



Cyngor Bwrdeistref Sirol

MERTHYR TUDFUL

MERTHYR TYDFIL

County Borough Council

Merthyr Tydfil County Borough Council 2018 Air Quality Progress Report

In fulfillment of Part IV of the Environment Act 1995

Local Air Quality Management

Date (September, 2018)

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Executive Summary: Air Quality in Our Area

Ansawdd Aer ym Merthyr Tudful

Prif ffynhonnell llygredd yr aer ym Merthyr Tudful yw traffig ffordd. Felly, mae CBSMT yn bryderus ynghylch NO₂. Mae rhwydwaith o diwbiau lledaenu yn gweithredu trwy'r ardal. Yn ystod y 5 mlynedd ddiwethaf, cyrhaeddodd NO₂ ei lefel uchaf yn yr ardal yn 2013 ac mae wedi gostwng ers hynny. Mae'r gostyngiad hwn wedi lefelu allan yn ystod y blynyddoedd diwethaf. Mae gan y mwyafrif o safleoedd ym Merthyr Tudful, grynodiadau o NO₂ sydd oddi fewn i'r amcan ansawdd aer cymedrig.

Mae nifer bychan o safleoedd (3) yn torri'r amcan ansawdd aer ac o achos hyn, mae ARhAA mewn grym ar Heol Twynyrodyn, o gylchfan Tesco i'r groesffordd â Chilfach Cynon a Maes Arfryn. Mae rhagor o wybodaeth ar gael ar https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=402 and www.merthyr.gov.uk <http://www.merthyr.gov.uk>.

Yn dilyn ymgynghoriad cyhoeddus ar dri dull gwahanol o wella ansawdd yr aer oddi fewn i'r ARhAA, mae CBSMT

Air Quality in Merthyr Tydfil County Borough

The main source of air pollution within Merthyr Tydfil is road traffic. As such MTCBC are concerned about NO₂. A network of diffusion tubes operates throughout the district. In the past 5 years NO₂ peaked throughout the district in 2013 and has declined since. This decline has levelled out in recent years. Most sites within Merthyr Tydfil have NO₂ concentrations within the annual mean air quality objective.

A small number of sites (No. 3) exceed the air quality objective, and as such there is currently an AQMA in place along Twynyrodyn Road, from Tesco roundabout to the cross roads with Gilfach Cynon and Arfryn Place. More information is available at https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=402 and www.merthyr.gov.uk. Following public consultation on 3 possible approaches to improving air quality within the AQMA, MTCBC has submitted an action plan to Welsh Government, which has been approved.

In accordance with this action plan, in October 2018 Traffic Regulation

wedi cyflwyno cynllun gweithredu i Lywodraeth Cymru ac mae wedi cael ei gymeradwyo.

Yn unol â'r cynllun gweithredu, yn Hydref 2018, bydd Gorchmynion Rheoliadau Traffig yn cael eu cyflwyno ac yn gynnwys yn 2019, bydd llif y traffig yn cael ei wrthdroi ar hyd Stryd Fawr Pontmorlais a Heol yr Eglwys. Bydd hyn yn darparu llwybrau amgen, i ffwrdd o Tesco a neuadd y Dref ac yna Heol Twynyrodyn.

Mae CBSMT hefyd yn ystyried effaith ansawdd yr aer ar ddatblygiadau newydd a lle y mae hynny'n angenrheidiol, mae amodau cynllunio yn cael eu defnyddio er mwyn lliniaru unrhyw effeithiau negyddol. Mae'r Cynllun Trafnidiaeth Lleol yn cefnogi teithio gweithredol a'r defnydd o drafnidiaeth gyhoeddus er mwyn lleihau dibyniaeth ar geir.

Camau i Wella Ansawdd Aer

Yn 2017, cafodd yr ARhAA ar Heol Twynyrodyn ei gyhoeddi'n ffurfiol. Yn 2018, cafwyd ymgynghoriad cyhoeddus am 8 wythnos ar gynllun gweithredu drafft er mwyn ymdrin â'r ARhAA ar Heol Twynyrodyn. Ymgynghorwyd â'r cyhoedd ar 3

Orders will be issued, and in early 2019 traffic flow will be reversed along Pontmorlais High Street and Church Street. This will provide alternative routes away from Tesco and the Town Centre then Twynyrodyn Road.

MTCBC also consider the impact on air quality of new developments, and where necessary planning conditions are used to mitigate any negative effects. The Local Transport Plan supports active travel and use of public transport to reduce reliance on cars.

Actions to Improve Air Quality

In 2017 the AQMA along Twynyrodyn Road was formally declared. In 2018 an 8-week public consultation was carried out on a draft action plan to address the AQMA along Twynyrodyn Road. The public were consulted on 3 options to reduce traffic use of

opsiwn er mwyn lleihau'r traffig ar Heol Twynyrodyn. Mynegodd y mwyafrif o ymatebwyr (94%) eu dymuniad i wrthdroi llif y traffig ar hyd Stryd Fawr Pontmorlais a Heol yr Eglwys. Cymeradwyodd y Cyngor y cynllun gweithredu a'i gyflwyno i Lywodraeth Cymru a Defra. Mae wedi cael ei gymeradwyo gan Lywodraeth Cymru. Y cam nesaf yw y bydd Adran y Priffyrdd a'r Adran Beiriannyddol yn cyhoeddi Gorchmynion Rheoleiddio Traffig. Yn gynnar yn 2019, bydd gwaith i ailgyfeirio'r traffig, yn unol â'r cynllun gweithredu yn dechrau. Rhagdybir y bydd gwelliannau yn yr ansawdd aer yn sgil hyn.

Blaenoriaethau a Heriau Lleol

Y flaenoriaeth ar gyfer 2018 a 2019 fydd gweithredu'r cynllun gweithredu a gymeradwywyd. Os bydd yn llwyddiannus, bydd yn caniatáu i'r ARhAA gael ei ddiddymu erbyn 2021. Os na fydd yn llwyddiannus, bydd gwaith ychwanegol yn cael ei ystyried mewn cynlluniau gweithredu a fydd yn cael eu diweddarau.

Bydd monitro yn cael ei ymestyn i gynnwys rhai ardaloedd sydd wedi cael eu dynodi gan Arolwg Sŵn a Seinwedd Llywodraeth Cymru, lle y

Twynyrodyn Road. Most respondents (94%) expressed a preference for the option of reversing traffic flow along Pontmorlais High Street and Church Street. Council approved an action plan to this effect being submitted to Welsh Government and Defra. It has been approved by Welsh Government. The next step is that in October 2018 the Highways and Engineering Department will be issuing Traffic Regulation Orders. In early 2019 works to re-route traffic in accordance with the approved action plan will commence. It is anticipated improvements in air quality will then be observed.

Local Priorities and Challenges

The priority for 2018 and 2019 will be implementation of the approved action plan. If successful this will enable the AQMA to be revoked by 2021. If unsuccessful additional works will be considered in updated action plans.

Monitoring will be extended to include some areas identified by the Welsh Government Noise and Soundscape survey, where heavy traffic may also affect air quality. Additionally some individual months of diffusion tube data from 6/7 Ladysmith Place indicate

gall traffig trwm hefyd effeithio ansawdd yr aer. Yn ychwanegol i hyn, mae data'r tiwbiau lledaenu ar gyfer ambell fis o 6/7 Maes Ladysmith yn dynodi y byddai monitro ychwanegol yn Nhroedyrhiw yn fanteisiol er mwyn cael darlun llawnach o ansawdd yr aer ledled y fwrdeistref sirol. Bydd hyn drwy diwbiau lledaenu ychwanegol.

Sut i Gyfranogi

Mae rhagor o wybodaeth ynghylch llygredd yr aer, gan gynnwys adroddiadau ar ansawdd yr aer ar gael yn www.merthyr.gov.uk. Gellir gofyn cwestiynau penodol drwy e-bostio PublicHealth@merthyr.gov.uk neu ffonio 01685 725000.

extending monitoring in Troedyrhiw would be beneficial in gaining a fuller picture of air quality throughout the county borough. This will be through additional diffusion tubes.

How to Get Involved

Further information on air pollution including access to previous air quality reports is available from www.merthyr.gov.uk. Specific questions can be addressed by emailing PublicHealth@merthyr.gov.uk or by telephoning 01685 725000.

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1. Actions to Improve Air Quality

1.1 Previous Work in Relation to Air Quality

Merthyr Tydfil County Borough Council has previously undertaken the following review and assessment reports as required by Local Air Quality Management:

Report Title	Date	Outcomes
First stage review and assessment	1998	Negligible risk of AQS objective for benzene, 1,3-butadiene, CO and lead being exceeded in the area Possible risk of objectives for PM ₁₀ , SO ₂ and NO ₂ being exceeded
Second stage review and assessment	2000	Negligible risk of AQS objectives for PM ₁₀ , SO ₂ and NO ₂ being exceeded in area Unnecessary to proceed any further with review and assessment process or declare AQMA's
Updating and screening assessment and progress reports	2003-2005	AQS objectives for 7 pollutants likely to be met at all locations with relevant public exposure Unnecessary to carry out detailed assessment or declare any AQMA's Progress reports 2004 and 2005 found no significant changes in air quality and no developments that might affect air quality within the borough
Updating and screening assessment and progress reports	2006-2008	AQS objectives for the 7 pollutants detailed in regulations likely to be met at all locations with relevant public exposure Unnecessary to carry out a detailed risk

		<p>assessment or declare any AQMA</p> <p>Progress Report 2007 found NO₂ levels had increased but within AQS objective of 40 µg/m³ at all locations</p> <p>Level at WAQF 29, 55 Twynyrodyn Road, was within 10% of the limit and monitoring network expanded in this area</p> <p>Progress report 2008 found levels increased and at WAQF 29, 55 Twynyrodyn Road, a marginal exceedence identified</p> <p>Considered necessary to proceed to detailed assessment</p>
Detailed assessment	2009	<p>Reviewed data for monitoring sites on Twynyrodyn Road and modelled NO₂ levels for length of the road</p> <p>Recommended siting of additional diffusion tubes at various points on road and declaring AQMA</p>
Updating and screening assessment and progress reports	2009-2011	<p>NO₂ reduced, AQS objectives met at all locations with relevant public exposure</p> <p>2010 progress report determined based on reduction no longer necessary to carry out further detailed assessment or declare AQMA</p> <p>Detailed assessments necessary for 2 new permitted processes and 1 substantially changed installation</p> <p>Progress report 2011 found NO₂ levels had increased throughout borough, with marked</p>

		<p>exceedence at WAQF 29, 55 Twynyrodyn Road</p> <p>Considered necessary to increase number of monitoring sites on Twynyrodyn Road prior to declaring AQMA in relation to this site</p>
Detailed assessment	2011	<p>Reviewed emissions data from Prince Charles Hospital combustion plant</p> <p>Concluded emissions will not result in any exceedences of objectives unless on-site emergency generators used for extended periods</p>
Updating and screening assessment and progress reports	2012-2014	<p>No new developments or proposed developments that could be considered to adversely affect air quality</p> <p>1 exceedence of NO₂ at WAQF 29, 55 Twynyrodyn Road</p> <p>Progress report 2013 found action to reduce NO₂ levels at WAQF 29, 55 Twynyrodyn Road, has reduced it to below AQS objective</p> <p>Additional monitoring found further location on same road link where NO₂ levels exceeded AQS objective</p> <p>Progress report 2014 identified new bus station development proposed may adversely affect NO₂. Environmental Health Department liaised with Regeneration Group to ensure air quality considered in planning process</p>

		<p>NO₂ levels on Twynyrodyn Road had increased to exceed AQS objective. Unclear if temporary and related to ongoing changes to traffic flow. Further monitoring proposed</p> <p>Detailed assessment and declaration of AQMA on Twynyrodyn Road necessary.</p>
Detailed assessment	2015	<p>Elevated NO₂ on Twynyrodyn Road associated with traffic. Wind speed and direction, and 2-storey terraced housing without front gardens resulted in NO₂ accumulating around 55 Twynyrodyn Road</p> <p>Predominantly associated with uphill traffic during early evening</p> <p>Considered necessary to declare AQMA from Western End of Twynyrodyn Road to 147 Gilfach Cynon</p> <p>MTCBC declared AQMA on 30th January 2017</p>
Updating and screening assessment and progress reports	2015-2017	<p>Proposed bus station could adversely affect air quality. Modelling indicates likely to comply with AQS objectives, to be monitored with diffusion tubes prior to bus station opening as modelling based on limited data</p> <p>NO₂ exceedences were contained within AQMA on Twynyrodyn Road</p> <p>Action plan under development for public consultation, on options to improve traffic flow and reduce traffic numbers</p>

		Additional monitoring in Swansea Road area in anticipation of Trago Mills opening, attracting additional traffic to Swansea Road area
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NO₂ continued to exceed the AQS objective in 2017 along Twynnyroddyn Road (stretch near 55 Twynnyroddyn Road within AQMA). This was in line with results in previous years.

MTCBC currently has one AQMA, in Twynnyroddyn Road. Following a detailed assessment in 2015 it was declared in January 2017. It was declared due to elevated NO₂ caused by road traffic. A draft action plan identified 3 changes to traffic flow anticipated to improve traffic flow, and consequently reduce NO₂. A 12-week public consultation was carried out from 16th March 2018 to 8th June 2018. The majority of consultation responses were in favour of reversing the traffic flow along Pontmorlais. This would provide an alternative route from the town centre without travelling along Twynnyroddyn Road. Other options to divert traffic travelling downhill along Twynnyroddyn Road onto Queens Road and to introduce chicanes to Twynnyroddyn Road reducing traffic to one-way through the chicaned area were less popular. Following the public consultation on 27th June 2018 the Council approved the action plan by reversing traffic flow along Pontmorlais for submission to Welsh Government. Welsh Government have approved the action plan. The Highways and Engineering Department will be issuing traffic management orders and following these aim to reverse the traffic flow in early 2019.

On some months there was elevated NO₂ at Ladysmith Square, Troedyrhiw. This requires further investigation. Prior to any breach of the AQS objective, initially we will be investigating the area of Cardiff Road in Troedyrhiw with slow traffic flow by increasing the number of diffusion tubes in the area.

1.2 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when air quality is close to or above an acceptable level of pollution (known as the air quality objective (Please see

Appendix B)). After declaring an AQMA the authority must prepare an Air Quality Action Plan (AQAP) within 18 months setting out measures it intends to put in place to improve air quality to at least the air quality objectives, if not even better. AQMA(s) are seen by local authorities as the focal points to channel resources into the most pressing areas of pollution as a priority.

A summary of AQMAs declared by Merthyr Tydfil County Borough Council can be found in Table 1.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at https://uk-air.defra.gov.uk/aqma/details?aqma_ref=2008, and maps are available in Appendix D.

Table 1.1 – Declared Air Quality Management Areas

AQMA	Relevant Air Quality Objective(s)	Comments on Air Quality Trend	City / Town	Description	Action Plan
AQMA Twynnyrodyn Road	NO ₂ annual mean	There has been no significant improvement in air quality in the AQMA since the AQMA was declared in 2017.	Merthyr Tydfil	An area encompassing a number of properties from Tesco Roundabout to Gilfach Cynon.	Air Quality Action Plan 2018 Available from: www.merthyr.gov.uk/resident/pests-pollution-and-food-hygiene/air-pollution/

AQMA boundary maps within Merthyr Tydfil County Borough Council can be viewed at https://laqm.defra.gov.uk/images/aqma_maps/1476_Merthyr%20Tydfil%20AQMA.jpg and are included in Appendix D.

1.3 Implementation of Action Plans

Merthyr Tydfil County Borough Council has taken forward a number of measures during 2017 and 2018 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 1.2. More detail on these measures can be found in the Air Quality Action Plan relating to any designated AQMAs.

Air Quality Action Plans are continuously reviewed and updated whenever deemed necessary, but no less frequently than once every five years. Such updates are completed in close consultation with local communities.

Key completed measures completed in 2017 are: a draft action plan was prepared for public consultation in 2018.

