2017 Air Quality Progress Report
Pembrokeshire County Council

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

September 2017

Local Authority Officer	David Walters
Department	Public Protection Division
Address	Pembrokeshire County Council County Hall Haverfordwest Pembrokeshire SA61 1TP
Telephone	01437 776546
e-mail	david.walters@pembrokeshire.gov.uk
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Executive Summary

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 2017 Progress Report for Pembrokeshire County Council 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 is being exceeded.**

The monitoring and assessment of the above parameters through 2016 has indicated a very slight reduction in nitrogen dioxide levels throughout the monitoring locations and resulting in two exceedances with the nitrogen dioxide objective with one in each of the declared Air Quality Management Areas .

The results of nitrogen dioxide monitoring undertaken by Pembrokeshire County Council has indicated the levels associated with vehicular traffic have been on a slow but steady reduction; the 2016 annual mean has indicated a continuation of this trend but with no significant reduction in the levels for nitrogen dioxide at the associated monitoring locations. The bias adjusted annual mean is generally complying with the relevant objective within the County though the declaration of two Air Quality Management Areas will still remain in effect until continued compliance is experienced as the norm.

Therefore this report concludes that the specific air quality objectives will be met but not for nitrogen dioxide and that the two Air Quality Management Areas associated with the nitrogen dioxide objective shall continue to remain in effect.

Crynodeb Gweithredol

Mae'r Strategaeth Ansawdd Aer Cenedlaethol yn gosod safonau ac amcanion ar gyfer saith llygrydd, sef bensen, 1,3 Bwtadeuen, carbon monocsid, plwm, nitrogen deuocsid, gronynnau a sylffwr deuocsid, sy'n cael effaith negyddol ar iechyd pobl. O bryd i'w gilydd, mae Awdurdodau Lleol yn arolygu ansawdd aer yn eu hardal i bennu'r risg y bydd yr amcanion safon aer yn cael eu rhagori.

Adroddodd Adroddiad Cynnydd 2017 Cyngor Sir Penfro ar y paramedrau ansawdd canlynol;

- Carbon Monocsid
- Bensen
- 1,3 Bwtadeuen
- Plwm
- Nitrogen Deuocsid
- Sulffwr Deuocsid
- Gronynnau

Mae'r amcanion ansawdd aer uchod wedi cael eu hasesu'n flaenorol yn rhan o gyfundrefn Diweddaru a Sgrinio Asesiadau ac Adroddiadau Cynnydd a phan gynhaliwyd Asesiad Manwl yn ymwneud â bensen, gronynnau a Nitrogen Deuocsid. **Hyd yn hyn, dim ond yr asesiad Nitrogen Deuocsid a nododd fod yr amcan perthnasol wedi cael ei ragori.**

Mae monitro ac asesu'r paramedrau uchod drwy 2016 wedi dynodi bod gostyngiad bychan yn lefel y nitrogen deuocsid yn y lleoliadau monitro, gyda dau amcan ar gyfer nitrogen deuocsid yn cael eu rhagori gydag un ym mhob Maes Rheoli Ansawdd Aer.

Mae canlyniadau monitro'r nitrogen deuocsid, a ymgymerwyd gan Cyngor Sir Penfro, yn dynodi bod y lefelau sy'n gysylltiedig â cherbydau wedi gostwng yn araf ond yn gyson; mae cymedr blynyddol 2016 wedi dynodi parhad o'r duedd hon ond heb ostyngiad sylweddol yn lefel y nitrogen deuocsid yn y lleoliadau monitro cysylltiedig. Ar y cyfan, mae'r cymedr tuedd blynyddol addasedig yn cydymffurfio â'r amcanion perthnasol yn y Sir, er bydd datganiad dau Faes Rheoli Ansawdd Aer yn parhau mewn grym nes mai cydymffurfiad parhaus yw'r arfer.

