road and Nantgarw Road areas within Caerphilly have been declared an Air Quality Management Area, along with properties on Woodside Terrace, Hafodyrynys.

1.2 Purpose of Progress Report

This report fulfils the requirements of the Local Air Quality Management (LAQM) process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents. The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where exceedences are considered likely, the local authority must then 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.

For Local Authorities in Wales, Progress Reports are required in the intervening years between the three-yearly Updating and Screening Assessment reports. Their purpose is to maintain continuity in the LAQM process.

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

1.3 Air Quality Objectives

The air quality objectives applicable to LAQM **in Wales** are set out in the Air Quality (Wales) Regulations 2000, No. 1940 (Wales 138), Air Quality (Amendment) (Wales) Regulations 2002, No 3182 (Wales 298), and are shown in Table 1.1. This table shows the objectives in units of microgrammes per cubic metre $\mu\text{g}/\text{m}^3$ (milligrammes per cubic metre, mg/m^3 for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).

Table 1.1 – Air Quality Objectives included in Regulations for the purpose of LAQM in Wales

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 µg/m ³	Running annual mean	31.12.2003
	5.00 µg/m ³	Annual mean	31.12.2011
1,3-butadiene	2.25 µg/m ³	Running annual mean	31.12.2003
Carbon monoxide	10 mg/m ³	Running 8-hour mean	31.12.2003
Lead	0.50 µg/m ³	Annual mean	31.12.2004
	0.25 µg/m ³	Annual mean	31.12.2008
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) (gravimetric)	50 µg/m ³ , not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 µg/m ³	Annual mean	31.12.2004
Sulphur dioxide	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

1.4 Summary of Previous Review and Assessments

The risk of an exceedance of the 2005 objective for annual mean NO₂ in central Caerphilly was first indicated by diffusion tube monitoring at White Street in 2004 and 2005. The exceedance area was investigated during the Detailed Assessment, which was carried out in 2006. The Detailed Assessment predicted that the National Annual Objective of 40µg/m³ for NO₂ in 2005, was being exceeded at relevant receptors in White Street between Van Road and Bartlett Street. It was further predicted that the National Hourly Objective for NO₂ in 2005 was not being exceeded at any relevant receptor in the areas studied.

The Detailed Assessment recommended that Caerphilly County Borough Council (CCBC) declare an AQMA in Caerphilly Town Centre.

The 2006 Updating and Screening Assessment (USA) identified exceedances of NO₂ in central Caerphilly. Subsequent progress reports in 2007 and 2008 corroborated this finding.

The 2007 Progress Report advised of another area of the Borough that continued to remain close to the NO₂ annual objective limit, namely Blackwood High Street. However, due to the construction of a bypass road and the redevelopment of the bus station, it was agreed by the Welsh Assembly Government (WAG) that the Local Authority would be afforded a time period until the aforementioned works were completed, to assess the impact they had upon the levels of NO₂ within the High Street. Since the completion of the bypass there have been no exceedances of the National Annual or Hourly Objectives for NO₂ at Blackwood High Street.

In 2008, CCBC declared an AQMA for NO₂ encompassing a number of properties along Clifton Street, White Street and Bartlett Street in Caerphilly.

The 2009 USA concluded several areas within Caerphilly Town Centre were exceeding the National Annual Objective for NO₂; however, the majority of the locations were already contained within the AQMA and were the focus of a Further Assessment. Two areas outside of the AQMA, namely Ton-Y-Felin Road and Nantgarw Road were also included within the Further Assessment, as any proposed actions for the AQMA would have a 'knock on' affect on these areas due to the road network. In conclusion, the Authority was not required to proceed to a Detailed Assessment for any areas within the County Borough.

In 2010, AEA consultants were commissioned by Caerphilly County Borough Council to undertake a Further Assessment of the air quality in Caerphilly Town Centre AQMA and the surrounding road network.

The modelling study undertaken as part of the Further Assessment, along with current monitoring and meteorological data for the area confirmed that the current AQMA was sufficient to cover the exceedances of the National Annual Objective for Nitrogen Dioxide, for White Street and Bartlett Street. However, the study also suggested that CCBC consider declaring a further AQMA (or extend the current AQMA) to encompass another small exceedance area identified to the north of the gyratory system, namely Ton-Y-Felin Road.

The modelling study for the Further Assessment used 2009 monitoring data. At the time, monitoring data relating to the Ton-y-Felin Road area of Caerphilly was not exceeding the National Annual Objective for NO₂. The Authority sought permission from Welsh Government to monitor in this area for a further year to confirm whether there was general improvement in this area or whether it was a 'one off' result. Monitoring data for 2010 confirmed that it was in fact a 'one off' result and that there was no requirement for the Authority to extend the existing AQMA within Caerphilly to encompass this area.

In addition to the exceedance at Ton-y-Felin Road, diffusion tube monitoring locations at Nantgarw Road Caerphilly, were also showing exceedances of the National Annual Objective for NO₂. The 2012 USA discussed how the Authority had deployed a new continuous monitoring station for the Nantgarw Road area, to inform the Detailed Assessment that was required. The Authority undertook a Detailed Assessment for the Nantgarw Road area using 6 months' of continuous data and the results of the modelling exercise were very close to the air quality objective for NO₂.

However the report concluded that there were no exceedances of the National Annual Objective for NO₂ at receptor locations along Nantgarw Road and there was no requirement for the Authority to extend the current Caerphilly Town Centre AQMA. The report was submitted to Welsh Government and the conclusions of the report were rejected. The Authority then rerun the air quality model for this area using 12 months of data rather than the previously used 6 months. This altered the conclusions of the report.

The recommendations of the updated Detailed Assessment for Nantgarw Road, was to extend the Caerphilly Town Centre AQMA to include the affected areas along Nantgarw Road and Ton-y-Felin Road. The Authority extended the Caerphilly Town Centre AQMA in November 2013 to include the areas recommended within the Detailed Assessment. Figure 1.1 on page 7 illustrates the Caerphilly Town Centre AQMA.

Table 1.2 – Timeline and Chart for Caerphilly Town Centre AQMA

TIMELINE	
<u>Description</u>	<u>Date</u>
Exceedances Identified by Diffusion Tubes	01/01/2005
Detailed Assessment for Caerphilly Town Centre	01/01/2006
Caerphilly Town Centre AQMA declared	01/09/2008
Further Assessment for Caerphilly Town Centre	01/02/2010
Detailed Assessment for Nantgarw Road and Ton-y-Felin Road	12/04/2013
Caerphilly Town Centre AQMA extended	01/11/2013
Caerphilly Town Centre Air Quality Action Plan	27/03/2014

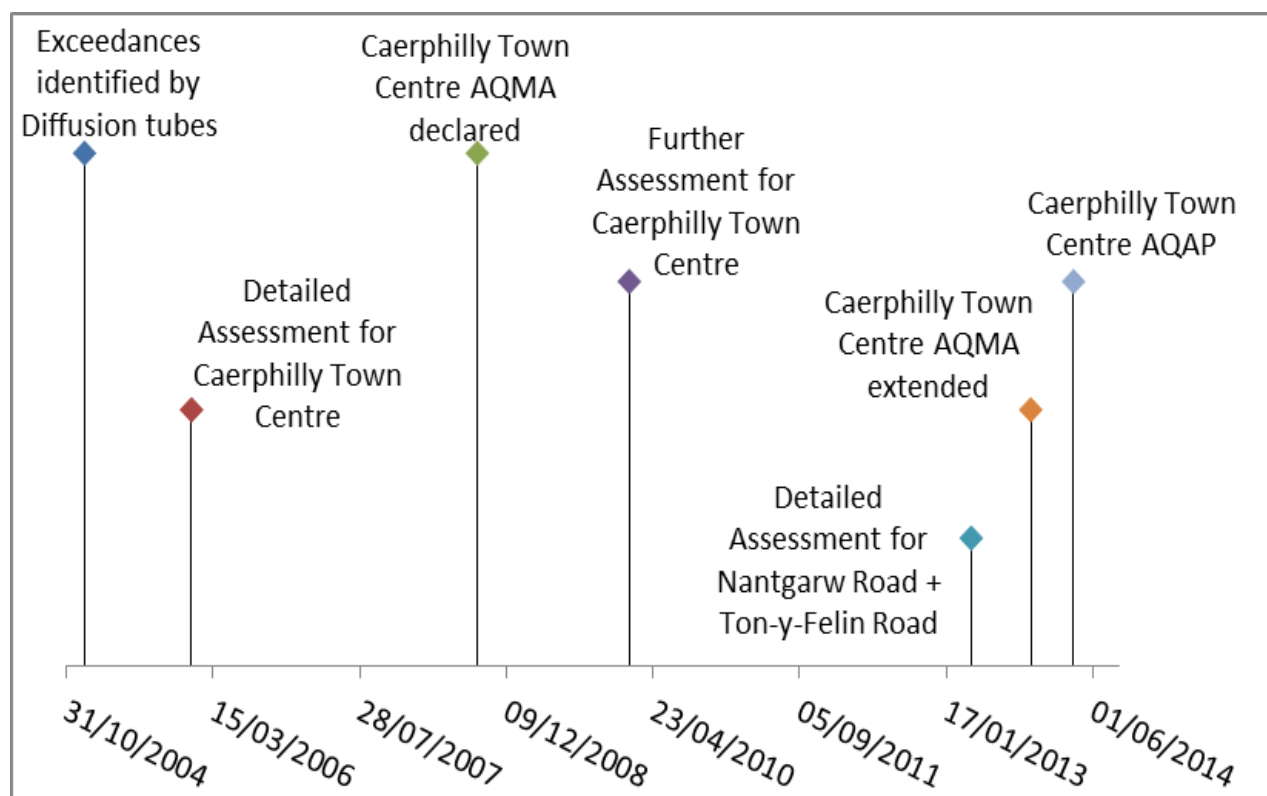
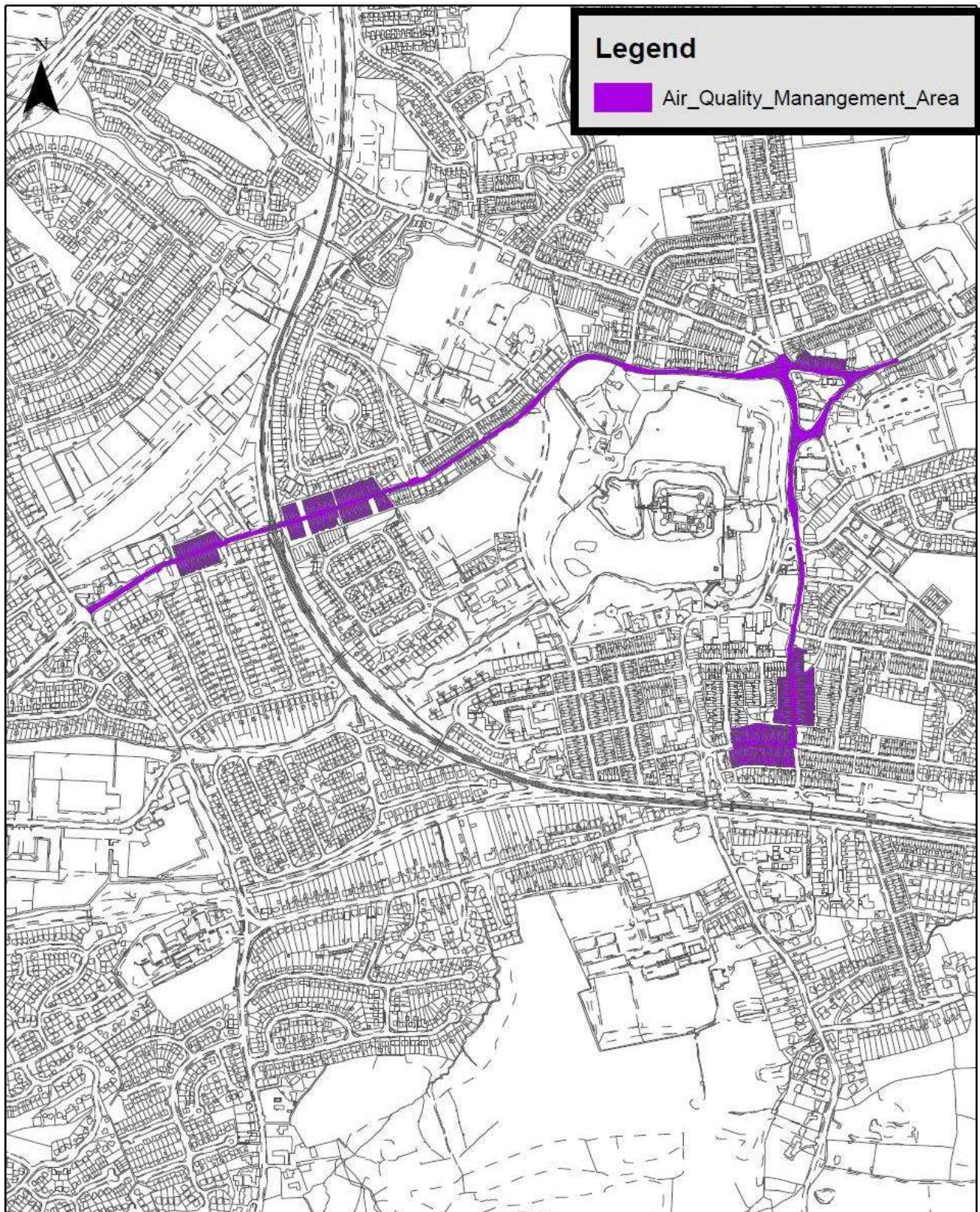


Figure 1.1 – Map of Caerphilly Town Centre AQMA



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As well as the Caerphilly area, the 2012 USA also discussed one other area that was exceeding the air quality objective for NO₂, namely Woodside Terrace, Hafodyrynys. The Authority has undertaken a Detailed Assessment for this area; the conclusions of which recommended that the Authority proceed to designating the area as an AQMA.

The Authority designated the Hafodyrynys Road AQMA in November 2013 (figure 1.2). Following the designation of the Hafodyrynys AQMA, CCBC commissioned Ricardo to produce an Air Quality Action Plan for the newly designated AQMA. The plan has recently been through a public consultation process, been approved by Cabinet and is awaiting formal approval by Welsh Government.