Merthyr Tydfil County Borough Council expects the following measures to be completed over the course of the next reporting year:

Public consultation was completed on 8th June 2018. It considered 3 options for reducing traffic using Twynyrodyn Road. The majority of respondents (94%) were in favour of reversing traffic flow on Pontmorlais. This has been modelled to improve traffic flow in the Twynyrodyn AQMA by providing alternative routes from the town centre. The Council have approved the action plan for implementation, and it has been submitted to and approved by Welsh Government and Defra. Traffic management orders will be issued by the Highways and Engineering Department, and subject to their consultation process being completed it will enable traffic to be re-routed in early 2019. Monitoring on Twynyrodyn Road and Pontmorlais is expected to see reductions and increases to NO₂ respectively. The resultant concentrations in both locations are predicted to be less than 36 µg/m³.

Table 1.2 – Progress on Measures to Improve Air Quality

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	Reversal of 1-way traffic on both Pontmorlais High Street and Church Street (AQAP 2018)	Reduce emissions in the AQMA by providing alternative routes from the town centre	MTCBC	2017-2018	2019-2020	Reduction in NO ₂ at monitoring sites along Twynyrodyn Road, and reduced traffic counts along Twynyrodyn Road	Reduction of 10 µg/m ³ at monitoring sites 14 and 21	AQAP approved by Welsh Government and Defra	Public consultation completed. AQAP approved by Council for submission to Welsh Government and Defra. Welsh Government and Defra approval received.	2020	Traffic management works to be completed in 2019 for monitoring in 2019 and 2020
2	Increase of environmental charges through permit systems	Environmental Permits charges according to risk, encouraging businesses to comply with permit conditions to operate at lowest applicable risk for process in question	MTCBC			Proportion of businesses in lowest risk category for their type of operation	0% No permitted processes operate within the AQMA	93% (15 out of 16 permitted processes) were within lowest risk category for their type of operation in 2017/2018	No change within last 12 months	2018	Following inspections businesses are guided on how to achieve full permit compliance

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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	Saturday shuttle bus provision	Reduce journeys to and from the town centre by providing an alternative (free during a 6-week trial)	MTCBC	2018	2018	Number of people getting on and off the shuttle bus at the Red house and College stops	<1% Extremely hard if not impossible to prove.			2018	The aim is to encourage people shopping at Cyfarthfa Retail Park and Trago Mills to visit the Town Centre, so the effect on the AQMA is likely to be marginal
4	Cycle to work scheme	Salary sacrifice scheme towards purchase of bicycle	MTCBC	2010	Ongoing	Number of people joining scheme	<1% Extremely hard if not impossible to prove.	Scheme attracts a handful of people every year	9 new scheme members in 2017	Ongoing	The aim is for MTCBC works to cycle to work. Although many live in Merthyr Tydfil only a few live within or travel through the AQMA and as such effects will be marginal.

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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	Walking to school initiatives	Encouraging primary school students to walk to school	MTCBC	2010	Ongoing	Number of students walking to school	<1% Extremely hard if not impossible to prove.	Not monitored	Not monitored	Ongoing	Schools including Twynnyrodyn Community Primary school take part in schemes to encourage walking to school including addressing road safety, walking buses, etc. It is unclear how effective they are at changing parental choice to drive or walk in the long run
6	Scoot to school	Training to primary school children to travel to school by scooter	MTCBC	2010	Ongoing	Number of students scooting to school	<1% Extremely hard if not impossible to prove.	Not monitored	Not monitored	Ongoing	It is unclear whether being a fun activity means it causes short term rather than long term changes

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No.	7
Measure	National Standards Cycling Scheme
Focus	Training year 6 students on cycling safety
Lead Authority	Sustrans
Planning Phase	Pre 2010
Implementation Phase	Ongoing
Indicator	Number of people signing up to schemes
Target Annual Emission Reduction in the AQMA	<1% Extremely hard if not impossible to prove.
Progress to Date	Consistently high uptake
Progress in Last 12 Months	Consistently high uptake
Estimated Completion Date	Ongoing
Comments Relating to Emission Reductions	It aims to encourage students starting secondary school to cycle to school. Although many take the course the number who then start secondary school by cycling and those who maintain it throughout their time at secondary school is not known.

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

2.1 Summary of Monitoring Undertaken in 2017

2.1.1 Automatic Monitoring Sites

This section sets out what monitoring has taken place and how results compare with the objectives.

Merthyr Tydfil County Borough Council undertook automatic (continuous) monitoring at 1 site during 2017. MTCBC monitored NO₂. PM₁₀ and PM_{2.5} were also monitored at a site operated by Merthyr (South Wales) Ltd, in accordance with planning conditions for the Ffos-Y-Fran land reclamation scheme. Table 2.1 presents the details of the sites.

Maps showing the location of the monitoring sites are provided in Figure 2.1. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

2.1.2 Non-Automatic Monitoring Sites

Merthyr Tydfil County Borough Council undertook non- automatic (passive) monitoring of NO₂ at 30 sites during 2017. Table 2.2 presents the details of the sites.

Maps showing the location of the monitoring sites are provided in Figure 2.2. Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

Table 2.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	Associated with (Named) AQMA?	OS Grid Reference		Pollutants Monitored	Monitoring Technique	Inlet Height (m)	Distance from Kerb to Nearest Relevant Exposure (m) ⁽¹⁾	Distance from Kerb to Monitor (m) ⁽²⁾
				X	Y					
APM1	Twynnyroddyn School	Suburban		305821	206008	PM ₁₀ PM _{2.5}	TEOM	2.43	0m	N/A
ECC	55 Twynnyroddyn Road	Kerbside	Twynnyroddyn Road AQMA	305416	205867	NO ₂	ECC	2.75	0m	2.25

Notes:

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

(2) N/A if not applicable.

Figure 2.1 – Map of Automatic Monitoring Sites

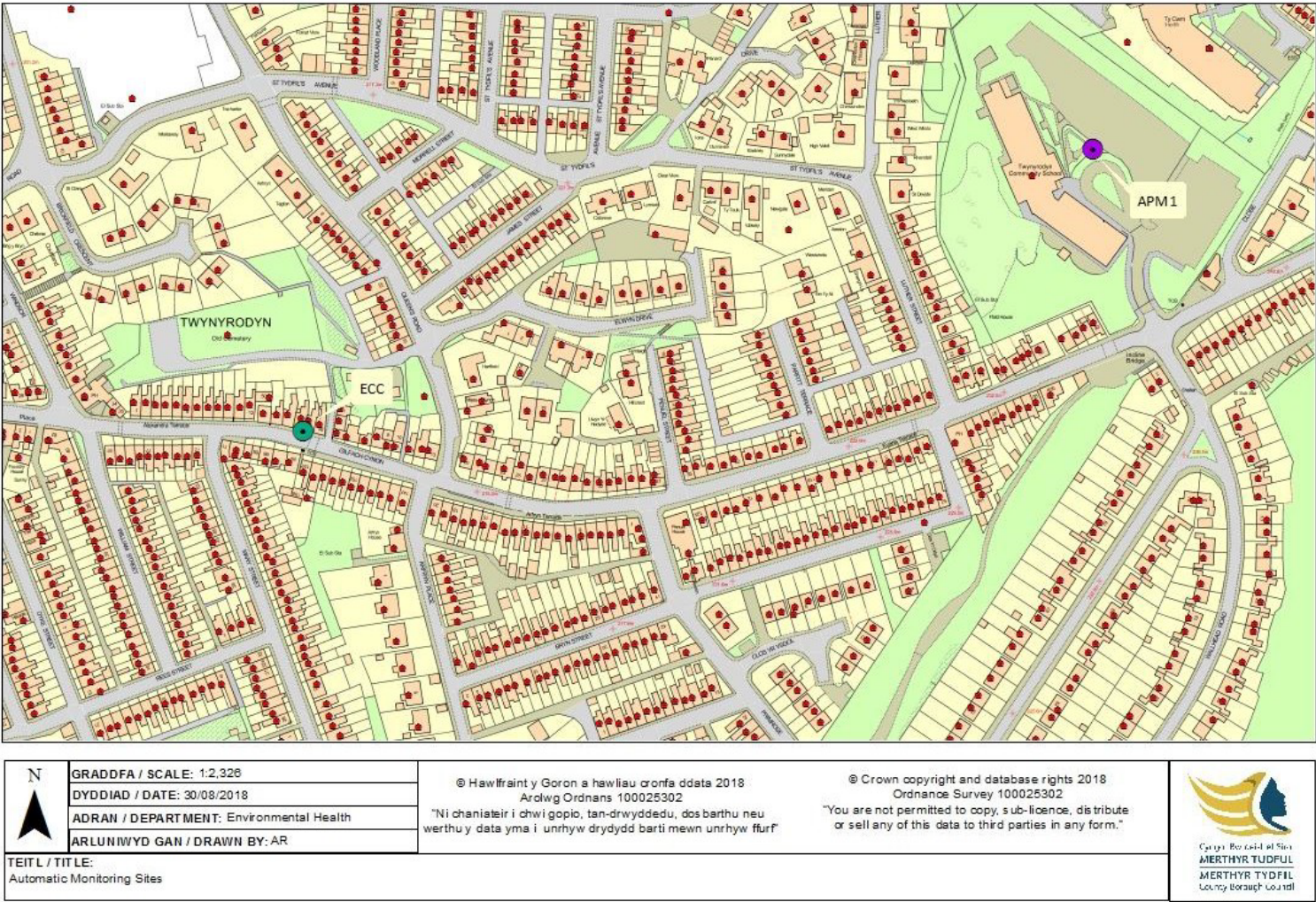


Table 2.2 – Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	Associated with Named AMQA?	OS Grid Reference		Site Height (m)	Collocated with a Continuous Analyser?	Distance from Kerb to Nearest Relevant Exposure (m) ⁽¹⁾	Distance from Kerb to Monitor (m) ⁽²⁾
				X	Y				
1	Imperial Hotel	Roadside		305042	206524	2.3	N	0	3.4
2	Civic Centre	Urban Background		304743	206261	1.9	N	0	43.3
3	Twynrobyn Community Primary School	Suburban		305832	205941	2.1	N	0	52.8
4	15 Lower High Street	Urban Centre		305001	205763	2.5	N	0	3.6
5	1 Alma Street	Roadside		305140	205910	2.3	N	0	1.1
6	20 Alma Street	Roadside		305183	205945	2.3	N	0	1.1
7	3 Gilfach Cynon	Roadside	Twynrobyn Road AQMA	305431	205863	2.4	N	0	2.2

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Site ID	Site Name	Site Type	Associated with Named AMQA?	OS Grid Reference		Site Height (m)	Collocated with a Continuous Analyser?	Distance from Kerb to Nearest Relevant Exposure (m) ⁽¹⁾	Distance from Kerb to Monitor (m) ⁽²⁾
				X	Y				
8	Victoria Street Taxi Rank	Urban Centre		304866	206137	2.3	N	0	3.4
9	Six Bells Estate	Suburban		303525	206388	1.9	N	0	6.3
10	9 Alma Street	Kerbside		305236	205964	2.3	N	0	1.0
11	11 Alexandra Terrace lamp-post	Roadside	Twynyrodyn Road AQMA	305382	205872	3.0	N	3.0	1.3
12	Dowlais Upper	Roadside		307171	207915	2.4	N	0	1.6
13	5 Davies Terrace	Roadside	Twynyrodyn Road AQMA	305156	205881	2.5	N	0	1.7
14	55 Twynyrodyn Road	Roadside	Twynyrodyn AQMA	305410	205410	2.5	Y	0	2.3
15	Quakers Yard	Suburban		309573	196518	2.0	N	0	3.4

Merthyr Tydfil County Borough Council

Site ID	Site Name	Site Type	Associated with Named AMQA?	OS Grid Reference		Site Height (m)	Collocated with a Continuous Analyser?	Distance from Kerb to Nearest Relevant Exposure (m) ⁽¹⁾	Distance from Kerb to Monitor (m) ⁽²⁾
				X	Y				
16	Erw Las	Suburban		303360	206822	2.2	N	0	37.0
17	11 Alexandra Terrace facade	Roadside	Twynnyroddyn AQMA	305382	205873	1.7	N	0	3.0
18	91 Twynnyroddyn Road	Roadside	Twynnyroddyn AQMA	305217	205880	2.4	N	0	2.3
19	40 William Street	Roadside	Twynnyroddyn Road AQMA	305316	2058723	2.1	N	0	5.3
20	17 Court Terrace	Roadside	Twynnyroddyn AQMA	305149	205906	2.3	N	0	1.5
21	51 Twynnyroddyn Road	Roadside	Twynnyroddyn AQMA	305394	205871	2.3	N	0	1.5
22	15 Arfryn Terrace	Roadside	Twynnyroddyn AQMA	305147	205906	2.3	N	0	4.9
23	Mount View, Mardy Street	Roadside		305521	205836	2.2	N	0	3.3

Merthyr Tydfil County Borough Council

Site ID	Site Name	Site Type	Associated with Named AMQA?	OS Grid Reference		Site Height (m)	Collocated with a Continuous Analyser?	Distance from Kerb to Nearest Relevant Exposure (m) ⁽¹⁾	Distance from Kerb to Monitor (m) ⁽²⁾
				X	Y				
24	64 Gilfach Cynon	Roadside	Twynrodyn Road AQMA	305415	205863	2.1	N	3.7	2.7
25	5 Milton Terrace, Windsor Terrace	Suburban		306260	205941	2.4	N	0	1.9
26	6 Windsor Terrace	Suburban		305296	205895	2.3	N	0	2.9
27	2 Jenkins Place, Queens Road	Suburban		305447	205956	2.3	N	0	1.6
28	5 Luther Street	Suburban		305715	205933	2.5	N	0	1.7
29	6/7 Ladysmith Place	Roadside		307112	202547	2.6	N	0	3.4
30	Bron-Gelli, Swansea Road	Roadside		303570	206676	2.1	N	0	8.4

Notes:

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

(2) N/A if not applicable.