Felly, daw'r adroddiad hwn i'r casgliad y bydd yr amcanion ansawdd aer penodol yn cael eu bodloni, ond nid ar gyfer Nitrogen Deuocsid, a bydd y ddau Faes Rheoli Ansawdd Aer sy'n gysylltiedig â'r amcan ar gyfer Nitrogen Deuocsid yn parhau mewn grym.

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1 Introduction

1.1 Description of Local Authority Area

The County of Pembrokeshire is a relatively flat peninsula bounded on three sides by the sea with the upland Preseli Hills inland to the north. More than one third of the County has been designated as the Pembrokeshire Coast National Park. Main conurbations are the towns of Fishguard, Milford Haven, Pembroke and Pembroke Dock, Tenby and the County town of Haverfordwest. These areas contain relatively busy roads that pass through streets with traditional high sided town houses and buildings creating the classic street “canyon” scenario. The Milford Haven Waterway provides deep water access for ferries and tankers visiting the ports and major energy infrastructure sites respectively.

Two main petrochemical installations have long been operational within the vicinity of the Haven though the MURCO refinery ceased operation at the end of 2014 to be utilised as a storage facility. Two Liquefied Natural Gas (LNG) storage facilities’ are also operational and receive tanker vessels delivering the LNG. The new liquefied natural gas fired Pembroke Power Station is now at the operational phase of the development and there are proposals for another liquefied natural gas power station to be developed at Waterston, Milford Haven the application of which has yet to be decided by the Authority.

1.2 Purpose of Report

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

The objective of this Progress Report is to update upon any matters associated with local air quality. A checklist approach and screening tools are used to identify significant new sources or changes and whether there is a need for a Detailed Assessment. The Progress Report provides an opportunity to update upon any information relevant to the Review and Assessment regime.

1.3 Air Quality Objectives

The air quality objectives applicable to LAQM in Wales are set out in the Air Quality (Wales) Regulations 2000, No. 1940 (Wales 138), Air Quality (Amendment) (Wales) Regulations 2000, No 3182 (Wales 298), and are shown in Table 1.1. This table shows the objectives in units of micrograms per cubic metre µg/m³ milligrammes

per cubic metre, mg/m³ for carbon monoxide with the number of exceedences in each year that are permitted (where applicable).

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

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 μg/m^3	Running annual mean	31.12.2003
	5.00 μg/m^3	Running annual mean	31.12.2010
1,3-Butadiene	2.25 μg/m^3	Running annual mean	31.12.2003
Carbon monoxide	10.0 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.5 μg/m^3	Annual mean	31.12.2004
	0.25 μg/m^3	Annual mean	31.12.2008
Nitrogen dioxide	200 μg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 μg/m^3	Annual mean	31.12.2005
Particles (PM_{10}) (gravimetric)	50 μg/m^3, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 μg/m^3	Annual mean	31.12.2004
Sulphur dioxide	350 μg/m^3, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 μg/m^3, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 μg/m^3, not to be exceeded more than 35 times a	15-minute mean	31.12.2005

1.4 Summary of Previous Review and Assessments

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/m³ by 0.5 µg/m³. 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.