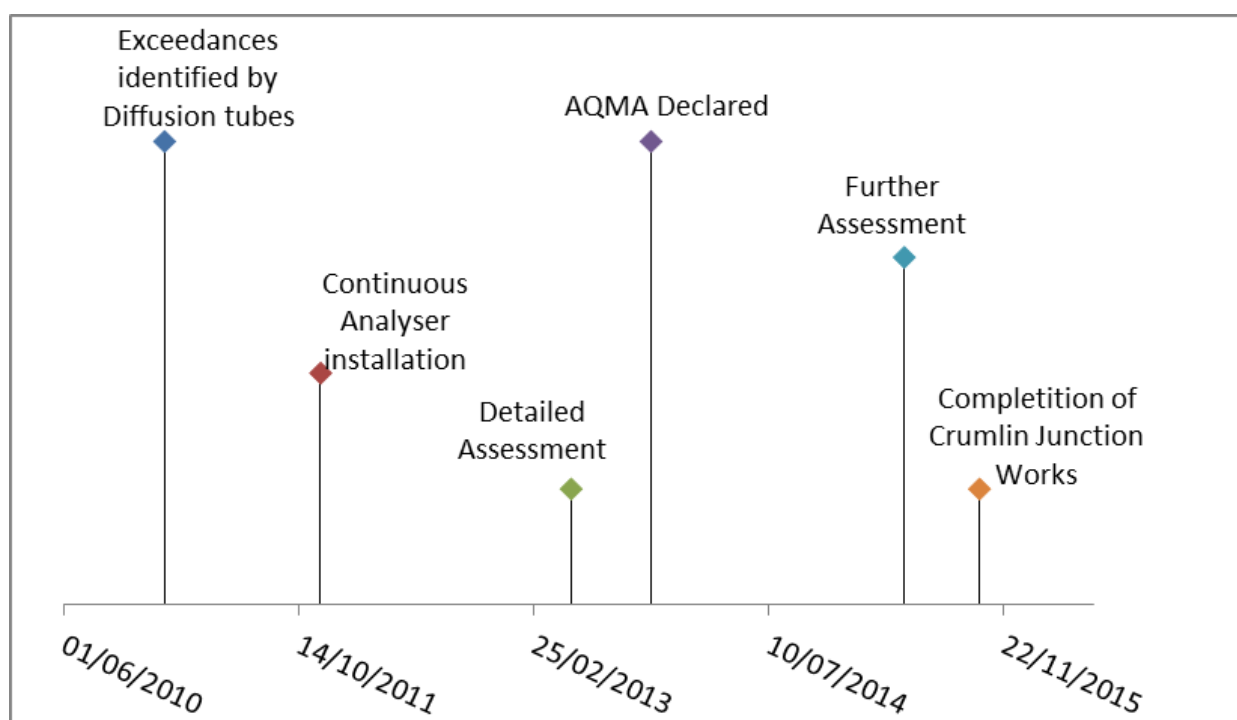
Further to this, in 2015 highway improvement works were undertaken at Crumlin junction. The aim of the works was to improve the efficiency of the junction and minimise the congestion of traffic at Hafodyrynys Hill by the introduction of the following:

- Installation of MOVA System.
- Additional right turn lane for North Bound (N/B) A467 vehicles turning East into A472
- Additional lane provided for A467 South Bound (S/B) vehicles passing straight on at traffic signals with A472.
- Extended left turn filter lane on the A472 for vehicles joining the A467 S/B.
- Additional right filter lane provided for vehicles leaving the A472 going N/B onto the A467.
- Additional merge lane provided on the A472 for vehicles heading East from N/B A467.
- Left turn filter lane extended on S/B A467 for vehicles joining into A472.

These works were completed in October 2015.

Table 1.3 – Timeline and Chart for Hafodyrynys AQMA

TIMELINE	
<u>Description</u>	<u>Date</u>
Exceedances Identified by Diffusion Tubes	01/01/2011
Continuous Analyser Installed	29/11/2011
Detailed Assessment	15/05/2013
AQMA declared	01/11/2013
Further Assessment	24/04/2015
Completion of Crumlin Junction Works	01/10/2015

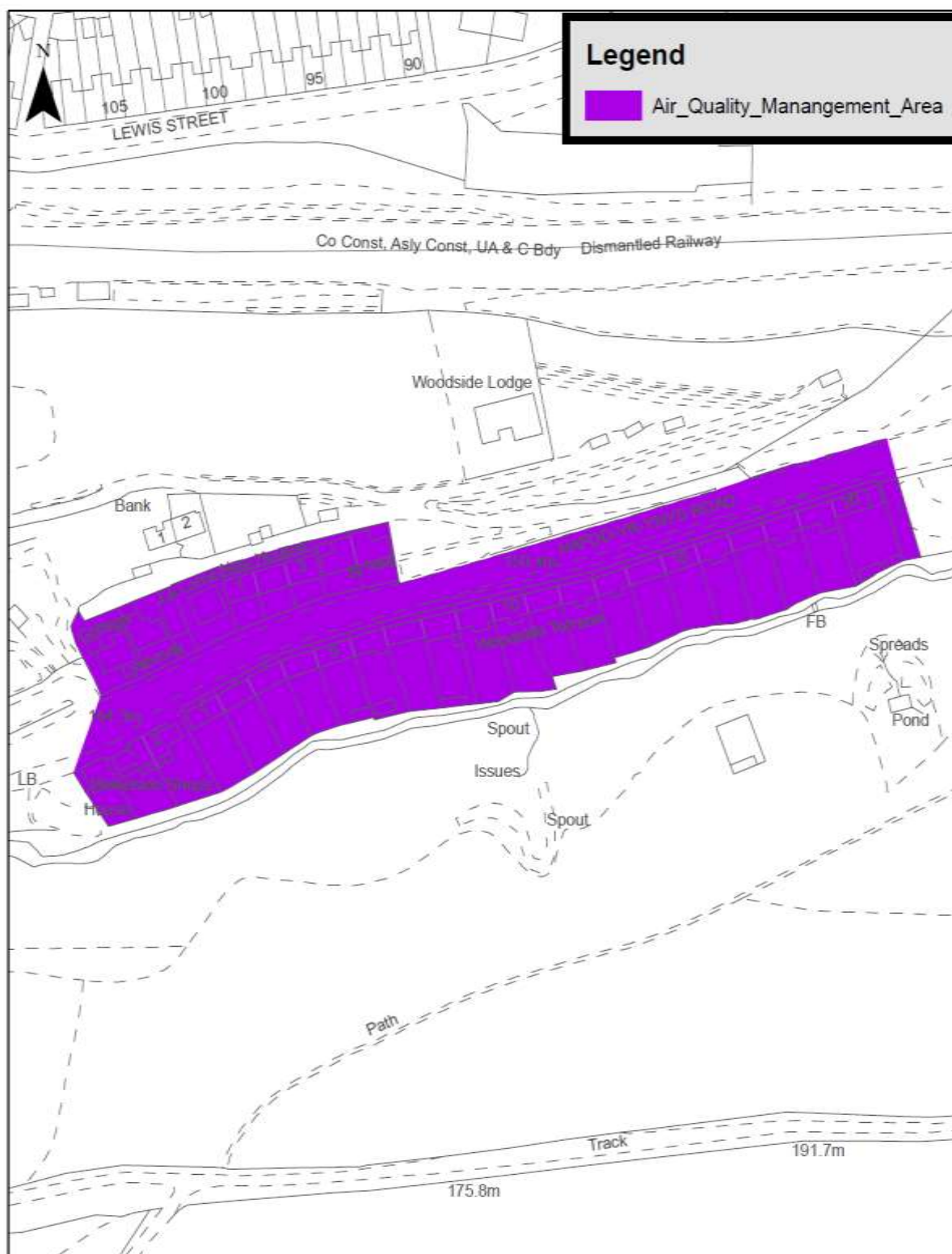


In 2015, there were a total of 56 diffusion tubes in circulation. All 56 were carried over for analysis in 2016 and in August, a further 5 tubes were added to the monitoring network. Three were placed on properties along the road from Aberbeeg to Oakdale to assess residential exposure after residents raised concerns of traffic emissions on the hill.

One additional tube was placed on Islwyn Road, Wattsville on a property set back from the road in order to assess the NO₂ drop-off at residential receptors with front gardens. One further tube was placed on the last property at the top of Woodside Terrace, Hafodyrynys in order to assess NO₂ levels at the end of the terrace.

This report will assess all monitoring data and any respective action taken for 2016. It will also discuss any other areas that are exceeding the National Air Quality Objectives.

Figure 1.2 – Map of Hafodyrynys AQMA



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2 New Monitoring Data

2.1 Automatic Monitoring Sites

Caerphilly County Borough Council (CCBC) currently monitors real-time nitrogen dioxide levels at five locations throughout the Borough using M200A Chemiluminescent continuous analysers.

Three of the five air quality stations also monitor PM₁₀ using the Met One Beta Attenuation Monitors (BAM) 1020. The Authority previously monitored PM₁₀ at four out of the five air quality stations; however the BAM 1020 at Nantgarw Road ceased function in January 2015 and was found to be irreparable. Following a cost-benefit analysis exercise, a decision was made to cease PM₁₀ monitoring permanently at this site due to the consistent low PM₁₀ data collated. This equipment meets the equivalence criteria for monitoring, provided the results are corrected for slope. The air quality station in Fochriw, which is situated near an open cast mine also monitors PM_{2.5} as well as PM₁₀ using individual BAMs. This air quality station was installed during May 2012 due to health concerns raised by local residents about emissions of dust from the mine.

2.1.1 Quality Assurance/ Quality Control

The Environmental Health, Pollution Control officers undertake routine calibration checks of the chemiluminescent continuous analysers fortnightly. The validation and ratification of the data is undertaken by Ricardo on behalf of the Local Authority. The analysers at Blackwood High Street and White Street Caerphilly form part of the Welsh Air Quality contract for QA/QC, so as well as regular service and maintenance checks, further audits are undertaken by Ricardo as part of the contract. In addition, the air quality station at Hafodyrynys forms part of the AURN (Automatic Urban and Rural Network) which is run by DEFRA and is also subject to additional regular audit checks by independent consultants.

The data is not corrected at the data validation stage. Only when reporting data as indicative gravimetric equivalent is a factor of 0.833 applied (or divide by a factor of 1.21).

Blackwood (BLW) Continuous Monitoring Site

Blackwood air quality enclosure is a Roadside monitoring site, located as a “worst case” scenario for NO₂ and particulate matter emissions along Blackwood High Street. The enclosure was originally sited to assess the exceedances in NO₂ levels along the High Street.

Hafodyrynys (HAF) Continuous Monitoring Site

Hafodyrynys air quality enclosure is a Kerbside monitoring site measuring NO₂ emissions from traffic along Hafodyrynys Road. The enclosure was sited to assess the exceedances of NO₂ at Woodside Terrace.

Caerphilly White Street (CWS) Continuous Monitoring Site

Caerphilly White Street air quality enclosure is a Roadside monitoring site, located to assess NO₂ and particulate matter exceedances along White Street. The enclosure was sited to assess the exceedances of NO₂ and to inform the Detailed Assessment into whether a formal AQMA needed to be declared.

Caerphilly Nantgarw (CNG) Continuous Monitoring Site

Caerphilly Nantgarw air quality enclosure is a Roadside monitoring site, located to assess NO₂ exceedances along Nantgarw Road. The enclosure was sited to assess whether Caerphilly AQMA required extending.

Fochriw (FCR) Continuous Monitoring Site

Fochriw air quality enclosure is a Roadside monitoring site, located to assess particulate matter within the area. The enclosure was sited after concerns were raised by residents about the air pollution from Ffos-y-Fran opencast mine.

In May 2017, a chemiluminescent continuous analyser was located on Islwyn Road, Wattsville to assess Nitrogen Dioxide after diffusion tube CCBC 69 recorded exactly 40µg/m³ as an annual average in 2016. The Authority are currently investigating whether there are any ‘quick fix’ solutions to this very small pinch point along Islwyn Road (2 affected properties) prior to proceeding to a Detailed Assessment. This data will be reported on within the 2018 Progress Report.

Figure 2.1 – Map of Automatic Monitoring Sites

Air Quality Enclosures 2017

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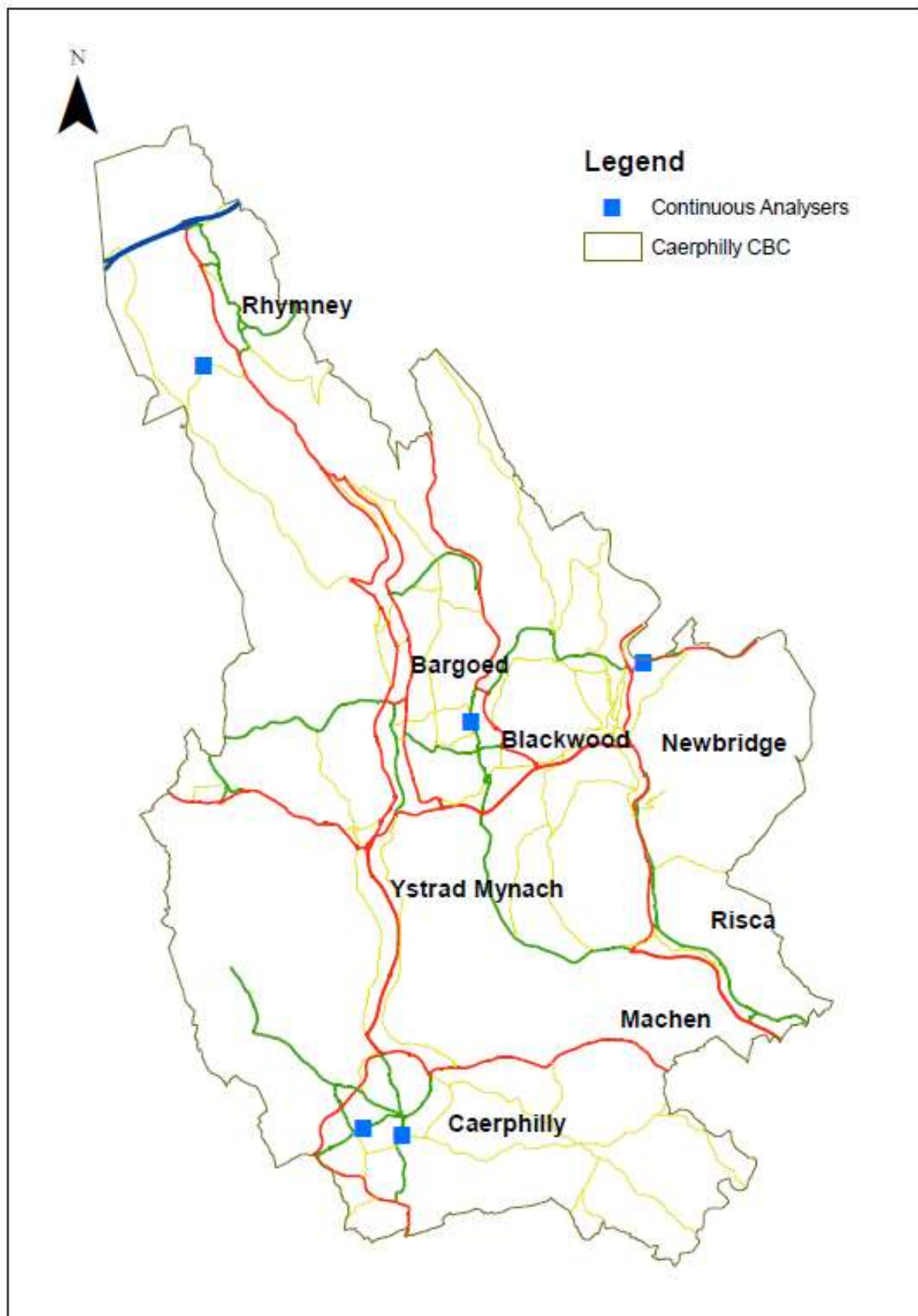


Table 2.1 – Details of Automatic Monitoring Sites

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?
BLW	Blackwood	Kerbside	317456	197109	1.8	PM ₁₀ NO ₂	N	BAM & M200A Chemiluminescent analysers	Y (1m for hourly average)	1	Y
CNG	Caerphilly Nantgarw	Roadside	314744	186997	1.8	NO ₂	Y	M200A Chemiluminescent analysers	Y (5m)	2	N
CWS	Caerphilly White Street	Roadside	315682	186825	1.8	PM ₁₀ NO ₂	Y	BAM & M200A Chemiluminescent analysers	Y (7m)	2	N
FCR	Fochriw	Roadside	310452	205422	1.8	PM ₁₀ PM _{2.5}	N	BAM	Y (1m)	2	Y
HAF	Hafodyrynys	Kerbside	321727	198588	1.47	NO ₂	Y	M200A Chemiluminescent analysers	Y(2.5m)	0.5	N

