



## 2019 Air Quality Progress Report Pembrokeshire County Council



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

January 2020

<b><i>Local Authority Officer</i></b>	David Walters
<b><i>Department</i></b>	Public Protection Division
<b><i>Address</i></b>	Pembrokeshire County Council County Hall Haverfordwest Pembrokeshire SA61 1TP
<b><i>Telephone</i></b>	01437 776546
<b><i>E-mail</i></b>	david.walters@pembrokeshire.gov.uk
<b><i>Report Reference number</i></b>	Progress Report 2019
<b><i>Date</i></b>	January 2020

## Executive Summary: Air Quality in Our Area

*The National Air Quality Strategy* sets air quality standards and objectives for seven pollutants, namely benzene, 1,3-butadiene, carbon monoxide, lead, nitrogen dioxide, particles and sulphur dioxide, that are known to have harmful effects on human health. Local Authorities periodically review the air quality within its areas to determine the risk of the air quality objectives being exceeded.

This 2019 Progress Report for Pembrokeshire County Council has reported on the following air quality parameters;

- Carbon Monoxide
- Benzene
- 1,3 Butadiene
- Lead
- Nitrogen Dioxide
- Sulphur Dioxide
- Particles

The aforementioned air quality objectives have been assessed previously as part of the Updating and Screening Assessment and Progress Report regime and in the case of benzene, particles and nitrogen dioxide specific Detailed Assessments have been carried out. **To date only the nitrogen dioxide assessment indicated that the relevant objective was being exceeded.**

This monitoring and assessment of the above parameters through 2018 has again indicated nitrogen dioxide as the pollutant of concern. The annual bias adjusted annual mean objective of 40µg/m<sup>3</sup> throughout the monitoring locations has resulted in one exceedance of nitrogen dioxide in relation to the objective within the Pembroke Air Quality Management Area.

The results of nitrogen dioxide monitoring undertaken by Pembrokeshire County Council has generally indicated levels associated with vehicular traffic have continued a steady and relatively stable level over the last few years; the 2018 annual mean has indicated an increase for nitrogen dioxide at the associated monitoring locations but the summer months have experienced extended periods of sunshine with higher than average temperatures resulting in ozone production that will influence ground level NO<sub>2</sub> production.

**This report concludes that the specific air quality objectives will be met and in relation to nitrogen dioxide and the two Air Quality Management Areas it would appear that there has been an increase of NO<sub>2</sub> at monitoring locations. The increase is thought to be associated with meteorological influences.**

**There has been one exceedance of NO<sub>2</sub> in 2018 but the location is not thought to be representative of a sensitive receptor location where persons could spend an hour or more at that particular location.**

# Table of Contents

<b>Executive Summary: Air Quality in Our Area</b>	<b>i</b>
<b>1. Actions to Improve Air Quality</b>	<b>1</b>
1.1 Previous Work in Relation to Air Quality	1
1.2 Air Quality Management Areas	3
1.3 Implementation of Action Plans	10
<b>2. Air Quality Monitoring Data and Comparison with Air Quality Objectives</b>	<b>13</b>
2.1 Summary of Monitoring Undertaken in 2018	13
2.1.1 Automatic Monitoring Sites	13
2.1.2 Non-Automatic Monitoring Sites	17
2.2 2014 to 2018 Air Quality Monitoring Results	21
2.3 Comparison of 2018 Monitoring Results with Previous Years and the Air Quality Objectives	32
2.3.1 Nitrogen Dioxide (NO <sub>2</sub> )	32
2.3.2 Particulate Matter (PM <sub>10</sub> )	35
2.3.3 Particulate Matter (PM <sub>2.5</sub> )	35
2.3.4 Sulphur Dioxide (SO <sub>2</sub> )	35
2.3.5 Ozone (O <sub>3</sub> )	35
2.4 Summary of Compliance with AQS Objectives as of 2018	38
<b>3. New Local Developments</b>	<b>39</b>
3.1 Road Traffic Sources (& other transport)	39
3.2 Industrial / Fugitive or Uncontrolled Sources / Commercial Sources	39
3.3 Planning Applications	39
3.4 Other Sources	39
<b>4. Policies and Strategies Affecting Airborne Pollution</b>	<b>40</b>
4.1 Local / Regional Air Quality Strategy	40
4.2 Air Quality Planning Policies	41
4.3 Local Transport Plans and Strategies	43
<b>5. Conclusions and Proposed Actions</b>	<b>45</b>
5.1 Conclusions from New Monitoring Data	45
5.2 Conclusions from Assessment of Sources	45
5.3 Proposed Actions	46
<b>References</b>	<b>47</b>
<b>Appendices</b>	<b>48</b>
<b>Appendix 1: WASP</b>	<b>49</b>

<b>Appendix 2: Annual Air Pollution Report Narberth AURN (PEMB)</b>	<b>50</b>
<b>Appendix 3: Joint Transport Plan for South West Wales 2015 – 2020 Table</b>	
<b>Six Pembrokeshire</b>	<b>52</b>
<b>Glossary of Terms</b>	<b>54</b>

## List of Tables

Table 1.1 Declared Air Quality Management Areas	6
Table 1.2 Progress on Measures to Improve Air Quality	7
Table 1.3 NO <sub>2</sub> Reduction Action Plan and Improvement Measures	11
Table 2.1 Details of Automatic Monitoring Sites	14
Table 2.2 Automatic NO <sub>2</sub> Monitoring Results	15
Table 2.3 Automatic SO <sub>2</sub> Monitoring Results	15
Table 2.4 Automatic PM <sub>10</sub> Particle Monitoring Results	16
Table 2.5 Automatic Ozone Monitoring Results	16
Table 2.6 Details of Non-Automatic Monitoring Sites	19
Table 2.7 Bias Adjusted Annual Mean NO <sub>2</sub> Monitoring Results	21
Table 2.8 1-Hour Mean NO <sub>2</sub> Monitoring Results	23
Table 2.9 Annual Mean PM <sub>10</sub> Monitoring Results	25
Table 2.10 24-Hour Mean PM <sub>10</sub> Monitoring Results	26
Table 2.11 AQMA NO <sub>2</sub> Exceedances 2013 - 2018	32
Table 2.12 Results of Automatic Monitoring of Nitrogen Dioxide: Comparison with Annual Mean Objective of 40 µg/m <sup>3</sup>	34
Table 2.13 Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour mean Objective of 200 µg/m <sup>3</sup>	34

## List of Figures

Figure 1.1 Map of Haverfordwest AQMA Boundaries	4
Figure 1.2 Map of Pembroke AQMA Boundaries	5
Figure 1.3 NO <sub>2</sub> Reduction Action Plan and Improvement Measures	12
Figure 2.1 Trends in Annual Mean NO <sub>2</sub> Concentrations	23
Figure 2.2 Haverfordwest AQMA	28
Figure 2.3 Haverfordwest AQMA	28
Figure 2.4 Haverfordwest AQMA	30
Figure 2.5 Pembroke AQMA	31
Figure 2.6 Bias Adjusted Nitrogen Dioxide Levels	33
Figure 2.7 Percentage Summer Sunshine 2018	36
Figure 2.8 Mean Summer Temperature 2018	37

## 1. Actions to Improve Air Quality

### 1.1 Previous Work in Relation to Air Quality

A summary of the reports produced on air quality by Pembrokeshire County Council to date is detailed below.

**1998** First Stage Review, an initial benchmark for local air quality, recognised that further detail was required in relation to nitrogen dioxide and particles.

**2000** Second Stage Review concentrating on nitrogen dioxide and particulates. The report concluded that the two pollutants would meet the objectives set out in Regulations.

**2003** Updating and Screening Assessment produced. This report recommended a Detailed Assessment of benzene in relation to the petrochemical facilities and fugitive emissions from a specified quarry.

**2005** Progress Report followed and detailed that benzene levels were already well within the 2010 objective levels. Introduction of permanent dust suppression had been introduced to the specified quarry and a re-assessment of the situation was taking place.

**2006** Updating and Screening Assessment submitted, the assessment of particles which concluded that the declaration of any Air Quality Management Area within Pembrokeshire is not necessary at this time but that a Detailed Assessment of particles associated with the quarry operation is still required.

**2007** Progress Report concluded that all air quality objectives would be met and that a Detailed Assessment of the fugitive dust emissions associated with a specific quarry was presently underway.

**2008** Progress Report and a Detailed Assessment for particles submitted. The Progress Report concluded that all reported air quality parameters would not exceed the relevant objective but that nitrogen dioxide monitoring at one road side location had exceeded the bias corrected annual objective of 40 µg/m<sup>3</sup> by 0.5 µg/m<sup>3</sup>. The location in question was undergoing changes to the road network including infrastructure improvements, introduction of traffic lights and the diversion of traffic volume due to improved access at a local supermarket. A reduction in levels at the monitoring site was therefore expected and the results would be examined in the

2009 Updating and Screening Assessment. The Detailed Assessment relating to fugitive dust emissions from a local quarry concluded that declaration of an Air Quality Management Area was not necessary for particles.

**2009** Updating and Screening Assessment conclusion identified an increasing upward trend of nitrogen dioxide at roadside locations associated with vehicle emissions. The report recommended a Detailed Assessment be carried out for three specific locations. The number of diffusion tubes has been significantly increased to identify the extent of the areas affected and the associated report is to be submitted in 2010.

**2010** Progress Report did not identify potential exceedance of the Air Quality Objectives but did recognise the upward trend of nitrogen dioxide emissions at roadside locations associated with vehicle emissions. This has necessitated a Detailed Assessment of nitrogen dioxide for publication in 2011 in conjunction with the annual Progress Report.

**2011** Progress Report and combined Detailed Assessment recognised the exceedance of the nitrogen dioxide objective requiring the declaration of two Air Quality Management Areas within the County as detailed in Figures 1.1 and 1.2 respectively. No other parameters were found to be in breach of their respective objective concentrations.

**2012** Updating and Screening Assessment detailed the continuing monitoring of nitrogen dioxide encompassing the full extent of the affected areas as identified within 2011 and resulting in the proposal to declare two Air Quality Management Areas for Haverfordwest and Pembroke.

These AQMA's for Haverfordwest and Pembroke were declared in July 2012 and the boundary of each AQMA has been subject to public consultation with local stakeholders including local residents and business premises, prior to the declaration and continues through the process in the development of the Air Quality Action Plan.

**2013** Following public consultation with local stakeholders the development of two Steering Groups has been established this year to develop an Air Quality Action Plan in an attempt to mitigate the nitrogen dioxide exceedance identified within Haverfordwest and Pembroke. Annual monitoring indicates a reduction in levels of nitrogen dioxide but exceedances of the objective are still taking place within Albert



Street, Haverfordwest and Main Street, Pembroke which are still the main areas of concern.

**2014** Monitoring results collated through the year continue to indicate a downward trend in nitrogen dioxide levels within the AQMA's. Production of an Air Quality Action Plan has been developed detailing methods of control in an attempt to mitigate vehicle emissions within the Pembroke AQMA and enable compliance with the relevant air quality objective. Consultation with stakeholders and Steering Groups has continued.

**2015** The raw annual mean nitrogen dioxide concentrations collated for all monitoring locations have continued to reduce through the year. The bias adjusted levels have resulted in all monitoring locations achieving the annual mean objective. It is the intention to maintain the two AQMA.s until compliance with the annual objective appears to be the norm.

**2016** Comparison of the individual 2016 annual mean nitrogen dioxide diffusion tube levels with the previous 2015 tube results details very little discrepancy between each site for both years. The relevant bias adjustment value for 2016 is practically the same as the 2015 bias adjustment resulting in less of a reduction for the 2016 adjusted nitrogen dioxide levels. There have been two exceedances of the annual mean nitrogen dioxide objective one within each of the two AQMA's for the 2016 period.

**2017** Similar outcome for this year's monitoring of nitrogen dioxide as 2016. No exceedances of the annual objective this year. But not a significant reduction to enable a revocation of AQMA declaration as  $<36 \mu\text{g}/\text{m}^3$  for three consecutive years has not been achieved.

## 1.2 Air Quality Management Areas

Air Quality Management Areas (AQMA.s) are declared when air quality is close to or above an acceptable level of pollution in relation to the air quality objective. 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.



AQMAs declared by Pembrokeshire Council can be found in Figure 1.1 and 1.2 respectively.