Figure 1.1: Map of Haverfordwest AQMA Boundaries

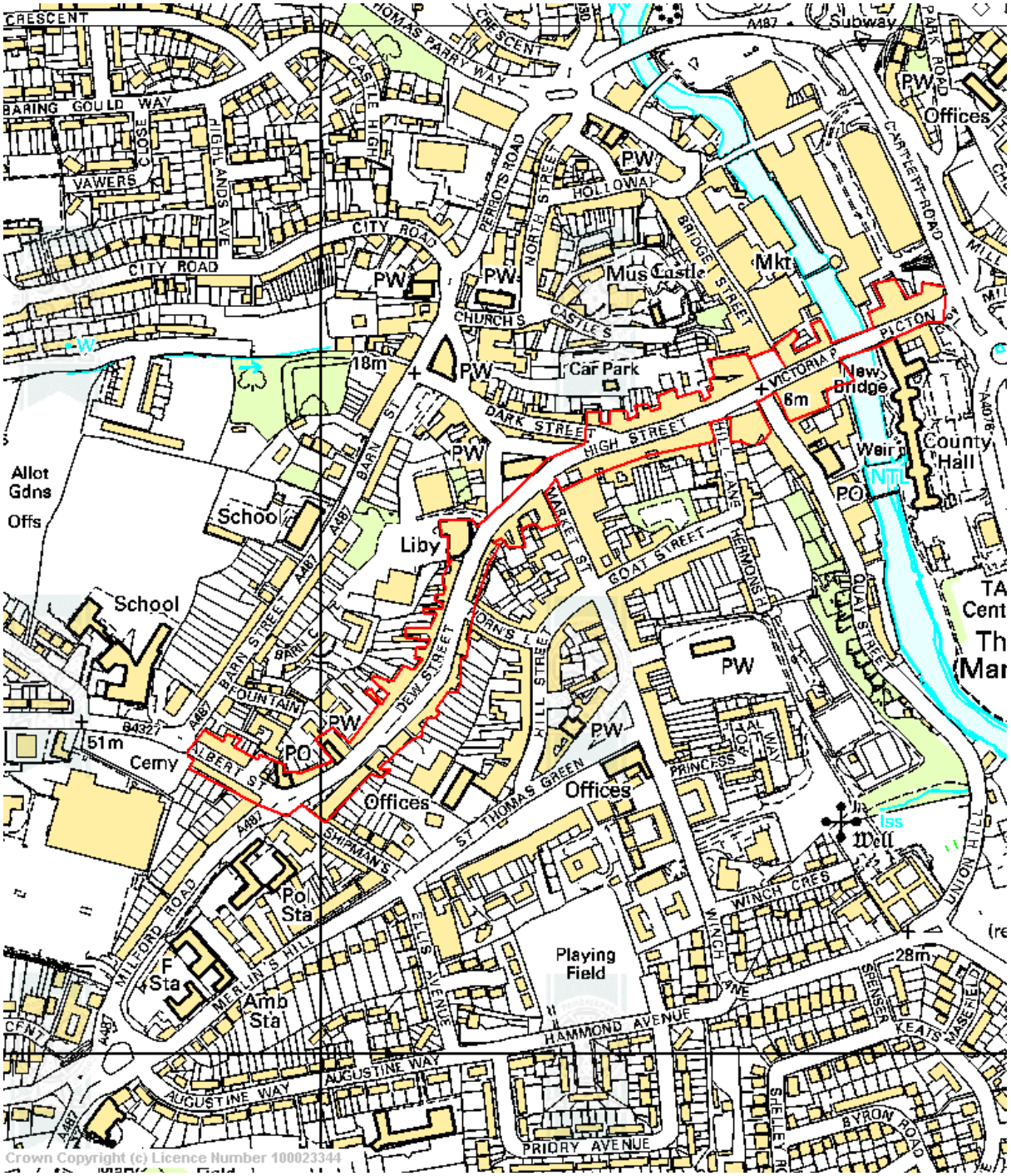
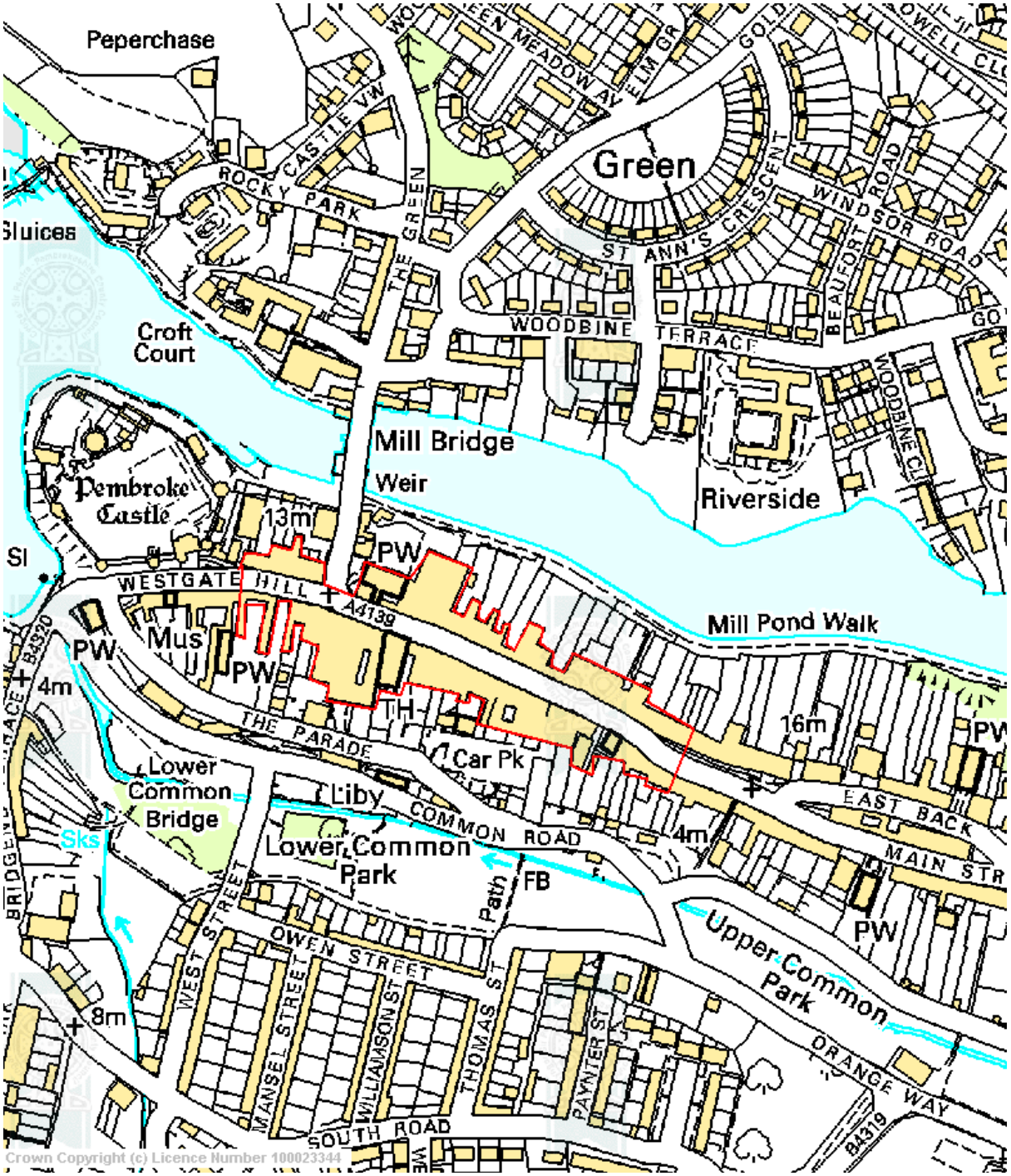