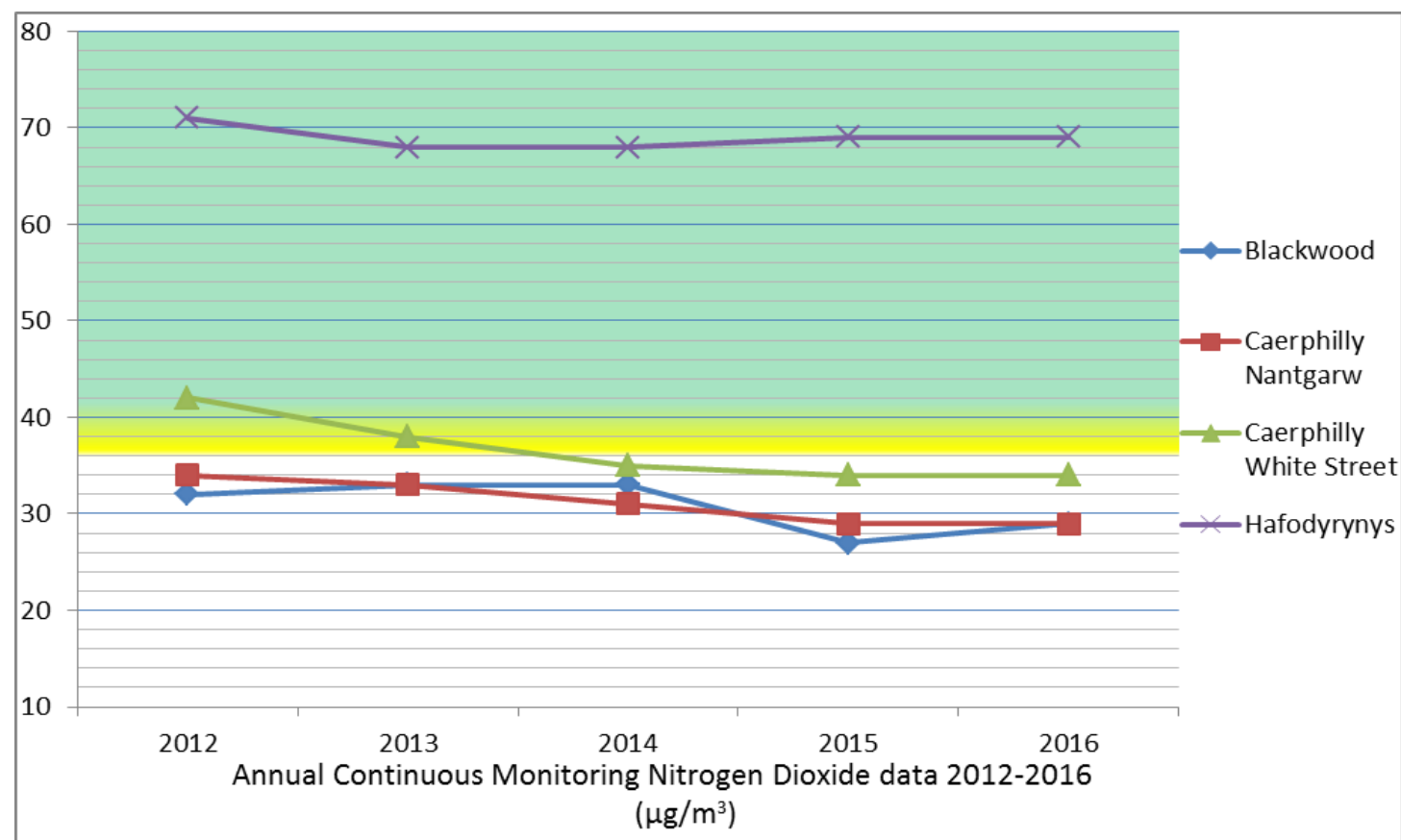
It is not always possible to locate continuous monitoring stations in an area representing worst case exposure due to the size of the enclosures and the requirements for an electrical supply.

2.1.2 Comparison of Monitoring Results with Air Quality Objectives

Table 2.2 – Results of Automatic Monitoring for NO₂: Comparison with Annual Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture 2016 %	Annual Mean Concentration (µg/m ³)				
				2012	2013	2014	2015	2016
BLW	Roadside	N	96	32	33	33	27	29
CNG	Roadside	Y	97	34	33	31	29	29
CWS	Roadside	Y	98	42	37	34	34	34
HAF	Kerbside	Y	93	71	68	68	68	69

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

Figure 2.2 – Trends in Annual Mean NO₂ Concentrations Measured at Automatic Monitoring Sites

The chart above displays the same trends over a five year period as the diffusion tubes – in general, there are reductions in NO₂ at every site from 2012 to 2016. However, Hafodyrynys is the one exception to the rule and has continued to exhibit a high exceedance of the National Annual Objective for NO₂; this has occurred despite traffic remediation works at Crumlin junction in 2015, which were modelled to reduce levels by 10%. Caerphilly White Street NO₂ levels have reduced from 41-34µg/m³ over the 5 year period and are now showing compliance with the National Annual Objective for NO₂. Blackwood and Caerphilly Nantgarw have shown consistent compliance with the National Annual Objective for NO₂ from 2012-2016.

Table 2.3 – Results of Automatic Monitoring for NO₂: Comparison with 1-hour Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture 2016 %	Number of Hourly Means > 200µg/m ³				
				2012	2013	2014	2015	2016
BLW	Roadside	N	96	0	1	0	0	0
CNG	Roadside	Y	97	2	1	2	0	0
CWS	Roadside	Y	98	17	1	23	9	2
HAF	Kerbside	Y	93	137	85	75	108	126

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

The table above depicts the number of exceedances of the Hourly Air Quality objective at the automatic monitoring stations. The objective permits 18 exceedances of 200µg/m³ per year. Hafodyrynys AQMA has continued to exceed over the threshold since 2012; Caerphilly White Street exceeded the threshold in 2014, but has remained compliant since.

2.2 Non-Automatic Monitoring Sites

In 2016, there were 61 diffusion tubes in circulation. 5 of those were new tubes; 3 were placed to assess the air quality along a new location with the other 2 being placed to enhance the assessment of areas under consideration. Of the 56 tubes already in distribution, 41 had higher NO₂ levels than in 2015 and the exceedances of the National Annual Objective of 40µg/m³ also increased from 4 tubes to 5.

The Nitrogen Dioxide diffusion tubes are currently supplied and analysed by Environmental Scientifics Group (ESG) Ltd. ESG performed to the following proficiency levels during the AIR-PT testing scheme:

- January-February – 100%
- April-May – 75%
- July-August – 75%
- September-October – 100%

The testing scheme is in place to evaluate the performance of the laboratory and the diffusion tubes in distribution. The percentage displays a “snap-shot” of the analytical quality; if five rolling rounds average significantly lower than 95%, it indicates issues with bias. Although there are only four rounds in 2016, the average of the rounds is 90%. This performance should be married up with other variables such as the skills of the laboratory, their measurement standards, their customer care etc.; therefore as the quality is only slightly lower than satisfactory, they are considered suitable from their other performances. The bias adjustment value for 2016 was 0.775 and was calculated using the average of the co-located diffusion tube results of Caerphilly White Street and Blackwood High Street. The LAQM website was accessed at the time of writing this report to check how the locally derived bias adjustment factor compared to the national figures. There are a number of local authorities in Wales that use ESG Didcot for their diffusion tube analysis and 38 overall in the UK; the suggested bias adjustment factor from these studies was 0.77. This shows the similarity of the analytical precision nationwide, but the local bias adjustment value has been used as it's more applicable to the Caerphilly Borough.

Figure 2.3 – Map of Non-Automatic Monitoring Sites

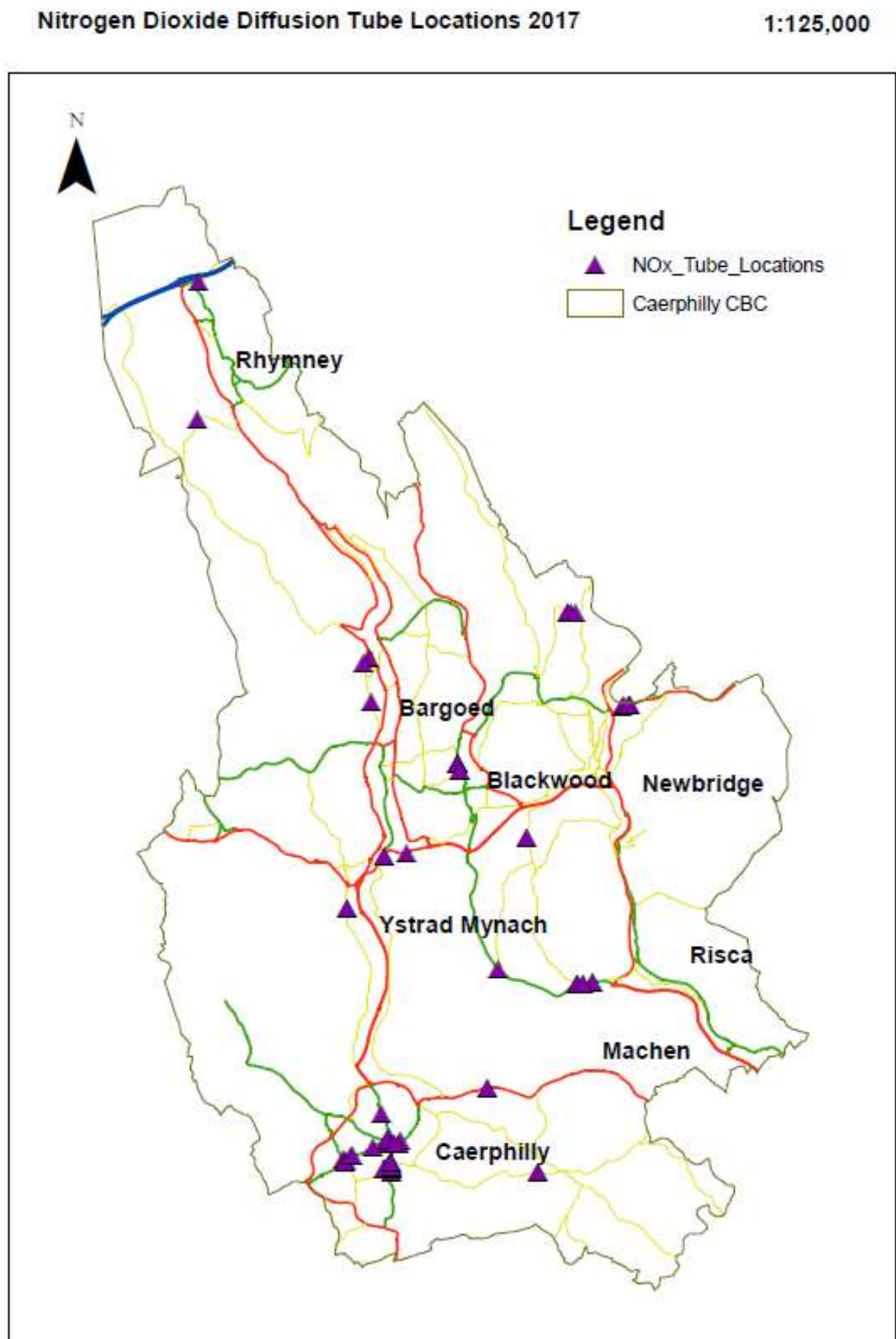


Table 2.4 – Details of Non- Automatic Monitoring Sites 2016

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?
CCBC1	Blackwood Post Office	Kerbside	317497	196911	3	NO ₂	N	N	Y	N/A	Y
CCBC3	Commercial Street, Gilfach	Kerbside	315211	198683	2	NO ₂	N	N	Y	N/A	Y
CCBC6	Ton-y-felin Road, Caerphilly	Roadside	315709	187325	2	NO ₂	Y	N	Y	2.5	Y
CCBC7	Cardiff Road, Caerphilly	Roadside	315552	186674	3	NO ₂	N	N	Y	2	Y
CCBC8	Blackwood High Street	Kerbside	317419	192211	2	NO ₂	N	N	Y	N/A	Y
CCBC14	Bargoed High Street	Kerbside	315144	199802	2.5	NO ₂	N	N	Y	N/A	Y
CCBC17	Bedwas Road, Caerphilly	Roadside	315907	187320	3	NO ₂	N	N	Y	3	Y
CCBC18	Pontygwindy Road, Caerphilly	Roadside	315670	187481	2	NO ₂	N	N	Y	3	Y
CCBC19	White Street, Caerphilly	Roadside	315718	186723	2	NO ₂	Y	N	Y	2	Y
CCBC20	Newport Road, Trethomas	Roadside	318179	188764	2	NO ₂	N	N	Y	4	Y
CCBC21	Maesycwmmmer Shop	Roadside	315533	194725	2	NO ₂	N	N	Y	12	Y
CCBC22	Gellideg Heights, Maesycwmmmer	Kerbside	316102	194790	2.5	NO ₂	N	N	Y (2.5m)	N/A	N
CCBC27	Penrhiw Franc Farm	Urban background	319196	195196	2	NO ₂	N	N	N (117m)	N/A	N
CCBC28	Parc Cwm Darran	Urban background	311324	203369	2	NO ₂	N	N	N (700m)	N/A	N
CCBC29	Maen Llwyd, Rudry	Urban background	319274	186558	2	NO ₂	N	N	Y	N/A	N
CCBC30	AQE – Caerphilly	Roadside	315705	186839	2	NO ₂	Y	Y	N (7m)	2	N
CCBC31	AQE – Caerphilly	Roadside	315705	186839	2	NO ₂	Y	Y	N (7m)	2	N
CCBC32	AQE – Caerphilly	Roadside	315705	186839	2	NO ₂	Y	Y	N (7m)	2	N
CCBC33	Lower left White Street	Roadside	315720	186761	2	NO ₂	Y	N	Y	2	Y
CCBC34	Corner of Windsor and White Street	Roadside	315708	186808	2	NO ₂	Y	N	Y	7	Y
CCBC35	Top Right of White Street	Roadside	315714	186668	2.5	NO ₂	Y	N	Y	2	Y
CCBC36	44/46 Bartlett Street	Roadside	315738	186654	2	NO ₂	Y	N	Y	3	Y
CCBC37	19 Station Terrace	Roadside	315727	186617	2	NO ₂	Y	N	Y	2	Y
CCBC38	32 Bartlett Street	Roadside	315700	186660	2	NO ₂	Y	N	Y	3	Y
CCBC39	18 Bartlett Street	Roadside	315652	186663	2	NO ₂	Y	N	Y	3	Y
CCBC40	7 Bartlett Street	Roadside	315621	186665	2.5	NO ₂	Y	N	Y	2	Y
CCBC44	244 Nantgarw Road, Caerphilly	Roadside	314712	186999	2	NO ₂	N	N	Y	2	Y
CCBC45	38 Bedwas Road, Caerphilly	Roadside	315954	187377	3	NO ₂	N	N	Y	3	Y
CCBC46	8 Windsor Street	Roadside	315669	186804	2	NO ₂	Y	N	Y	2	Y