**Figure 1.1 Map of Haverfordwest AQMA Boundaries**

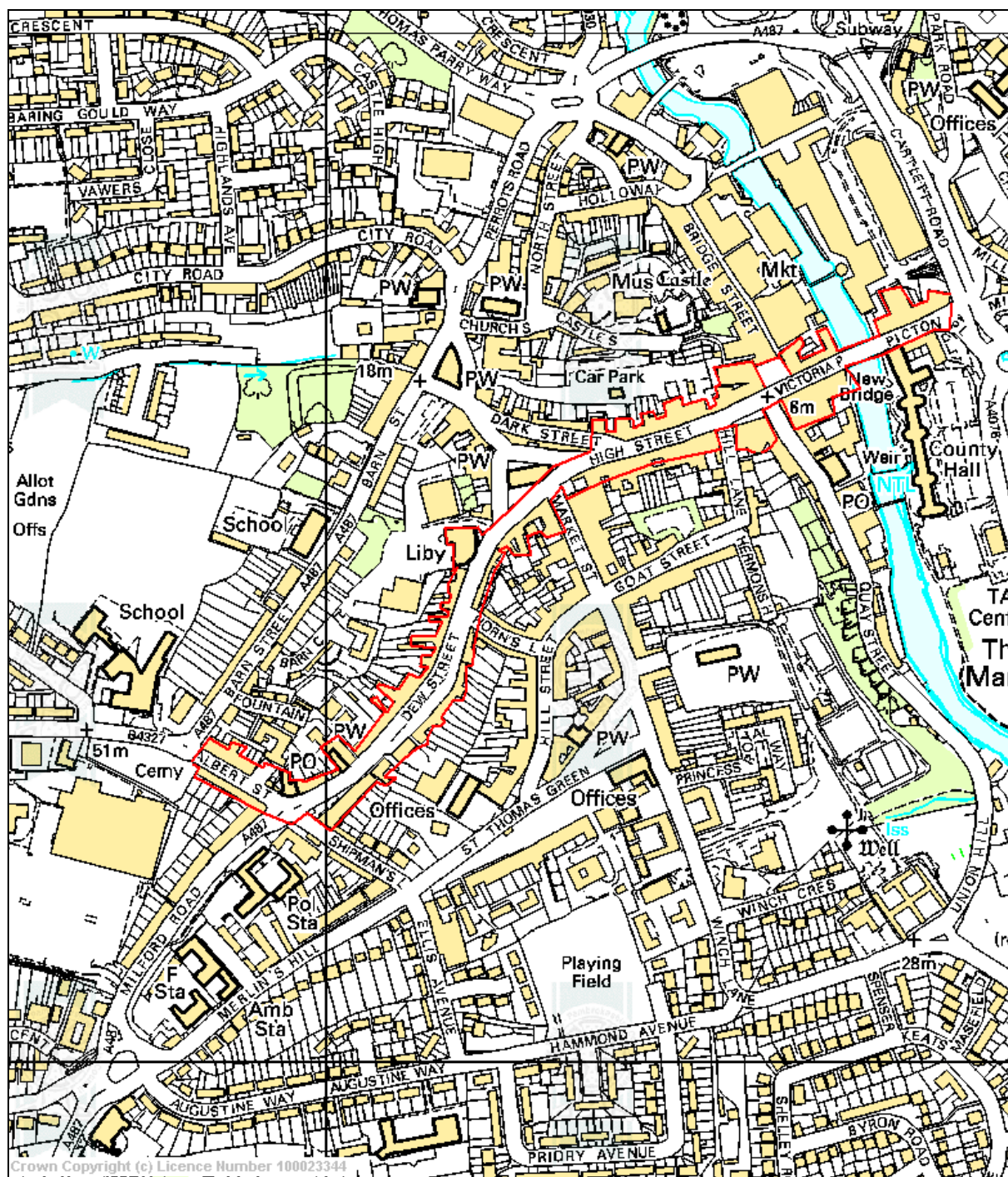
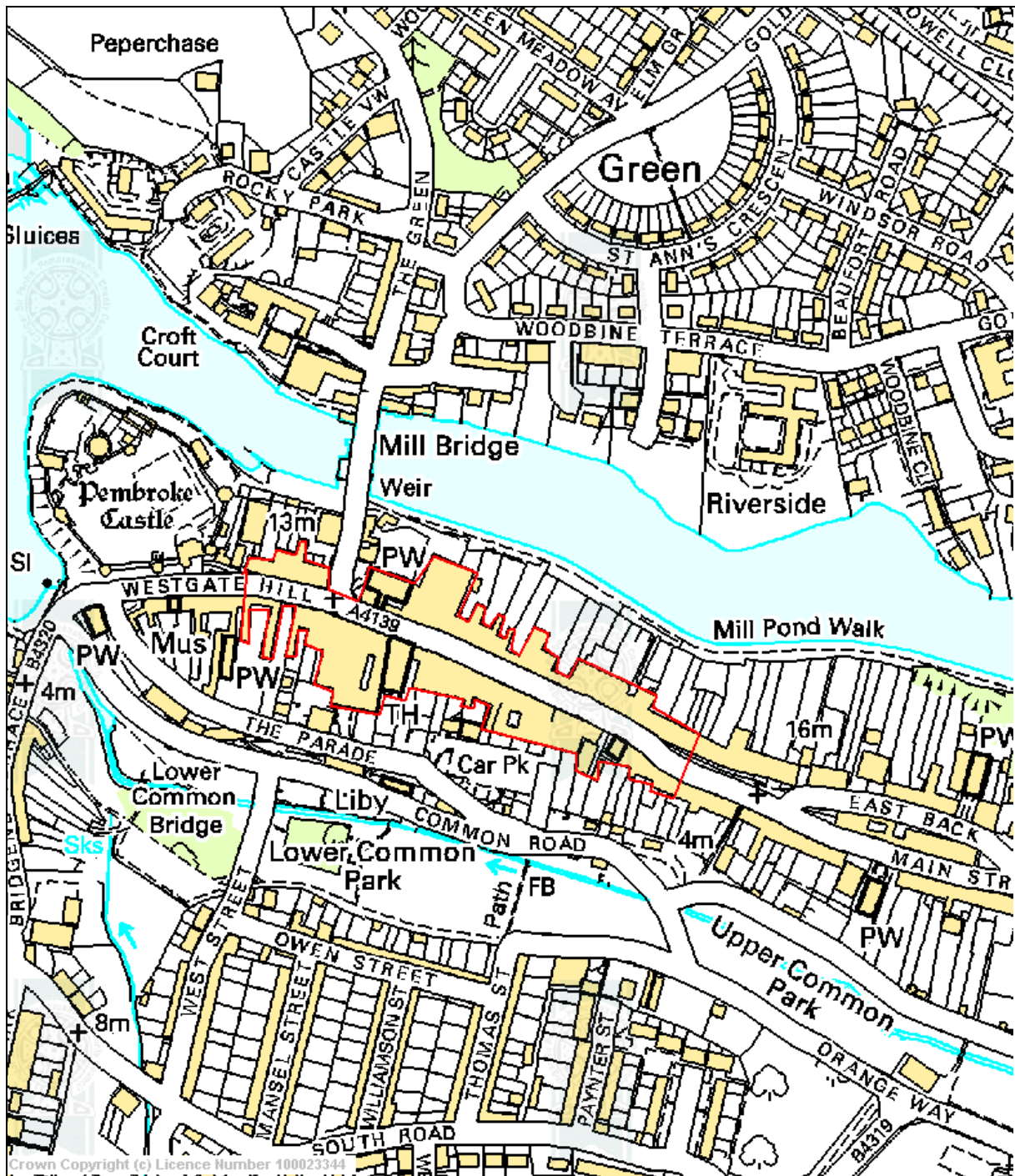


Figure 1.2 Map of Pembroke AQMA Boundaries



**Table 1.1 Declared Air Quality Management Areas**

<b>AQMA</b>	<b>Relevant Air Quality Objective(s)</b>	<b>Comments on Air Quality Trend</b>	<b>City / Town</b>	<b>Description</b>	<b>Action Plan</b>
H,West	NO <sub>2</sub> annual mean	There has been noticeable improvement in air quality in the AQMA for several years.	Haverfordwest	The main road network through the town comprising mixed commercial residential areas.	Action Plan 2014 Updated 2018
Pembroke	NO <sub>2</sub> annual mean	There has been noticeable improvement in air quality in the AQMA for several years.	Pembroke	The main road network through the town, the main shopping high street with a mix of commercial and residential property.	Action Plan 2014 Updated 2018

**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	Manage bus emissions	Reduce unit emissions in the AQMA using Bus Quality Partnership Agreements (BQPA)	County Council	2013	2014-15	Elimination of Euro I and II buses by 2016	2%	Failure to reach a BQPA meant the authority applied for a Traffic Regulation Control (TRC)	The TRC was adopted with the condition of having no Euro I and Euro II buses passing through the AQMA from 2014 onwards	2016	Elimination of remaining few Euro I and II buses still estimated to deliver a 2% reduction in annual emissions.
2	Air Quality Action Plan 2017	Parking restrictions Pembroke AQMA	County Council	2014	2014 - 17	NO2 levels	Compliance with NO2 objective in AQMA	Reduction, but cannot patrol 7 days a week	Compliance with NO2 objective achieved but <36ug/m required for 3 years	Ongoing	Reduction from initial exceedance that led to AQMA declaration
3	LINC	Bwcabus service	Partnership, Carmarthenshire, Ceredigion, Pembrokeshire Authority's	Pre 2017	2017 – 2020 RDP	none	n/a	Used by public in other areas	Resulting in 2017 expansion to more Pembrokeshire	2020	Remove private vehicles from roads
4	Active Travel Consultation	Walking and cycling	County Council	2017 public consultation	2017	none	n/a	ongoing	n/a	15 year programme	To ensure planners consider needs of walkers and cyclists and encourage active travel

Pembrokeshire County Council

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	Chimney Links, Fishguard	To alleviate traffic congestion and improve public transport in town centre	County Council	Pre 2017	2017	n/a	n/a	Ongoing works	Construction underway	2018 - 2019	Alleviate vehicle congestion and associated emissions within town centre
6	Quality Partnership Scheme	Improve the quality and service provided by bus operators	Welsh Government	Pre 2017	2017	n/a	Contributes to reduced emissions	n/a	Funding received	Ongoing	Encourage use of public transport reducing private vehicle use
7	Review of Local Development Plan	Statutory requirement	County Council	2017	2019	n/a	Air quality considerations within planning consultation phase	Public Consultation	Ongoing	2019	Relevant departments can comment in relation to developments and air quality specifically
8	Funding Boost	Transport Schemes	Welsh Government	Pre 2018	2018	n/a	n/a	n/a	n/a	Ongoing	Develop cycle/pedestrian routes, electric car charging facilities, transport data studies to deliver sustainable transport initiatives



Pembrokeshire County Council

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	Pedestrianisation Scheme Consultation	To remove annual variation to start finish dates	Local Authority	Pre 2018	2018	n/a	n/a	Ongoing strategy	Ongoing annual scheme	2018	Questionnaire to assess public interest in development and possible permanent pedestrianisation of Tenby centre
10	Website Development	Maps and detailed information of cycle routes around county to website	Local Authority	Pre 2018	2018	n/a	n/a	Ongoing	Ongoing	Ongoing	Information source for cyclists includes traffic free sections of cycle path routes
11	Coastal Bus Service Provision	To provide access for tourists and walkers and residents in coastal communities	Local Authority and Pembrokeshire Coast National Park	Pre 2015	Pre 2015	Increase in passenger figures	n/a	Ongoing	Highest passenger numbers to date	Ongoing	Removes private vehicles from road use
12	Vehicle Idling Prevention	To prevent emissions to air from idling vehicles	Local Authority	Pre 2018	2018	Taxi rank in AQMA well within NO2 objective	Yes	Ongoing	Objective for NO2 met	Ongoing	Taxi firms contacted directly via Licensing regime, NO2 Objective met

### 1.3 Implementation of Action Plans

Pembrokeshire County Council having declared two Air Quality Management Areas and following consultation with the associated local communities produced an Action Plan in 2014.

The report recognised the fact that the main contributor of NO<sub>2</sub> concentrations to the AQMA's originated from cars as this was the significant form of transport utilised within the affected areas. The physical "canyon" type characteristics of the locations were not conducive to enable sufficient dispersion of NO<sub>2</sub> resulting in the exceedances recorded through the continued monitoring regime.

This monitoring regime has also recorded that the initial exceedance had been on a downward trend to a steady level over the years. But on inspection the monitoring points where the initial high NO<sub>2</sub> results occurred are subject to convenience parking by the public resulting in the narrowing of the road and stationary idling traffic at these points. With the poor dispersion associated with the locality, specifically Pembroke Main Street, the introduction of further parking restrictions took place in an attempt to mitigate the problem.

It is difficult to fully establish whether the mitigation has assisted with the reduction of NO<sub>2</sub> within Pembroke Main Street but as detailed within this and previous annual reports the level of NO<sub>2</sub> has reduced below the relevant objective of 40ug/m<sup>3</sup> within both the Pembroke and Haverfordwest AQMA's over the years.

There has been one exceedance in 2018 for Pembroke, none in 2017 and two slight exceedances in 2016 for Pembroke and Haverfordwest respectively.

Table 1.2 above details strategies within the county developed to counter adverse impacts upon air quality some of which would also have a direct association with the two AQMA's in conjunction with the parking restrictions associated with the Action Plan. The following Table 1.3 and associated graph at Figure 1.3 detail the reduction of NO<sub>2</sub> exceedances within the AQMA's for the 40ug/m<sup>3</sup> annual objective and the 36ug/m<sup>3</sup> not to be exceeded for three consecutive years which may be due to the introduction of the Action Plan and other strategies detailed above.



Table 1.3. Bias Adjusted Annual Mean NO<sub>2</sub> Monitoring Results

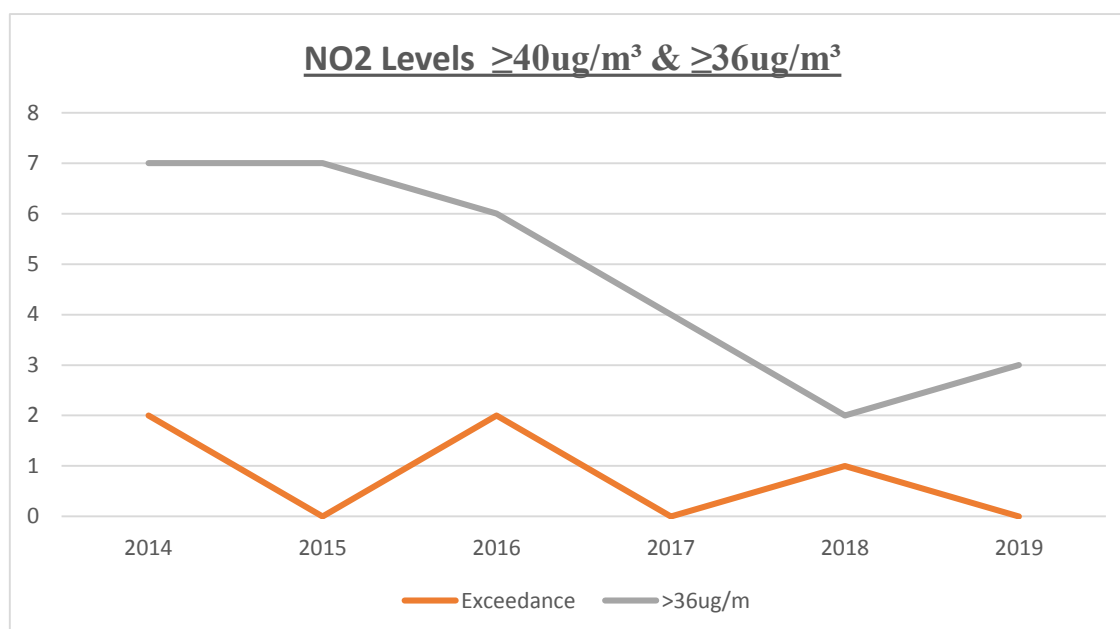
**≥40ug/m<sup>3</sup> (Annual Objective) & ≥36ug/m<sup>3</sup> (Not to be exceeded for three consecutive years).**