Figure 2.2 – Maps of Non-Automatic Monitoring Sites

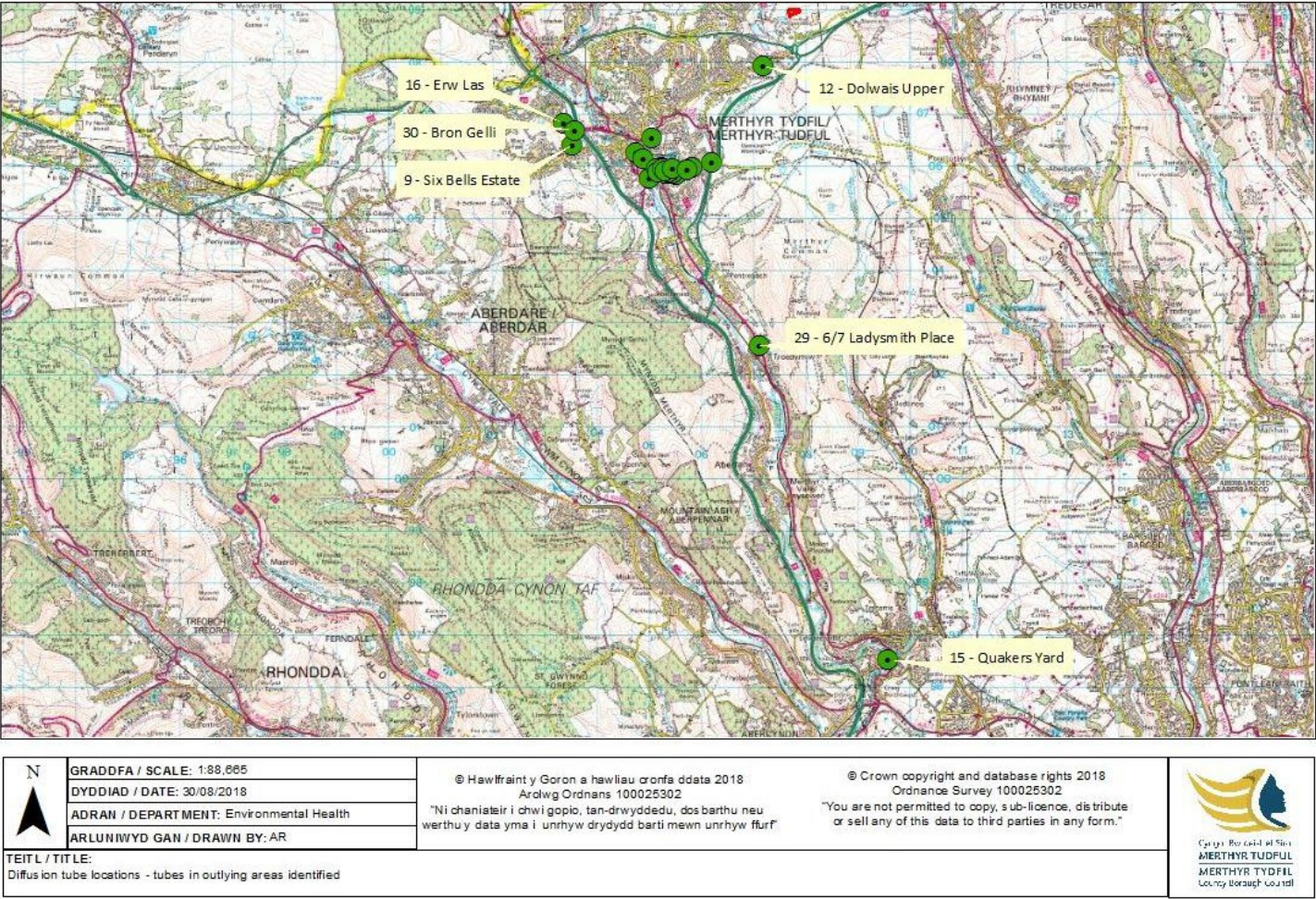


Figure 2.2a – Diffusion tube locations across County Borough

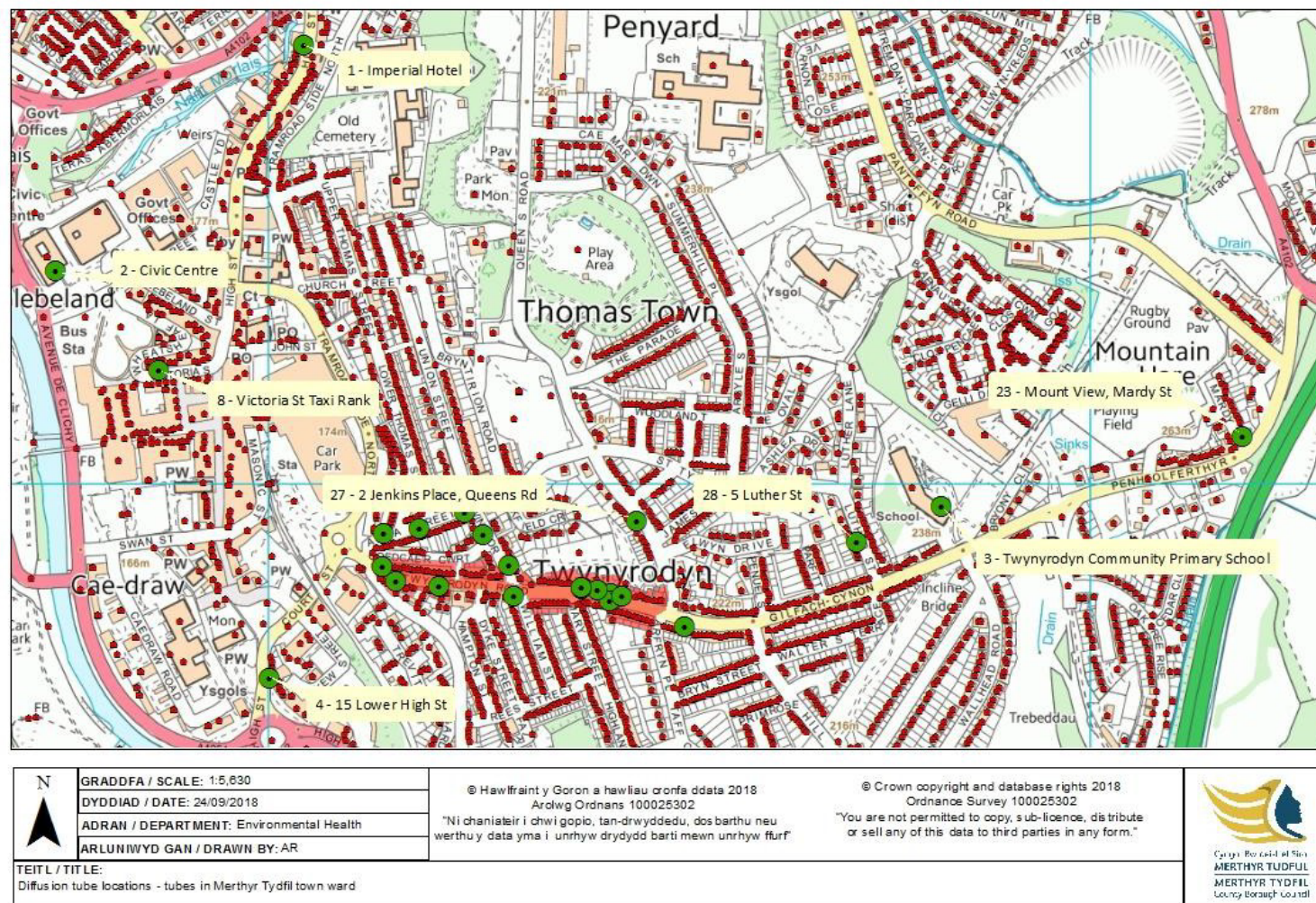


Figure 2.2b – Diffusion tubes in Merthyr Tydfil town ward

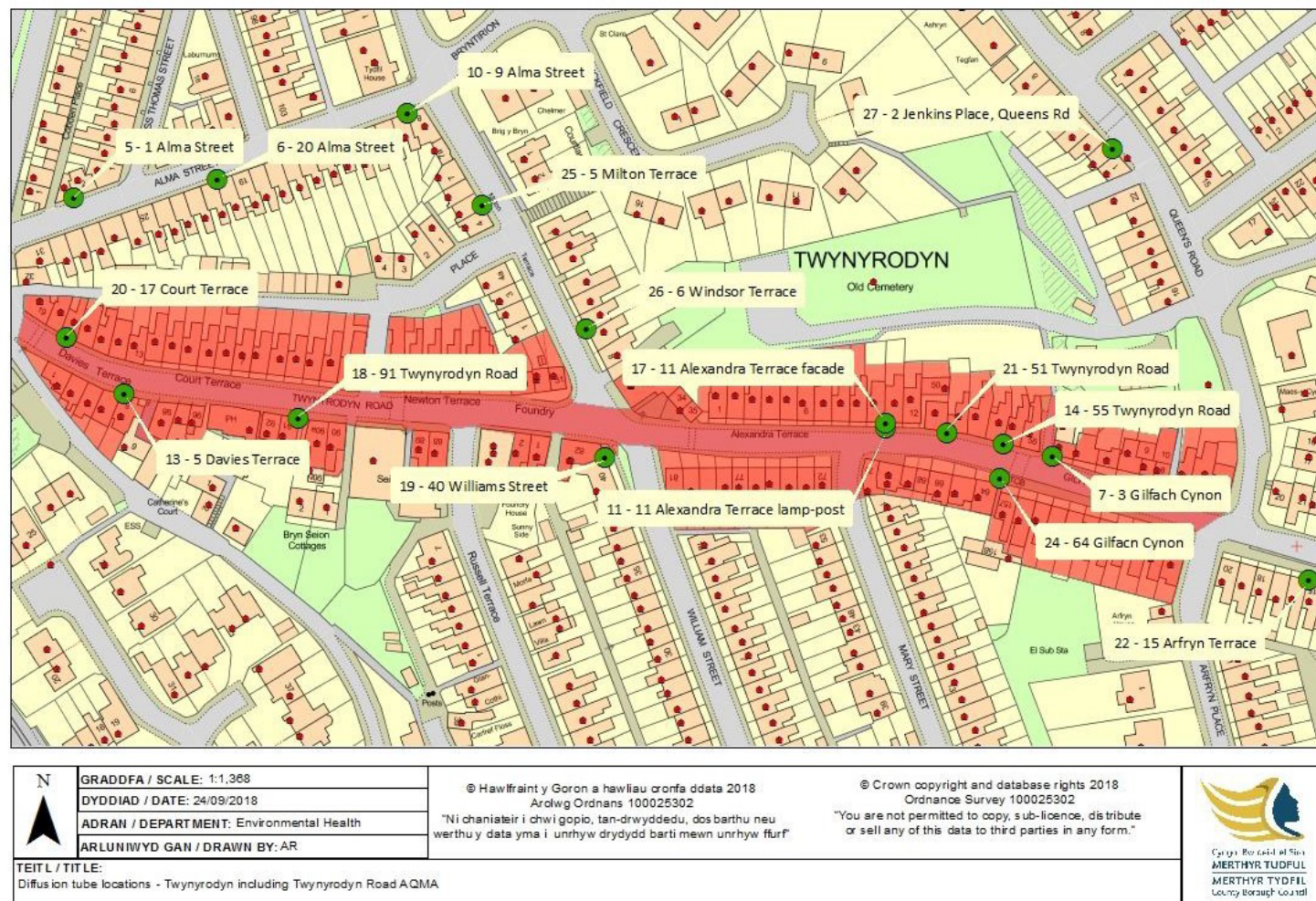


Figure 2.2c – Diffusion tubes in Twynrodyn including Twynrodyn Road AQMA

2.2 2017 Air Quality Monitoring Results

Table 2.3 – Annual Mean NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2017 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2013	2014	2015	2016	2017
ECC	Roadside	Automatic	56	56		52.3	46.1	39.7	33.9*
1	Roadside	Diffusion tube	92	92	26.3	23.1	23.2	21.2	21.3
2	Urban Background	Diffusion tube	100	100	21.8	19.4	16.4	18.1	17.9
3	Suburban	Diffusion tube	100	100	13.9	12.4	12.5	13.0	11.4
4	Urban Centre	Diffusion tube	92	92	32.8	28.7	26.5	25.3	26.9
5	Roadside	Diffusion tube	100	100	23.4	19.7	19.7	19.8	18.5
6	Roadside	Diffusion tube	100	100	19.7	17.1	16.3	17.0	15.9
7	Roadside	Diffusion tube	100	100	38.0	36.5	38.0	37.8	38.3
8	Urban Centre	Diffusion tube	100	100	26.2	24.3	23.6	22.9	22.2
9	Suburban	Diffusion tube	100	100	13.4	11.4	10.8	10.6	10.2
10	Kerbside	Diffusion tube	100	100	20.4	17.8	17.7	17.7	16.3
11	Roadside	Diffusion tube	100	100	54.8	43.3	42.5	40.9	40.5
12	Roadside	Diffusion tube	92	92	28.7	26.1	25.3	26.4	23.4
13	Roadside	Diffusion tube	100	100					28.3

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2017 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2013	2014	2015	2016	2017
14	Roadside	Diffusion tube	92	92	49.8	45.7	44.6	43.2	40.7
15	Suburban	Diffusion tube	92	92	13.9	12.8	12.9	12.8	12.8
16	Suburban	Diffusion tube	83	83	14.0	11.5	11.9	12.6	12.9
17	Roadside	Diffusion tube	92	92	49.0	35.4	36.7	36.0	35.6
18	Roadside	Diffusion tube	100	100	32.6	29.1	28.5	25.9	26.2
19	Roadside	Diffusion tube	92	92	24.7	22.2	22.2	21.5	21.9
20	Roadside	Diffusion tube	100	100	31.2	30.6	29.6	31.1	28.6
21	Roadside	Diffusion tube	100	100	51.1	45.9	45.1	48.5	46.2
22	Roadside	Diffusion tube	100	100	33.1	33.4	33.4	31.5	31.8
23	Roadside	Diffusion tube	100	100	22.9	22.3	21.0	23.2	21.9
24	Roadside	Diffusion tube	92	92	26.0	23.1	23.5	24.5	25.2
25	Suburban	Diffusion tube	100	75					16.1
26	Suburban	Diffusion tube	100	75					16.6
27	Suburban	Diffusion tube	100	75					12.6
28	Suburban	Diffusion tube	100	75					15.7
29	Roadside	Diffusion tube	100	75	39.4				33.0

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2017 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2013	2014	2015	2016	2017
30	Roadside	Diffusion tube	100	75					17.0