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?
CCBC48	1 Woodside Terrace, Hafodyrynys	Roadside	321652	198557	2	NO ₂	Y	N	Y	2	Y
CCBC49	Pontygwindy Road, Caerphilly	Roadside	315470	188101	2	NO ₂	N	N	Y	3	Y
CCBC50	Past Woodside Terrace, Hafod	Kerbside	321851	198619	2	NO ₂	Y	N	N (20m)	N/A	N
CCBC51	AQE – Blackwood	Kerbside	317419	197103	2	NO ₂	N	Y	Y	N/A	Y
CCBC52	AQE – Blackwood	Kerbside	317419	197103	2	NO ₂	N	Y	Y	N/A	Y
CCBC53	AQE- Blackwood	Kerbside	317419	197103	2	NO ₂	N	Y	Y	N/A	Y
CCBC54	Clive Street, Caerphilly	Roadside	315518	186646	2.5	NO ₂	N	N	Y	2	Y
CCBC55	6 Ton-y-Felin Road, Caerphilly	Roadside	315742	187316	2	NO ₂	Y	N	Y	3	Y
CCBC56	3 Nantgarw Road, Caerphilly	Roadside	315579	187305	2	NO ₂	Y	N	Y	2	Y
CCBC57	14 Mill Road, Caerphilly	Roadside	315629	187375	3	NO ₂	N	N	Y	3	Y
CCBC58	1 Coopers Terrace, Ystrad Mynach	Roadside	314582	193385	2	NO ₂	N	N	Y	1.5	Y
CCBC59	30 Ton-y-Felin Road, Caerphilly	Roadside	315793	187305	2.5	NO ₂	Y	N	Y	3	Y
CCBC60	3 New Houses, Hafodyrynys	Roadside	321681	198584	5	NO ₂	Y	N	Y	3.5	Y
CCBC61	258 Nantgarw Road, Caerphilly	Roadside	314680	186988	2	NO ₂	N	N	Y	1.5	Y
CCBC62	Ger-y-Nant, Llechryd	Kerbside	310768	209498	2	NO ₂	N	N	Y	N/A	Y
CCBC63	34 Pontlottyn Road, Fochriw	Roadside	310739	205938	2	NO ₂	N	N	Y	5	Y
CCBC64	3 St Cenydd Road, Caerphilly	Roadside	314478	186911	2	NO ₂	N	N	Y	12	Y
CCBC65	60 Lon-y-Llyn, Caerphilly	Roadside	314554	186865	2.5	NO ₂	N	N	Y	12	Y
CCBC66	14 Lon-y-Rhedyn, Caerphilly	Roadside	314524	186842	2.5	NO ₂	N	N	Y	15	Y
CCBC67	84 Nantgarw Road, Caerphilly	Roadside	315242	187223	2	NO ₂	Y	N	Y	2	Y
CCBC68	Premier Stores, Cwmfelinfach	Roadside	318467	191788	2	NO ₂	N	N	Y	1.5	Y
CCBC69	80 Islwyn Road, Wattsville	Roadside	320647	191427	2	NO ₂	N	N	Y	1.5	Y
CCBC70	153 Islwyn Road, Wattsville	Roadside	320499	191427	2	NO ₂	N	N	Y	2	Y
CCBC71	128 Islwyn Road, Wattsville	Roadside	320507	191405	2	NO ₂	N	N	Y	2	Y
CCBC72	109 Islwyn Road, Wattsville	Roadside	320629	191442	2	NO ₂	N	N	Y	2	Y
CCBC73	21 Islwyn Road, Wattsville	Roadside	320886	191474	2	NO ₂	N	N	Y	2	Y
CCBC74	2 Islwyn Road, Wattsville	Roadside	320883	191451	2	NO ₂	N	N	Y	2	Y
CCBC75	2 Rock Cottages, Aberbeeg	Roadside	320336	200952	2	NO ₂	N	N	Y	3	Y
CCBC76	3 Fern Cottages, Aberbeeg	Roadside	320249	200987	2	NO ₂	N	N	Y	2	Y
CCBC77	3 Bute Place, Aberbeeg	Kerbside	320450	200971	2	NO ₂	N	N	Y	N/A	Y
CCBC78	86 Islwyn Road, Wattsville	Roadside	320634	191424	2	NO ₂	N	N	Y	3	Y
CCBC79	20 Woodside Terrace, Hafodyrynys	Roadside	321812	198610	2	NO ₂	Y	N	Y	1.5	Y

2.2.1 Comparison of Monitoring Results with Air Quality Objectives

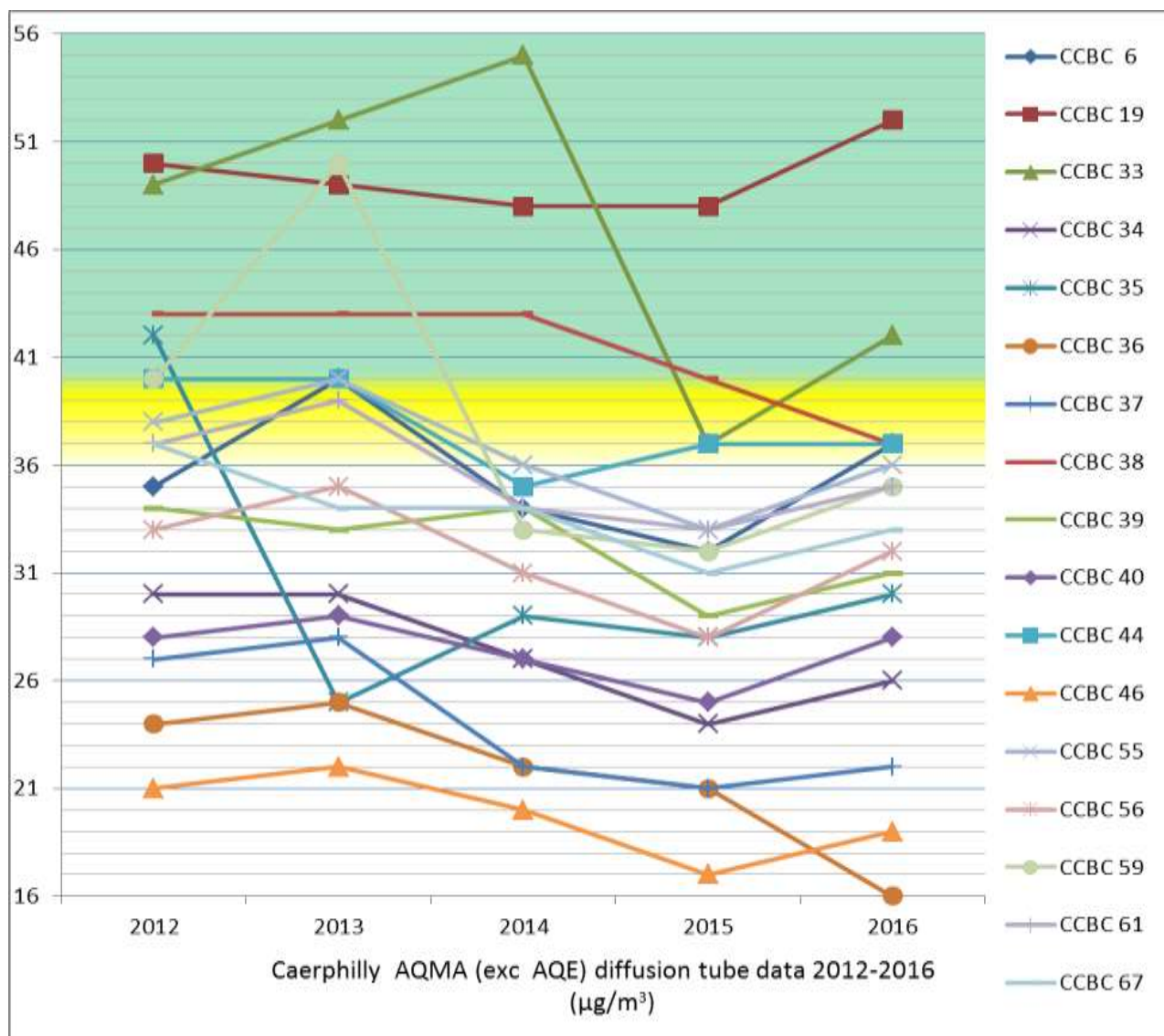
Table 2.5 – Diffusion tubes in distribution from 2015-2016

Places	Amount of Diffusion Tubes	Amount of tubes that increased in NO ₂ from 2015 to 2016	Percentage increase of tubes from 2015 to 2016	Exceedances in National Annual Objective for NO ₂ - 2016
Caerphilly AQMA	20	17	85%	2
Caerphilly Other	12	10	83%	0
Hafodyrynys	3	2	67%	3
Blackwood	5	2	40%	0
Wattsville	7	5	71%	1
Others	9	5	56%	0

As the table shows, the diffusion tubes located within the Caerphilly Basin (AQMA and others), had a high percentage of increases in NO₂ from 2015-2016. Although the majority of these increases are only a few µg/m³, the high percentage illustrates that levels as a whole generally increased in 2016. This has implications for future housing developments, industrial sources etc. that are likely to contribute to these increases. Major developments and new industrial processes within the Caerphilly basin will require assessment for their impact on local air quality, prior to any planning decision being made.

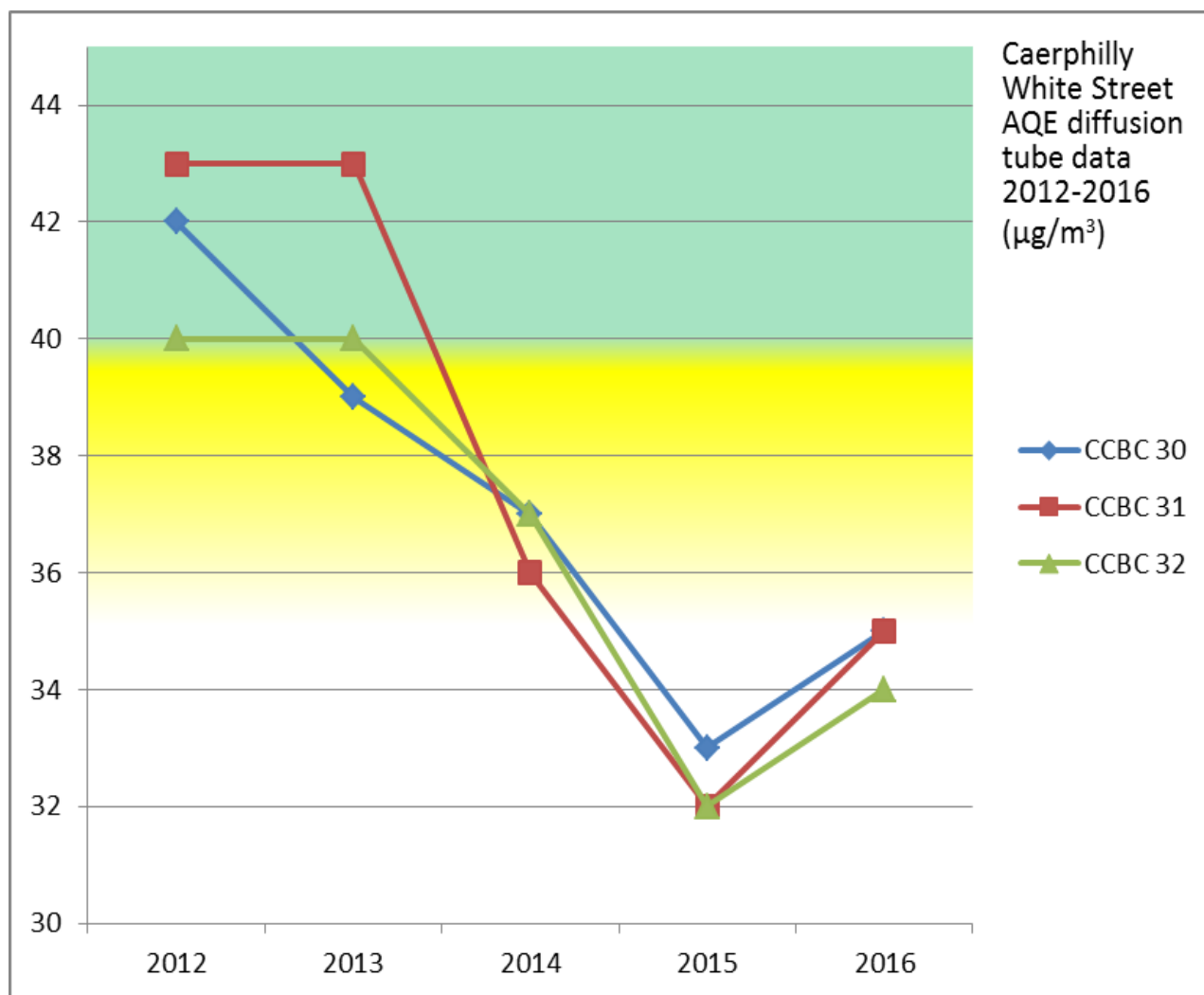
Caerphilly AQMA Diffusion Tubes

Figure 2.4 – Chart of Caerphilly Air Quality Management Area Diffusion Tubes (excluding AQE) results 2012-2016



The chart above illustrates the trends in NO₂ levels over five years. Notably it highlights how many of the tube results increased from 2015 to 2016. CCBC 19 and CCBC 33 both located on White Street and within the AQMA, exceeded the National Annual Objective for 2016, denoted by the area coloured in green. CCBC 6, CCBC 38, CCBC 44 and CCBC 55, located on Ton y Felin Road, Nantgarw Road and Bartlett Street were all borderline for NO₂ – above 36µg/m³ as denoted by the area coloured in yellow. The remainder of the Caerphilly AQMA tubes are compliant with the air quality objective for nitrogen dioxide for 2016.

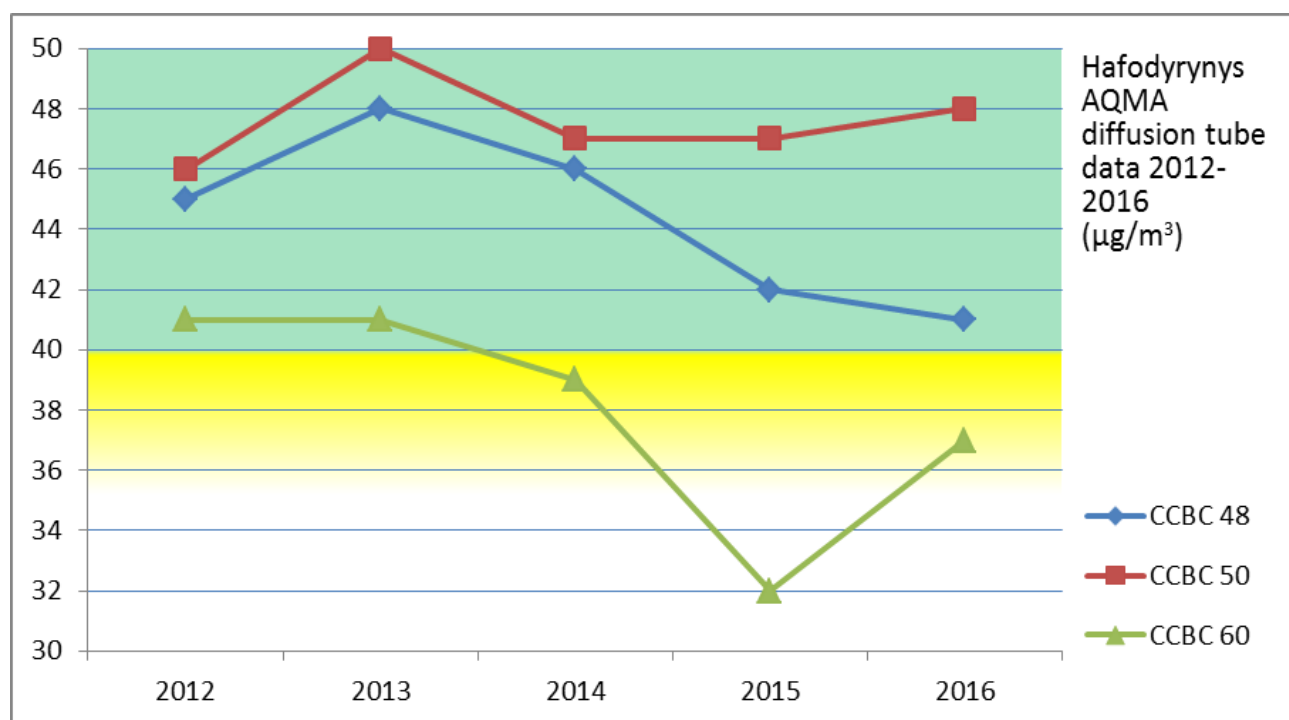
Figure 2.5 – Chart of Caerphilly Air Quality Enclosure Co-Located Diffusion Tubes results 2012-2016



The chart above follows the same trends as the rest of Caerphilly AQMA; over five years there is a substantial reduction from exceedances in the National Annual Objectives – ranging from 44-40 $\mu\text{g}/\text{m}^3$ in 2012, to compliance. There has been a slight increase in NO_2 levels from 2015-2016.