Site ID	NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> )					2019 9 months data	
	2014	2015	2016	2017	2018		
Haverfordwest AQMA							
PCC1	19.7	22.8	21.2	19.9	20.7	19.5	
PCC2	29.2	25.5	26.8	25.8	26.4	24.4	
PCC3	25.8	26.7	24.3	24.8	27.1	25.2	
PCC4	30.7	33.8	33.2	32.6	30.6	31.6	
PCC5	<b>38.5</b>	<b>39.5</b>	<b>38.9</b>	33.4	<b>36.9</b>	<b>36.3</b>	
PCC6	<b>36.9</b>	34.3	34	32.4	33.6	32.7	
PCC7	<b>37.7</b>	<b>39.1</b>	<b>38.5</b>	<b>37.5</b>	35.6	35.4	
PCC8	34.3	31.5	31.1	27.8	29.3	27.8	
PCC9	23.3	25.4	22.3	22.9	23.1	20.1	
PCC10	17.6	18.5	17.2	16.8	15.1	13.5	
PCC11	31.1	31.1	30.4	28.3	32.2	28.9	
PCC12	33.8	30.9	28.9	27.9	28.2	26.9	
PCC13	30.1	30.8	29.3	27	28.4	26.3	
PCC14	25.4	25.7	24.6	25.1	24.4	22.9	
PCC15	30.8	30.1	29.5	28.9	29.6	28.8	
PCC16	17.5	20.4	20.2	19.1	19.2	18.7	
PCC17	25.3	30.3	30.8	27.6	28.5	26.2	
PCC18	<b>39.4</b>	35.1	<b>39.1</b>	<b>37.5</b>	36	34.2	
PCC19	18	24.8	26.3	24.6	25.6	23	
PCC20	27.7	<b>38.7</b>	<b>40.3</b>	<b>38.6</b>	35.1	<b>36.1</b>	
PCC21	26.8	18.3	17.8	18.2	17.6	16.1	
PCC22	25.2	<b>36.6</b>	<b>38.7</b>	35	35.8	34.5	
PCC23	<b>39.8</b>	29.2	25.7	26.3	28	26.2	
PCC24	<b>37</b>	<b>39.1</b>	<b>38.2</b>	35.4	34.8	33.8	
PCC25	<b>40.2</b>	28.1	24.6	21.9	24	22.3	
PCC26	<b>43.7</b>	<b>37.8</b>	<b>38.6</b>	35	35.5	35.7	
PCC27	30.2	25.2	26.7	22.3	24.5	22.4	
PCC28	25.4	21.9	20.6	16.6	19.5	19.6	
PCC29	20	21.9	23.2	22	22.8	21.1	
PCC30	15.1	15.1	15.9	15.5	15.7	13.4	
PCC31	27	31.1	29.2	30.3	29.8	29.5	
PCC32	31.6	33.7	32.9	33.1	31.6	33.7	
PCC33	22.8	23.3	22.3	21.1	22.1	22	
PCC34	27.3	24.3	21.6	22.3	21.2	20	
PCC35	25	10.9	12.8	12.5	12.8	11.3	
Haverfordwest AQMA	6	2	6	6	3	1	2

Site ID	NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> )					2019 9months
	2014	2015	2016	2017	2018	

Pembroke AQMA												
PCC40	22.9	20.2	20.1	20.5	20.7	20.9						
PCC41	30.7	22.7	23.4	23.8	24.4	23.6						
PCC42	33.2	23	20.6	19.4	19.7	22.1						
PCC43	<b>38.7</b>	29.3	31.5	31.9	31.7	32.6						
PCC44	33	33.7	33.7	33.3	<b>36.4</b>	35.2						
PCC45	23.5	<b>37.3</b>	<b>40.5</b>	<b>38.2</b>	<b>41.2</b>	<b>39.1</b>						
PCC46	21.3	30.5	33.5	33.1	35.5	33.9						
PCC47	21.7	22.4	24.3	24.8	23.6	23.3						
PCC48	13.1	13	13	12.5	12.1	12						
Pembroke AQMA	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>
AQMA Totals	<b>7</b>	<b>2</b>	<b>7</b>	<b>0</b>	<b>6</b>	<b>2</b>	<b>4</b>	<b>0</b>	<b>2</b>	<b>1</b>	<b>3</b>	<b>0</b>

Figure 1.3



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

### **2.1 Summary of Monitoring Undertaken in 2018**

#### **2.1.1 Automatic Monitoring Sites**

Nitrogen dioxide levels continue to be monitored at the Narberth AURN site, identified as PEMB on the Welsh Air Quality Forum web site, and a summary of the results from this rural site are detailed in Table 2.1 and Tables 2.2, 2.3, 2.4 and 2.5 respectively.

The Narberth AURN site, until 2009, comprised of an Ambirack automated air quality analyser that monitored nitrogen dioxide (NO<sub>2</sub>), sulphur dioxide (SO<sub>2</sub>) and ozone (O<sub>3</sub>) and a TEOM 1400A particulate (PM<sub>10</sub>) analyser. During 2009 the station was upgraded; firstly with the introduction of an FDMS analyser for particulate monitoring; one API 200 NO<sub>x</sub> analyser and one API 100 SO<sub>2</sub> analyser and an API 400 O<sub>3</sub> analyser. Pembrokeshire County Council calibrates the Narberth AURN on a monthly basis on behalf of Bureau Veritas, with site audits and maintenance provided by AEA Technology; data validation and ratification is carried out by Bureau Veritas.

A section 106 Agreement associated with the planning consent for the development of the new RWE npower Pembroke Power Station required the introduction of automated analysers at Pennar Cants in close proximity to the development site. The analyser has been providing data since 2010 and has been operated by RWE npower since that time. Pembrokeshire Council operated the site for 2014 and 2015 as per the requirements of the relevant agreement and utilised the data for reporting purposes.

Pembrokeshire County Council have now ceased the operation of the Pembroke site during January 2016 due to consistently low monitoring results since 2010 and no longer collates data from the site. The Narberth AURN unit continues to provide analysis of air quality and data for reporting purposes.

**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) <sup>(1)</sup>	Distance from Kerb to Monitor (m) <sup>(2)</sup>
				X	Y					
PEMB	Narberth	Rural	n/a	214374	212774	PM <sub>10</sub>	FDMS	2.5	n/a	n/a
PEMB	Narberth	Rural	Haverfordwest and Pembroke	214374	212774	NO <sub>2</sub> , SO <sub>2</sub> , O <sub>3</sub>	API Analysers	2.5	n/a	n/a

**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.

Table 2.2 Automatic NO<sub>2</sub> Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture 2018 (%)	NO <sub>2</sub> Concentration (µg/m <sup>3</sup> )									
				2014		2015		2016		2017		2018	
				Annual Mean	Max Hourly Mean	Annual Mean	Max Hourly Mean	Annual Mean	Max Hourly Mean	Annual Mean	Max Hourly Mean	Annual Mean	Max Hourly Mean
PEMB	Rural	Automatic	99	4	70	3	52	3	61	3	51	4	39
rwe	Background	Automatic	n/a	7	63	5	52	n/a		n/a		n/a	

**Notes:**

Exceedances of the NO<sub>2</sub> 1-hour mean objective (200µg/m<sup>3</sup> not to be exceeded more than 18 times/year) are shown in **bold**.

Table 2.3 Automatic SO<sub>2</sub> Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture 2018 (%)	SO <sub>2</sub> Concentration (µg/m <sup>3</sup> )									
				2014		2015		2016		2017		2018	
				Max Daily Mean	Max Hourly Mean	Max Daily Mean	Max Hourly Mean	Max Daily Mean	Max Hourly Mean	Max Daily Mean	Max Hourly Mean	Max Daily Mean	Max Hourly Mean
PEMB	Rural	Automatic	84	10	36	41	41	5	12	6	12	8	22

**Table 2.4 Automatic PM<sub>10</sub> Particle Monitoring Results**

Site ID	Site Type	Monitoring Type	Valid Data Capture 2018 (%)	Particles Concentration (µg/m <sup>3</sup> )									
				2014		2015		2016		2017		2018	
				Annual Mean	Max Daily Mean	Annual Mean	Max Daily Mean	Annual Mean	Max Daily Mean	Annual Mean	Max Daily Mean	Annual Mean	Max Daily Mean
PEMB	Rural	Automatic	100	3	10	12	47	12	50	1	43	61	79
rwe	Background	Automatic	n/a	19.7	46	17	57	n/a		n/a		n/a	

**Notes:**

Exceedances of the PM<sub>10</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in **bold**.

**Table 2.5 Automatic Ozone Monitoring Results**

Site ID	Site Type	Monitoring Type	Valid Data Capture 2018 (%)	Ozone Concentration (µg/m <sup>3</sup> )									
				2014		2015		2016		2017		2018	
				Annual Mean	Max Daily Mean	Annual Mean	Max Daily Mean	Annual Mean	Max Daily Mean	Annual Mean	Max Daily Mean	Annual Mean	Max Daily Mean
PEMB	Rural	Automatic	99	62	93	63	93	59	104	1	106	63	121
rwe	Background	Automatic	n/a	69	100	68	104	n/a		n/a		n/a	

### 2.1.2 Non-Automatic Monitoring Sites

Diffusion tubes have been used by Pembrokeshire County Council to monitor nitrogen dioxide levels within the County in proximity to roads where there has been concern over relevant public exposure from associated vehicle emissions for local residents. The number of tubes has varied over the years as areas have been identified for assessment due to relevant exposure or where developments of road networks or activities likely to generate greater traffic flow have come under scrutiny.

At the time of writing this Authority presently has forty eight tubes located within the County the details of which are represented within Table 2.6 below.

Pembrokeshire County Council's supply and analysis of NO<sub>2</sub> diffusion tubes for 2018 were prepared and supplied by **gradko environmental** who utilise a tube preparation of 20% TEA analysis technique.

To ensure the QA/QC **gradko environmental** diffusion tube's sampling methodology is UKAS accredited and the laboratory participates in the laboratory performance for proficiency testing and the latest results are detailed within the **Laboratory Summary Performance for AIR NO<sub>2</sub> PT Round AR0018, 19, 21, 22, 24, 25, 27 and 28** analyses of NO<sub>2</sub> diffusion tubes and **gradko environmental** are ranked as a **Satisfactory** laboratory based upon the aforementioned testing regime. See Appendix 1.

This Authority carries out a bias adjustment study by co-locating three diffusion tubes at the local automated monitoring facility. The results of which were entered into the AEA Energy and Environment spreadsheet application for Checking Precision and Accuracy of Triplicate Tubes. The spreadsheet application details Good Precision and Good Overall Data Capture for the triplicate tube study with a > 90% data capture by the automatic monitor.

This data is submitted to the National Diffusion Tube Bias Adjustment Factor Spreadsheet (v.03/19) available via <http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html> to provide the bias factor used to correct the annual mean NO<sub>2</sub> diffusion tube results. The spreadsheet updated in March 2018 has been utilised and details use of an overall bias adjustment factor of **0.93** for diffusion tubes



supplied by Gradko services and derived from thirty studies utilising the same sampling method.

A specific bias adjustment factor for Pembrokeshire has not been generated by the National Physical Laboratory for 2018 who have detailed that the co-location data submitted did not have enough measurement resolution/accuracy due to low concentrations. The NPL detailed that the bias factor data submitted would artificially skew the average of all the Gradko results submitted and have detailed the reason as the automated site is rural whereas tube locations are roadside.

Also consulting with the LAQM Helpdesk it has been advised that the factor closest to that utilised for previous years is used. Use of Box 7.11 within the Local Air Quality Management Technical Guidance (LAQM.TG(16)) document to clarify the choice of bias adjustment factors from the locally derived or national database has supported the choice for the overall bias adjustment factor. Specifically the co-location site is within an exposed rural setting whereas the monitoring locations are kerbside and/or building facades in “canyon” type streets.

Therefore, and in accordance with Step 4 of the National Diffusion Tube Bias Adjustment Factor Spreadsheet (v.03/19), the Overall Factor of 0.93 detailed above has been utilised to bias adjust the annual mean averages for 2018 diffusion tube monitoring.

The mean annual concentrations have been corrected by use of the relevant bias adjustment factor provided for the year as discussed above. The resultant bias adjusted annual mean NO<sub>2</sub> levels are detailed within Table 2.7.

Table 2.6 Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	Associated with Named AQMA?	OS Grid Reference		Site Height (m)	Collocated with a Continuous Analyser?	Distance from Kerb to Nearest Relevant Exposure (m) <sup>(1)</sup>	Distance from Kerb to Monitor (m) <sup>(2)</sup>
				X	Y				
PCC1	Salutation Square	Roadside	n/a	195629	215655	2	Y	n/a	1
PCC2	Picton Place	Roadside	Haverfordwest	195574	215704	2	Y	<1	1
PCC3	Victoria Place	Roadside	Haverfordwest	195474	215661	2	Y	<1	1
PCC4	High St	Roadside	Haverfordwest	195402	215634	2	Y	<1	1
PCC5	High St	Roadside	Haverfordwest	195312	215605	2	Y	<1	1
PCC6	High St	Roadside	Haverfordwest	195294	215591	2	Y	<1	1
PCC7	High St	Roadside	Haverfordwest	195203	215544	2	Y	<1	1
PCC8	High St	Roadside	Haverfordwest	195159	215494	2	Y	<1	1
PCC9	Dark St	Roadside	Haverfordwest	195267	215603	2	Y	<1	1
PCC10	Dark St	Roadside	n/a	195177	215616	2	Y	<1	1
PCC11	Dew St	Roadside	Haverfordwest	195143	215464	2	Y	<1	1
PCC12	Dew St	Roadside	Haverfordwest	195110	215394	2	Y	<1	1
PCC13	Dew St	Roadside	Haverfordwest	195101	215357	2	Y	<1	1
PCC14	Dew St	Roadside	Haverfordwest	195028	215269	2	Y	<1	1
PCC15	Dew St	Roadside	Haverfordwest	194998	215255	2	Y	<1	1
PCC16	Shipmans Lane	Roadside	n/a	195006	215208	2	Y	<1	1
PCC17	Albert St	Roadside	Haverfordwest	194945	215259	2	Y	0	1
PCC18	Albert St	Roadside	Haverfordwest	194937	215254	2	Y	0	1
PCC19	Albert St	Roadside	Haverfordwest	194936	215268	2	Y	0	1
PCC20	Albert St	Roadside	Haverfordwest	194922	215263	2	Y	0	1
PCC21	Albert St	Roadside	Haverfordwest	194930	215276	2	Y	0	1
PCC22	Albert St	Roadside	Haverfordwest	194911	215268	2	Y	0	1
PCC23	Albert St	Roadside	Haverfordwest	194911	215279	2	Y	0	1
PCC24	Albert St	Roadside	Haverfordwest	194893	215279	2	Y	0	1
PCC25	Albert St	Roadside	Haverfordwest	194905	215286	2	Y	0	1
PCC26	Albert St	Roadside	n/a	194886	215284	2	Y	0	1
PCC27	Albert St	Roadside	Haverfordwest	194879	215300	2	Y	0	1
PCC28	Albert St	Roadside	Haverfordwest	194856	215299	2	Y	0	1
PCC29	Barn St	Roadside	n/a	194901	215345	2	Y	0	1