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

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

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

(3) Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

* *Annualised figure*

Figure 2.3 – Trends in Annual Mean NO₂ Concentrations

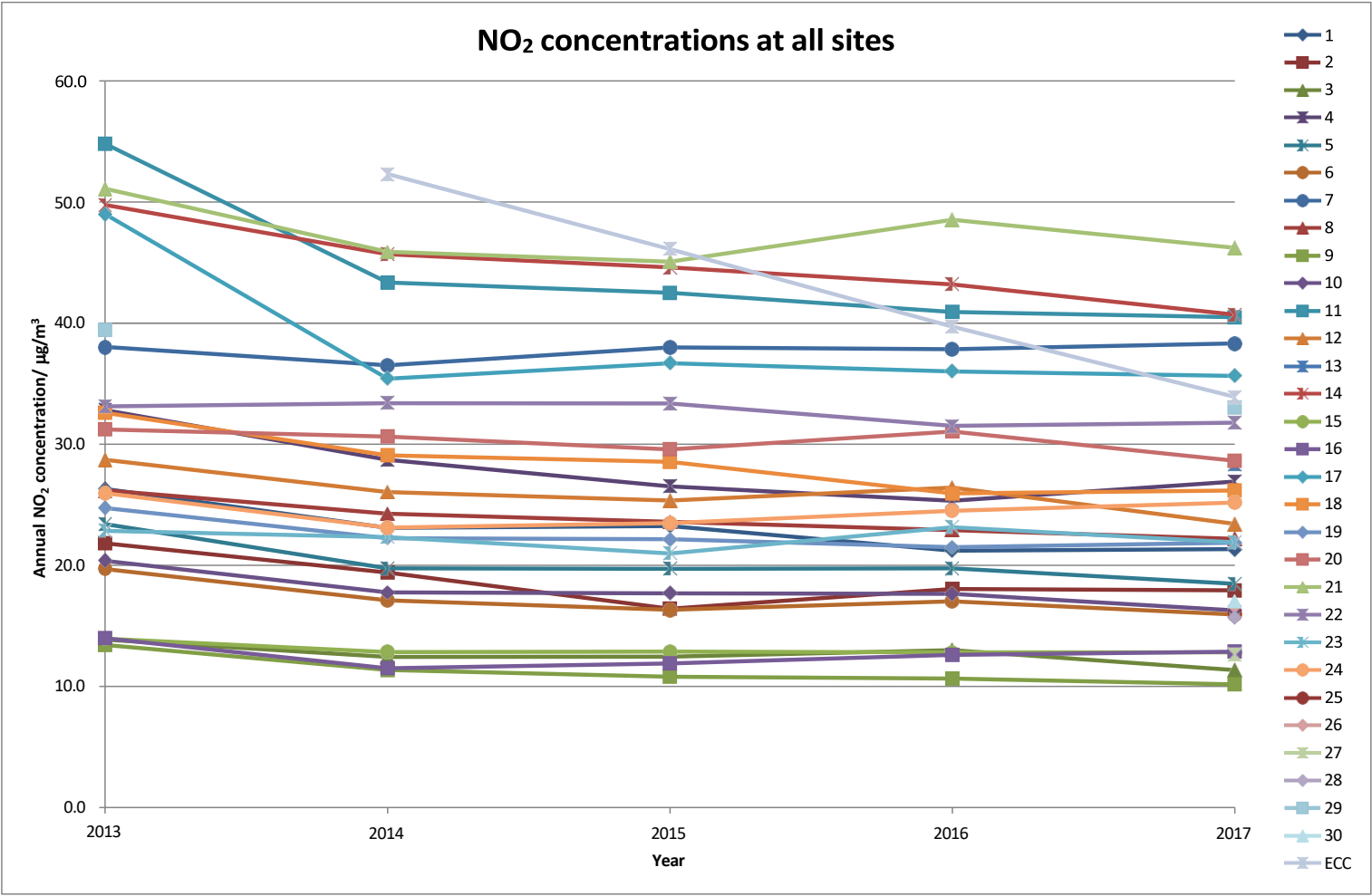
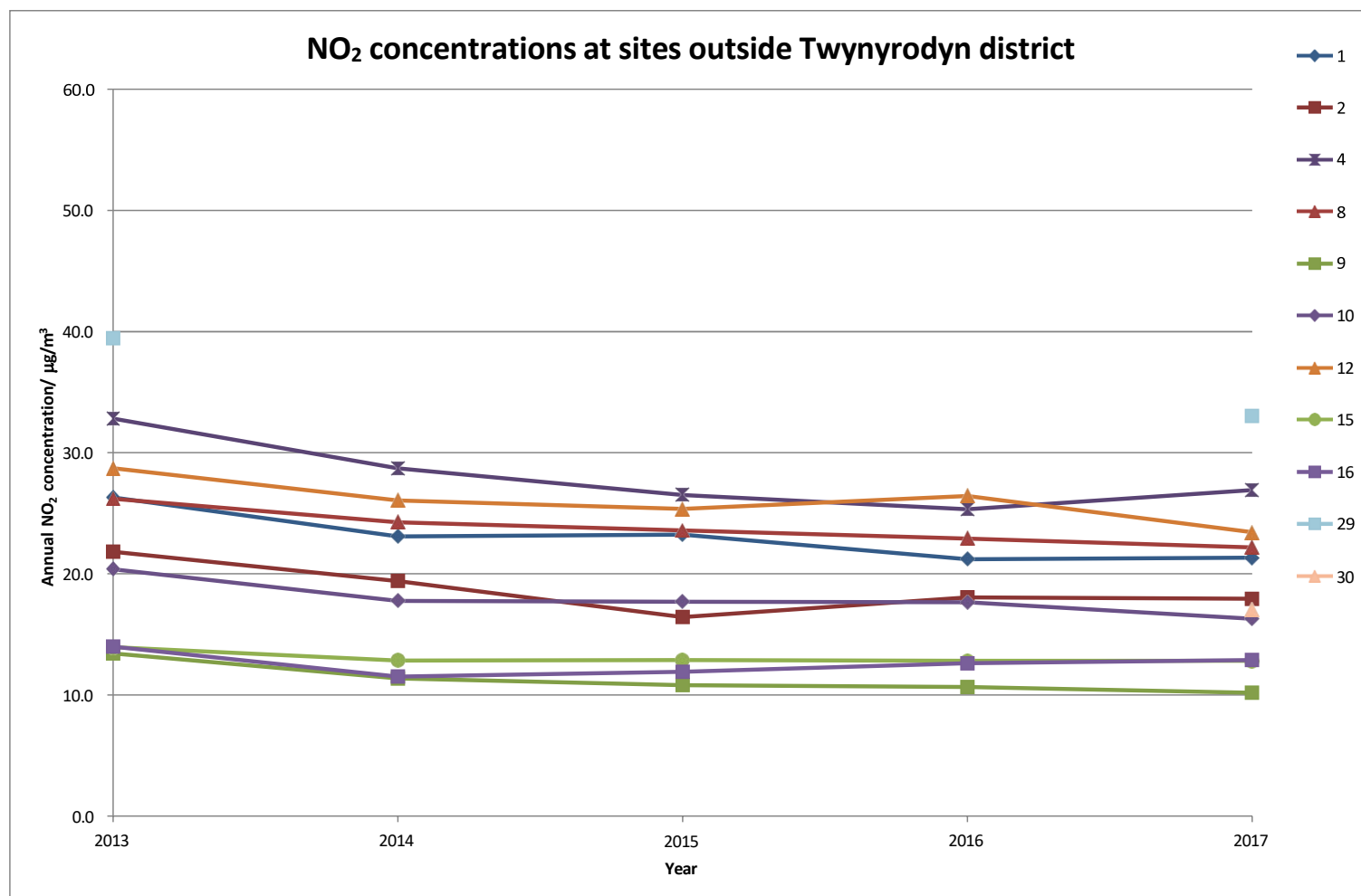
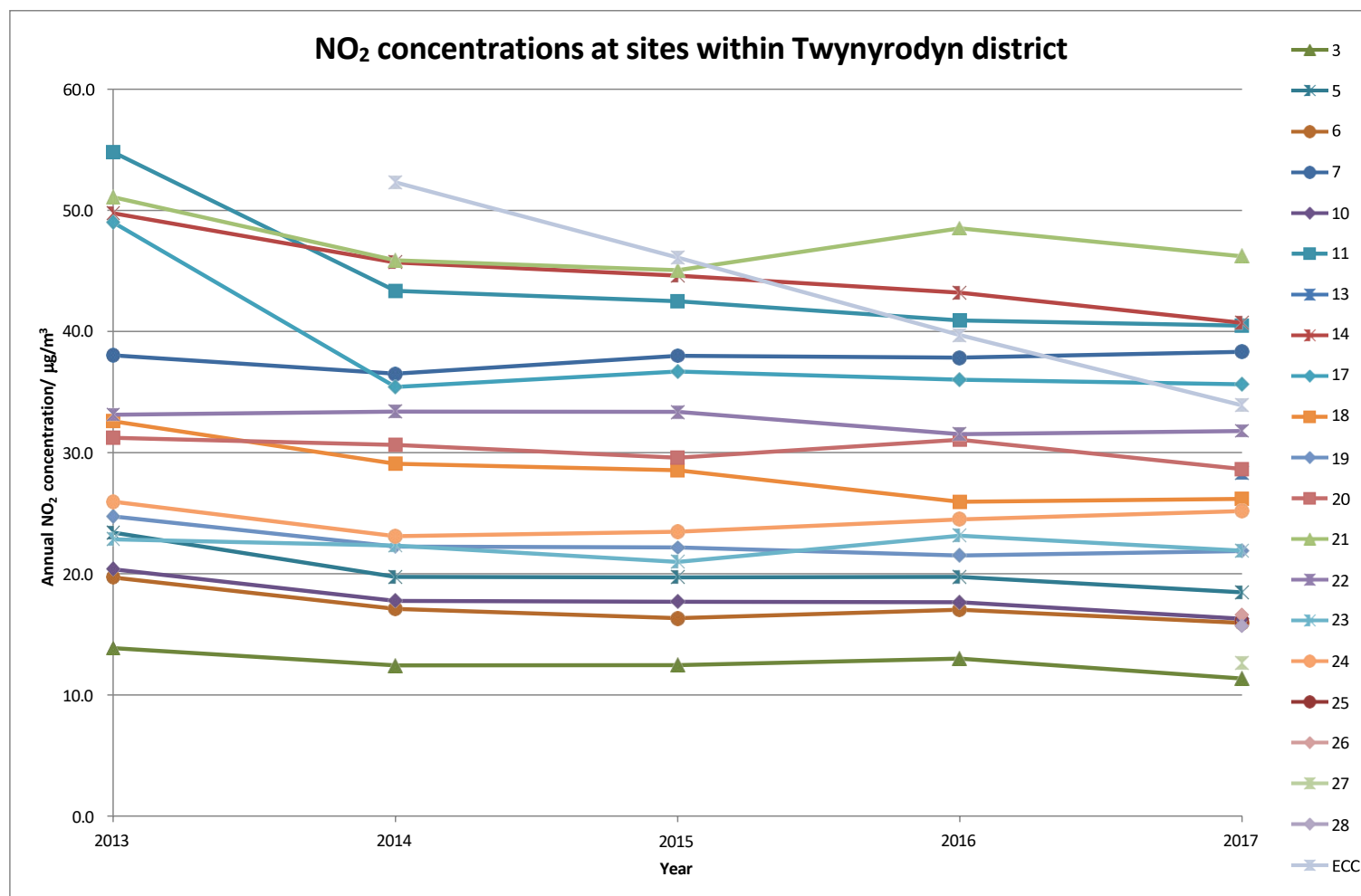
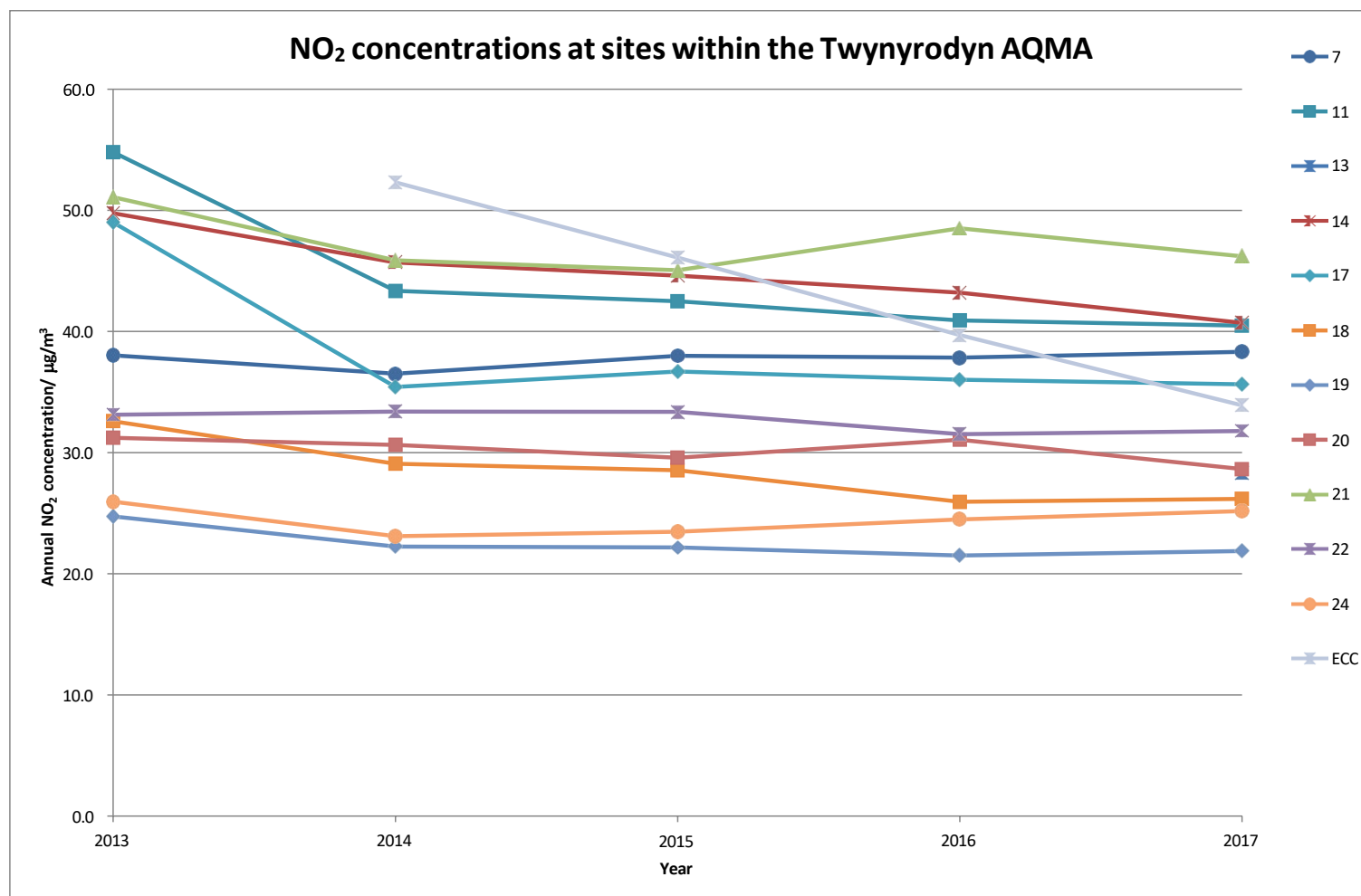


Figure 2.3a – NO₂ concentrations at all sites

Figure 2.3b – NO₂ concentrations at sites outside the Twynirodyn district

Figure 2.3c – NO₂ concentrations within Twynnyrobyn district

Figure 2.3d – NO₂ concentrations within the Twynnyrobyn AQMA

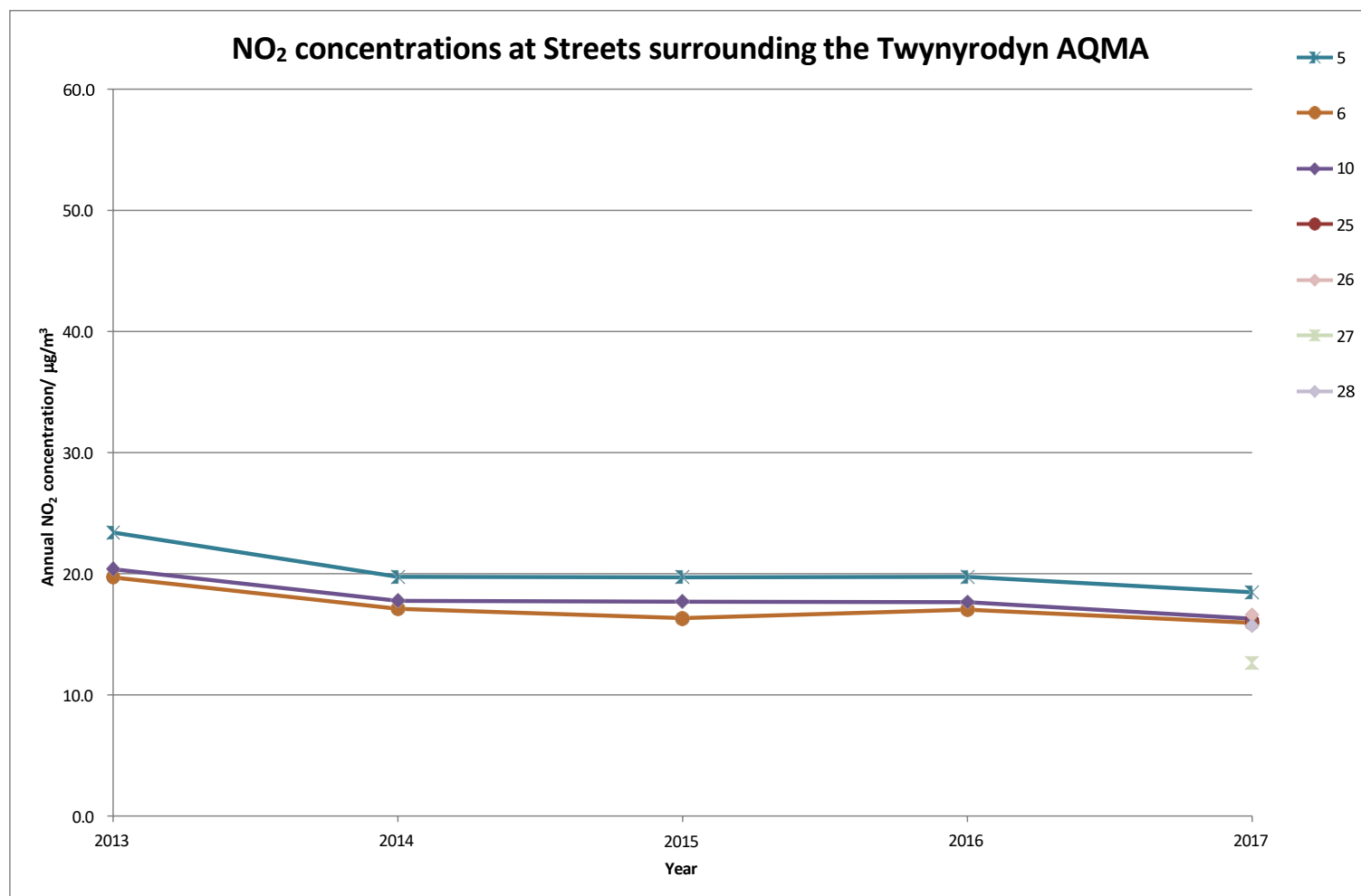


Figure 2.3e – NO₂ concentrations in the streets surrounding the Twynyrodyn Road AQMA