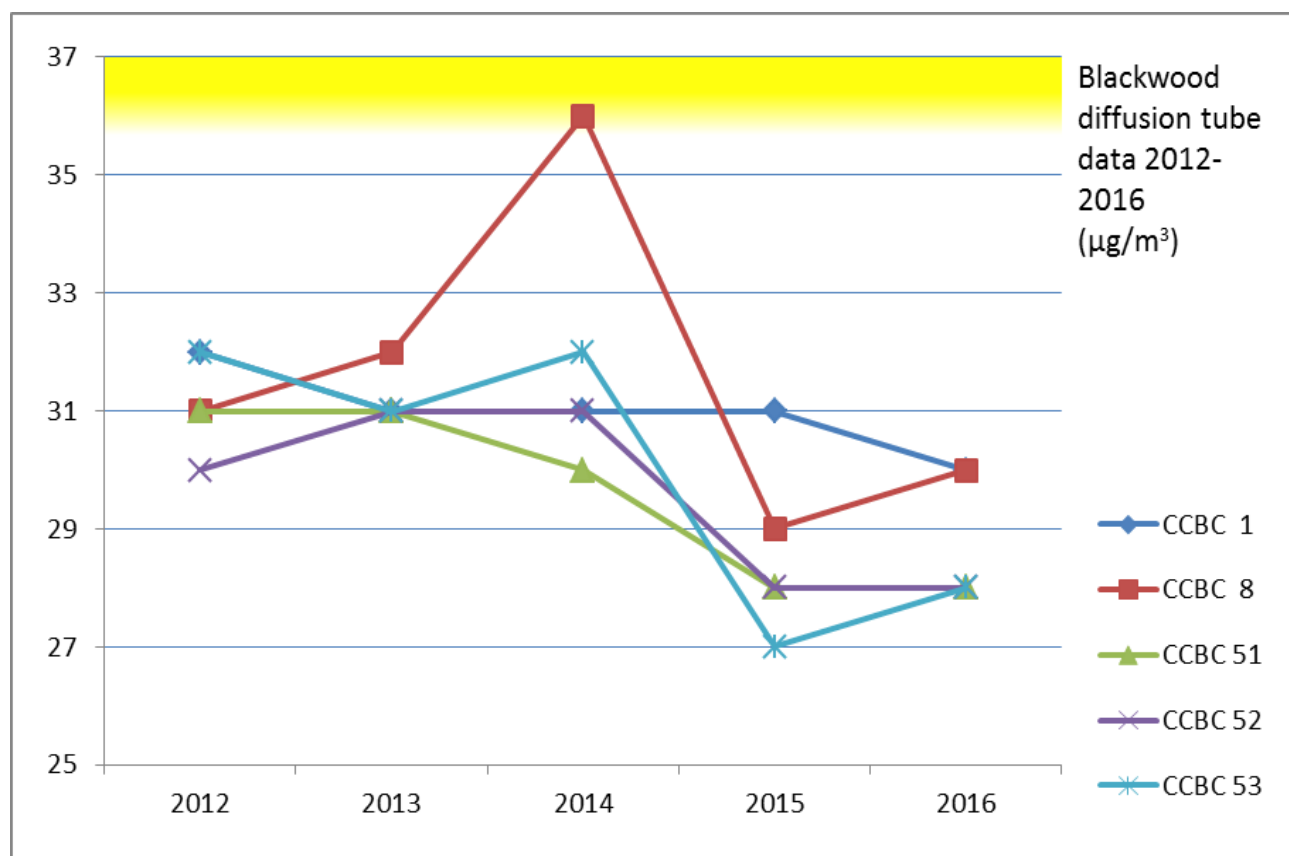
Hafodyrynys AQMA Diffusion Tubes

Figure 2.6 – Chart of Hafodyrynys Air Quality Management Area Diffusion Tubes results 2012-2016



The chart above illustrates that there have been reductions in NO₂ levels over the five year period, although not as consistent as other diffusion tubes around the borough. The diffusion tube at the nearest receptor (CCBC 48) is still exceeding the National Annual Objective in 2016, despite works at Crumlin Junction to reduce the backing up of traffic in this area. CCBC 50 was placed at the top of the road away from residents as a marker tube; although this has been placed where the road opens up, this tube is likely to continue to exceed the National Annual Objective as the northbound road opens up and cars look to overtake vehicles that they are driving behind. CCBC 60 is placed on raised properties across the road from Woodside Terrace; the difference of these values to CCBC 48 illustrates the dispersal of NO₂ as properties are situated at varying distances from the road and at a higher level than those on Woodside Terrace.

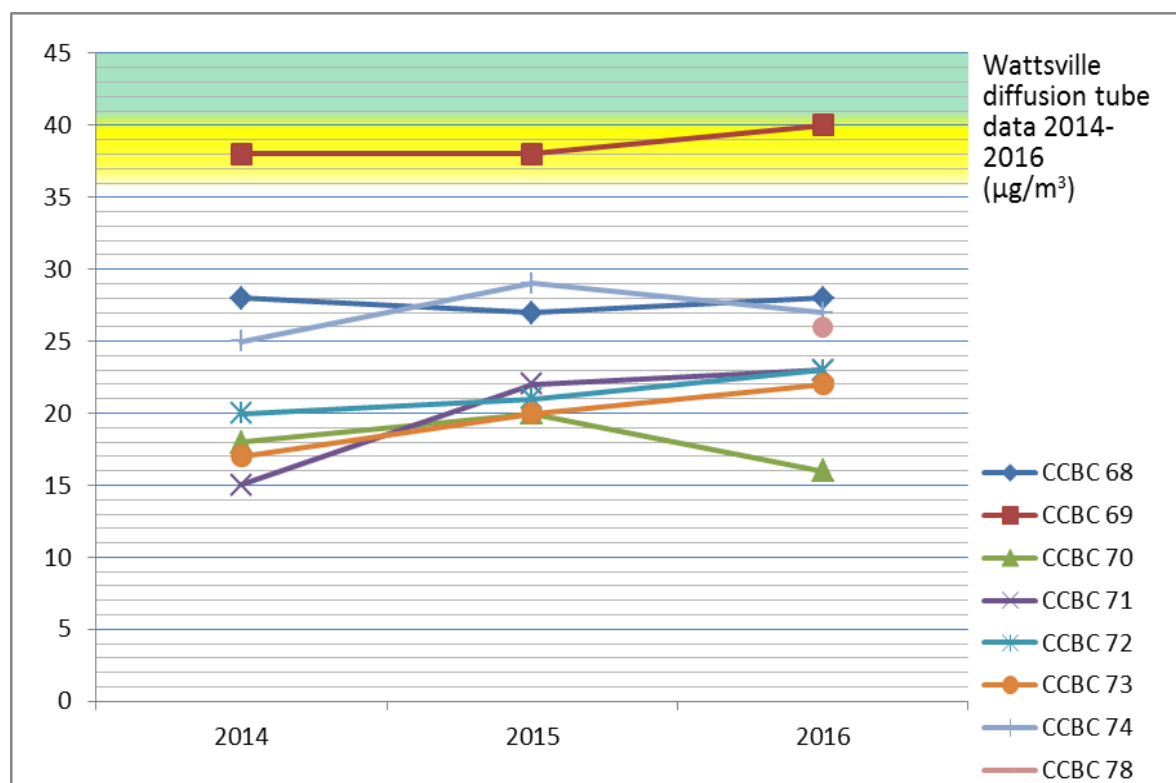
Blackwood Town Centre Diffusion Tubes

Figure 2.7 – Chart of Blackwood Town Centre Diffusion Tubes results 2012-2016

The chart above shows a general reduction in all diffusion tubes from 2012 to 2016; there are also some small increases in NO_2 from 2015-2016 – mimicking the trends of the majority of diffusion tubes around the borough. None of these diffusion tubes display exceedances of the National Annual Objective for NO_2 .

Wattsville Diffusion Tubes

Figure 2.8 – Chart of Wattsville Diffusion Tubes results 2012-2016



This chart demonstrates that over the three year monitoring period, NO₂ levels have not varied significantly in Wattsville. There is no established trend, other than that most have slightly increased from 2015 to 2016, like most borough-wide diffusion tubes. CCBC 69 measured 40µg/m³ exactly for 2016; the tube is located on one of a few properties without front gardens. The measurement is attributed to its close proximity to the road.

CCBC 78 has been placed along Islwyn Road on properties with a front garden; the aim of this tube is to assess the difference in NO₂ exposure for properties set back from the road. It recorded levels of 26µg/m³, indicating a significant drop off of NO₂ levels at the façade of properties set back from the road.

Although the majority of tubes fall significantly below the National Annual Objective for NO₂, a real-time air quality analyser has been located near to CCBC 69, in order to assess real-time NO₂ levels and identify any trends in traffic at specific times of the day which are contributing to elevated levels of air pollution at this pinch point on Islwyn Road. It is the intention of the Local Authority to explore some 'quick fix' solutions for this area prior to proceeding to a Detailed Assessment of air quality. However given the remainder of the results along the street, evidence suggests that only 2 properties are affected by elevated levels of nitrogen dioxide caused by traffic.

Table 2.6 – Results of NO₂ Diffusion Tubes 2016

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2016 (Number of Months or %)	2016 Annual Mean Concentration (µg/m ³) - Bias Adjustment factor = 0.775
CCBC1	Blackwood Post Office	Kerbside	N	N	8	30
CCBC3	Commercial Street, Gilfach	Kerbside	N	N	12	23
CCBC6	Ton-y-felin Road, Caerphilly	Roadside	Y	N	12	37
CCBC7	Cardiff Road, Caerphilly	Roadside	N	N	10	30
CCBC8	Blackwood High Street	Kerbside	N	N	11	30
CCBC14	Bargoed High Street	Kerbside	N	N	11	20
CCBC17	Bedwas Road, Caerphilly	Roadside	N	N	12	25
CCBC18	Pontygwindy Road, Caerphilly	Roadside	N	N	12	27
CCBC19	White Street, Caerphilly	Roadside	Y	N	11	52
CCBC20	Newport Road, Trethomas	Roadside	N	N	12	27
CCBC21	Maesycwmmmer Shop	Roadside	N	N	12	29
CCBC22	Gellideg Heights, Maesycwmmmer	Kerbside	N	N	12	30
CCBC27	Penrhiw Franc Farm	Urban background	N	N	11	8
CCBC28	Parc Cwm Darran	Urban background	N	N	10	11
CCBC29	Maen Llwyd, Rudry	Urban background	N	N	12	14
CCBC30	AQE – Caerphilly	Roadside	Y	Co-Located	12	35

Caerphilly County Borough Council

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2016 (Number of Months or %)	2016 Annual Mean Concentration ($\mu\text{g}/\text{m}^3$) - Bias Adjustment factor = 0.775
CCBC31	AQE – Caerphilly	Roadside	Y	Co-Located	12	35
CCBC32	AQE – Caerphilly	Roadside	Y	Co-Located	11	34
CCBC33	Lower left White street	Roadside	Y	N	12	42
CCBC34	Corner of Windsor and White Street	Roadside	Y	N	12	26
CCBC35	Top Right of White Street	Roadside	Y	N	10	30
CCBC36	44/46 Bartlett Street	Roadside	Y	N	12	23
CCBC37	19 Station Terrace	Roadside	Y	N	10	22
CCBC38	32 Bartlett Street	Roadside	Y	N	12	37
CCBC39	18 Bartlett Street	Roadside	Y	N	12	31
CCBC40	7 Bartlett Street	Roadside	Y	N	11	28
CCBC44	244 Nantgarw Road, Caerphilly	Roadside	N	N	12	37
CCBC45	38 Bedwas Road, Caerphilly	Roadside	N	N	11	27
CCBC46	8 Windsor Street	Roadside	Y	N	11	19
CCBC48	1 Woodside Terrace, Hafodyrynys	Roadside	Y	N	12	41
CCBC49	Pontygwindy Road, Caerphilly	Roadside	N	N	12	26
CCBC50	Past Woodside Terrace, Hafod	Kerbside	Y	N	12	48
CCBC51	AQE – Blackwood	Kerbside	N	Co-Located	11	28

Caerphilly County Borough Council

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2016 (Number of Months or %)	2016 Annual Mean Concentration ($\mu\text{g}/\text{m}^3$) - Bias Adjustment factor = 0.775
CCBC52	AQE – Blackwood	Kerbside	N	Co-Located	12	28
CCBC53	AQE- Blackwood	Kerbside	N	Co-Located	12	28
CCBC54	Clive Street, Caerphilly	Roadside	N	N	10	24
CCBC55	6 Ton-y-Felin Road, Caerphilly	Roadside	Y	N	12	36
CCBC56	3 Nantgarw Road, Caerphilly	Roadside	Y	N	12	32
CCBC57	14 Mill Road, Caerphilly	Roadside	N	N	12	25
CCBC58	1 Coopers Terrace, Ystrad Mynach	Roadside	N	N	10	25
CCBC59	30 Ton-y-Felin Road, Caerphilly	Roadside	Y	N	12	35
CCBC60	3 New Houses, Hafodyrynys	Roadside	Y	N	10	37
CCBC61	258 Nantgarw Road, Caerphilly	Roadside	N	N	12	35
CCBC62	Ger-y-Nant, Llechryd	Kerbside	N	N	11	14
CCBC63	34 Pontlottyn Road, Fochriw	Roadside	N	N	8	10* Annualisation factor 0.78
CCBC64	3 St Cenydd Road, Caerphilly	Roadside	N	N	12	19
CCBC65	60 Lon-y-Llyn, Caerphilly	Roadside	N	N	12	18
CCBC66	14 Lon-y-Rhedyn, Caerphilly	Roadside	N	N	11	16
CCBC67	84 Nantgarw Road, Caerphilly	Roadside	Y	N	12	33

Caerphilly County Borough Council

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2016 (Number of Months or %)	2016 Annual Mean Concentration ($\mu\text{g}/\text{m}^3$) - Bias Adjustment factor = 0.775
CCBC68	Premier Stores, Cwmfelinfach	Roadside	N	N	12	28
CCBC69	80 Islwyn Road, Wattsville	Roadside	N	N	12	40
CCBC70	153 Islwyn Road, Wattsville	Roadside	N	N	11	16
CCBC71	128 Islwyn Road, Wattsville	Roadside	N	N	9	23
CCBC72	109 Islwyn Road, Wattsville	Roadside	N	N	12	23
CCBC73	21 Islwyn Road, Wattsville	Roadside	N	N	12	22
CCBC74	2 Islwyn Road, Wattsville	Roadside	N	N	11	27
CCBC75	2 Rock Cottages, Aberbeeg	Roadside	N	N	5	24* Annualisation factor 1.1035
CCBC76	3 Fern Cottages, Aberbeeg	Roadside	N	N	5	25* Annualisation factor 1.035
CCBC77	3 Bute Place, Aberbeeg	Kerbside	N	N	5	30* Annualisation factor 1.035
CCBC78	86 Islwyn Road, Wattsville	Roadside	N	N	4	26* Annualisation factor 1.03
CCBC79	20 Woodside Terrace, Hafodyrynys	Roadside	Y	N	5	53* Annualisation factor 1.035

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

* 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%

Table 2.7 – Results of NO₂ Diffusion Tubes 2012-2016

Site ID	Site Type	Within AQMA?	Annual Mean Concentration (µg/m ³) - Adjusted for Bias				
			2012 (Bias Adjustment Factor = 0.86)	2013 (Bias Adjustment Factor = 0.86)	2014 (Bias Adjustment Factor = 0.86)	2015 (Bias Adjustment Factor = 0.81)	2016 (Bias Adjustment Factor = 0.775)
CCBC1	Kerbside	N	32	31	31	31	30
CCBC3	Kerbside	N	22	25	23	20	23
CCBC6	Roadside	Y	35	40	34	32	37
CCBC7	Roadside	N	32	23*	36	18*	30
CCBC8	Kerbside	N	31	32	36	29	30
CCBC14	Kerbside	N	26*	33*	19*	19	20
CCBC17	Roadside	N	30	30	30	26	25
CCBC18	Roadside	N	28	28	25	24	27
CCBC19	Roadside	Y	50	49	48	48	52
CCBC20	Roadside	N	29	28	27	24	27
CCBC21	Roadside	N	28	30	31	29	29
CCBC22	Kerbside	N	30	32	30	27	30
CCBC27	Urban background	N	10	9*	6	12*	8
CCBC28	Urban background	N	11	11	11	11	11
CCBC29	Urban background	N	14*	14	14	11	14
CCBC30	Roadside	Y	42	39	37	33	35
CCBC31	Roadside	Y	43	43	36	32	35