Site ID	Site Name	Site Type	Associated with Named AQMA?	OS Grid Reference		Site Height (m)	Collocated with a Continuous Analyser?	Distance from Kerb to Nearest Relevant Exposure (m) <sup>(1)</sup>	Distance from Kerb to Monitor (m) <sup>(2)</sup>
				X	Y				
PCC30	Barn St	Roadside	n/a	194974	215448	2	Y	0	1
PCC31	Merlins Bridge	Roadside	n/a	194730	214554	2	Y	n/a	1
PCC32	Merlins Bridge	Roadside	n/a	194761	214610	2	Y	n/a	1
PCC33	Haroldston Terrace	Roadside	n/a	194774	214465	2	Y	n/a	1
PCC34	Quay St	Roadside	n/a	195453	215594	2	Y	<1	1
PCC35	Quay St	Roadside	n/a	195642	215273	2	Y	<1	1
PCC36	High St	Roadside	n/a	210901	214713	2	Y	<1	1
PCC37	AURN	Rural	Haverfordwest & Pembroke	214374	212774	2	Y	n/a	n/a
PCC38	AURN	Rural	Haverfordwest & Pembroke	214374	212774	2	Y	n/a	n/a
PCC39	AURN	Rural	Haverfordwest & Pembroke	214374	212774	2	Y	n/a	n/a
PCC40	Main St	Roadside	Pembroke	198244	201554	2	Y	<1	1
PCC41	Main St	Roadside	Pembroke	198274	201547	2	Y	<1	1
PCC42	Main St	Roadside	Pembroke	198333	201549	2	Y	<1	1
PCC43	Main St	Roadside	Pembroke	198364	201502	2	Y	<1	1
PCC44	Main St	Roadside	Pembroke	198396	201495	2	Y	<1	1
PCC45	Main St	Roadside	Pembroke	198407	201489	2	Y	<1	1
PCC46	Main St	Roadside	Pembroke	198460	201464	2	Y	<1	1
PCC47	Main St	Roadside	Pembroke	198548	201419	2	Y	<1	1
PCC48	Main St	Roadside	Pembroke	198869	201299	2	Y	<1	1

**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.

## 2.2 2014 to 2018 Air Quality Monitoring Results

**Table 2.7 Bias Adjusted Annual Mean NO<sub>2</sub> Monitoring Results**

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2018 (%) <sup>(2)</sup>	NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3)</sup>				
					2014	2015	2016	2017	2018
PEMB	Rural	Automatic	n/a	99	4	3	3	3	4
PCC1	Roadside	Passive	n/a	100	19.7	22.8	21.2	19.9	20.7
PCC2	Roadside	Passive	n/a	92	29.2	25.5	26.8	25.8	26.4
PCC3	Roadside	Passive	n/a	83	25.8	26.7	24.3	24.8	27.1
PCC4	Roadside	Passive	n/a	92	30.7	33.8	33.2	32.6	30.6
PCC5	Roadside	Passive	n/a	100	38.5	39.5	38.9	33.4	36.9
PCC6	Roadside	Passive	n/a	100	36.9	34.3	34	32.4	33.6
PCC7	Roadside	Passive	n/a	100	37.7	39.1	38.5	37.5	35.6
PCC8	Roadside	Passive	n/a	100	34.3	31.5	31.1	27.8	29.3
PCC9	Roadside	Passive	n/a	100	23.3	25.4	22.3	22.9	23.1
PCC10	Roadside	Passive	n/a	100	17.6	18.5	17.2	16.8	15.1
PCC11	Roadside	Passive	n/a	92	31.1	31.1	30.4	28.3	32.2
PCC12	Roadside	Passive	n/a	75	33.8	30.9	28.9	27.9	28.2
PCC13	Roadside	Passive	n/a	92	30.1	30.8	29.3	27	28.4
PCC14	Roadside	Passive	n/a	100	25.4	25.7	24.6	25.1	24.4
PCC15	Roadside	Passive	n/a	100	30.8	30.1	29.5	28.9	29.6
PCC16	Roadside	Passive	n/a	83	17.5	20.4	20.2	19.1	19.2
PCC17	Roadside	Passive	n/a	100	25.3	30.3	30.8	27.6	28.5
PCC18	Roadside	Passive	n/a	100	39.4	35.1	39.1	37.5	36
PCC19	Roadside	Passive	n/a	100	18	24.8	26.3	24.6	25.6
PCC20	Roadside	Passive	n/a	100	27.7	38.7	40.3	38.6	35.1
PCC21	Roadside	Passive	n/a	100	26.8	18.3	17.8	18.2	17.6
PCC22	Roadside	Passive	n/a	100	25.2	36.6	38.7	35	35.8
PCC23	Roadside	Passive	n/a	83	39.8	29.2	25.7	26.3	28
PCC24	Roadside	Passive	n/a	83	37	39.1	38.2	35.4	34.8
PCC25	Roadside	Passive	n/a	100	40.2	28.1	24.6	21.9	24
PCC26	Roadside	Passive	n/a	100	43.7	37.8	38.6	35	35.5

PCC27	Roadside	Passive	n/a	50	30.2	25.2	26.7	22.3	24.5
PCC28	Roadside	Passive	n/a	92	25.4	21.9	20.6	16.6	19.5
PCC29	Roadside	Passive	n/a	83	20	21.9	23.2	22	22.8
PCC30	Roadside	Passive	n/a	100	15.1	15.1	15.9	15.5	15.7
PCC31	Roadside	Passive	n/a	100	27	31.1	29.2	30.3	29.8
PCC32	Roadside	Passive	n/a	100	31.6	33.7	32.9	33.1	31.6
PCC33	Roadside	Passive	n/a	92	22.8	23.3	22.3	21.1	22.1
PCC34	Roadside	Passive	n/a	100	27.3	24.3	21.6	22.3	21.2
PCC35	Roadside	Passive	n/a	92	25	10.9	12.8	12.5	12.8
PCC36	Roadside	Passive	n/a	100	21.9	23.1	22.8	20.1	22.8
PCC37	Roadside	Passive	n/a	100	5.6	3.5	4.1	3.8	4
PCC38	Roadside	Passive	n/a	100	5.6	3.5	4	3.7	3.9
PCC39	Roadside	Passive	n/a	100	5.5	3.3	3.9	3.6	3.5
PCC40	Roadside	Passive	n/a	100	22.9	20.2	20.1	20.5	20.7
PCC41	Roadside	Passive	n/a	92	30.7	22.7	23.4	23.8	24.4
PCC42	Roadside	Passive	n/a	92	33.2	23	20.6	19.4	19.7
PCC43	Roadside	Passive	n/a	100	38.7	29.3	31.5	31.9	31.7
PCC44	Roadside	Passive	n/a	92	33	33.7	33.7	33.3	36.4
PCC45	Roadside	Passive	n/a	100	23.5	37.3	<b>40.5</b>	38.2	<b>41.2</b>
PCC46	Roadside	Passive	n/a	92	21.3	30.5	33.5	33.1	35.5
PCC47	Roadside	Passive	n/a	100	21.7	22.4	24.3	24.8	23.6
PCC48	Roadside	Passive	n/a	100	13.1	13	13	12.5	12.1

#### Notes:

Exceedances of the NO<sub>2</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in **bold**.

NO<sub>2</sub> annual means exceeding 60µg/m<sup>3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 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.

**Figure 2.1 Trends in Annual Mean NO<sub>2</sub> Concentrations**

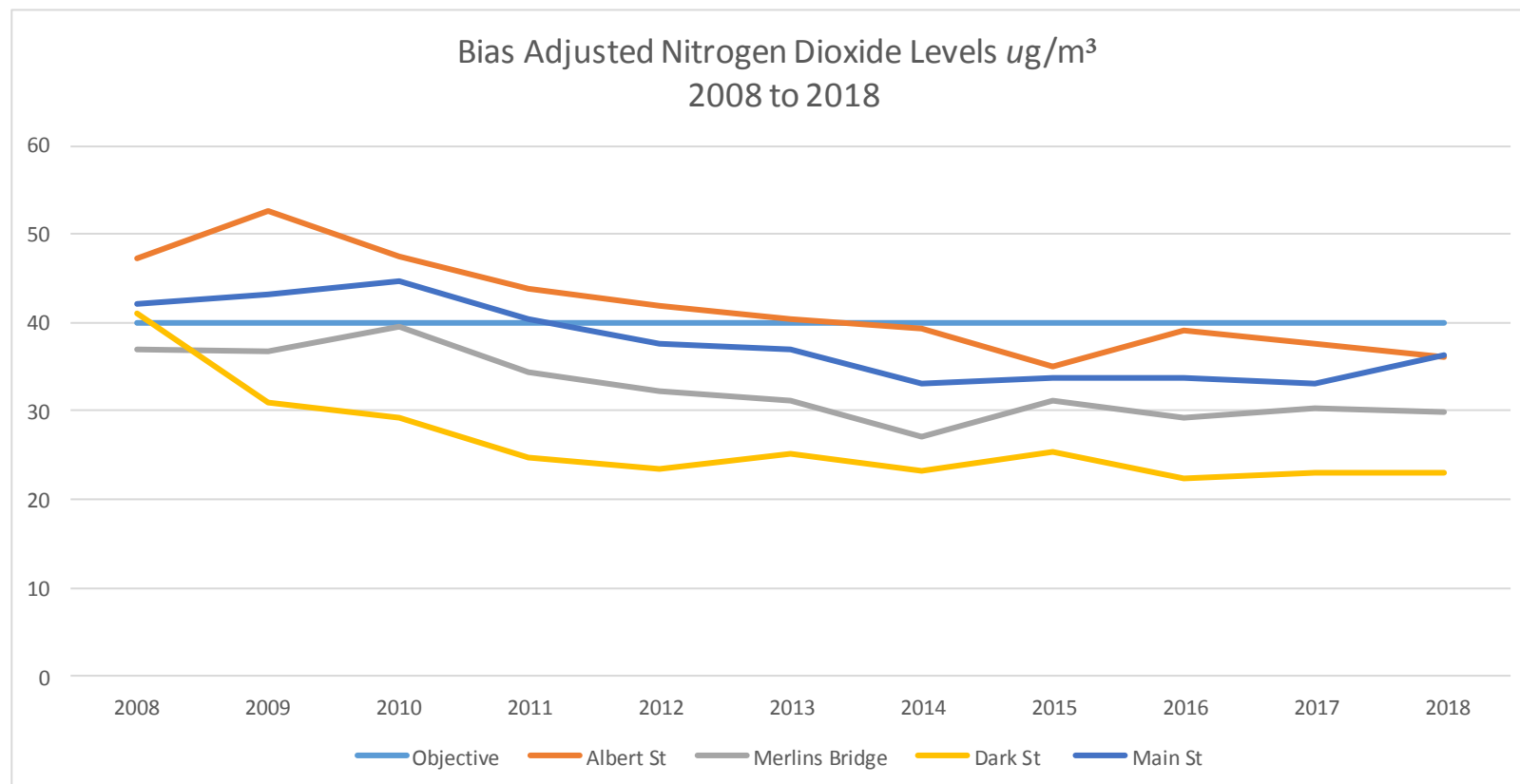


Table 2.8 1-Hour Mean NO<sub>2</sub> Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2018 (%) <sup>(2)</sup>	NO <sub>2</sub> 1-Hour Means > 200µg/m <sup>3</sup> <sup>(3)</sup>				
					2014	2015	2016	2017	2018
PEMB	Rural	Automatic	n/a	99	0	0	<b>0</b>	0	0

**Notes:**

Exceedances of the NO<sub>2</sub> 1-hour mean objective (200µg/m<sup>3</sup> not to be exceeded more than 18 times/year) are shown in **bold**.

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

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

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



**Table 2.9 Annual Mean PM<sub>10</sub> Monitoring Results**

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2018 (%) <sup>(2)</sup>	PM <sub>10</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3)</sup>				
				2014	2015	2016	2017	2018
PEMB	Rural	n/a	97	<b>0</b>	<b>0</b>	0	0	0

**Notes:**

Exceedances of the PM<sub>10</sub> annual mean objective of 40µg/m<sup>3</sup> 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.

**Table 2.10 24-Hour Mean PM<sub>10</sub> Monitoring Results**

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2018 (%) <sup>(2)</sup>	PM <sub>10</sub> 24-Hour Means > 50µg/m <sup>3</sup> <sup>(3)</sup>				
				2014	2015	2016	2017	2018
PEMB	Rural	n/a	97	58	<b>35</b>	35	43	0

**Notes:**

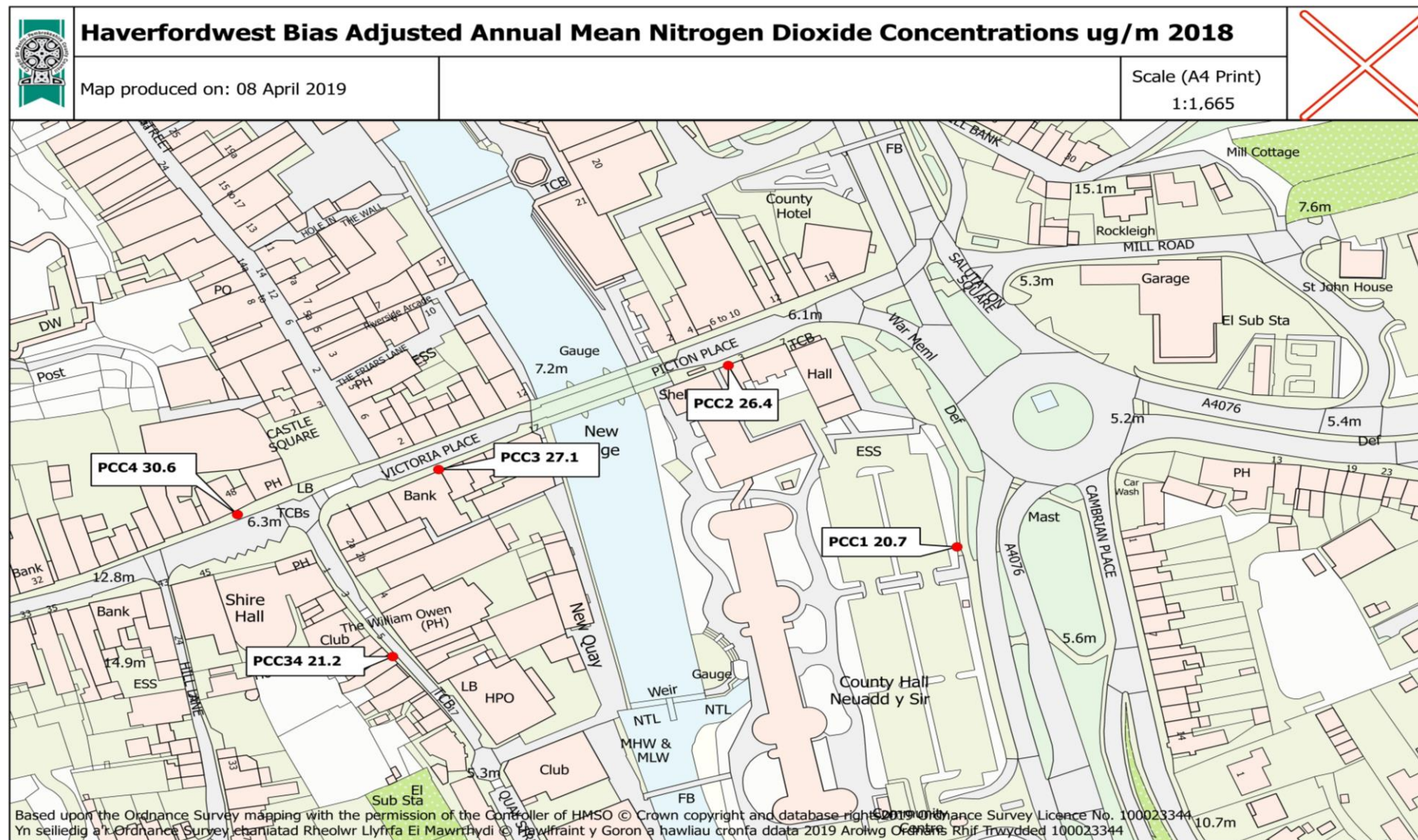
Exceedances of the PM<sub>10</sub> 24-hour mean objective (50µg/m<sup>3</sup> not to be exceeded more than 35 times/year) are shown in **bold**.