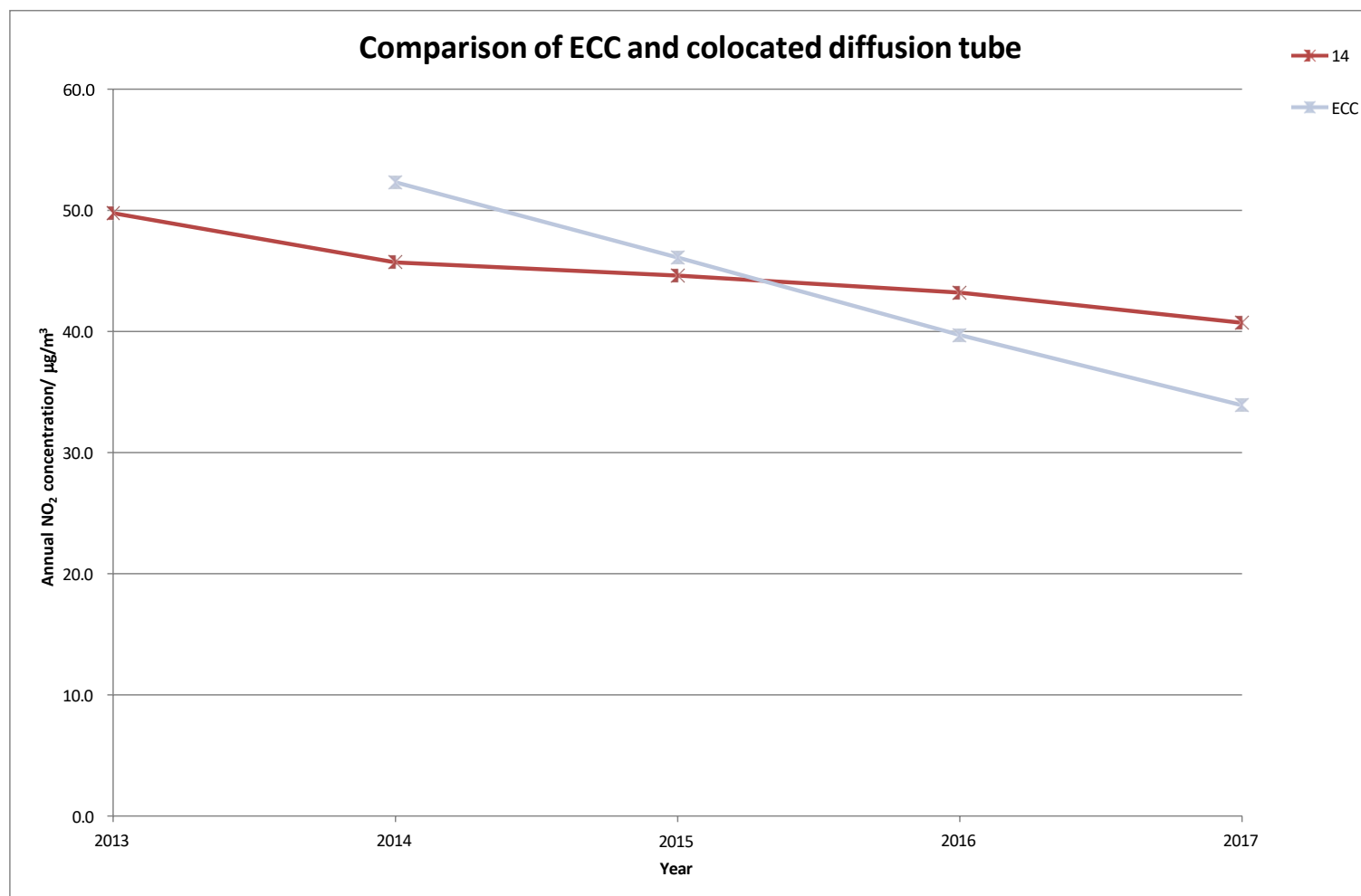


Figure 2.3f – Comparison of ECC and colocated diffusion tube

Table 2.4 – 1-Hour Mean NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2017 (%) ⁽²⁾	NO ₂ 1-Hour Means > 200µg/m ³ ⁽³⁾				
					2013	2014	2015	2016	2017
ECC	Roadside	Automatic	56	56		1	0	0	1 (154.5)

Notes:

Exceedances of the NO₂ 1-hour mean objective (200µg/m³ not to be exceeded more than 18 times/year) are shown in **bold**.

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

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

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

Table 2.5 – Annual Mean PM₁₀ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2017 (%) ⁽²⁾	PM ₁₀ Annual Mean Concentration (µg/m ³) ⁽³⁾				
				2013	2014	2015	2016	2017
TEOM	Suburban	98	98	13.0	9.63	9.26	8.41	11.32

Notes:

Exceedances of the PM₁₀ annual mean objective of 40µg/m³ are shown in **bold**.

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

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

(3) All means have been “annualised” as per Boxes 7.9 and 7.10 in LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure 2.4 – Trends in Annual Mean PM₁₀ Concentrations

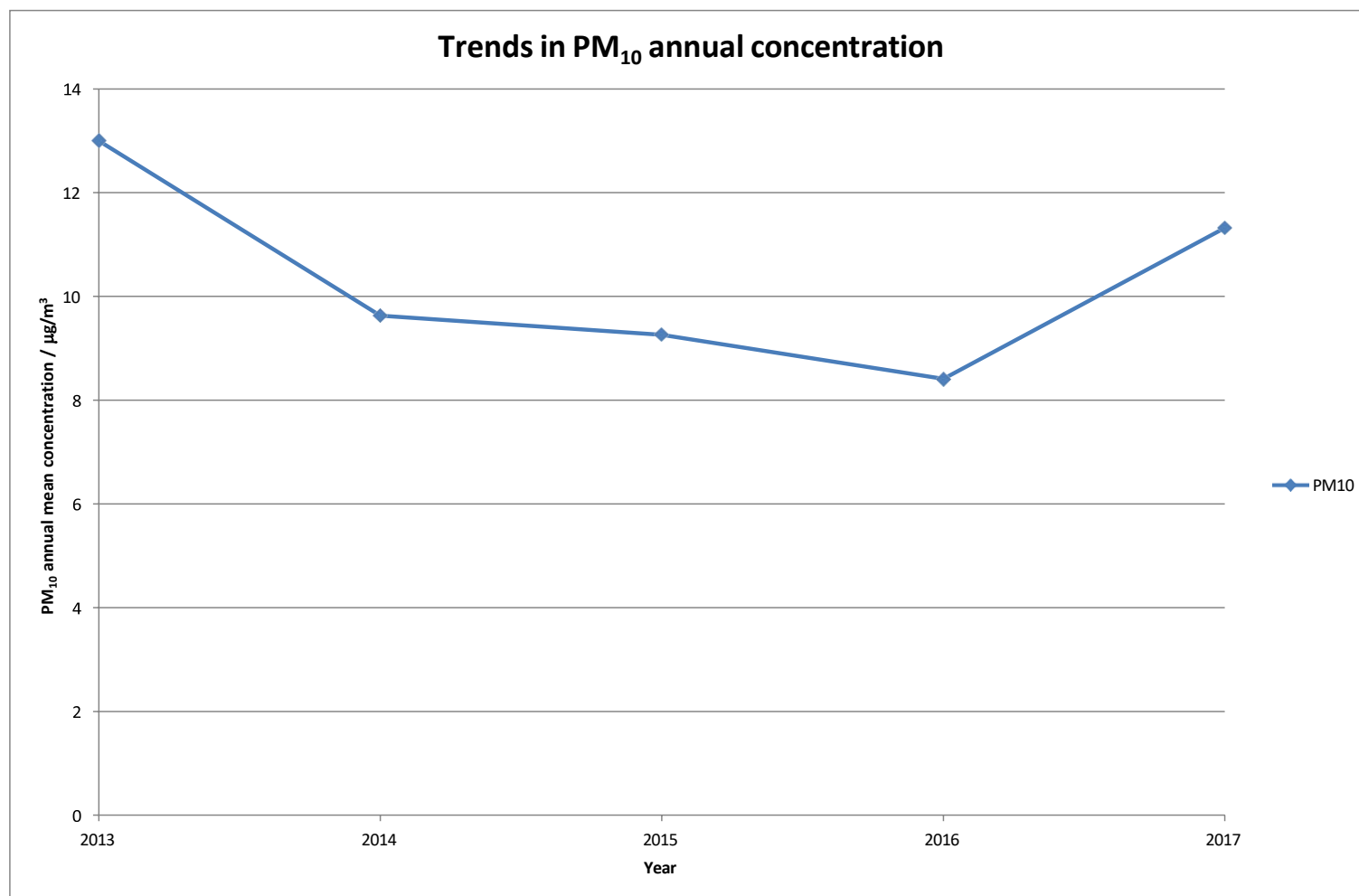


Table 2.6 – 24-Hour Mean PM₁₀ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2017 (%) ⁽²⁾	PM ₁₀ 24-Hour Means > 50µg/m ³ ⁽³⁾				
				2013	2014	2015	2016	2017
TEOM	Suburban	98	98	0	0	0	0	0

Notes:

Exceedances of the PM₁₀ 24-hour mean objective (50µg/m³ not to be exceeded more than 35 times/year) are shown in **bold**.

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

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

(3) If the period of valid data is less than 85%, the 90.4th percentile of 24-hour means is provided in brackets.

Table 2.7 – PM_{2.5} Monitoring Results

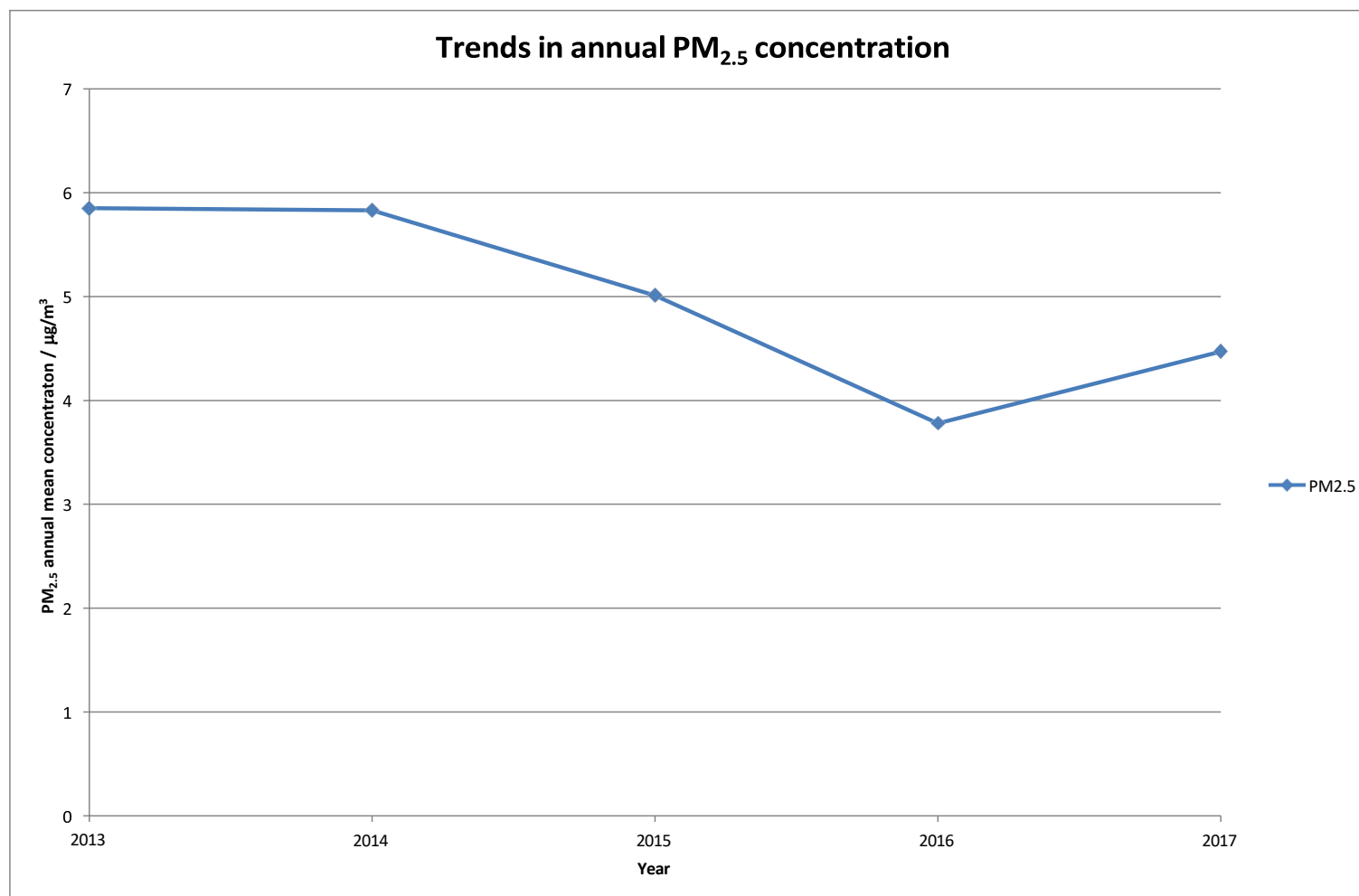
Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2017 (%) ⁽²⁾	PM _{2.5} Annual Mean Concentration (µg/m ³) ⁽³⁾				
				2013	2014	2015	2016	2017
TEOM	Suburban	98	98	5.85	5.83	5.01	3.78	4.47

Notes:

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

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

(3) All means have been “annualised” as per Boxes 7.9 and 7.10 in LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure 2.5 – Trends in Annual Mean PM_{2.5} Concentrations

2.3 Comparison of 2017 Monitoring Results with Previous Years and the Air Quality Objectives

Generally NO₂ concentrations have reduced then levelled off over the last 5 years, as shown in Figure 2.3a. Most sites are within the 40µg/m³ AQS objective as shown in Figure 2.3b. There are 3 sites within the AQMA where 40 µg/m³ is exceeded, as shown in Figure 2.3d. Following the public consultation in 2018, early in 2019 traffic flow changes along Pontmorlais will be implemented. It is predicted this will reduce traffic along Twynyrodyn Road and air quality within the AQMA will improve to within AQS objectives by the end of 2020.

The effectiveness of the ECC monitor is of concern. It was only functioning for 56% of the monitoring period and under-read compared to diffusion tubes, as shown in Figure 2.3e. The sensors have been described by AirMonitors UK as prone to damage by cold weather. This is the time of year when it is most critical as it is when engines perform most poorly and heating is in use, so NO₂ concentrations are at their highest. Loss of the sensors during the cold weather and cross interference from ozone may explain it under-reading.

After 4 years of reducing PM₁₀ and PM_{2.5} increased. This may be an anomaly or part of a trend. This cannot be inferred until 2019 at the earliest. They are still significantly below the AQS objective, and are not currently of concern.

2.3.1 Nitrogen Dioxide (NO₂)

Monitoring at the majority of sites was for the full calendar year. A small number of tubes went missing but no one site was subject to several months of missing tubes. Sites 25-30 were introduced in the financial year 2017-2018, and as such were opened in April 2017. They captured 9 months of data and remain open in 2018. Period means were not calculated as data capture was 75%.

The ECC showed poor data capture at 56%. After problems with the sensor, which was replaced in April 2017, it captured data from May onwards until October. A further sensor problem developed in November 2017 and a subsequent amount of that month's data was not captured. On this basis MTCBC decided to calculate the period mean for monitoring periods 6-9 and compare this to be period mean from 4 nearby tubes, in order to calculate the annual mean. Although the ECC is useful for

providing real time data, for monitoring annual mean NO₂ concentrations diffusion tubes have proven to be more reliable. It may be useful when the action plan is implemented as it should show a downwards trend or even a downwards jump if the measure of reversing traffic flow on Pontmorlais High Street proves effective as predicted.