Site ID	Site Type	Within AQMA?	Annual Mean Concentration ($\mu\text{g}/\text{m}^3$) - Adjusted for Bias				
			2012 (Bias Adjustment Factor = 0.86)	2013 (Bias Adjustment Factor = 0.86)	2014 (Bias Adjustment Factor = 0.86)	2015 (Bias Adjustment Factor = 0.81)	2016 (Bias Adjustment Factor = 0.775)
CCBC32	Roadside	Y	40	40	37	32	34
CCBC33	Roadside	Y	49	52	55	37	42
CCBC34	Roadside	Y	30	30	27	24	26
CCBC35	Roadside	Y	42*	25	29	28	30
CCBC36	Roadside	Y	24	25	22	21	23
CCBC37	Roadside	Y	27	28*	22	21	22
CCBC38	Roadside	Y	43	43	43	40	37
CCBC39	Roadside	Y	34	33	34	29	31
CCBC40	Roadside	Y	28	29	27	25	28
CCBC44	Roadside	N	40	40	35	37	37
CCBC45	Roadside	N	28	30	28	26	27
CCBC46	Roadside	Y	21	22	20*	17	19
CCBC48	Roadside	Y	45*	48*	46	42	41
CCBC49	Roadside	N	27	29	26	19	26
CCBC50	Kerbside	Y	46	50	47	47	48
CCBC51	Kerbside	N	31	31	30	28	28
CCBC52	Kerbside	N	30	31	31	28	28
CCBC53	Kerbside	N	32	31	32	27	28

Site ID	Site Type	Within AQMA?	Annual Mean Concentration ($\mu\text{g}/\text{m}^3$) - Adjusted for Bias				
			2012 (Bias Adjustment Factor = 0.86)	2013 (Bias Adjustment Factor = 0.86)	2014 (Bias Adjustment Factor = 0.86)	2015 (Bias Adjustment Factor = 0.81)	2016 (Bias Adjustment Factor = 0.775)
CCBC54	Roadside	N	27	26	24	22	24
CCBC55	Roadside	Y	38	40	36	33	36
CCBC56	Roadside	Y	33	35	31	28	32
CCBC57	Roadside	N	27	29	25	23	25
CCBC58	Roadside	N	29	27	26	26	25
CCBC59	Roadside	Y	40	50*	33*	32	35
CCBC60	Roadside	Y	41	41	39	32	37
CCBC61	Roadside	N	37	39	34	33	35
CCBC62	Kerbside	N	15	15	13	13	14
CCBC63	Roadside	N	10	10*	9*	9	10*
CCBC64	Roadside	N	21	20	19	18	19
CCBC65	Roadside	N	21	20	20	19	18
CCBC66	Roadside	N	19	17	16	15	16
CCBC67	Roadside	Y	37	34	34	31	33
CCBC68	Roadside	N	N/A	N/A	28	27	28
CCBC69	Roadside	N	N/A	N/A	38	38	40
CCBC70	Roadside	N	N/A	N/A	18*	20*	16
CCBC71	Roadside	N	N/A	N/A	15*	22	23

Site ID	Site Type	Within AQMA?	Annual Mean Concentration ($\mu\text{g}/\text{m}^3$) - Adjusted for Bias				
			2012 (Bias Adjustment Factor = 0.86)	2013 (Bias Adjustment Factor = 0.86)	2014 (Bias Adjustment Factor = 0.86)	2015 (Bias Adjustment Factor = 0.81)	2016 (Bias Adjustment Factor = 0.775)
CCBC72	Roadside	N	N/A	N/A	20*	21	23
CCBC73	Roadside	N	N/A	N/A	17*	20	22
CCBC74	Roadside	N	N/A	N/A	25*	29*	27
CCBC75	Roadside	N	N/A	N/A	N/A	N/A	24*
CCBC76	Roadside	N	N/A	N/A	N/A	N/A	25*
CCBC77	Kerbside	N	N/A	N/A	N/A	N/A	30*
CCBC78	Roadside	N	N/A	N/A	N/A	N/A	26*
CCBC79	Roadside	Y	N/A	N/A	N/A	N/A	53*

In bold, exceedence of the NO_2 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 NO_2 hourly mean AQS objective

* 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%

2.2.2 Particulate Matter (PM₁₀)

Particulate Matter is a term used to describe condensed phase (solid or liquid) particles suspended in the atmosphere. Their potential for causing health problems is directly linked to the size of the particles. The abbreviations PM₁₀ and PM_{2.5} relate to their diameter size in µm. PM₁₀ is currently monitored in three locations in the Local Authority area – Caerphilly White Street, Blackwood High Street and Fochriw. The enclosure at Fochriw also monitors PM_{2.5}, due to the close proximity to an open cast mine.

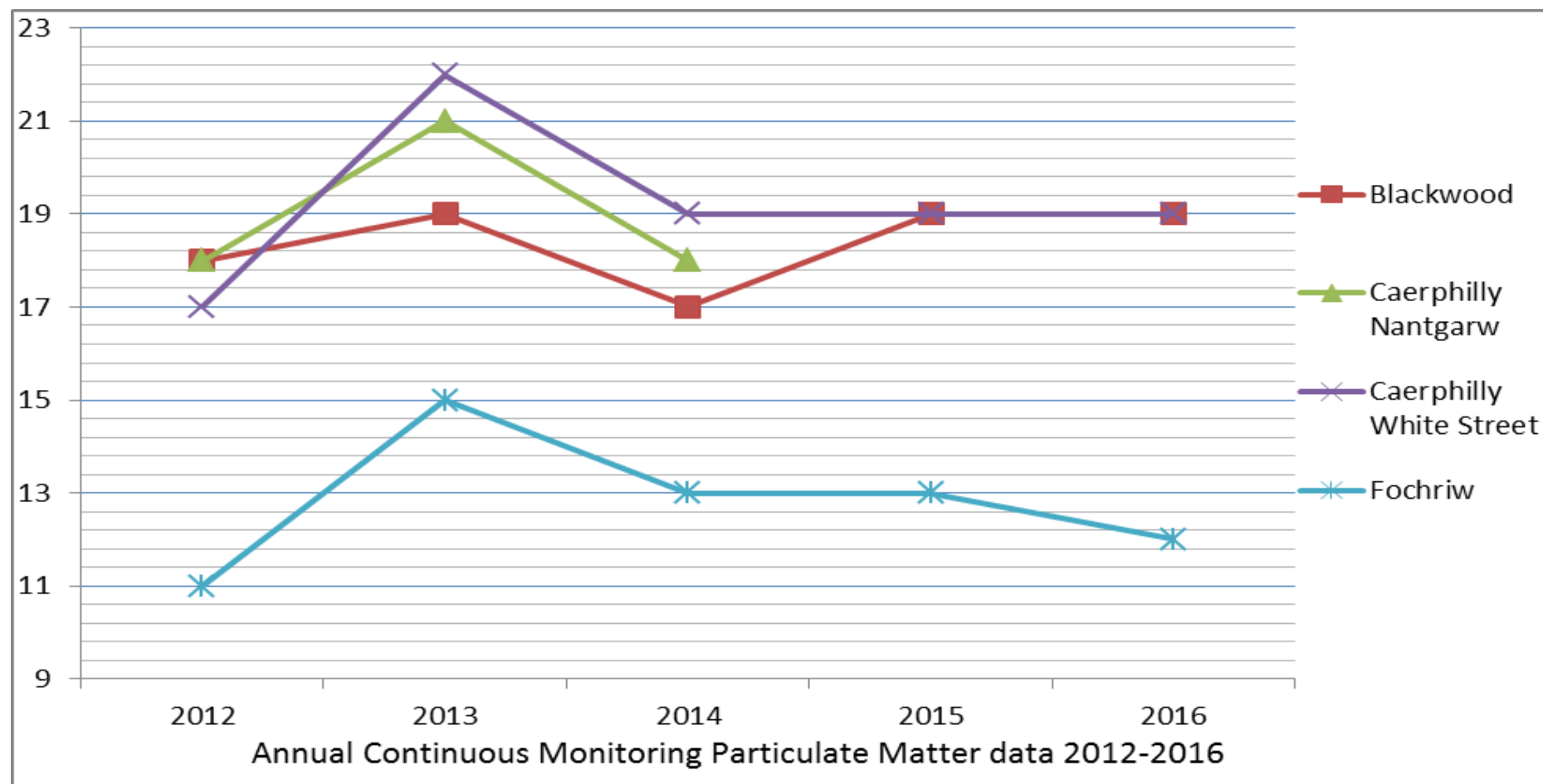
Table 2.8 – Results of Automatic Monitoring for PM₁₀: Comparison with Annual Mean Objective 2012-2016

Site ID	Site Type	Within AQMA?	Valid Data Capture 2016 %	Confirm Gravimetric Equivalent (Y or N/A)	Annual Mean Concentration (µg/m ³)				
					2012* ^c	2013* ^c	2014* ^c	2015* ^c	2016 ^c
BLW	Roadside	N	85	Y	18	19	17	19	19
CNG	Roadside	Y	N/A	N/A	18	21	17	N/A	N/A
CWS	Roadside	Y	75	Y	17	21	19	19	19
FCR	Roadside	N	95	Y	11	14	13	13	12

In bold, exceedence of the PM₁₀ annual mean AQS objective of 40µg/m³

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

The chart above illustrates compliance borough-wide for the National Annual Objective for Particulate Matter. There is no requirement for further investigation at any of these sites.

Figure 2.5 – Trends in Annual Mean PM₁₀ Concentrations 2012-2016

The chart above shows that all Particulate Matter Monitoring stations are compliant with the National Annual Objective for PM₁₀ emissions. All sites depict the same trend of increases between 1-5 $\mu\text{g}/\text{m}^3$ from 2012-2013 but the five year trend depicts smaller increases of 1-2 $\mu\text{g}/\text{m}^3$.

Table 2.9 – Results of Automatic Monitoring for PM₁₀: Comparison with 24-hour Mean Objective 2012-2016

Site ID	Site Type	Within AQMA?	Valid Data Capture 2016 % ^b	Confirm Gravimetric Equivalent (Y or N/A)	Number of Daily Means > 50µg/m ³				
					2012	2013	2014	2015	2016
BLW	Roadside	N	85	Y	0	3	1	1	0
CNG	Roadside	Y	N/A	N/A	2	1	2	N/A	N/A
CWS	Roadside	Y	75	Y	2	1	3	1	1
FCR	Roadside	N	95	Y	0	0	1	0	0

In bold, exceedence of the PM₁₀ daily mean AQS objective (50µg/m³ – not to be exceeded more than 35 times per year)

The table illustrates compliance with the National Daily objective for PM₁₀ across all monitoring stations.

From the table it can be seen that PM₁₀ monitoring at Caerphilly Nantgarw (CNG) ceased in 2014 due to an irreparable fault. The site had shown continuous compliance for some time prior to that time so the machine was not replaced.

2.2.3 Sulphur Dioxide (SO₂)

The Authority previously monitored for Sulphur Dioxide in 4 areas of the Borough. The monitoring areas were situated in close proximity to large coal-fired boilers. The decline in industrial processes and the move to cleaner energy has meant that the use of large coal-fired boilers has now ceased. The Authority stopped actively monitoring for Sulphur Dioxide in 2009. All monitoring results collected between 1999 and 2009 were well below the air quality objective set for this pollutant.

2.2.4 Benzene

The Authority does not actively monitor for Benzene.

2.2.5 Other Pollutants Monitored

The County Borough of Caerphilly monitors PM_{2.5} along with PM₁₀ at the Fochriw air quality monitoring station, which is situated near an open cast mine. This air quality station was installed during May 2012 due to health concerns raised by local residents. Although there is no legal requirement to monitor for PM_{2.5}, the annual mean for 2016 measured 8µg/m³.

2.2.6 Summary of Compliance with AQS Objectives

Caerphilly County Borough Council has examined the results from monitoring within the Local Authority area.

Caerphilly AQMA diffusion tubes continue to record some exceedances of the National Annual Objective for NO₂, therefore the AQMA should remain.

Blackwood High Street diffusion tubes and continuous analyser display readings below the National Annual and Hourly Objectives for NO₂, therefore there is no need to proceed to a detailed assessment in this area.

Hafodyrynys AQMA diffusion tubes and continuous analyser displayed exceedances of the National Annual and Hourly Objectives for NO₂, therefore the AQMA should remain.

The diffusion tubes located in Wattsville are generally compliant with the National Annual Objective for NO₂, however, one tube has recorded a measurement of 40µg/m³ exactly for 2016 so an automatic analyser was installed at this location in May 2017 to further identify any trends in traffic and subsequent pollution. The Local Authority will analyse the data and identify whether there are 'quick fix' interventions that can be taken forward in the area to reduce pollution prior to proceeding to a Detailed Assessment as the result only relates to two properties within the area.

3 New Local Developments

3.1 Road Traffic Sources

3.1.1 Narrow Congested Streets with Residential Properties Close to the Kerb

Caerphilly County Borough Council has not identified any new narrow congested streets with residential properties close to the kerb since the last round of review and assessment.

Caerphilly County Borough Council confirms that there are no new/newly identified congested streets with a flow above 5,000 vehicles per day and residential properties close to the kerb, that have not been adequately considered in previous rounds of Review and Assessment.

3.1.2 Busy Streets Where People May Spend 1-hour or More Close to Traffic

Caerphilly County Borough Council has not identified any new busy streets where people may spend 1 hour or more close to traffic since the last round of review and assessment.

Caerphilly County Borough Council confirms that there are no new/newly identified busy streets where people may spend 1 hour or more close to traffic.

3.1.3 Roads with a High Flow of Buses and/or HGVs.

Caerphilly County Borough Council has considered roads with a high flow of HGVs and/or buses and no such locations have been identified.

Caerphilly County Borough Council confirms that there are no new/newly identified roads with high flows of buses/HGVs.

3.1.4 Junctions

Caerphilly County Borough Council confirms that no new busy junctions have been identified since the last round of review and assessment.

Caerphilly County Borough Council confirms that there are no new/newly identified busy junctions/busy roads.

3.1.5 New Roads Constructed or Proposed Since the Last Round of Review and Assessment

There are no new roads constructed or proposed since the last round of review and assessment.

Caerphilly County Borough Council confirms that there are no new/proposed roads.

3.1.6 Roads with Significantly Changed Traffic Flows

Caerphilly County Borough Council has considered roads with a greater than 25% change in traffic flow and no new locations have been identified.

Caerphilly County Borough Council confirms that there are no new/newly identified roads with significantly changed traffic flows.

3.1.7 Bus and Coach Stations

Caerphilly County Borough Council has two main bus stations in the County Borough, one in Blackwood Town Centre and one in Caerphilly Town Centre. Daily bus movements at these sites are in the order of 400 movements and 450 movements respectively. Technical guidance LAQM.TG (16) considers bus stations with less than 2,500 bus movements per day as not being significant. Therefore no further consideration of this section is required.

Caerphilly County Borough Council confirms that there are no relevant bus stations in the Local Authority area.

3.2 Other Transport Sources

Caerphilly County Borough Council has no airports within the Local Authority area. Locations where diesel locomotives may regularly remain stationary for 15 minutes or more, with relevant exposure within 15m were considered and no such locations were identified.

None of the rail lines listed within table 7.2 of the Technical Guidance LAQM.TG(16) travel through Caerphilly County Borough Council. Caerphilly County Borough Council has no coastline and therefore no significant shipping to consider.

3.3 Industrial Sources

Caerphilly County Borough Council has considered all new or proposed installations for which an air quality assessment has been carried out, and can confirm that there have been none since the last round of review and assessment.

Caerphilly County Borough Council has considered all existing installations and can confirm that no emissions have increased substantially and no new relevant exposure has been introduced.

Caerphilly County Borough Council has no new or significantly changed installations with no previous air quality assessment since the last round of review and assessment.

There are currently 22 petrol stations within Caerphilly County Borough Council regulated under the Pollution Prevention Control Act 1999. Of these, 15 are fitted with Stage 1b Petrol Vapour Recovery and 7 are fitted with Stage 2 Vapour Recovery Systems.