(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 90.4<sup>th</sup> percentile of 24-hour means is provided in brackets.

Figure 2.2 Haverfordwest AQMA





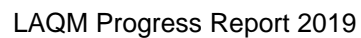




Figure 2.3 Haverfordwest AQMA

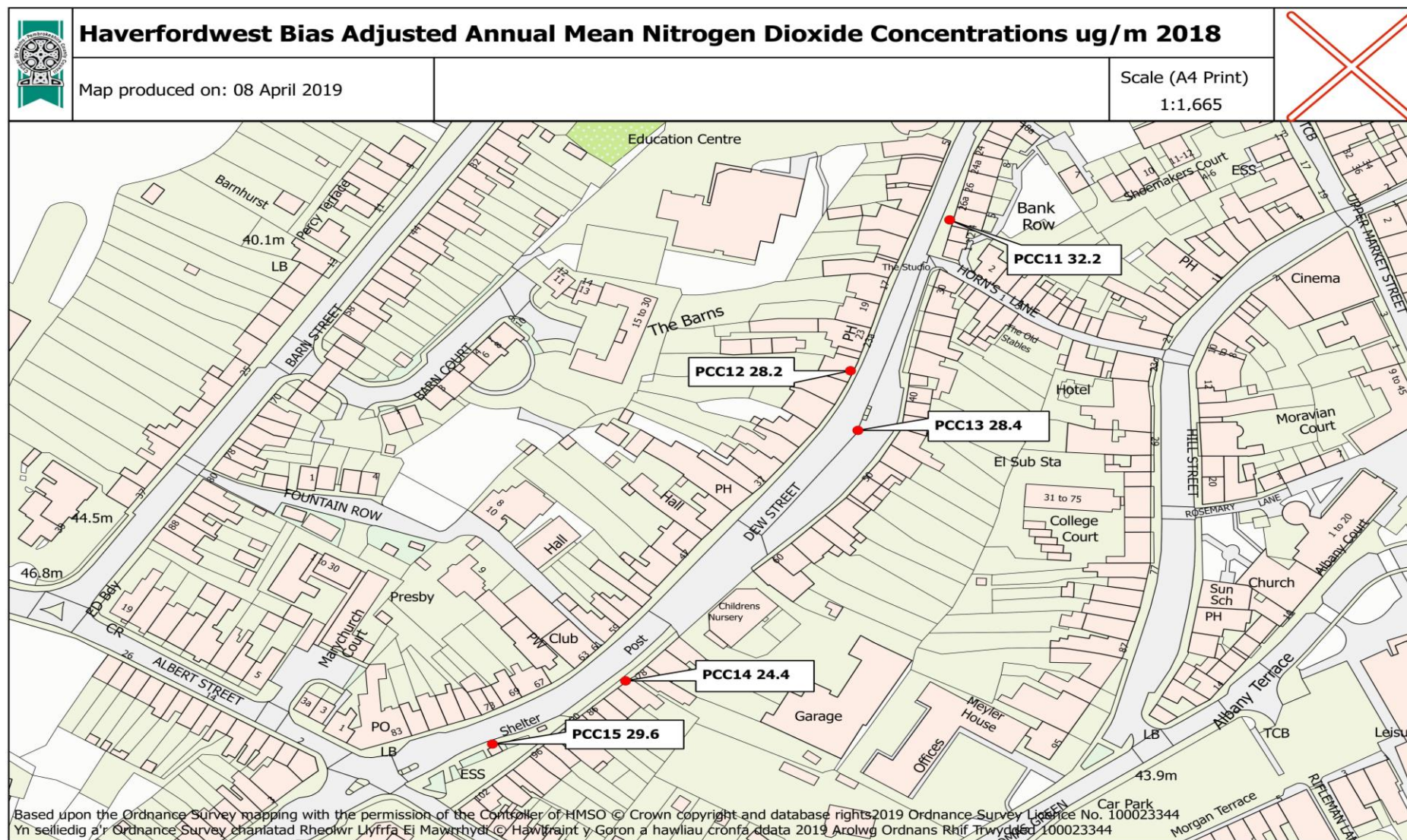




Figure 2.4 Haverfordwest AQMA

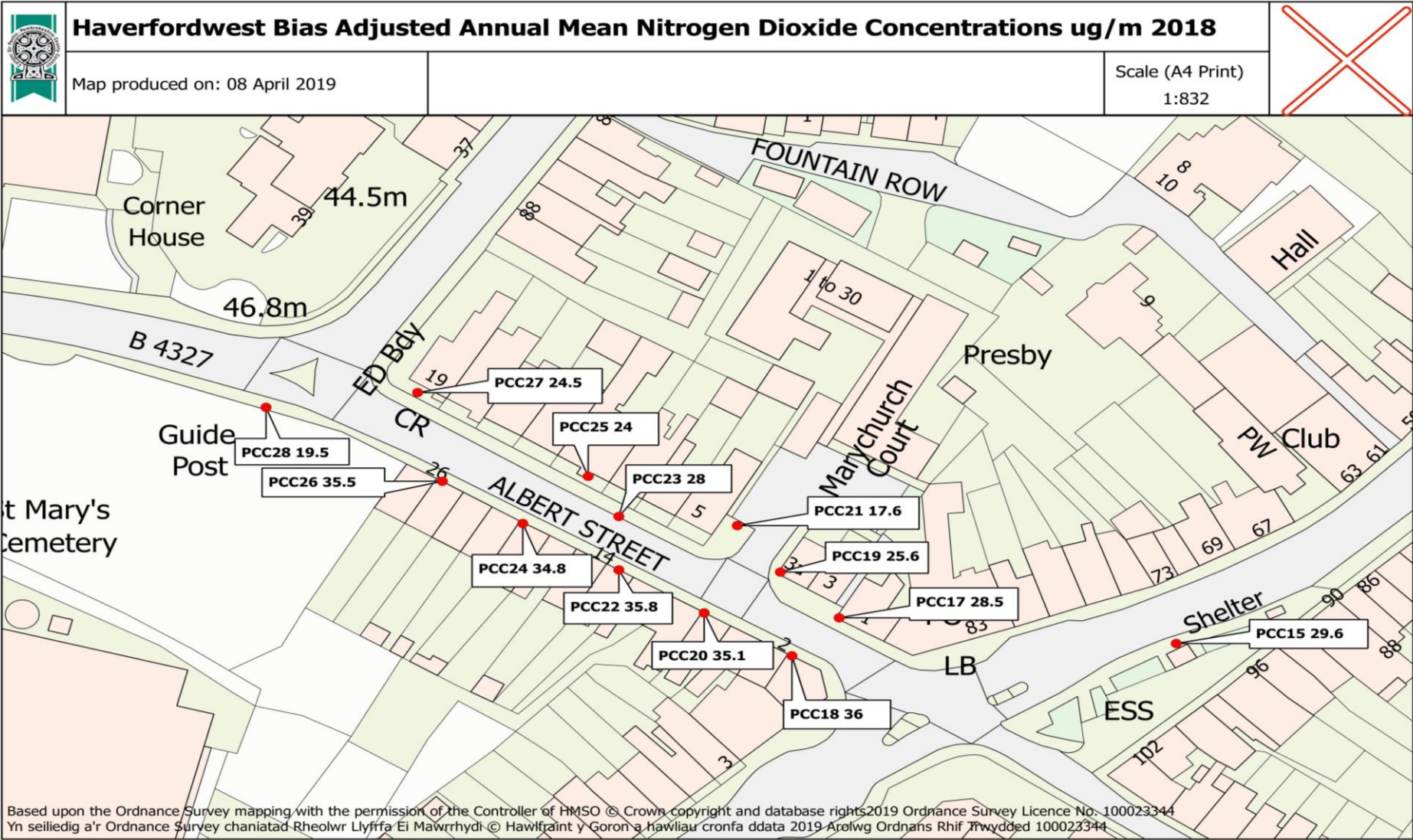
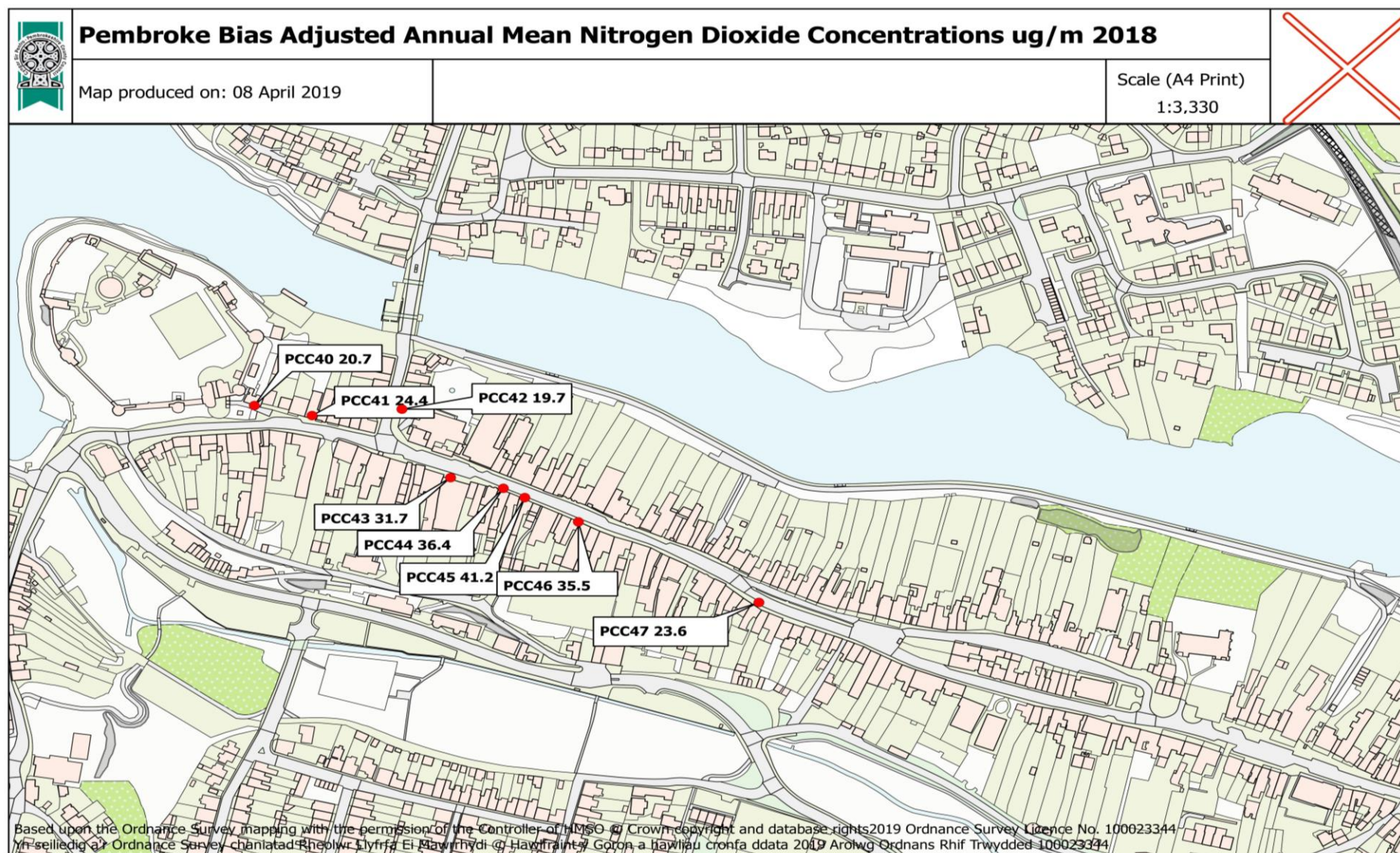




Figure 2.5 Pembroke AQMA





## 2.3 Comparison of 2018 Monitoring Results with Previous Years and the Air Quality Objectives

### 2.3.1 Nitrogen Dioxide (NO<sub>2</sub>)

Diffusion tube monitoring for annual mean NO<sub>2</sub> levels within this Authority's area has indicated a reduction of exceedances within the AQMA's declared as detailed below;

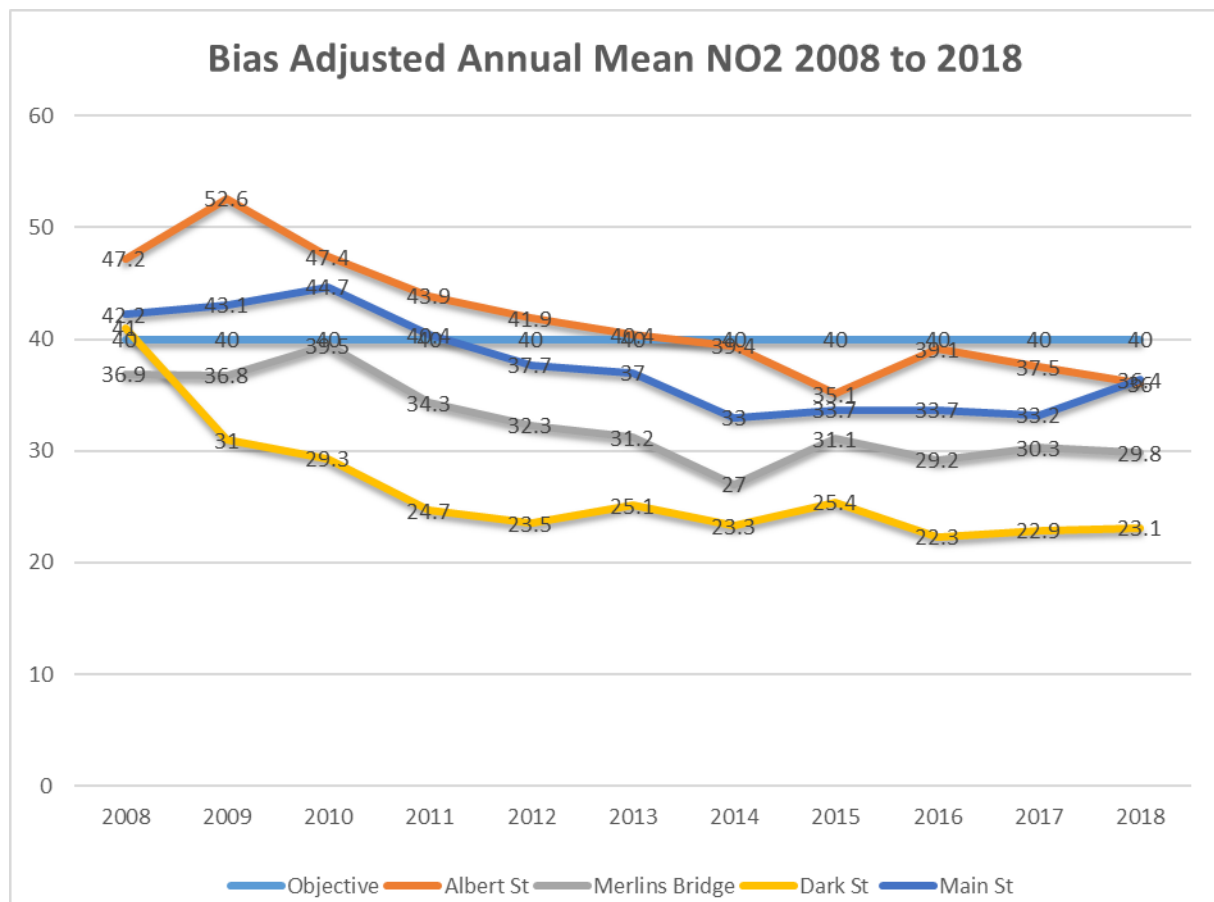
**Table 2.11 AQMA NO<sub>2</sub> Exceedances 2013 - 2018**

Location	Year					
	2013	2014	2015	2016	2017	2018
Haverfordwest	4	2	0	1	0	0
Pembroke	1	0	0	1	0	1

Monitoring has taken place historically at these locations due to the local site characteristics being typically representative of the "street canyon" scenario and relevant exposure for members of the public within the environs of Haverfordwest and Pembroke which provide central shopping high streets areas.