3 sites exceeded the annual mean AQS objective for NO₂: Site 11 (11 Alexandra Terrace lamp-post), site 14 (55 Twynyrodyn Road) and site 21 (51 Twynyrodyn Road). Sites 14 and 21 are located on the façade of terraced properties and are indicative of the exposure residents will receive. Site 7 (3 Gilfach Cynon) was within 10% of the AQS objective. All 4 sites are within the existing AQMA. Following the public consultation and approval by Council, Welsh Government and Defra, works to improve traffic flow are to start in 2019, and it is predicted NO₂ concentrations will then reduce.

The general trend throughout the district has been for a reduction and levelling out of NO₂ concentrations. Concentrations increased in 2013 when various road changes took place throughout the town centre, interrupting a declining trend associated with fleet changes. This has since reduced and levelled out, however as stated a small number of sites within the AQMA have levelled out above the AQS objective.

Sites 5, 6, 10, and 25-28 are on the streets surrounding Twynyrodyn Road. One of the proposals put forward for public consultation was to use them as a diversionary route. The 2017 results shows they have capacity to take additional vehicles without NO₂ concentrations reaching 36 µg/m³ or more. However in public consultation feedback comments from residents was strongly in favour of reversing the flow of traffic along Pontmorlais High Street (94% of respondents), with a number of comments being made about residential amenity and road safety if used as a diversionary route. On the basis of the public consultation no diversions through these side streets will occur under the current version of the action plan. If changes to Pontmorlais High Street are unsuccessful in improving air quality in the AQMA this option may be revisited in a further action plan.

Comparing the ECC with tube 14, a collocated diffusion tube at 55 Twynyrodyn Road, shows some concerns over its performance. It previously over-read compared to bias adjusted diffusion tubes, but in the past 2 years has under-read. The sensor responds to ozone resulting in some negative readings and reduced readings of NO₂.

Over the course of a year this results in it under-reading compared to diffusion tubes. Although it provides some useful data in terms of diurnal patterns and short-term changes, it is not an established technology and is not sufficiently reliable at this time. In 2017 the sensors were replaced in April and in November following failures. As the sensors failed data was lost up until the point replacements were received and fitted. AirMonitorsUK have stated this is as the sensors are prone to failure in cold weather. This means the device has a risk of periods of failure during the winter months when NO₂ concentrations are at their highest. This may be another reason for under-reading, failing at critical periods. It will continue to be used to give real time data on the effectiveness of the action plan, however it will be used as an indicative measure only.

2.3.2 Particulate Matter (PM₁₀)

PM₁₀ and PM_{2.5} are monitored by Merthyr (South Wales) Ltd as a planning condition for the Ffos-y-Fran land reclamation scheme, an opencast coal reclamation scheme. They operate the TEOM at Twynyrodyn Community Primary School. PM₁₀ was reducing, but on 2017 has increased. It is not possible at this time to say whether it is an anomaly or part of an upwards trend. It was still significantly below the 40 µg/m³ limit at the background site. There were no exceedences of the daily mean of 50 µg/m³. PM₁₀ may be higher and more prone to variation within the AQMA as it is also produced by traffic. This means any improvements achieved by the action plan will also benefit public health by reducing PM₁₀.

2.3.3 Particulate Matter (PM_{2.5})

PM_{2.5} was reducing, but on 2017 has increased, following the same pattern as PM₁₀. It is not possible at this time to say whether it is an anomaly or part of an upwards trend. It was still significantly below the 25 µg/m³ target at the background site. It comprises about half of the PM₁₀ measured on site. PM_{2.5} may be higher within the AQMA as it is also produced by traffic. This means any improvements achieved by the action plan will also benefit public health by reducing PM_{2.5}.

2.4 Summary of Compliance with AQS Objectives as of 2017

MTCBC has examined the results from monitoring in the borough .

Concentrations within the Twynyrodyn Road AQMA still exceed the annual mean AQS objective of 40 $\mu\text{g}/\text{m}^3$ for NO_2 . Therefore this AQMA should remain.

3. New Local Developments

At this time there have been no new developments that have required an air quality assessment since the previous Air Quality Progress Report. The Environmental Health Department is aware of planned developments through consultation on the planning process and the Local Development Plan.

3.1 Road Traffic Sources (& other transport)

Narrow Congested Streets with Residential Properties Close to the Kerb

Twynyrodyn Road

As identified in previous reports and the Detailed Assessment 2015, Twynyrodyn Road is a narrow, busy street with residential properties close to the kerb, and is currently the location of an AQMA.

Following the Detailed Assessment and declaration of the AQMA, MTCBC has carried out a public consultation on 3 options identified by the action plan to reduce traffic along Twynyrodyn Road. These were: reversing the traffic flow along Pontmorlais High Street (with the option of Church Street to be either reversed and one-way, or a two-way road); re-routing traffic travelling downhill along Twynyrodyn Road along a diversion at Queens Road re-joining Twynyrodyn Road at Windsor Terrace; and chicanes narrowing traffic flow to single carriageway along the section of Twynyrodyn Road from Alexandra Terrace - 55 Twynyrodyn Road. All 3 measures were modelled and considered likely to reduce NO₂ within the AQMA to <36 $\mu\text{g}/\text{m}^3$

at all diffusion tube locations. The results of the public consultation was that the majority of respondents (94%) were in favour of reversing traffic flow along Pontmorlais High Street, offering the public with an alternative route away from Tesco and the town centre, where it is believed a significant proportion of drivers on Twynyrodyn Road originate from. Following approval of the action plan by the Council and by Welsh Government, traffic regulation orders have been drafted to be put to Council in October, and subject to those TROs in early 2019 engineers will be reversing the flow of traffic on Pontmorlais. Existing NO₂ monitoring stations on Pontmorlais High Street and Twynyrodyn Road will be retained to determine whether the reversal has had the predicted effect.

Cardiff Road, Troedyrhiw

The monitoring location at 6/7 Ladysmith Place is along this stretch of the Cardiff Road. Although the annual monitoring figure came out within air quality limits there were significant differences between periods 4 and 6-12 and period 5. Removing period 5 it remains within the AQS objective at $35 \mu\text{g}/\text{m}^3$. Period 5 was noticeably lower than other periods, including those immediately on either side. Early indications from 2018 figures so far, are that it may get close to or exceed the air quality objective, although complete data and bias adjustment are not yet available. The Cardiff Road is the main route between Merthyr and Troedyrhiw, Aberfan, Merthyr Vale and Treharris. In Troedyrhiw there is limited parking with traffic parking in the street, narrowing the road and slowing traffic flow. Traffic can become congested, particularly when buses including school buses are on the road. Some properties are accessed directly from the street with no front gardens or yards. On this basis we intend to review the location of all diffusion tubes and relocate additional tubes to this stretch of road to gather a better picture of where any potential hotspots of air pollution occur.

Roads with significantly changed traffic flows

Trago Mills Development, Swansea Road

The Trago Mills development opened on 21st April 2018. The development is a £40 million 30,250m² retail development and includes 38 retail departments, leisure facilities and is likely to include a petrol station in the near future.

In April 2017 MTCBC opened a new diffusion tube location on Swansea Road to gather information on background levels, prior to the proposed 2018 opening.

Existing NO₂ was found to be $17.02 \mu\text{g}/\text{m}^3$. This tube remains open to assess the impact Trago Mills has on air quality.

It was anticipated to have a negative effect on air quality. In Devon the area around the Trago Mills roundabout, Newton Abbot, is frequently congested and as a consequence road widening is taking place in the area. Other Trago Mills developments in the South West of England have also been referred to in relation to congestion. Given the Trago Mills development in Merthyr will be in close proximity to

Cyfarthfa Retail Park and the A470, there was considered to be a significant risk of congestion.

In February 2017, Wales Online reported that residents had expressed concerns about the impact the development would have on road traffic, and this was reiterated in 2018 by the public's comments to their ward councillors. Despite concerns, although there has been some increase in road usage, there has not been significant congestion caused by the opening of Trago Mills. It is likely air quality in the Swansea Road area will remain within AQS objectives whilst the traffic flow is slow and steady.

A465 Heads of the Valleys and Surrounding Roads

There is an ongoing project to convert sections of the A465 Heads of the Valleys Road to dual carriageway. Following works between Fochriw and Abergavenny, it is anticipated work will start on the A465 in Merthyr Tydfil in 2019 and could go on until 2022. This will result in slowed traffic on the A465 and the use of diversions through the Dowlais and Twynyrodyn areas through town, to re-join the A465 from the A470. Traffic will be increased on the A470 where diversions will join at Rhydycar and by Cyfarthfa Retail Park to re-join the A465 at Cefn Coed. It is likely during such diversions, NO₂ will increase along the diversionary routes. As this is temporary, MTCBC are not considering any actions to reduce NO₂ in the affected areas for the time being. Different diversions are predicted to last for up to 6 months. This policy of no action will be reviewed if diversions and consequent deterioration in air quality are more significant or of longer duration than anticipated.

3.2 Industrial / Fugitive or Uncontrolled Sources / Commercial Sources

There are no other industrial sources identified since the previous Progress Report.

3.3 Planning Applications

Planning applications have been for small scale developments and this is expected to continue. These are scattered at various locations throughout the district. They are not considered likely to have a significant effect on air quality.

The Environmental Health Department have commented in the Local Development Plan 2018. Some of the proposed developments are accessed via Twynyrodyn

Road, and planning conditions will be used to limit the impact any development can have on the AQMA.

The Local Development Plan includes a large development on the former Hoover Factory site. This will be up to 800 houses, and is also intended to include public transport. Planning conditions may be used to offset the effect on air quality of an increased number of cars, such as charging points for electric vehicles.

The Environmental Health Department is considering special planning guidance to allow for mitigation of deterioration in air quality.

3.4 Other Sources

Bonfires occur occasionally, both around November 5th and in domestic gardens. As these occur on an isolated rather than continuous basis they are not considered likely to significantly affect air quality. Some properties have installed domestic wood burners. This is on a scattered and random basis throughout the borough. Due to the scattered nature it is not considered to have significantly affected air quality.

MTCBC has identified the following new or previously unidentified local developments which may impact on air quality in the Local Authority area.

A465 Heads of the Valleys and Surrounding Roads

These will be taken into consideration in the next Annual Progress Report.

Therefore MTCBC will need to further consider the implications to local air quality arising from the development.

4. Policies and Strategies Affecting Airborne Pollution

4.1 Local / Regional Air Quality Strategy

MTCBC have an informal strategy of addressing air quality. We use diffusion tube monitoring and real time monitoring to assess air quality, and produces the relevant annual reports. Changes to the traffic network are regularly considered including whether these necessitate a change to the air quality monitoring network. MTCBC will be changing the traffic direction on Pontmorlais High Street to reduce traffic and improve traffic flow along Twynyrodyn Road as indicated by the action plan. This is to address the AQMA.

At present the Environmental Health Department is considering drawing up a formal local air quality strategy that formalises our current approach. It is likely to be published later than 2019 due to current workloads and temporary reductions in staffing levels. The strategy will complement the finalised Welsh Government Air Quality Plan, which is currently in interim form. When produced it will be made available to the public by our website.

4.2 Air Quality Planning Policies

The Local Development Plan 2016-2031 was updated in 2018. Environmental Health provided comments on candidate sites, including on their potential to impact on local air quality. Development includes a small increase in industrial and commercial sites and a significant increase in residential sites, in particular a substantial housing development on the former Hoover site. The size of the Hoover site means that although increased residential use will affect air quality, it offers sustainable travel options being large enough to accommodate a Metro site and/or Park and Ride. As it is likely to be developed in phases by a single large-scale developer this will allow mitigation measures to be considered during the planning process.

Also identified was the conversion of former offices to residential flats, within the town centre. Depending on location this may necessitate extension of the air quality monitoring network, however as the town centre is substantially pedestrianised or otherwise restricted the air quality impact is not considered to be a major factor.

The Environmental Health Department has considered the Special Planning Guidance produced by various councils and is considering producing SPG to require mitigation measures to offset some of the deterioration in air quality caused by increased residential use, particularly the introduction of domestic vehicles to an area. This will be explored further when a local air quality strategy is formalised.

4.3 Local Transport Plans and Strategies

MTCBC's local transport plan is as part of the South East Valleys Local Transport Plan, with 4 other councils. These areas make up the capital city region in that they are within commuting distance of Cardiff.

The plan focusses on economic growth both by improving commuting to Cardiff and Newport, and transport to encourage economic growth in other areas, social inclusion through providing transport to disadvantaged areas, and improving environmental quality through safer, healthier and sustainable travel.

The plan considers various other related documents including the Wales Transport Strategy 2008, National Transport Plan 2011 and the Active Travel (Wales) Act 2013.

It incorporates the Cardiff Capital Region Metro, a plan to link various modes of transport to improve connectivity between Cardiff and the South East Valleys.

The aim is to offer other modes of transport than driving such as active travel (walking and cycling), regional rail and buses, and highway improvements to ease congestion and assist in freight transport. Aims include integrating active travel and public transport to offer multi-modal alternatives to the car.

To carry out the aims of the LTP, MTCBC is expected to seek funding through sources including European, the private sector and Welsh Government funds. Under the LTP, MTCBC aim to develop the new bus station, provide a railway Park and Ride scheme serving Pentrebach station, improve pedestrian and cycle access to Merthyr College and Cyfarthfa Retail Park and improve the Taff Trail for active travel. Additionally the LTP covers the dualling of the A465 Heads of the Valleys Road to improve West-East routes between the South East Wales valleys.

4.4 Active Travel Plans and Strategies

Active Travel aims to improve access for walking, including the use of mobility scooters, and cycling. It addresses routes to schools, workplaces, shops and

services such as healthcare and leisure. It does not address walking or cycling for recreational purposes. MTCBC has improved various walking and cycling routes. Within the next 1-5 years new routes will be developed and in 5 or more years routes will be developed or improved subject to feasibility studies.

It is aimed at improving healthier lifestyles and reducing the negative impacts of traffic on neighbourhoods and communities. The aim of improving the active travel routes is to encourage people to swap from car journeys to active travel methods. By reducing the number of journeys made by car, in particular short journeys where car engines have little time to warm up and perform inefficiently, air quality should improve.

4.5 Local Authorities Well-being Objectives

Air pollution is considered in the well-being objectives, specifically in relation to the Twynyrodyn AQMA. There are 4 key areas of well-being: Best start to life; working life; environmental well-being; and living well. Implementation of the action plan to address the Twynyrodyn Road AQMA is a key performance indicator in environmental well-being and a specific project for working life. This is in addition to affecting air quality congestion affects people's perception of the area and can slow journeys to work.

The key performance indicator set is that NO₂ levels at any diffusion tube along Twynyrodyn Road, should be not more than the current range of 36-48.8 µg/m³ prior to 2021 and by 2021 should be <40 µg/m³. i.e. Air quality along Twynyrodyn Road should not deteriorate as the action plan is implemented, and by 2021 should have improved to within AQS objectives. This timescale allows for the action plan to be revised and further steps implemented if the first step of reversing traffic flow along Pontmorlais High Street to ease traffic flow is unsuccessful.

The Environmental Health Department reports on progress towards this performance indicator at quarterly scrutiny meetings. Since June 2018 the action plan has been subject to public consultation, and the strategy identified as most popular with the public, the reversal of traffic flow on Pontmorlais, been approved by Council and Welsh Government. The next steps are for the Highways and Engineering Department to issue traffic regulation orders explaining the road changes at a Council meeting in October 2018, and to implement the road changes in early 2019.

4.6 Green Infrastructure Plans and Strategies

MTCBC does not currently have a Green Infrastructure Strategy. Green infrastructure has been considered in the Local Development Plan, and may need formalising into a strategy in the near future.

4.7 Climate Change Strategies

The well-being objectives cover the need to limit climate change. Low carbon usage contributes towards the objectives of a prosperous Wales and a resilient Wales. The well-being objectives for MTCBC include under environmental wellbeing, the key performance indicator of carbon management of local authority buildings. Carbon dioxide emissions from local authority buildings reduced from 2016/2017 to 2017/2018, and there are targets to reduce emissions further. This is in order to comply with Welsh Government's plan for the Welsh Public Sector to be carbon neutral by 2030. Current work includes feasibility studies for solar farms within the county borough.