There are no poultry farms meeting the specified criteria within Caerphilly County Borough Council. Caerphilly County Borough Council has no major fuel (petrol) storage depots within the Local Authority area.

3.4 Commercial and Domestic Sources

There are no areas throughout the Local Authority Area where biomass combustion is dominant. However, since the last Progress Report this department has seen a substantial increase in the use of commercial wood burners as a means to reduce fuel costs and/or dispose of waste wood products. Not all installations have required planning permission through the Development Control process; they are permitted to operate from a planning stand point as long as they have been signed off as complying with Building Regulations by the Building Control department. The amount of waste combusted dictates whether an environmental permit is required to comply with the Environmental Permitting Regulations 2016.

TG Howell Sawmill have been granted an environmental permit by Caerphilly CBC for "*The Combustion of over 50kg of Waste Wood per hour, in Compliances over 3MW*", meaning that they are permitted to burn Grade A waste wood in three biomass boilers. Conditions have been implemented on the permit to limit the emissions of Carbon Monoxide, Total Particulate Matter, Oxides of Nitrogen and Organic compounds.

There are also installations in the Local Authority area, that have waste exemption permissions from Natural Resources Wales that permit the burning of waste wood under the threshold for an Environmental Permit.

The effect of these installations is likely to add to the local air quality; however, there will be some offset of national air quality emissions due to the reduction in energy usage / transportation for the disposal of waste wood.

There are also small pockets of coal-fired homes in the County Borough. However, following discussions with the Private Sector Housing Team, the Energy Officers and a review of the domestic smoke complaints received by the Environmental Health Department, information obtained suggests that there is insufficient density of coal fired homes in Caerphilly County Borough Council to be deemed significant as defined in Technical Guidance LAQM.TG (16).

3.5 New Developments with Fugitive or Uncontrolled Sources

Caerphilly County Borough Council confirms that there are no new developments with fugitive or uncontrolled emissions that are likely to have an impact on air quality with the local authority area.

4 Local / Regional Air Quality Strategy

Caerphilly County Borough Council does not currently have an Air Quality Strategy document. LAQM reviews are undertaken on an annual basis in accordance with the National Air Quality Strategy and associated published guidance.

5 Planning Applications

Since the last Progress Report, Hazrem solid recovered fuel plant located in Cwmfelinfach has received planning permission. To operate, it requires an Environmental Permit from Natural Resources Wales, which has been the subject of appeal by local residents, on grounds of Air Quality. Although the modelling of the installation indicated no exceedances of the National Annual or Hourly Objectives for NO₂, the appeal relates to the impact the plant will have on Air Quality as a whole – taking into account its geographical location and subsequent atmospheric conditions that could inhibit the dispersal of emissions.

The appeal has subsequently been dismissed and an environmental permit granted.

There are a number of large housing developments in Caerphilly that are currently going through the planning process which have been required to formally assess their impact on local air quality. The developments include the Gwern-y-Domen estate that has proposed 618 new houses, Virginia Park estate that has proposed 380 new houses and Old Quarry Court estate that has proposed 24 new houses. The Caerphilly Basin is the most attractive to developers due to its good transport links to the M4, including Cardiff and Newport.

Gwern-y-Domen and Virginia Park developments are both located within the Caerphilly Basin and have the capacity to add 1090 new houses into the area, and approximately 2180 new vehicles onto the local roads.

The traffic assessments for these developments are currently being scrutinised and agreed with Highways colleagues. Following this, the developer can model the air quality impacts of these developments on the immediate vicinity and the Caerphilly AQMA and draw conclusions and offer appropriate mitigation.

Gwaun Gledyr Isaf is another development on the periphery of Caerphilly where the applicant seeks to develop 260 houses on land that is currently greenfield and out of settlement. However there have been a few appeals granted recently, namely Pandy Road and Hendredeny for residential estates that were contrary to policy and out of settlement, however the need for housing and the deficit in housing land supply have outweighed the highways concerns.

6 Air Quality Planning Policies

Caerphilly Council does not have a specific air quality planning policy, but relies upon national planning policy and associated guidance.

The Pollution Control team are currently in the process of drafting a Developer's guide with regard to air quality and what information should be considered when a planning application is submitted.

The production of this guidance is being prepared as a reference document for developers and their advisers who may be involved in the assessment of air quality associated with developments. It will detail the type of information required by the Local Planning Authority (LPA) in order for them to assess an application for planning permission that may cause an impact on air quality.

The guidance deals principally with the following;

- Those pollutants regulated under the Local Air Quality Management (LAQM) regime including PM_{2.5} due to its significant health effects and no safe exposure level.
- The impact of traffic emissions.
- The impact of emissions from biomass boilers.
- The assessment and control of dust impacts during construction which contribute to airborne particulate emissions.

7 Local Transport Plans and Strategies

The Local Authority has a Local Transport Plan (South East Wales Valleys Local Transport Plan, January 2015), which aims to target investment, support economic growth, reduce economic inactivity, tackle poverty and encourage safer, healthier and sustainable travel. The report can be accessed through <http://www.caerphilly.gov.uk/Services/Transport-and-parking/Local-Transport-Plan>

There are a number of strategy policies within the Council's LDP which aim to bring about improvements in transport connections and infrastructure.

Strategy Policy 19 (SP19) in the LDP seeks to implement improvements to the existing transport infrastructure that;

- Address social exclusion by increasing accessibility to employment, services and facilities throughout the County Borough
- Assist in regenerating the Heads of the Valley Regeneration Area through creating and improving transport links to the settlements in the Northern and Southern Connections Corridors, and / or
- Reinforce the role and function of settlements, and/or
- Reduce the level of traffic movements and / or congestion, within any identified air quality management area, and/or
- Promote the most efficient use of the transport network.

There are a number of identified infrastructure improvement schemes under the various strategy policies. A few examples for the Caerphilly area are listed below, however all schemes are dependent upon funding availability.

TR6.2 Trecenydd Roundabout

Trecenydd Roundabout is located along the Caerphilly Northern Bypass and provides an important link for communities located within the Aber Valley. The roundabout was unable to cope efficiently with traffic volumes travelling along the A468 / A469 between Caerphilly and Cardiff, which resulted in congestion and particular problems for traffic from the Aber Valley accessing the A468. This not only caused localised problems but put pressure on Pwllypant Roundabout and other rural roads during peak hours as traffic was displaced to alternative routes. The scheme was undertaken in 2013 and included the redesign of the roundabout to provide better access to the A468 / A469 particularly for commuters from the Aber Valley.

TR6.3 Pwllypant Roundabout

The A468 / A469 Caerphilly Northern Bypass is the main artery linking Caerphilly and settlements in the north of the borough to the trunk road network (A470, M4) and Cardiff. The A468 / A469 Caerphilly Northern Bypass is already heavily overloaded at peak periods and all junctions are at, or in excess of, capacity at peak times. Improvements to this key six-arm junction at Pwllypant, which connects the A468 and A469 and form part of the strategic network of roads in South East Wales, are required to improve efficiency of the network and reduce congestion, which is evident for periods throughout the day. These works commenced on 9th October 2017 and are currently ongoing.

TR6.4 Crumlin Junction

The implementation of the Crumlin junction works commenced 5 January 2015 and concluded in October 2015. The aim of the works was to minimise the congestion of traffic at the base of Hafodyrynys Hill by the introduction of the following:

- Installation of MOVA System.
- Additional right turn lane for North Bound (N/B) A467 vehicles turning East into A472
- Additional lane provided for A467 South Bound (S/B) vehicles passing straight on at traffic signals with A472.
- Extended left turn filter lane on the A472 for vehicles joining the A467 S/B.
- Additional right filter lane provided for vehicles leaving the A472 going N/B onto the A467.
- Additional merge lane provided on the A472 for vehicles heading East from N/B A467.
- Left turn filter lane extended on S/B A467 for vehicles joining into A472.

The schemes below are yet to be implemented:

TR6.4 Bedwas Bridge Roundabout

Bedwas Bridge Roundabout is a key junction on the northern route around Caerphilly town centre. It links the communities of Bedwas and Trethomas to the northern bypass and contributes to efficient distribution of traffic within the Caerphilly Basin. The junction also provides access to the park and ride facility at Caerphilly Station via the Lansbury Park ring road. The roundabout currently operates efficiently for much of the day, however congestion is evident during peak hours and further development in the Caerphilly Basin will put increased pressure on this key junction. A major constraint in improving operation of the roundabout is Bedwas Bridge and therefore improvements will require the provision of a second crossing. Highway improvements to A468 Bedwas Bridge will require a Flood Consequences Assessment to be submitted as part of any future planning application.

TR6.5 Piccadilly Gyratory

Piccadilly Gyratory is a key junction in managing and distributing traffic travelling within and through Caerphilly town centre. Traffic growth in the town centre has resulted in additional capacity being required at the junction. The scheme will upgrade and improve the existing traffic signals, improving network efficiency and providing additional capacity at the junction to relieve congestion and related environmental problems in the town centre.

TR6.6 Penrhos to Pwllypant

The current A468 / A469 varies in standard between dual carriageway and single carriageway. The single-carriageway section between Pwllypant and Penrhos has traffic levels far exceeding design capacity, which results in problems of congestion and queuing vehicles along the route during peak periods. This leads to traffic diverting through Caerphilly town centre, which increases traffic congestion / environmental problems and reduces the attractiveness of the town centre. The scheme will upgrade the existing A468/A469 single-carriageway road between Pwllypant and Penrhos roundabouts to dual carriageway standard, which will link into the existing dualled sections leading northwards from Pwllypant (along the A469) and westwards from Penrhos to the A470 (along the A468). The scheme aims to provide a high quality route along the length of the A468 / A469, to maximise the efficiency of the strategic highway network, reduce congestion/pollution, remove through traffic from Caerphilly town centre and improve access to the north of the borough to encourage economic regeneration.

TR6.7 Pwllypant to Bedwas

The section of the A468 between Pwllypant and Bedwas Bridge is important in managing traffic and congestion in Caerphilly town centre. The road completes the northern route around the town and currently operates efficiently for much of the day. However congestion is evident during the peak hours when commuter traffic is at its highest and further development in Caerphilly Basin will put increased pressure on the route. Network efficiency improvements will be required to maintain its attraction as a route for through traffic and prevent traffic diverting through the town centre.

8 Climate Change Strategies

The Climate Change Strategy for Caerphilly County Borough was produced by the Living Environment Partnership, one of the four partnerships of the Community Strategy. This group was predominantly made up of environmental organisations but on climate change issues it linked to a number of partners including Aneurin Bevan Local Health Board, Caerphilly Community Safety Partnership, Health Challenge Caerphilly, National Farmers Union, Sustrans, CADW, Groundwork Caerphilly and Welsh Government, to name but a few.

The aims of the Strategy are:-

To bring together organisations from all sectors and coordinate a joined up response to the challenge of climate change, using the expertise and experience of partners and sharing good practice.

To establish baseline information about the contribution that Caerphilly County Borough makes to global climate change, in terms of greenhouse gas emissions from all sectors:

- ✓ To promote ownership of the responsibility for greenhouse gas mitigation within the County Borough, amongst all sectors.
- ✓ To encourage and facilitate greenhouse gas mitigation through providing advice and guidance to all sectors.
- ✓ To anticipate the possible effects that global climate change may have on Caerphilly County Borough and to begin planning the adaptation measures required to minimise the potentially harmful consequences of climate change on our residents and the local environment.
- ✓ To fully appreciate both the potential risks but also the potentially beneficial effects of climate change and to identify a range of opportunities that could arise from the environmental changes presented.

The Community Strategy has since been replaced by the Single Integrated Plan (SIP), with environmental issues within the SIP being part of “Greener Caerphilly”. To “Reduce the causes and adapt to the effects of Climate Change”, is one of the 3 priorities of the Greener Caerphilly partnership. Work on this is reported to the Greener Caerphilly Leadership Group and on to the Local Service Board.

Within Caerphilly County Borough Council, strategies and actions have been put in place for us to play our part in combating climate change. This includes:

Carbon Reduction Strategy

The Authority, working with the Carbon Trust, developed a long-term carbon reduction strategy in 2009. The ambitious but achievable target of a 45% reduction in CO₂ emissions by 2019 was agreed. It is anticipated that this target will be met by a mixture of:

- ✓ good housekeeping (10%)
- ✓ invest to save energy efficiency projects (20%)
- ✓ good design and asset management (10%)
- ✓ renewable energy (5%)

Housing

Housing accounts for 27% of the UK's carbon emissions. The rising cost of energy has resulted in an increase in Caerphilly residents being driven in to fuel poverty. Work is ongoing with Housing Services, housing associations and residents to address energy issues.

The Authority's Housing Services have an ongoing programme involving improving the energy efficiency of homes, including innovative measures such as external wall insulation and renewable technologies such as solar panels and heat pumps. They also have a programme replacing old boilers with new condensing boilers.

Adaptation Plan for Caerphilly County Borough Council

Caerphilly County Borough Council is preparing a Climate Adaptation Plan for the borough, and has been engaging with all Council Service areas. This is following the methodology set out in the guidance accompanying the Climate Change Act 2008. A Local Climate Impact Profile (LCLIP) has been completed and approved by the Authority's Corporate Management Team in July 2015. The LCLIP identified 128 impacts, of which 32 were rated as high priority.

9 Implementation of Action Plans

Further monitoring has been commissioned along Islwyn Road, Wattsville after a single diffusion tube identified the road as potentially failing the National Annual Objective for NO₂. Islwyn Road is used by HGVs as an access to Nine Mile Point Industrial Estate; the main issue lies at the few houses situated closest to the road which are a pinch point along the Islwyn Road as it narrows to cater for on street parking.

In May 2017, Environmental Health located a M200A Chemiluminescent continuous analyser near the location of CCBC 69, to identify trends in traffic flows and subsequent NO₂ emissions along Islwyn Road. The Authority are currently considering whether there are any 'quick fix' solutions to reduce levels of air pollution at the pinch point along the road prior to proceeding to a detailed assessment.

A full review of the borough-wide diffusion tube network was undertaken at the end of 2016 to assess whether to cease, continue or increase the monitoring of NO₂ in 2017. All diffusion tubes located in the north (four) of the Local Authority area were ceased after continued low readings of NO₂. Three diffusion tubes outside of the AQMA were also ceased in the Caerphilly area because of continued compliance with the National Annual Objective.

Five new diffusion tubes were brought into distribution. Three have been placed along Commercial Street, Aberbargoed after health concerns as a result of traffic emissions were raised by local residents. The other two have been located in Hafodyrynys AQMA; one has been located in proximity to the continuous analyser to identify the drop-off in NO₂ values at residential receptors, with the other located on raised properties across the road from Woodside Terrace to assess their exposure.

Further 2017 actions:

Environmental Health are also looking into initiatives to educate local children in schools about air quality, including some school yard monitoring to assess pupils exposure within playgrounds.

There are plans to work with CCBC Transport to review the buses that operate within Caerphilly Borough, including those in the Caerphilly Town Centre area that travel through the AQMA, and the buses that serve schools within the borough.

The Air Quality Action Plan for Hafodyrynys AQMA has recently been produced. Part of the process involved public consultation via steering groups with local residents, councillors, Public Health Wales, Caerphilly Council officers and officers from neighbouring local authorities. The steering groups were designed to prompt ideas on remedial strategies and measures to reduce poor Air Quality. Some of the ideas discussed within the group included a compulsory purchase order of Woodside Terrace Houses with a view to demolishing them, a ban of HGVs through the AQMA, the erection of bypass road and traffic management schemes etc. These ideas were incorporated into the air quality action plan as well as soft measures including, educating on alternate routes, education through schools and promotion of public transport and active travel.