The following Figure 2.6 graphically represents the downward trend of NO<sub>2</sub> levels at the historic locations detailed at Table 2.11. It is notable that the 2010/2011 trend is for a reduction in the level of NO<sub>2</sub> at all the monitoring locations compared to the steady rise over the previous years. This general reduction has continued within 2018 and appears to be relatively stable overall within the AQMA's and the outlying diffusion tubes that provide the detailed assessment of the locations for Haverfordwest and Pembroke with the NO<sub>2</sub> objective.

The 2018 monitoring results provide the data set for the provision of the required Progress Report as recommended in guidance document LAQM.TG(16).

**Figure 2.6 Bias Adjusted Nitrogen Dioxide Levels**

### Automatic Monitoring Data

An automated analyser has been located at the Narberth site for many years providing the automatic data for the county of Pembrokeshire. A section 106 Agreement associated with the planning consent for the development of the RWE npower Pembroke Power Station required the introduction of automated analysers at Pennar Cants in close proximity to the development site. The analyser has been providing data since 2010 but as detailed above has ceased in January 2016.

Tables 2.12 and 2.13 summarise the results of the automatic monitoring of NO2 carried out within the County and detail that neither of the relevant objectives have been exceeded and there is not thought to be a likelihood of an exceedance within the foreseeable future. An Annual Pollution Report for 2018 is also included for the Narberth (PEMB) site produced by Ricardo Energy and Environment on behalf of the Welsh Air Quality Forum at Appendix 2 to assist in the assessment.

**Table 2.12 Results of Automatic Monitoring of Nitrogen Dioxide: Comparison with Annual Mean Objective of 40 µg/m<sup>3</sup>**

Site ID	Site Type	Within AQMA?	Valid Data Capture for period of monitoring % <sup>a</sup>	Valid Data Capture 2018 % <sup>b</sup>	Annual Mean Concentration µg/m <sup>3</sup>		
					2016* c	2017* c	2018 c
Narberth	Rural	N	N/A	99	4	3	4

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

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

<sup>c</sup> Means should be "annualised" as in Box 3.2 of TG(09), if monitoring was not carried out for the full year.

\*Annual mean concentrations for previous years are optional.

**Table 2.13 Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour mean Objective of 200 µg/m<sup>3</sup>**

Site ID	Site Type	Within AQMA?	Valid Data Capture for period of monitoring % <sup>a</sup>	Valid Data Capture 2018 % <sup>b</sup>	Maximum Hourly Mean µg/m <sup>3</sup>		
					2016* c	2017* c	2018 c
Narberth	Rural	N	N/A	99	61	51	39

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

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

<sup>c</sup> If the period of valid data is less than 90%, include the 99.8<sup>th</sup> percentile of hourly means in brackets

\*Number of exceedences for previous years are optional.

## Diffusion Tube Monitoring Data

The results for diffusion tube monitoring have been detailed previously at Tables 2.6, 2.7 and 2.11 for the years 2016, 2017 and 2018 respectively.

### 2.3.2 Particulate Matter (PM<sub>10</sub>)

The objective for particulate matter has not been compromised as detailed within the aforementioned results data and associated tables therefore no further comments will be made.

### 2.3.3 Particulate Matter (PM<sub>2.5</sub>)

Narberth AURN is now able to monitor for PM<sub>2.5</sub> as a new particulate monitor, an Air Monitors Pala Fidas 200, has been introduced to the site in 2018 but only six months data collection has taken place to date. PM<sub>2.5</sub> results will be reported in future air quality reporting.

### 2.3.4 Sulphur Dioxide (SO<sub>2</sub>)

No concerns have been raised in relation to sulphur dioxide as the monitored levels have been low but it should be reported that the data capture for the analyser for 2018 was below the recommended level at 84%.

### 2.3.5 Ozone (O<sub>3</sub>)

The Air Quality Strategy Guidelines are not applicable to this pollutant but due to the results obtained for 2018 it is thought to be worth commenting upon in this report. The Air Pollution Report for 2018 produced by Ricardo Energy and Environment via the Welsh Air Quality Forum (WAQF) web site details an exceedance for ozone and is produced at Appendix 2.

The report details that in relation to the 8 hour running mean > 100 $\mu$ g/m<sup>3</sup> not to be exceeded ten times per year 228 exceedances took place over a period of 30 days during 2018 and the associated ozone graph within the report indicates that the summer months were the active period for increased ozone levels.

The WAQF details that low level ozone is formed by a process of chemical reactions between sunlight and volatile organic compounds (VOC's) in the presence of nitrogen oxides (NO<sub>x</sub>). VOC's can be attributable to petroleum handling and distribution and the Narberth AURN site is located at an elevated location within the county and downwind of the predominant wind direction from the Miford Haven estuary area where petrochemical storage, transport and refining operations take place. The chemical reaction associated with ozone production can take place over

time, hours and days, and so the source of VOC's and NOx can be some distance away from monitoring locations and develop over time and distance travelled, the source can therefore be some distance away from the monitoring/affected area/s. Inspection of meteorology data for the 2018 period via the following source <https://www.metoffice.gov.uk/climate/uk/summaries/2018/summer> detail's a year with a summer with above average sunshine and temperature levels and the following Map at Figure 2.7 and Graph at Figure 2.8 are reproduced from the Met Office to evidence this.

**Figure 2.7 Percentage Summer Sunshine 2018**

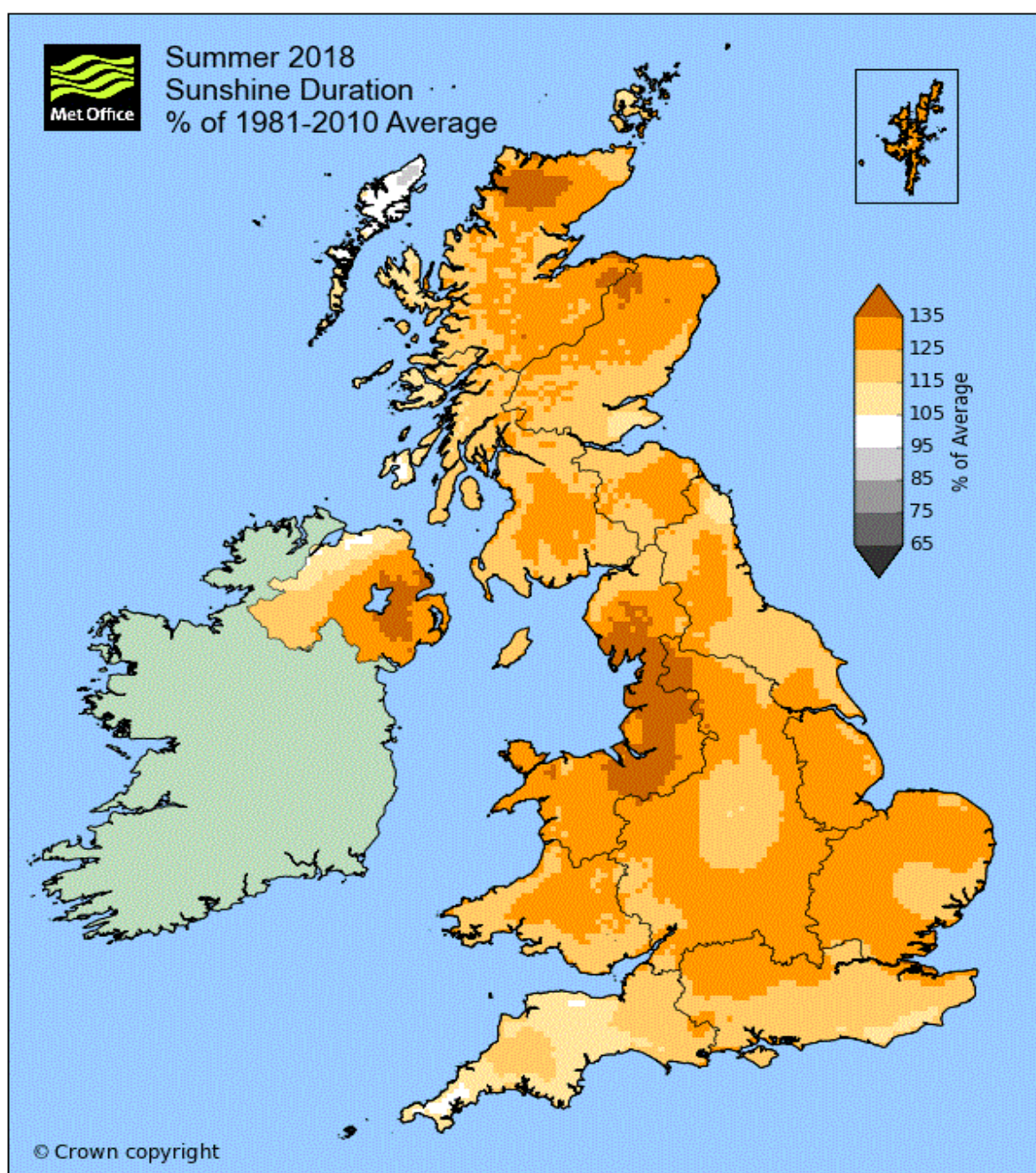
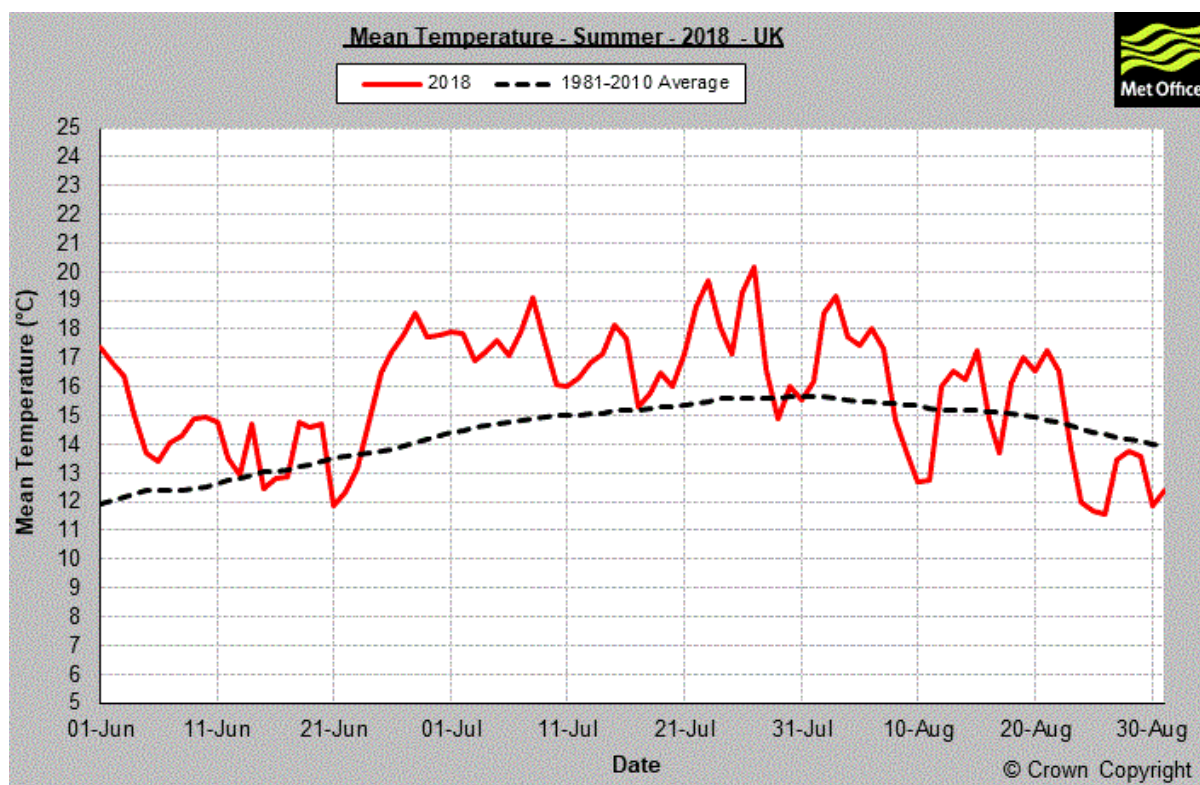




Figure 2.8 Mean Summer Temperature 2018



The Met Office report details that most of the 2018 summer was dominated by warm and largely sunny weather with short unsettled periods. High pressure maintained a settled influence over the UK with temperatures well above average for much of the time up to August with numerous days above 30°C within the UK and sunshine overall was above average. The report also recognises that the west of the UK were much sunnier than average in June and July 2018.

The report provided a 2018 UK statistical summary that included the mean temperature as 1.4°C above the 1981 to 2010 average and 625 hours of sunshine which represent 124% of the 1981 to 2010 average.

Therefore, it is thought that the prevailing meteorological conditions detailed above have had an influence upon the chemical process associated with ozone formation that potentially is related to local industry resulting in the air quality monitoring results for ozone recorded at the Narberth AURN monitoring station.