5. Conclusions and Proposed Actions

5.1 Conclusions from New Monitoring Data

The AQS objective for NO₂ continued to be exceeded within the Twynyrodyn Road AQMA, specifically at 51 and 55 Twynyrodyn Road. On this basis the existing AQMA should not be revoked. The action plan will be implemented in 2019. The Highways and Engineering Department will be issuing traffic regulation orders in order to reverse traffic flow along Pontmorlais High Street. The Environmental Health Department will continue to monitor air quality along Twynyrodyn Road to check the changes in traffic flow are reducing NO₂ concentrations as anticipated.

There were no exceedences outside the AQMA. However some of the monthly NO₂ readings in 2017 were high for 6/7 Ladysmith Square, Troedyrhiw. When 1 unexpectedly low result was removed, the annual mean remained below the AQS objective. Results for 2018 also appear high and there is concern the AQS objective may be approached or breached when the results are bias adjusted. On this basis in 2019 MTCBC is looking to introduce some additional tubes to Cardiff Road, Troedyrhiw, to further investigate the area.

The tube at Swansea Road will remain in place to monitor the impact of Trago Mills, however at this time there has not been significant congestion observed, and it is not considered likely the AQS objective would be exceeded.

5.2 Conclusions relating to New Local Developments

Although Cardiff Road is not a new road, it is a new area for investigation. There are concerns based on some of the 2017 and 2018 monthly diffusion tube readings at 6/7 Ladysmith Square that the AQS objective of <40 µg/m³ annual mean NO₂ concentration may be approached or breached in 2018. No definitive conclusions can be reached until all 2018 data is collected and bias adjusted. To monitor the situation in 2019 additional tubes will be introduced to the stretch of road in Troedyrhiw where parking on both sides of the road slows traffic flows.

Trago Mills opened in April 2018 and changes in air quality are monitored using a diffusion at Bron-Gelli, Swansea Road (30). Comparing the same months between 2017 and 2018 there has been an increase in NO₂. However the increase is likely to remain within the AQS objective. Trade has been more moderate and steady than

expected and the anticipated increase in congestion on the A470 around Trago Mills and Cyfarthfa Retail Park has not been experienced.

The development most likely to have a significant impact on air quality is the dualling project on the A465 Heads of the Valleys Road. The phase of development in Merthyr is expected to start in late 2019 and continue until 2022. At times it will be necessary to close whole sections of the A465 and divert traffic at various times through Dowlais, Twynrodyn and the Town Centre to re-join the A465 from the A470. This may cause congestion at various pinch points including the Cyfarthfa Retail Park/Trago Mills roundabout and through the AQMA. Each diversion could last a number of months. The impact on air quality may be unavoidable as the scheme to dual to A465 has been assessed as necessary for the long term well-being of Wales.

5.3 Other Conclusions

During 2019 the action plan will be implemented, initially through reversing traffic flow along Pontmorlais High Street. It is anticipated that although in 2018 the AQS objective will be exceeded, offering alternatives routes from the town centre, NO₂ levels along Twynrodyn Road will reduce in 2019.

In the long term the focus of the Local Transport Plan on providing alternatives to the car should improve air quality, as will improvements to the existing vehicle fleet as older vehicles are replaced.

The Environmental Health Department will continue to monitor air quality and will look to produce an air quality strategy, and are considering special planning guidance around air quality. Due to temporary changes in staffing levels in 2019, it is likely these documents will not be finalised until after that date.

5.4 Proposed Actions

The following actions are proposed to address air quality:

- No new AQMAs will be declared in 2018. When full and bias adjusted diffusion tube data is available for 2018, this will be reviewed.
- The existing AQMA will not be revoked at this time as the exceedence of the AQS objective for annual mean NO₂ remains.
- Monthly monitoring data to date from 6/7 Ladysmith Square indicates there is potential for an exceedence of the AQS for annual mean NO₂ in Troedyrhiw.

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To prepare for any such exceedence and allow for a fast track AQMA declaration in 2019 if necessary, the diffusion tube network will be extended along Cardiff Road, Troedyrhiw.

- The Highways and Engineering Department will be issuing Traffic Regulation Orders and anticipate to reverse traffic flow along Pontmorlais High Street in early 2019. This was the strategy identified in the action plan to address the Twynyrodyn Road AQMA, selected following public consultation.

References

Title	Author	Date
Prince Charles Hospital, Merthyr Tydfil Detailed Assessment of Air Quality	AEA for MTCBC	2011
Particulate Measurement at Twynrodyn Primary School Monitoring Site - 2015 Data	AQ Data Services for Miller Argent (South Wales) Ltd	2016
Detailed Assessment of Air Quality at Twynrodyn Road, Merthyr Tydfil	AQC for MTCBC	2009
South East Valleys Local Transport Plan	Blaenau Gwent CBC, Caerphilly CBC, Merthyr Tydfil CBC, Rhondda Cynon Taff CBC and Torfaen CBC	2015
Local Air Quality Management – Technical Guidance (LAQM TG(16))	DEFRA	2016
National Diffusion Tube Bias Adjustment Factor Spreadsheet (09/16)	DEFRA	2016
Local Air Quality Management Technical Guidance (TG16)	Defra	2018
LAQM Helpdesk August 2018: Summary of laboratory performance in AIR NO2 proficiency testing scheme September 2016 – August 2018	LAQM	2018
First Stage Review and Assessment	MTCBC	1998
Second Stage Review and Assessment	MTCBC	2000
Progress Report	MTCBC	2004
Updating and Screening Assessment	MTCBC	2004
Progress Report	MTCBC	2005
Updating and Screening Assessment	MTCBC	2006
Progress Report	MTCBC	2007
Progress Report	MTCBC	2008
Updating and Screening Assessment	MTCBC	2009

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Progress Report	MTCBC	2010
Progress Report	MTCBC	2011
Updating and Screening Assessment	MTCBC	2012
Progress Report	MTCBC	2013
Progress Report	MTCBC	2014
Detailed Assessment of Air Quality at Twynrobyn Road, Merthyr Tydfil	MTCBC	2015
Updating and Screening Assessment	MTCBC	2015
Active Travel Policy	MTCBC	2017
First replacement Local Development Plan 2016-2031	MTCBC	2018
Focus on the future: Wellbeing in our community 2017-2022	MTCBC	2018
Wellbeing of Future Generations (Wales) Act 2015	Welsh Government	2015

Appendices

Appendix A: Monthly Diffusion Tube Monitoring Results

Appendix B: A Summary of Local Air Quality Management

Appendix C: Air Quality Monitoring Data QA/QC

Appendix D: AQMA Boundary Maps

Appendix E: ECC Meteorological data, NO₂ and O₃ 15-minute readings

Appendix A: Monthly Diffusion Tube Monitoring Results

Table A.1 – Full Monthly Diffusion Tube Results for 2017

Site ID	NO ₂ Mean Concentrations (µg/m ³)														
	Period 1 05/01/17 - 26/01/17	Period 2 26/01/17 - 02/03/17	Period 3 02/03/17 - 31/03/17	Period 4 31/03/17 - 28/04/17	Period 5 28/04/17 - 01/06/17	Period 6 01/06/17 - 30/06/17	Period 7 30/06/17 - 04/08/17	Period 8 04/08/17 - 07/09/17	Period 9 07/09/17 - 06/10/17	Period 10 06/10/17 - 08/11/17	Period 11 08/11/17 - 12/12/17	Period 12 12/12/17 - 11/01/17	Annual Mean		
													Raw Data	Bias Adjusted (factor) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾
1		34.5	31.1	27.2	22.2	25.8	18.5	23.4	23.7	32.3	33.6	32.4	27.7	21.3	21.3
2	36.0	30.8	26.5	21.0	19.4	17.0	15.6	19.2	17.6	26.9	28.9	20.5	23.3	17.9	17.9
3	27.6	19.9	18.6	13.0	12.7	10.0	9.4	9.8	10.3	13.6	17.4	14.6	14.7	11.4	11.4
4	50.2	41.5	35.7	32.2	33.9	24.7		28.8	27.1	37.1	45.0	28.2	34.9	26.9	26.9
5	37.9	30.3	24.4	23.2	19.1	17.7	14.0	20.0	19.6	27.1	28.4	26.0	24.0	18.5	18.5
6	37.2	25.6	22.6	19.5	14.8	14.6	14.0	9.3	16.2	22.7	27.8	24.0	20.7	15.9	15.9
7	61.4	58.0	55.2	49.4	43.9	44.6	36.0	41.4	40.2	52.2	61.1	53.7	49.8	38.3	38.3
8	48.0	27.9	31.6	32.8	21.7	18.7	20.4	23.5	24.2	33.4	30.5	32.9	28.8	22.2	22.2
9	28.3	19.5	13.9	11.3	10.9	7.0	6.7	9.3	7.5	14.4	16.8	13.0	13.2	10.2	10.2
10	37.9	21.7	24.4	19.3	16.6	13.9	12.3	16.3	17.5	25.4	24.6	23.9	21.2	16.3	16.3
11	70.1	52.3	48.5	61.7	47.8	44.4	44.8	47.8	40.2	58.2	72.6	42.4	52.6	40.5	35.4
12	46.6	36.9		26.5	30.6	26.0	23.5	23.8	24.0	30.7	37.1	28.9	30.4	23.4	23.4
13	26.2	52.4		39.9	40.5	34.6	34.8	36.7	31.7	47.7	53.5	43.3	36.8	28.3	28.3
14	76.5	59.3		54.1	46.4	41.6	43.5	44.7	38.8	55.6	60.8	60.1	52.9	40.7	40.7
15	27.9	21.3		15.3	12.7	9.5	11.2	12.9	11.8	19.3	26.3	14.8	16.6	12.8	12.8
16	28.5	22.3		14.5	13.5	11.0	10.2	11.8	12.9	20.0	22.5		16.7	12.9	12.9
17	60.8	48.7		56.6	41.1	35.8	35.6	35.6	35.9	48.1	61.9	49.1	46.3	35.6	35.6
18	47.3	41.0	33.4	34.7	32.9	29.5	28.1	27.8	30.6	40.1	40.7	21.9	34.0	26.2	26.2
19	42.9	32.2	30.2		18.4	21.3	21.1	23.7	19.7	32.1	37.8	32.9	28.4	21.9	21.9
20	54.9	47.1	41.5	41.1	37.2	27.4	28.8	28.6	31.4	38.0	43.5	26.6	37.2	28.6	28.6
21	85.5	49.6	59.0	68.5	51.1	50.7	43.5	54.7	48.9	48.7	80.0	80.0	60.0	46.2	46.2
22	54.5	48.6	48.4	36.0	41.4	36.9	31.6	34.1	35.2	44.7	41.9	41.9	41.3	31.8	31.8

Site ID	NO ₂ Mean Concentrations (µg/m ³)												Annual Mean		
	Period 1 05/01/17 - 26/01/17	Period 2 26/01/17 - 02/03/17	Period 3 02/03/17 - 31/03/17	Period 4 31/03/17 - 28/04/17	Period 5 28/04/17 - 01/06/17	Period 6 01/06/17 - 30/06/17	Period 7 30/06/17 - 04/08/17	Period 8 04/08/17 - 07/09/17	Period 9 07/09/17 - 06/10/17	Period 10 06/10/17 - 08/11/17	Period 11 08/11/17 - 12/12/17	Period 12 12/12/17 - 11/01/17	Raw Data	Bias Adjusted (factor) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾
23	41.0	37.3	32.2	30.5	29.0	18.1	19.7	23.3	21.4	31.6	32.0	25.2	28.4	21.9	25.2
24	48.5	41.1	34.3	28.3	27.3	21.9		24.0	21.7	32.9	39.5	40.1	32.7	25.2	<u>24.2</u>
25				23.9	15.8	14.7	16.7	17.3	18.6	24.0	31.2	26.0	20.9	16.1	16.1
26				21.7	22.9	17.7	16.0	17.9	18.7	27.2	26.4	26.4	21.6	16.6	16.6
27				18.9	12.9	11.9	11.6	14.3	12.7	21.7	23.6	19.6	16.4	12.6	12.6
28				21.8	16.9	16.5	16.0	16.6	17.4	26.8	29.8	21.6	20.4	15.7	15.7
29				47.8	19.7	36.2	36.3	39.7	38.3	54.1	64.7	49.1	42.9	33.0	33.0
30				23.3	13.1	18.8	18.8	18.4	20.9	29.8	31.2	24.6	22.1	17.0	17.0

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

(1) See Appendix C for details on bias adjustment and annualisation.

(2) Distance corrected to nearest relevant public exposure.

Appendix B: A Summary of Local Air Quality Management

Purpose of an Annual Progress Report

This report fulfils the requirements of the Local Air Quality Management (LAQM) process as set out in the Environment Act 1995 and associated government guidance. 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 being achieved. Where exceedances occur, or are likely to occur, the local authority must then declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) within 18 months of declaration setting out the measures it intends to put in place in pursuit of the objectives. Action plans should then be reviewed and updated where necessary at least every 5 years.

For Local Authorities in Wales, an Annual Progress Report replaces all other formal reporting requirements and have a very clear purpose of updating the general public on air quality, including what ongoing actions are being taken locally to improve it if necessary.

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 B.1.

The 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 exceedances in each year that are permitted (where applicable).

Table B.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	
Nitrogen Dioxide (NO ₂)	200µg/m ³ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40µg/m ³	Annual mean	31.12.2005
Particulate Matter (PM ₁₀)	50µg/m ³ , not to be exceeded more than 7 times a year	24-hour mean	31.12.2010
	18µg/m ³	Annual mean	31.12.2010
Particulate Matter (PM _{2.5})	10µg/m ³	Annual mean	31.12.2020
Sulphur dioxide (SO ₂)	350µg/m ³ , not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125µg/m ³ , not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266µg/m ³ , not to be exceeded more than 35 times a year	15-minute mean	31.12.2005
Benzene	3.25µg/m ³	Running annual mean	31.12.2010
1,3 Butadiene	2.25µg/m ³	Running annual mean	31.12.2003
Carbon Monoxide	10.0mg/m ³	Running 8-Hour mean	31.12.2003
Lead	0.25µg/m ³	Annual Mean	31.12.2008

Appendix C: Air Quality Monitoring Data QA/QC

Diffusion Tube Bias Adjustment Factors

Diffusion tubes may systematically under- or over-read NO₂ concentrations compared to a chemiluminescent analyser. This is known as bias and can be adjusted for using a suitable bias adjustment factor. Applying a bias adjustment factor improves the accuracy of the data. Merthyr Tydfil County Borough Council does not undertake any co-location studies and as such applies a National bias adjustment factor.

The National bias adjustment factor applied was obtained from National Diffusion Tube Bias Adjustment Factor Spreadsheet: Spreadsheet Version Number: 09/18. This is the most up to date version of the spreadsheet at the time of writing. The tubes used are supplied and analysed by ESG, now known as Socotec. They are analysed using 50% TEA in acetone. 30 co-location studies were undertaken in England and Wales in 2017, and an overall bias adjustment factor of 0.77 was obtained as shown in the abstract below.