Table 9.1 – Action Plan Progress

No	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
1	a) Assess (through modelling) the air quality benefits of replacing the zebra crossing at White Street with a signalised crossing and prohibit the left turn from Van Road onto White Street	Reduce emissions within the AQMA by making changes to the surrounding roads which will subsequently affect traffic movements in the AQMA.	CCBC Environmental Health	2014	2015	Completion of Modelling Exercise	10%	In Progress	Complete	Completed	Measures 1a to 1d are being offered as a basket of short term measures and will affect traffic movements in the AQMA.
	b) Assess (through modelling) the air quality benefits of closing Mountain Road over the rail bridge to Southbound traffic		CCBC Environmental Health	2014	2015			Complete	Complete	Completed	
	c) Refurbishment of the vehicle detection at Bartlett Street traffic signals	Reduce emissions within the AQMA by making changes to the surrounding roads which will subsequently affect traffic movements in the AQMA.	CCBC Highways			Completion of Modelling Exercise	10%	Complete	Complete	Completed 2015	Measures 1a to 1d are being offered as a basket of short term measures and will affect traffic movements in the AQMA.
	d) Assess (through modelling) the effect of a right turn prohibition from Pontygwindy Road into Nantgarw Road		CCBC Environmental Health	2014	2015			complete	Complete	Completed	
2	Assess (through modelling) the air quality benefits of dualling the A468 Caerphilly Northern Bypass (Bedwas Bridge - Pwll-y-Pant - Penrhos roundabout).	Prevent 'through' traffic in Caerphilly Town Centre by making other routes more efficient	CCBC Environmental Health	2014	2015	Completion of Modelling Exercise		In Progress	Complete	Complete	This scenario was modelled in the 2009 Further Assessment in conjunction with the basket of short term measures and the effect on reduction in NO ₂ was ~15% in and around the AQMA. The scheme will be modelled by itself to realise any potential impact.

No	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
3	Assess (through modelling) the air quality benefits of construction of a bypass to the south-east of Caerphilly	Prevent 'through' traffic in Caerphilly Town Centre by making other routes more efficient	CCBC Environmental Health	2014	2015	Completion of Modelling Exercise	Unknown	In Progress	Complete	Complete	This scenario was modelled in the 2009 Further Assessment in conjunction with the basket of short term measures and the effect on reduction in NO ₂ was ~17% in and around the AQMA. The scheme will be modelled by itself to realise any potential impact.
4	Encourage travel plans for businesses, schools and CCBC	Reducing the number of vehicles travelling on the roads	CCBC Planning / Highway Development Control / Transport Strategy Group	Ongoing	Ongoing	No. of schools holding travel plans.	Not quantifiable	There are 68 active school travel plans, 17 of which are for the Caerphilly Basin area. There are a large number of employers who currently have travel plans e.g. DAS Group, GE Group, Co-op and Caerphilly Library. CCBC Highways Development Control also condition certain planning applications to produce sustainable travel plans. To date 20 Travel Plans have been conditioned.	2 school travel plans completed in the last year.	Ongoing	

No	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
5	Use the planning system to secure AQ Improvements	Reduce emissions in and around the AQMAs and in areas where the air quality monitoring results show levels approaching the air quality objective limit.	CCBC Planning / Env Health / Highways Development Control	2008	Ongoing	Adoption and use of s.106 agreements and Community Infrastructure Levy Agreements for securing funds for additional monitoring equipment and implementation of the Caerphilly Air Quality Action Plan	Not quantifiable	Ongoing	None	Ongoing	Air Quality Impact Assessments are required in areas where CCBC have designated AQMAs and in areas where monitoring results show NO ₂ levels approaching the air quality objective limit.
6	Eliminate bus idling at Caerphilly Bus Station	Reducing vehicle emissions	CCBC Passenger Transport & Bus Operators	Mar-15		Further work is required to understand the effect of buses idling at Caerphilly Bus Station	Not currently quantifiable - a baseline measurement needs to be established	Bylaw introduced	Met with Passenger Transport Manager to discuss a project around buses within Caerphilly.		Stagecoach has invested in technology that monitors driver and vehicle performance and can identify periods of idling. The Council will work with Stagecoach to understand how / whether this could be used to monitor / enforce periods of idling.
7	Investigate the potential for the use of electric vehicles in the Council's fleet	Reducing vehicle emissions	Sustainable Development / Fleet Management	Sep-15	Mar-16	Outcome of Investigation	Not quantifiable		Electric charge points installed at Council Buildings	Trial completion by Sept 2018	
8	Reduce emissions from buses	Reducing vehicle emissions by working with commercial bus operators and seeking grants to assist with the purchase of 'green' buses (biodiesel / hybrid / alternative fuels)	CCBC Passenger Transport & Bus Operators	Ongoing	Dependent on incentives available to invest in Low Emission Vehicles (LEV) - otherwise will be through natural replacement of existing fleets	Further modelling is required to understand the contribution of buses alone to poor air quality in the Caerphilly area.			None	Modelling to be completed by Dec 2018	Stagecoach has recently invested in 14 new Euro VI buses that are used on routes between Bargoed / Blackwood and Newport. One route serves Caerphilly town centre 4 times each hour.

No	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
9	Increase and publicise the availability of cycling facilities	Reduce emissions by promoting alternative forms of transport	CCBC Transport Strategy/ Road Safety/ Passenger Transport/ Sustainable Development	Ongoing	Ongoing	Difficult to quantify	Not quantifiable	Initiatives completed include the travel hub in Caerphilly Town Centre that promotes Personalised Travel Planning, passenger transport and the existing travel routes within the Caerphilly Basin and the County Borough.	Active Travel Plan with newly proposed routes published in 2017	Ongoing	
10	Introduce cycling proficiency / National Standards in schools	Reduce emissions by promoting safe use of alternative forms of transport	CCBC Sustainable Development & Transport Strategy	2010	Ongoing	No. of pupils trained	Not quantifiable	1129 pupils trained in total	540 pupils trained	Ongoing	Currently being delivered in schools on a rolling programme.
11	Promote school walking buses	Reduce emissions by promoting walking	CCBC Transport Strategy	2005	Ongoing	No. of schools participating in the scheme.	Not quantifiable	20 schools signed up to participate in the walking bus initiative. 4 schools are in the Caerphilly Basin area.		Ongoing	
12	Improve walking routes in the town centre	Reduce emissions by promoting walking	CCBC Highway Operations Group / Transportation Engineering Group	2014/15	2015 onwards	No. of schemes delivered	Not quantifiable	Will progress as part of the Active Travel Duties / Safe Routes in Communities (SRIC) initiative	SRIC initiative delivered in Deri. Active Travel produced	Ongoing	Modal Shift
13	Health Awareness - working with partners to incorporate AQ in to Eco schools and Healthy Schools	Education to encourage alternative forms of transport to reduce emissions	Env Health /Policy/Healthy Schools	Oct-14	Ongoing	No. of schools visited	Not quantifiable	7 schools to date	6 schools visited	Ongoing	All schools will be visited on a rolling programme. As the visits now include 12 months AQ monitoring, we will aim to deliver to 6-10 schools per year to ensure sufficient resource

No	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
14	Improve CCBC vehicle fleet - lead by example	Upgrade vehicles to EURO VI standard to reduce emissions	Passenger Transport/ Fleet Management	2014	2015	No. of vehicles in Council fleet which are EURO VI standard.	Not quantifiable	The Council has 483 vehicles in total, 181 of which are Euro VI	3 Euro VI vehicles purchased	Ongoing	The Council renews its fleet on a rolling programme and will shortly be trialling electric vehicles also
15	Limit street cleaning to off peak hours	Reduce emissions due to congestion	CCBC Fleet Management/ Public services	2014	Ongoing	Avoid cleaning the area between the hours of 0730am and 0900am	Not quantifiable	Mechanical sweeper starts at 0400am in Caerphilly Town Centre and has vacated the area by 0530am ahead of peak traffic flows. The pedestrian sweeper starts at 0600am and has vacated the area by 0730am.	Ongoing	Ongoing	ECO driving training given to Refuse vehicle drivers
16	Junction improvements to the A467/A472 at Hafodyrynys to add additional junction capacity which in turn prevents queuing and congestion within the Hafodyrynys Road AQMA	Reduce emissions due to congestion	CCBC Transport Strategy/CCBC Highways Operations Group	2014	Jan - Oct 2015	Completion of Scheme	~10% reduction in the measured annual mean for NO ₂ . ~90% reduction in the measured hourly means for NO ₂ .	Scheme complete	Scheme complete	Scheme complete	The modelled NO ₂ improvements have not been realised on completion of the works. This area is now subject to its own AQAP and updates will be reported in 2018.

No	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
17	Preliminary design work , inform public and carry out enabling works to A468/A469 Pwll-y-Pant Roundabout improvements to increase vehicle capacity of the roundabout to discourage through traffic in the town centre subsequently reducing congestion and improving air quality.	Reduce emissions due to congestion and queuing in Caerphilly Town Centre	CCBC Transport Strategy/CCBC Engineering Consultancy	2008	2012	Establish final design/layout	Not quantifiable - air quality modelling would be undertaken if the scheme was to be progressed.	Works completed, final design determined	Works commenced on site on 9 th October 2017 and are due to run for 12 months.	Completed	Implementation of the project is currently underway.

10 Conclusions and Proposed Actions

10.1 Conclusions from New Monitoring Data

Caerphilly AQMA

As stated within section 2.2, 85% of the diffusion tubes within the Caerphilly Air Quality Management Area, displayed increases in NO₂ levels from 2015 to 2016. Although a high percentage increased, only two diffusion tubes exceeded the National Annual Objective for NO₂, similarly to 2015.

Both exceedances are located at White Street – CCBC 19 continues to exceed from 2012-2016 and CCBC 33 is a new exceedance, however it previously exceeded in 2012-2014. CCBC 38 had formerly exceeded from 2012-2015, but didn't in 2016.

The continuous analysers at White Street and Nantgarw Road, displayed annual levels of 34µg/m³ and 29µg/m³ respectively, which are consistent with the levels in 2015. These levels contradict the trend established by the diffusion tubes of annual increases in NO₂ from 2015 to 2016.

CCBC 30, 31 and 32 are co-located on the White Street enclosure; the NO₂ levels are consistent with the majority of the other tubes in that they increased from 2015 to 2016.

In 2016, Caerphilly White Street continuous analyser recorded 2 exceedances of the National Hourly Objective of over 200µg/m³ for NO₂. This is a reduction from the 9 exceedances in 2015 and 23 in 2014. Caerphilly Nantgarw had no exceedances in 2016. The National Air Quality Objective permits 18 hourly exceedances a year, of which neither enclosure registered.

The PM₁₀ levels recorded at Caerphilly White Street remained at 19µg/m³ from 2015 to 2016, with an overall increase of 2µg/m³ from 2012 to 2016. The exceedances of the national daily mean also remained the same, at 1 for 2016. PM₁₀ monitoring ceased at Caerphilly Nantgarw in 2014. The National Air Quality Objective permits 35 daily exceedances a year, which the enclosure did not registered.

To conclude, the review of the 2016 data set demonstrates compliance with the National Air Quality Objectives, however, as the diffusion tubes are continuing to exceed the National Annual Objective at residential receptors the Caerphilly Air Quality Management Area must remain in place and progress with the current action plan.

Blackwood Town Centre

The five diffusion tubes located in Blackwood town centre did not display any substantial changes in NO₂ levels from 2015 to 2016. All three of the co-located diffusion tubes recorded levels of 28µg/m³, compared to the continuous analyser levels of 29µg/m³. From 2012 to 2016, both diffusion tube and continuous analyser levels have decreased by 1-4µg/m³. There were no exceedances in the National Hourly Objective for NO₂ in 2016.

The PM₁₀ levels remained at 19µg/m³ from 2015 to 2016, with an increase of 1µg/m³ from 2012 to 2016 overall. Although the annual levels remained the same, the exceedances of the national daily mean reduced from 1 occasion to 0.

To conclude, the review of the 2016 data-set demonstrates compliance with the National air quality objectives, therefore there is no requirement for this Authority to proceed to a Detailed Assessment for Blackwood High Street for PM₁₀ or NO₂.

Hafodyrynys

In 2016, CCBC 79 was introduced to assess the residential exposure of NO₂ emissions at the top of Hafodyrynys Hill, reading 53µg/m³. This tube was added to the three tubes already in distribution prior to 2016.

From 2015 to 2016 – CCBC 50 increased by 1µg/m³ to 48µg/m³, CCBC 60 increased by 5µg/m³ to 37µg/m³ and CCBC 50 decreased by 1µg/m³ to 41µg/m³. Three out of four of the diffusion tubes in distribution in 2016, exceeded the National Annual objective for NO₂.

The continuous analyser recorded an annual average of 69µg/m³, as it did in 2015. The levels in 2016 were modelled to be reduced by 10% to roughly 60µg/m³, following completion of the Crumlin Junction Works. The works were designed to increase the capacity and efficiency of the junction and reduce queueing and subsequent idling of vehicles at Hafodyrynys Hill. The junction works were also modelled to remove all exceedances of the National Hourly Objective, however, there were still 126 exceedances of the hourly objective for NO₂ recorded in 2016. It has been acknowledged that further up to date monitoring and traffic counts are required at Hafodyrynys to better inform any future studies for this area.

To conclude, the review of the 2016 data-set currently demonstrates non-compliance with the National Air Quality Objectives for NO₂, therefore the Air Quality Management Area must remain and the Hafodyrynys Action Plan be taken forward.

Fochriw

In 2016, PM₁₀ levels decreased from 13µg/m³ in 2015, to 12µg/m³, with an increase of 1µg/m³ overall from 2012 to 2016. PM_{2.5} levels also decreased from 11µg/m³ in 2015, to 8µg/m³ in 2016, with an overall decrease of 2µg/m³ from 2013 to 2016.

Both PM₁₀ and PM_{2.5} levels are very low and do not require any further action at this time.

Wattsville

There were six diffusion tubes monitoring NO₂ levels at Islwyn Road in 2016. Out of these six tubes, five of them complied with the National Annual Objective for NO₂.

CCBC 69, which is placed on a property in closer proximity to the road, measured a higher level of 40µg/m³. This tube is the one exception on Islwyn Road as the remainder of them measured between 16µg/m³ and 27µg/m³. In May 2017, a continuous analyser was procured and placed on Islwyn Road in close proximity to CCBC 69 to identify any trends in the traffic and subsequent pollution. In addition to this the Authority placed an additional diffusion tube on the properties immediately next the houses in question with a front garden to demonstrate the drop off in NO₂ levels and this will be reported upon in the 2018 Progress Report. The Authority are currently exploring whether there are any 'quick fix' options for this area prior to proceeding to a detailed assessment and this will be reported on in the 2018 report. Should there be no 'quick' suitable solutions, then the Authority will proceed to a Detailed Assessment.

Other monitored locations

Other than the diffusion tubes stated above, there are 24 others located in areas around the borough, three of which were introduced in Aberbeeg in 2016 to assess the residential exposure of NO₂ along the road from Aberbeeg to Oakdale. These three tubes recorded levels between 24-30µg/m³.

In relation to the tubes placed in other locations around the borough, 12 are located within the Caerphilly basin outside of the designated AQMA; 10 of these tubes increased from 2015-2016, following a similar trend to the AQMA tubes.

The remaining tubes which are located at various sites around the borough all decreased in measured NO₂ levels and are compliant with the National Annual Objective for NO₂.

To conclude, the review of the 2016 data-set demonstrates compliance with the National air quality objectives, therefore removing the requirement for this Authority to proceed to a Detailed Assessment for NO₂ in these areas. However CCBC 69 is the exception to this rule and if a suitable 'quick fix' solution cannot be achieved, then the Authority will proceed to a Detailed Assessment at Wattsville.

10.2 Proposed Actions

Caerphilly CBC Environmental Health's proposed action in the coming years:

- Formally submit Hafodyrynys Air Quality Action Plan to Welsh Government.
- Continue the actions for Caerphilly Town Centre and Hafodyrynys Air Quality Management Areas, as outlined within their Action Plans.
- Continue to review and assess the Local Authority area for air quality and identify any area of concern.
- Continue to work with developers of new development sites to encourage active travel solutions and also secure air quality mitigation on any new sites proposed.
- Work with schools to raise awareness and educate on poor air quality and its effects on health.
- Explore 'quick fix' solutions to address the measured NO₂ levels at CCBC 69 on Islwyn Road Wattsville.

11 References

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