## 2.4 Summary of Compliance with AQS Objectives as of 2018

Pembrokeshire County Council has examined the results from monitoring within the County of Pembrokeshire and have found that the associated concentrations are all below the relevant Objectives except for nitrogen dioxide where a slight exceedance has taken place at one monitoring point within the Pembroke AQMA.

This Authority intends to continue with the monitoring regime currently in place for nitrogen dioxide monitoring and the two AQMA's of Haverfordwest and Pembroke.

The use of diffusion tubes has taken place within the two affected areas for some considerable time and has come about due to initial concerns being raised with regard the exceedance of a few monitoring locations within Haverfordwest and Pembroke respectively. These historic monitoring point locations did not meet the criteria as sensitive receptor locations where a person may spend an hour or more at that particular location but are all within the town high street areas where persons may spend an hour or more.

The concern was then for the extent to which the high street areas were affected and to what degree and so the number of diffusion tube locations were increased over a period of time to confirm the extent of the affected areas resulting in the AQMA designations detailed within figures 1.1 and 1.2 respectively. It was thought that this was the responsible approach to take to the NO<sub>2</sub> influence identified within Pembrokeshire as the other approach could have been to argue that the initial exceedance monitoring points were not representative of sensitive receptor locations and so no further actions were required but it was felt that this approach did not clarify with certainty the possible and/or actual extent of the NO<sub>2</sub> problem within a wider public area where members of the public could potentially be exposed to NO<sub>2</sub> for periods amounting to or exceeding an hour.

The data now accumulated over several years has identified that following the initial periods where exceedance of the NO<sub>2</sub> objective was encountered has seen a steady reduction in the levels monitored and are remaining relatively constant and below the 40µg/m<sup>3</sup> threshold level that represents the relevant annual objective for NO<sub>2</sub>.

### **3. New Local Developments**

Pembrokeshire County Council confirms that there are no new or newly identified local developments which may have an impact on air quality within the Local Authority area.

Pembrokeshire County Council confirms that all the following have been considered:

- Road traffic sources
- Other transport sources
- Industrial sources
- Commercial and domestic sources
- New developments with fugitive or uncontrolled sources.

#### **3.1 Road Traffic Sources (& other transport)**

There has been no identification of any new road traffic and other transport sources of concern since the last air quality assessment.

#### **3.2 Industrial / Fugitive or Uncontrolled Sources / Commercial Sources**

There has been no identification of any new industrial, fugitive or uncontrolled sources and/or commercial sources of concern since the last air quality assessment.

#### **3.3 Planning Applications**

There has been no identification of any new planning applications of concern since the last air quality assessment.

#### **3.4 Other Sources**

There has been no identification of any other source that may have an adverse impact upon local air quality since the last air quality assessment.



## 4. Policies and Strategies Affecting Airborne Pollution

### 4.1 Local / Regional Air Quality Strategy

Pembrokeshire County Council provide annual reports to the Wales Climate Change Strategy to assist in assessing sector specific emission reduction targets specifically energy and/or green-house gas emissions from the public sector in Wales in relation to the Authority's;

- Housing stock.
- Non-domestic buildings.
- Fleet vehicles and transport provisions.

Encompassing emissions from energy use in buildings, community wide emission's from private sector housing, fleet transport and business travel.

The data is compiled and returned as;

- Utility supplier information.
- Annual Welsh Assembly Government Returns.
- Carbon Reduction Commitment Energy Efficiency Scheme returns.
- Annual surveys.
- Internal Business Plan reporting.
- Returns from site managers.

Other reporting indicators to assist strategy development are;

- Welsh Assembly Government National Strategic Indicator EEF/002a (NS18a) (NSPI19) for percentage reduction in carbon emissions in the councils non-domestic public stock.
- Internal local indicator HC HC2 for percentage reduction in carbon emissions in the council's non-domestic public stock since 2003.
- Welsh Assembly Government National Strategic Indicator EEF/002bi (NS18bi) for percentage reduction in energy use in the housing stock.

- Welsh Assembly Government National Strategic Indicator EEF/002bii (NS18bii) for percentage reduction in carbon dioxide emissions in the housing stock.
- Transport emissions reporting.

In 2014 local authorities were advised by the Welsh Assembly Government that the European Commission had formally launched infraction proceedings against the UK for breaching nitrogen dioxide limit values under the EU Air Quality Directive 2008/50.

Pembrokeshire County Council, along with all local authorities, completed a log sheet as requested to assist with the development of a National Air Quality Plan to resolve the nitrogen dioxide exceedence.

In July 2017 the UK Government announced that new petrol and diesel cars and vans will be phased out by 2040 in a bid to tackle air pollution with a £255m fund to help councils tackle emissions from diesel vehicles as part of a £3bn package of spending on air quality.

## 4.2 Air Quality Planning Policies

Pembrokeshire County Council in conjunction with Carmarthenshire County Council, Ceredigion County Council and Powys County Council in relation to the planning application process have developed the guidance document **Mid and West Wales Air Quality: A Guide for Developers**.

The production of this guidance has been prepared as a reference document for Developers and their advisers who may be involved in the assessment of air quality associated with developments. It details 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 is the result of joint work carried out by Carmarthenshire County Council, Ceredigion County Council, Pembrokeshire County Council and Powys County Council. The guidance will be reviewed annually or as and when necessary.

New developments have the potential to impact on air quality. Air quality is a material consideration when assessing an application for planning permission under the planning system. Where appropriate, the application for the development, which will

normally be determined by the Local Planning Authority (LPA), should be accompanied by an air quality assessment.

This guidance deals principally with the following:

- those pollutants regulated under the Local Air Quality Management (LAQM) regime. PM2.5, which is not covered in this regime is, however, given some attention because of its significant health effects and absence of a safe level for exposure;
- the impact of traffic emissions;
- the impact of emissions from biomass boilers; and
- the assessment and control of dust impacts during construction is also considered, as dusts contribute to airborne particulate matter, as well as to dust soiling.

The following are not specifically considered:

- emissions from industrial sources as they are principally covered by the Environmental Permitting regime;
- assessments of the air quality impacts of major road schemes which are principally covered by the Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 1 (Air Quality);
- greenhouse gas emissions; and
- odours as reference should be made to other specific guidance on odour.

The spatial planning system, which includes development control and local development planning, has an important role to play in improving air quality and reducing exposure to air pollution.

Where a proposed development is likely to give rise to significant air quality impacts on the surrounding area or be impacted upon by existing poor air quality, the planning process requires assessment of the impacts and the introduction of measures to minimise any adverse impacts. National planning policy requires particular attention to be paid to development within or close to areas formally designated as Air Quality Management Areas (AQMAs). In certain circumstances, air

quality issues within AQMAs may be sufficient for planning permission to be refused, but there is no blanket presumption against development within AQMAs.

This guidance aims to provide advice on describing air quality impacts and assessing their significance, specifically:

- detailing the need for an air quality assessment;
- what should be included in an assessment;
- the methods of evaluating air quality assessments;
- mitigation measures for the construction phase;
- mitigation for air quality impacts; and
- planning conditions and obligations (Section 106 agreements).

Early dialogue is highly recommended between developers and planners, as well as with pollution officers. Failure to provide adequate supporting information with the planning application may result in significant delays in the planning process or planning permission being refused by the LPA.

### 4.3 Local Transport Plans and Strategies

The Joint Transport Plan for South West Wales 2015 – 2020 is now in effect as the Local Transport Plan initiative replacing the Regional Transport Plan 2010 – 2015 though the RTP is still recognised as being relevant within the JTP and forms the basis of the LTP.

The LTP vision is “To improve transport and access within and beyond the region to facilitate economic regeneration, reduce deprivation and support the development and use of more sustainable and healthier modes of transport.”

The objectives of the LTP are detailed as;

1. To improve the efficiency and reliability of the movement of people and freight within and beyond South West Wales to support economic growth in the City Region.
2. To improve access for all to a wide range of services and facilities including employment and business, education and training, health care, tourism and leisure activities.

3. To improve the sustainability of transport by improving the range and quality of, and awareness about, transport options, including those which improve health and wellbeing.
4. To improve integration between policies, service provision and modes of transport in South West Wales.
5. To implement measures which will protect and enhance the natural and built environment and reduce the adverse impact of transport on health and climate change.
6. To improve road safety and personal security in South West Wales.

The vision and objectives detailed above relate to the National Transport Plan and the Welsh Governments priorities associated with the development of Transport Plans.

The JTP details the LTP Programme 2015 – 2020 of work to be developed with eight tables detailing specific schemes and table six relates specifically to Pembrokeshire a copy of which is provided at Appendix 3. The table details specific schemes to be developed a description of the scheme its priority, costs and funding source.

## 5. Conclusions and Proposed Actions

### 5.1 Conclusions from New Monitoring Data

Figure 2.1 of this report graphically represents a general stable trend for the monitoring of NO<sub>2</sub> at the locations detailed within this report and the air quality monitoring regime incorporated by Pembrokeshire County Council has indicated that the air quality objective for the nitrogen dioxide annual mean level of 40µg/m<sup>3</sup> has been complied with at all but one of the monitoring locations within the identified AQMA's within Haverfordwest and Pembroke as well as outlying monitoring locations.

The trend within both the AQMA's within 2018 is of compliance of the NO<sub>2</sub> objectives with an apparent consistency in NO<sub>2</sub> levels over the last three years.

### 5.2 Conclusions from Assessment of Sources

The ongoing use of diffusion tubes in and around the areas where high NO<sub>2</sub> concentrations have historically taken place has enabled an assessment of the NO<sub>2</sub> levels within affected areas; thereby enabling recognition of the extent to which AQMA's are being affected over time and the stable shape of their boundaries and enabling designation or removal of AQMA status.

The 2018 data contained in this report represents the Progress Report of the air quality within Pembrokeshire.

This report confirms the previous requirement for the designation of two AQMA's within Haverfordwest and Pembroke were correct but that the present trend for the NO<sub>2</sub> levels within the AQMA's to be steadily below the objective has continued.

The Pembroke AQMA has one exceedance of the NO<sub>2</sub> annual mean objective in 2018 but not a sensitive receptor location.

The area of the Haverfordwest AQMA in Albert Street has historically been an area of concern and for 2018 there are no exceedances of the NO<sub>2</sub> annual mean objective.

It is thought that the improved fuel efficiency and emission control associated with improved modern vehicles that are taking over from older vehicle types, action planning and associated strategies detailed previously are having a positive impact upon local air quality within the AQMA's declared with regard to NO<sub>2</sub>. But there is still

an issue for NO<sub>2</sub> as the revocation of an AQMA requires less than 10% of the NO<sub>2</sub> objective, < 36µg/m<sup>3</sup> for three consecutive years to take place before an AQMA declaration can be removed.

### 5.3 Proposed Actions

The Progress Report 2018 confirms that the air quality objective for NO<sub>2</sub> has only been exceeded at one location within the two designated AQMA's during 2018 and that the location does not represent a sensitive receptor site where person's may be present for an hour or more at that one location.

The AQMA's themselves were designated as the concern related to the fact that persons could be within the affected locality for an hour or more as they are both main high street shopping locations.

But the trend over recent years is for a relatively stable level of NO<sub>2</sub> concentrations that are remaining within the bias adjusted annual mean objective of 40µg/m<sup>3</sup>.

Pembrokeshire County Council has continued to declare two Air Quality Management Area's within Haverfordwest and Pembroke town centres during 2018 as detailed within Figure's 1.1 and 1.2 respectively within this report.

Pembrokeshire County Council has continued with the same air quality sampling monitoring regime as detailed within this and the previous year's reporting. This trend has been found to have continued through the 2018 NO<sub>2</sub> objective monitoring period within the AQMA's.

**Therefore, this authority intends to continue the present regime of diffusion tube monitoring at all locations detailed within this report through 2019 to monitor future levels of the NO<sub>2</sub> annual objective. Specifically in relation to the < 36µg/m<sup>3</sup> criteria for all monitoring locations for three consecutive years. If this criteria is then met an application for revocation of the two AQMA designations in Pembroke and Haverfordwest would then be submitted for consideration.**

## References

- Pembrokeshire County Council's Updating and Screening Assessment December 2015
- Pembrokeshire County Council's Progress Report September 2018
- Pembrokeshire County Council's Progress Report and Detailed Assessment April 2011
- Part IV of the Environment Act 1995  
Local Air Quality Management  
Technical Guidance LAQM.TG(16)  
2016
- Air Pollution in Wales Reports 2009 to 2010  
Reports of the Welsh Air Quality Forum  
AEA Energy & Environment
- Welsh Air Quality Forum data downloads.  
[www.welshairquality.co.uk](http://www.welshairquality.co.uk)
- Mid and West Wales Air Quality: A Guide for Developers (2012)
- Joint Transport Plan for South West Wales 2015 – 2020
- Local Air Quality Management in Wales. Policy Guidance June 2017



## Appendices

Appendix 1: WASP

Appendix 2: Annual Air Pollution Report Narberth AURN (PEMB)

Appendix 3: Joint Transport Plan for South West Wales 2015 – 2020 Table Six  
Pembrokeshire

## Appendix 1: WASP

**Table 1: Laboratory summary performance for AIR NO<sub>2</sub> PT rounds AR0018, 19, 21, 22, 24, 25, 27 and 28**

The following table lists those UK laboratories undertaking LAQM activities that have participated in recent AIR NO<sub>2</sub> PT rounds and the percentage (%) of results submitted which were subsequently determined to be satisfactory based upon a z-score of  $\leq \pm 2$  as defined above.

AIR PT Round	AIR PT AR018	AIR PT AR019	AIR PT AR021	AIR PT AR022	AIR PT AR024	AIR PT AR025	AIR PT AR027	AIR PT AR028
Round conducted in the period	January – February 2017	April – May 2017	July – August 2017	September – October 2017	January – February 2018	April – May 2018	July – August 2018	September – October 2018
Aberdeen Scientific Services	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Cardiff Scientific Services	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Edinburgh Scientific Services	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Environmental Services Group, Didcot	100 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]
Exova (formerly Clyde Analytical)	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Glasgow Scientific Services	100 %	50 %	0 %	100 %	100 %	100 %	50 %	100 %
Gradko International [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	100 %	100 %	100 %
Kent Scientific Services	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Kirklees MBC	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Lambeth Scientific Services	100 %	NR [2]	NR [2]	100 %	NR [2]	NR [2]	NR [2]	25 %
Milton Keynes Council	100 %	75 %	0 %	75 %	100 %	75 %	100 %	100 %
Northampton Borough Council	0 %	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Somerset Scientific Services	100 %	100 %	100 %	75 %	100 %	100 %	100 %	100 %
South Yorkshire Air Quality Samplers	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Staffordshire County Council	100 %	100 %	100 %	100 %	50 %	100 %	100 %	100 %
Tayside Scientific Services (formerly Dundee CC)	100 %	NR [2]	100 %	NR [2]	100 %	NR [2]	100 %	NR [2]
West Yorkshire Analytical Services	100 %	100 %	100 %	100 %	50 %	75 %	100 %	100 %

[1] Participant subscribed to two sets of test results (2 x 4 test samples) in each AIR PT round.