National Diffusion Tube Bias Adjustment Factor Spreadsheet						Spreadsheet Version Number: 09/18				
Follow the steps below in the correct order to show the results of relevant co location studies										
Data only apply to tubes exposed monthly and are not suitable for correcting individual short term monitoring periods Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet This spreadsheet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.										This spreadsheet will be updated at the end of March 2019 LAQM Helpdesk Website
The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.						Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.				
Step 1:		Step 2:	Step 3:	Step 4:						
Select the Laboratory that Analyses Your Tubes from the Drop-Down List		Select a Preparation Method from the Drop-Down List	Select a Year from the Drop-Down List	Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor ⁵ shown in blue at the foot of the final column.						
If a laboratory is not shown, we have no data for this laboratory.		If a preparation method is not shown, we have no data for this method at this laboratory.	If a year is not shown, we have no data ²	If you have your own co-location study then see footnote ⁴ . If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@uk.bureauveritas.com or 0800 0327953						
Analysed By ¹	Method ² To undo your selection, choose (All) from the pop-up list	Year ³ To undo your selection, choose (All)	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m ³)	Automatic Monitor Mean Conc. (Cm) (µg/m ³)	Bias (B)	Tube Precision ⁴	Bias Adjustment Factor (A) (Cm/Dm)
ESG Didcot	50% TEA in acetone	2017	R	Suffolk Coastal DC	12	45	37	21.7%	G	0.82
ESG Didcot	50% TEA in acetone	2017	R	Dumfries and Galloway ay Council	12	36	30	19.6%	G	0.84
ESG Didcot	50% TEA in acetone	2017	KS	Marylebone Road Intercomparison	12	106	79	34.3%	G	0.74
ESG Didcot	50% TEA in acetone	2017	R	Vale of White Horse District Council	11	31	25	26.0%	G	0.79
ESG Didcot	50% TEA in acetone	2017	UB	Cardiff City Council	10	29	21	35.1%	G	0.74
ESG Didcot	50% TEA in acetone	2017	R	Cambridge City Council	12	45	33	37.7%	G	0.73
ESG Didcot	50% TEA in acetone	2017	R	Wrexham County Borough Council	12	20	17	14.5%	G	0.87
ESG Didcot	50% TEA in acetone	2017	UI	North Lincolnshire Council	12	22	16	40.7%	G	0.71
ESG Didcot	50% TEA in acetone	2017	KS	Caerphilly CBC	12	37	32	15.8%	G	0.86
ESG Didcot	50% TEA in acetone	2017	R	Caerphilly CBC	11	44	29	51.2%	G	0.66
ESG Didcot	50% TEA in acetone	2017	UB	City of York Council	12	23	15	53.4%	G	0.65
ESG Didcot	50% TEA in acetone	2017	R	City of York Council	10	37	28	30.8%	G	0.76
ESG Didcot	50% TEA in acetone	2017	R	City of York Council	11	32	23	41.0%	G	0.71
ESG Didcot	50% TEA in acetone	2017	R	City of York Council	12	40	25	58.6%	G	0.63
ESG Didcot	50% TEA in acetone	2017	R	Hambleton District Council	10	21	20	4.0%	G	0.96
ESG Didcot	50% TEA in acetone	2017	R	Horsham District Council	11	35	29	18.1%	G	0.85
ESG Didcot	50% TEA in acetone	2017	R	Horsham District Council	12	31	26	21.3%	G	0.82
ESG Didcot	50% TEA in acetone	2017	R	Horsham District Council	11	33	22	47.3%	G	0.68
ESG Didcot	50% TEA in acetone	2017	R	Slough Borough Council	12	45	35	26.4%	G	0.79
ESG Didcot	50% TEA in acetone	2017	UB	Slough Borough Council	12	32	25	28.6%	G	0.78
ESG Didcot	50% TEA in acetone	2017	UB	Slough Borough Council	11	39	33	19.2%	G	0.84
ESG Didcot	50% TEA in acetone	2017	R	Tunbridge Wells	12	56	40	38.2%	G	0.72
ESG Didcot	50% TEA in acetone	2017	UB	Kingston upon Hull City Council	12	32	23	38.2%	G	0.72
ESG Didcot	50% TEA in acetone	2017	R	Suffolk Coastal DC	12	45	37	23.8%	G	0.81
ESG Didcot	50% TEA in acetone	2017	R	Dacorum Borough Council	9	31	27	14.7%	G	0.87
ESG Didcot	50% TEA in acetone	2017	R	North East Lincolnshire Council	11	37	24	53.5%	G	0.65
ESG Didcot	50% TEA in acetone	2017	UB	Sw ansea Council	10	17	14	23.4%	G	0.81
ESG Didcot	50% TEA in acetone	2017	R	Sw ansea Council	12	33	24	34.5%	G	0.74
ESG Didcot	50% TEA in acetone	2017	UB	Derry City and Strabane District Council	12	14	10	39.1%	G	0.72
ESG Didcot	50% TEA in acetone	2017	R	Derry City and Strabane District Council	12	36	36	0.9%	G	0.99
ESG Didcot	50% TEA in acetone	2017		Overall Factor ⁵ (30 studies)					Use	0.77

Factor from Local Co-location Studies

None - no co-location studies are currently undertaken by Merthyr Tydfil County Borough Council. Although there is a continuous ECC NO₂ monitor collocated with 1 diffusion tube at 55 Twynyrodyn Road, the monitor is not suitable for a colocation study in that it is not a chemiluminescent monitor as specified in best practice.

Discussion of Choice of Factor to Use

A national Bias Adjustment Factor has been used for the following reasons:

- There are currently no co-location studies undertaken in accordance with best practice in Merthyr Tydfil County Borough.
- The sites listed in the Bias Adjustment Factor spreadsheet are in generally comparable locations and;

- The diffusion tube mean concentrations measured at significant Merthyr sites are within the range of results obtained from the specified national co-location sites;

Although there are general similarities between the sites there are also some significant differences. The derived bias adjustment factor is therefore used with a degree of caution.

PM Monitoring Adjustment

Instrument Service Routine

Main QA and QC procedures for the Thermo Fisher TEOM analysers are carried out at the routine service visits, normally carried out at 6 monthly intervals by AQ Data Services.

Filter Change Procedures

At each site visit for exchange of the TEOM filters, a routine of record keeping has been established whereby the analyser operating parameters (flow, temperatures etc) are recorded before and after the filter change. This gives a reference datum of instrument performance at that time, and can often give good information on flows beginning to drop off etc, which can assist in arranging call-out of support engineers thereby preventing down time for the analyser.

Data Collection / Storage

Analog outputs from the 2 TEOM analysers are fed to the data logger system. To ensure correct analog to digital conversion, periodic checks are made to compare the data stored within the system against the internal data storage within each of the TEOM analyser control units.

Data Management

Data is downloaded from the data logger system using the Enviro2000 data management system. The data is initially “screened” to remove obvious spikes (both negative and positive spikes) caused by electrical disruption, after filter change, after analyser start-up etc.

PM Monitoring Adjustment

Equivalence Testing has shown that the TEOM can under read possible losses of volatile material from the TEOM filter.

Data can be corrected for the loss of volatiles by applying the King's College London Volatile Correction Model – a spreadsheet for Correction. The VCM takes FDMS purge measurements from the two nearest FDMS equipped TEOM analysers, and an average of all the other FDMS purge measurements within 130 km. The two nearest sites are Port Talbot AURN at Margam Fire Station and Newport AURN. More information on the VCM can be found at <http://www.volatile-correction-model.info/>.

At the time of writing data from the FDMS purge measurements used had been ratified and the PM₁₀ and PM_{2.5} data should be considered reliable.

Short-Term to Long-Term Data Adjustment

The site that needed adjustment from a period mean to an annual mean was the ECC automatic monitor. There were significant gaps in the data at the start and end of the year, when the sensors failed and were replaced. There were also some periods of intermittent signal so some data was not collected. The 4 nearest suitable sites were identified as sites 11 – Alexandra Terrace lamp-post, 14 – 55 Twynyrodyn Road, 17 – Alexandra Terrace façade and 21 – 51 Twynyrodyn Road. A suitable period of continuous data from the ECC was identified as 01/06/17 – 05/10/18, matching with monitoring periods 6-9 for the diffusion tubes.

The Period mean for the ECC for this time was 27.3 µg/m³, and based on a AM:PM ratio of 1.24, this gave an annual mean of 33. µg/m³.

Table C.1 – Short-Term to Long-Term Monitoring Data Adjustment

Site	Site Type	Annual Mean (µg/m ³)	Period Mean (µg/m ³)	Ratio
11	Roadside	52.6	44.3	1.19
14	Roadside	52.9	42.2	1.26
17	Roadside	46.3	35.7	1.30
21	Roadside	60.0	49.5	1.21
Average				1.24

QA/QC of Automatic Monitoring

The ECC is manufactured by Air Monitors UK. The model is the AQMesh Pod. It was first produced in 2013 and has been through regular upgrades to improve performance.

The ECC is tested and calibrated by the manufacturer. In laboratory conditions accuracy is ± 5 ppb. It is designed with a sensor life and battery life of 2 years. After 2 years the battery and sensors should be replaced. It has also been discovered recently that the sensors can fail in cold and damp conditions, and this should be checked for to enable fast replacement and to minimise data loss.

Colocation studies have been carried out against reference methods such as the chemiluminescent monitor. The correlations are variable, with v4.2 in 3 trials giving correlation of 0.70, 0.81 and 0.89. This shows the device should be used for indications of variations in NO₂, rather than as an accurate NO₂ concentration.

Once installed on site there is a short period of stabilisation as the ECC adjusts to environmental conditions. During the 2-year lifespan of the sensors and battery no further calibration is required. Performance may be affected after 2 years.

When installed in 2016 the device was collocated with 2 diffusion tubes and could be checked for significant differences. It was generally within 10% of diffusion tubes, with a tendency to under-read.

QA/QC of Diffusion Tube Monitoring

Diffusion tubes were manufactured and analysed by ESG. The absorbant is analysed for NO₂ concentration using 50% TEA in acetone. Diffusion tubes were kept and used in accordance with the manufacturer's instructions, and were left out for a minimum of 4 weeks.

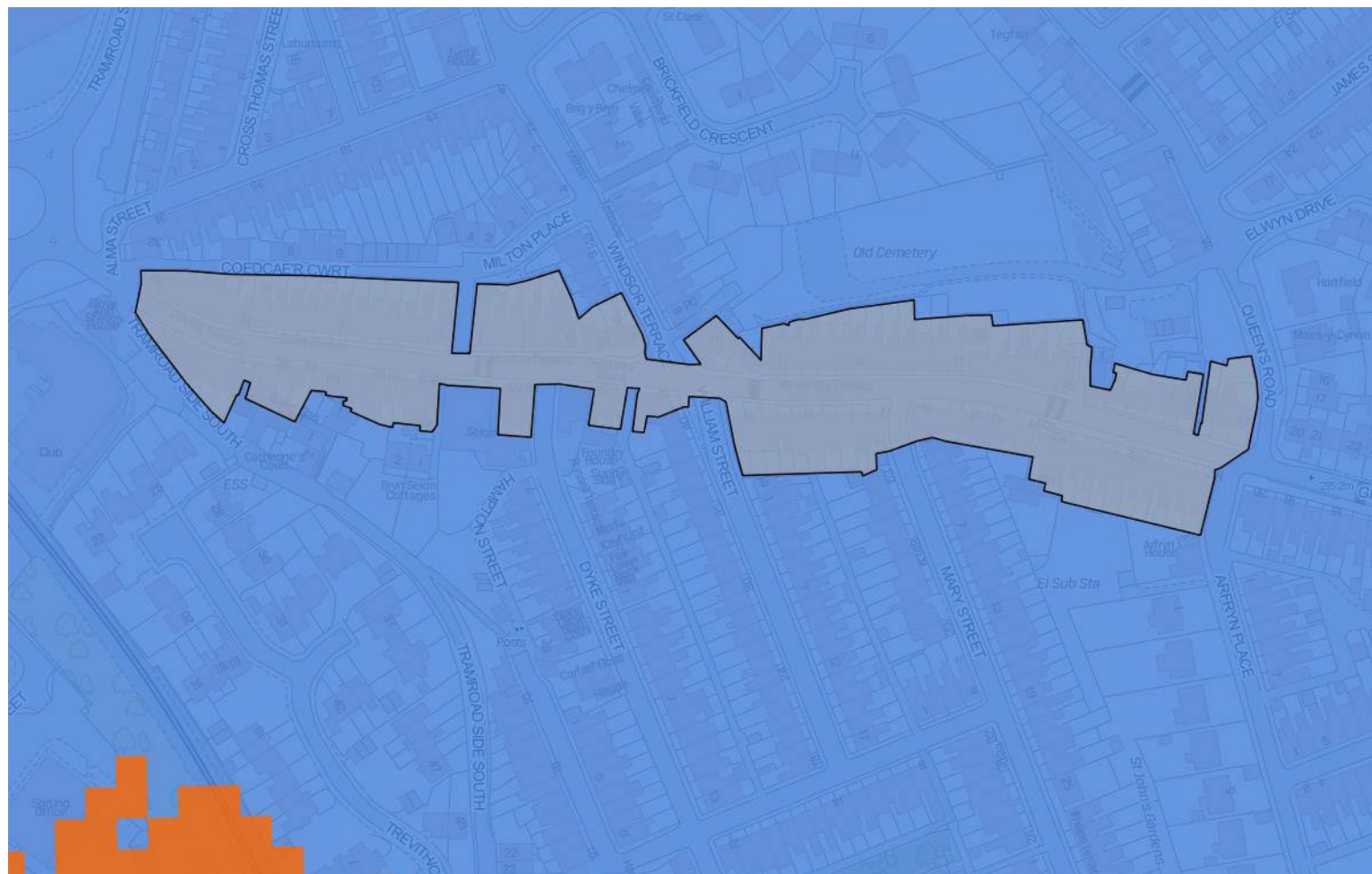
Precision is the ability of a measurement to be consistently reproduced. Diffusion tubes are defined as having good precision when the coefficient of variation between triplicate tubes is <20% for eight periods out of 12, and <10% overall. In 2016 good

precision was found in 30 out of 30 co-location studies. As such the precision for the diffusion tubes used in Merthyr Tydfil County Borough in 2017 is likely to be good.



ESG participates in the AIR PT NO₂ proficiency testing, an independent scheme supported by the Health and Safety Laboratory (HSL). It uses artificially spiked Palmes type diffusion tubes on a quarterly basis to determine a laboratory's analytical performance. Tubes are doped with a known amount of nitrate to determine accuracy, with at least two of the tubes being duplicates, to determine laboratory performance. A different mass of nitrate is used each quarter and reflect the typical analytical range encountered in NO₂ monitoring in the UK. From this a performance score (z-score) is generated based on deviation between the known concentration and the value measured by the laboratory. Laboratories with 19 out of 20 (95%), from 5 rounds of testing, z-scores of $\leq \pm 2$ provide satisfactory performance. For the quarters from January – February 2017 to January – February 2018, Environmental Services Group for 100% of testing achieved z-scores within this range. This is above 95%, the threshold for a laboratory to be considered satisfactory, and as such the results are regarded as satisfactory.

Appendix D: AQMA Boundary Maps

Figure D.1 –





	GRADDFA / SCALE: 1:1,877	<p>© Hawlfraint y Goron a hawliau cronfa ddata 2018 Arolwg Ordnans 100025302</p> <p>"Ni chaniateir i chwi gopio, tan-drwyddedu, dos barthu neu werthu y data yma i unrhyw drydydd barti mewn unrhyw ffurf"</p> <p>© Crown copyright and database rights 2018 Ordnance Survey 100025302</p> <p>"You are not permitted to copy, sub-licence, distribute or sell any of this data to third parties in any form."</p>	 <p>Cwmni Rhedrefol Merthyr Tydfil MERTHYR TYDFIL Merthyr Tydfil County Borough Council</p>
	DYDDIAD / DATE: 27/09/2018		
	ADRAN / DEPARTMENT: Environmental Health		
	ARLUNIWYD GAN / DRAWN BY: AR		
TEITL / TITLE: AQMA boundary - s street map			

Appendix E: ECC Meteorological data, NO₂ and O₃ 15-minute readings

The data is available on request.

Glossary of Terms

Abbreviation	Description
AQ	Air quality
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the LA intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
AQS	Air quality standard
APR	Air quality Annual Progress Report
AURN	Automatic Urban and Rural Network (UK air quality monitoring network)
CO	Carbon monoxide
DA	Detailed assessment
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
ECC	Electrochemical cell
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
mg/m ³	Milligrams of the pollutant per cubic metre of air
µg/m ³	Micrograms of the pollutant per cubic metre of air
MTCBC	Merthyr Tydfil County Borough Council
NO	Nitric oxide
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides

O ₃	Ozone
PM ₁₀	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM _{2.5}	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SPG	Special planning guidance
SO ₂	Sulphur Dioxide
TEOM	Tapered element oscillating microbalance
TRO	Traffic Regulation Order
USA	Updating and Screening Assessment
WAQF	Welsh Air Quality Forum