[2] NR No results reported

[3] Northampton Borough Council, Kent Scientific Services, Cardiff Scientific Services, Kirklees MBC and Exova (formerly Clyde Analytical) no longer carry out NO<sub>2</sub> diffusion tube monitoring and therefore did not submit results.

## Appendix 2: Annual Air Pollution Report Narberth AURN (PEMB)

### Air Pollution Report

1st January to 31st December 2018

Narberth (Site ID: PEMB )

Note: These data are **provisional**

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

Pollutant	O <sub>3</sub> µg/m <sup>3</sup>	NO µg/m <sup>3</sup>	NO <sub>2</sub> µg/m <sup>3</sup>	NO <sub>x</sub> asNO <sub>2</sub> µg/m <sup>3</sup>	SO <sub>2</sub> µg/m <sup>3</sup>	PM <sub>10</sub> µg/m <sup>3</sup>	PM <sub>25</sub> µg/m <sup>3</sup>
Number Days Low	0	-	0	-	0	0	0
Number Days Moderate	0	-	0	-	0	0	0
Number Days High	0	-	0	-	0	0	0
Number Days Very High	0	-	0	-	0	0	0
Max Daily Mean	121	2	20	21	8	33	23
Max 8 Hour Ozone	140	-	-	-	-	-	-
Max 15 min SO <sub>2</sub>	-	-	-	-	40	-	-
Annual Max	149	16	39	50	22	96	41
Annual Mean	63	1	4	5	1	12	6
98th Percentile of daily mean	-	-	-	-	-	27	-
90th Percentile of daily mean	-	-	-	-	-	20	-
99.9th Percentile of 15 minute mean	-	-	-	-	8	-	-
99.8th Percentile of hourly mean	-	-	24	-	-	-	-
99.7th Percentile of hourly mean	-	-	-	-	6	-	-
98th Percentile of hourly mean	106	2	16	17	4	32	20
95th Percentile of hourly mean	93	1	11	13	3	27	16
50th Percentile of hourly mean	64	0	2	3	1	10	5
% Annual data capture	99.05%	98.57%	98.57%	98.57%	83.74%	97.31%	56.22%

Instruments: PM<sub>10</sub>: FDMS TEOM (no correction) (01/01/2018 to 22/06/2018), FIDAS (25/05/2018 to 31/12/2018)

PM<sub>25</sub>:

1

PM<sub>10</sub>: FDMS TEOM (no correction) (01/01/2018 to 22/06/2018), FIDAS (25/05/2018 to 31/12/2018)

PM<sub>25</sub>:

1

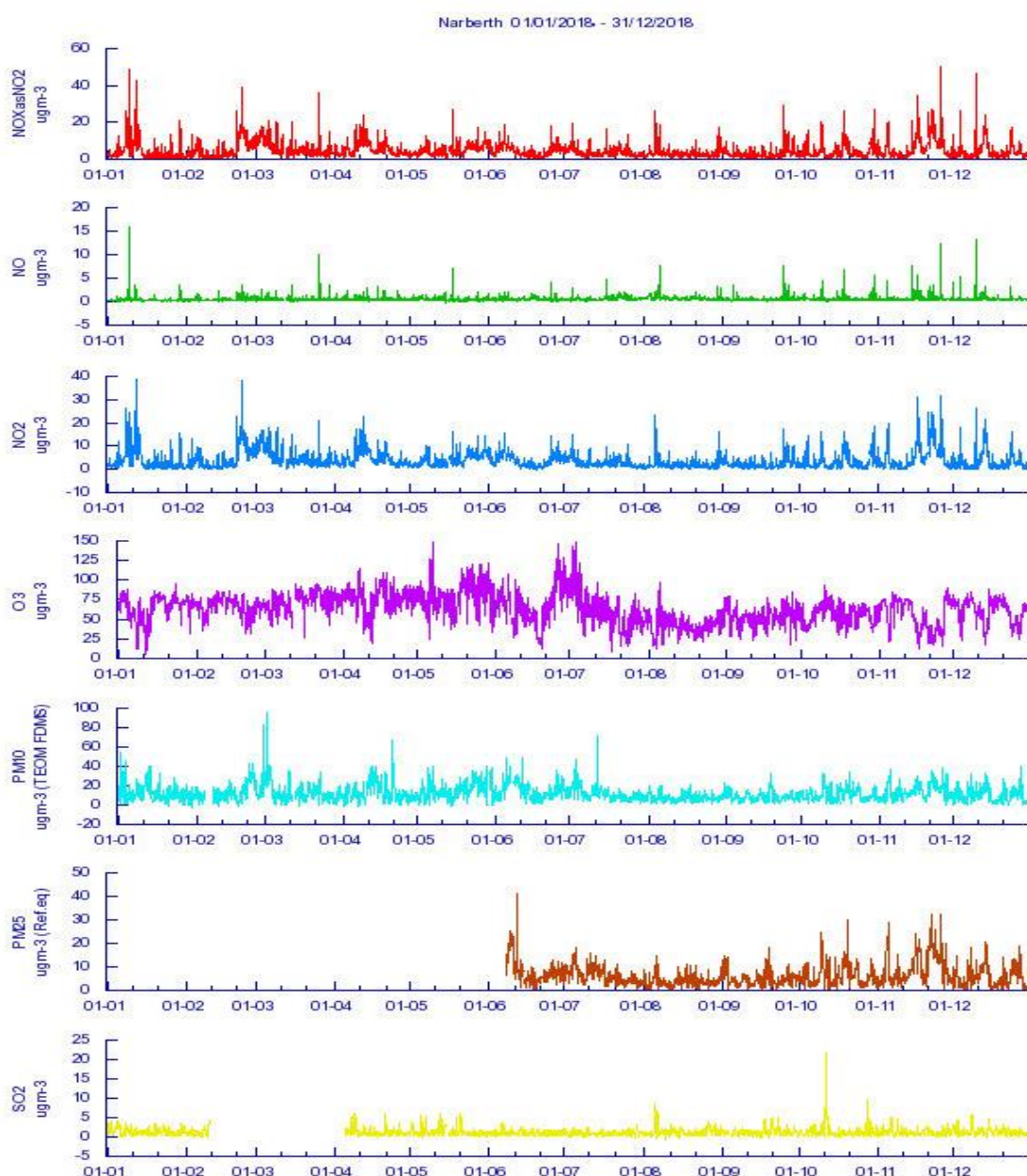
PM<sub>10</sub>: FDMS TEOM (no correction) (01/01/2018 to 22/06/2018), FIDAS (25/05/2018 to 31/12/2018)

PM<sub>25</sub>:

All gaseous pollutant mass units are at 20°C and 1013mb. Particulate matter concentrations are reported at ambient temperature and pressure. NO<sub>x</sub> mass units are NO<sub>x</sub> as NO<sub>2</sub> µg/m<sup>3</sup>.

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

Pollutant	Air quality standard	Exceedances	Days
Particulates < 10um (hourly measured)	daily mean > 50 microgrammes per metre cubed	0	0
Particulates < 10um (hourly measured)	Annual mean > 40 microgrammes per metre cubed	0	-
Nitrogen dioxide	Hourly Mean > 200 microgrammes per metre cubed	0	0
Nitrogen dioxide	Annual Mean > 40 microgrammes per metre cubed	0	-
Ozone	8-hour running mean > 100 microgrammes per metre cubed	228	30
Sulphur dioxide	15 Minute mean > 266 microgrammes per metre cubed	0	0
Sulphur dioxide	Hourly mean > 350 microgrammes per metre cubed	0	0
Sulphur dioxide	Daily Mean > 125 microgrammes per metre cubed	0	0
Sulphur dioxide	Annual mean > 20 microgrammes per metre cubed	0	-
Sulphur dioxide	Winter Mean > 20 microgrammes per metre cubed	0	-





## Appendix 3: Joint Transport Plan for South West Wales 2015 – 2020 Table Six Pembrokeshire

Table Six – Pembrokeshire County Council Schemes 2015 – 2020

Scheme Name	Description of Scheme	Priority	Local, regional or national significance	Cost (£k)	Funding sources
Road Safety and safe routes in Communities package	A County wide programme aimed at providing safer environments for all road users through the introduction of engineering and educational measures together with safe routes in communities.	1	Local	4,500	Road Safety Grant, Safe Routes in Communities, WG
Fishguard Town Centre Access Improvements including bus focal point	Link road to enable a one way system and Bus Focal point in the centre of Fishguard. Work will include footway and shared-use path provision, safety improvements and enhancements to public transport infrastructure.	2	Local	1,500	LTF, Corporate, Section 106, CIL
St. Davids Sustainable Access Project (Glasfryn Road)	Traffic relief for the centre of St. Davids by widening to two lanes the existing Glasfryn Road which would form a bypass. This will provide an opportunity to improve pedestrian safety and cycle accessibility in St. Davids.	3	Local	950	LTF, Corporate, Section 106, CIL
Southern Strategic Route	Nash Fingerpost to Energy Site Corridor enhancement- completion of route with Maidenwells Link Road, and Greenhill/Glenside improvements	3	Local	3,100	LTF, Corporate, Section 106, CIL
Haverfordwest Masterplan (incl. Air Quality and Sustainable Access)	Improvements to town centre connectivity including bus and shared use path routes as part of the Haverfordwest Masterplan for improving the county town's transport network to facilitate economic development.	5	Local	4,500	LTF, Corporate, Section 106, CIL, LGBI,
Active Travel Act Schemes	Schemes to be worked up through consultation process at Fishguard & Goodwick,, Haverfordwest,, Narberth, Johnston, Milford Haven, Neyland, Pembroke, Pembroke Dock, Tenby , Saundersfoot and St. Dogmaels (in partnership with Ceredigion).	5	Local	2,500	LTF, Corporate, Section 106, CIL Safe Routes,
North-west Shared Use Path (SUP) link into Haverfordwest	To complete missing sections of SUP linking town with communities to the north-west, i.e. Pelcomb Bridge to Pelcomb Cross, and Simpsons Cross to Roch	7	Local	300	LTF, Corporate, Safe Routes (Roch)
Completion of Cycle Route (including SUPs) from Milford Haven to Johnston and to St Ishmaels / Dale – classification as NCN 449 pending	Will provide final sections of safe cycling route from Milford Haven to Haverfordwest and from Milford Haven to St. Ishmaels via Hebrandston. The western link will necessitate a crossing of Sandy Haven near Middlekilns and the use of quiet lanes	7	National	1,500	LTF, Corporate, Section 106, CIL, Trunk Road
Haverfordwest to Narberth Cycle route	Safe Walking & Cycling route between the towns linking with NCN, Pembrokeshire Trail and Bluestone Centre	7	Regional	375	LTF, Corporate, Section 106, CIL, Trunk Road
Fishguard to Llanychaer SUP	Wheelchair accessible traffic free route for NCN 47&82. Avoids very steep on-road route	7	National	450	LTF, Corporate
Llanychaer to Cilrhedyn Bridge SUP	Wheelchair accessible traffic free route for NCN 82. Avoids very steep on-road route	7	National	300	LTF, Corporate
Newport to Castell Henllys SUP	Part of NCN82, links also with Llwyngwair, Nevern and Felindre Farchog. Avoids trunk road	7	National	350	WG, Corporate, Trunk Road

Scheme Name	Description of Scheme	Priority	Local, regional or national significance	Cost (£k)	Funding sources
Fishguard to Letterston SUP(Phase 2)	Extends completed Phase 1 alongside TRA40 on completion of Phase 3 in the future. Would then form part of NCN 449 with link to NCN 4, 47 & 82 at northern end. Opportunity to interface with former railway line which if developed could be designated as NCN 47	7	National	205	WG, Trunk Road
Pembroke Dock to Milton SUP	Extends partly completed scheme along TRA477 with link to NCN 4 at western end and link to established community SUPs at eastern end. Includes SUP modifications/crossings near Waterloo roundabout	7	Regional	525	WG, Trunk Road
Pembrokeshire Strategic Bus Corridor Improvements	Bus stop infrastructure improvements to key bus corridor routes, including the new Traws Cymru route from Haverfordwest to Aberystwyth, to improve connectivity & access between the County's main settlements. Improvements to include bus stop enhancements, new bus shelters and the provision of real time information where practicable.	15	Regional	170	LTF, Corporate, Section 106, CIL
Pembroke Community Regeneration Scheme - Traffic Management and Air Quality	Traffic Management improvements to assist traffic flow, reduce congestion, and improve air quality within Pembroke town centre.	15	Local	450	LTF, Corporate
Pembroke Dock Public Transport Interchange	Public transport interchange adjacent to Pembroke Dock Railway station to include improved pedestrian and shared use links to Pembroke Dock Town Centre and Retail Park. The scheme is spade ready having Planning Permission	17	Regional	1,300	LTF, Corporate
Access Improvement to railway stations	Walking, cycling and public transport access improvements to the county's rail stations to complement the increasing patronage.	18	Regional	400	LTF, Corporate
Fishguard Harbour Development	Improvements to transport infrastructure and seaborne access to support Fishguard Harbour regeneration and improve links to the TEN_T network, Ireland and the rest of Europe.	19	Regional	10,000	LTF, Corporate, Section 106, CIL, Private Sector
Haverfordwest Airport Extension	Extending runway and upgrading facilities to support regeneration as part of the Haven Waterway Enterprise Zone.	20	National	2,100	LTF, Corporate, Private Sector
Milford Haven Public Transport Interchange	Improved access to Milford Haven Bus/Rail interchange including improved pedestrian and shared use links around Havens Head Retail Park.	21	Regional	4,300	LTF, Corporate
Tenby Sustainable Access Project	To improve sustainable access to and within the town including further developments to the Park & Ride and Pedestrianisation scheme	22	Local	1,800	LTF, Corporate
Newhouse Bridge Improvement A4075	Newhouse Bridge is located just north of the Bluestone roundabout. This minor realignment scheme is considered desirable not only to improve visibility but also to accommodate a facility for pedestrians and cyclists benefitting locals and visitors to the area.	23	Local	350	LTF, Corporate
Waterston Bypass	Bypass of the village of Waterston to provide and improve highway connectivity between the A40/A4076 Trunk Road Network via the A477 to regeneration areas within the Haven Waterway Enterprise Zone (northern shore )	24	Regional	10,500	LTF, Corporate Section 106, CIL

## Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the LA intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
APR	Air quality Annual Progress Report
AURN	Automatic Urban and Rural Network (UK air quality monitoring network)
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Nitrogen Oxides
PM <sub>10</sub>	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM <sub>2.5</sub>	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO <sub>2</sub>	Sulphur Dioxide