Figure 1.2: Map of Pembroke AQMA Boundaries



2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

Nitrogen dioxide levels continue to be monitored at the Narberth AURN 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. Since 2003 there have been three co – located diffusion tubes at the Narberth site to enable bias adjustment of the raw results obtained from the diffusion tube monitoring network within the County.

The Narberth AURN site, until 2009, comprised of an Ambirack automated air quality analyser that monitored nitrogen dioxide (NO_2), sulphur dioxide (SO_2) and ozone (O_3) and a TEOM 1400A particulate (PM_{10}) analyser. During 2009 the station was upgraded; firstly with the introduction of an FDMS analyser for particulate monitoring; one API 200 NOx analyser and one API 100 SO_2 analyser and an API 400 O_3 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 Name	Site Type	OS Grid Ref	Pollutants Monitored	In AQMA ?	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*	Worst-case Location ?
Narberth	Rural	214527 212686	NO2,SO2, O3, PM10	No	No	Approx 140m	No
Pennar Cants, rwenpower	Background	SN932031	NO2, O3, PM10	No	No	N/A	No

Table 2.2: Nitrogen dioxide levels (µg/m^3) monitored at the Narberth AURN & rwenpower Sites.

	2014		2015		2016
	AURN	rwe	AURN	rwe	AURN
Annual Mean µg/m^3	4	7	3	5	3
Max Hourly Mean µg/m^3	70	63	52	52	61
Data capture (%)	98	98	99	99	93

Table 2.3: Sulphur dioxide levels (µg/m^3) monitored at the Narberth AURN Site.

	2014	2015	2016
Max Daily Mean µg/m^3	10	41	5
Max Hourly Mean µg/m^3	36	41	12
Max 15 Minute Mean µg/m^3	No Exceedances	No Exceedances	No Exceedances
Data Capture	98	99	81

Table 2.4: Particles levels (µg/m^3) monitored at the Narberth AURN & rwenpower Sites.

	2014		2015		2016
	AURN	rwe	AURN	rwe	AURN
Annual Mean µg/m^3	3	19.7	12	17	12
Max Daily Mean µg/m^3	10	46	47	57	50
Data capture (%)	98	64	87	94	95

Table 2.5: Ozone levels (µg/m^3) monitored at the Narberth AURN site.

	2014		2015		2016
	AURN	rwe	AURN	rwe	AURN
Annual Mean µg/m^3	62	69	63	68	59
Max Daily Mean µg/m^3	93	100	93	104	104
Data capture (%)	98	71	99	95	99

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.

Table 2.6: Details of Non-Automatic Monitoring Sites for 2016

Site Name	Site Type	OS Grid Ref	Pollutants Monitored	In AQMA?	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*	Worst-case Location?
PCC1 Salutation Square Haverfordwest	Roadside	SM956156	NO_2	N	N	1m	Y
PCC2 Picton Place Haverfordwest	Roadside	SM957157	NO_2	Y	Y 1m	1m	Y
PCC3 Victoria Place Haverfordwest	Roadside	SM957157	NO_2	Y	Y 1m	1m	Y
PCC4 High St Haverfordwest	Roadside	SM957157	NO_2	Y	Y	1m	Y
PCC5 High St Haverfordwest	Roadside	SM957157	NO_2	Y	Y 1m	1m	Y
PCC6 High St Haverfordwest	Roadside	SM957157	NO_2	Y	Y 1m	1m	Y
PCC7 High St Haverfordwest	Roadside	SM957157	NO_2	Y	Y 1m	1m	Y
PCC8 High St Haverfordwest	Roadside	SM957157	NO_2	Y	Y 1m	1m	Y
PCC9 Dark St Haverfordwest	Roadside	SM957157	NO_2 Benzene	Y	Y Facade	1m	Y
PCC10 Dark St Haverfordwest	Roadside	SM957157	NO_2	N	Y Facade	1m	Y
PCC11 Dew St Haverfordwest	Roadside	SM953156	NO_2	Y	Y 1m	1m	Y
PCC12 Dew St Haverfordwest	Roadside	SN953156	NO_2	Y	Y 1m	1m	Y
PCC13 Dew St Haverfordwest	Roadside	SM953156	NO_2	Y	Y 1m	1m	Y
PCC14 Dew St Haverfordwest	Roadside	SM953155	NO_2	Y	Y 1m	1m	Y
PCC15 Dew St Haverfordwest	Roadside	SM953155	NO_2	Y	Y 1m	<1m	Y
PCC 16 Shipmans Lane Haverfordwest	Roadside	SM949153	NO_2	N	N	<1m	Y
PCC17 Albert St Haverfordwest	Roadside	SM948154	NO_2	Y	Y Facade	<1m	Y
PCC18 Albert St Haverfordwest	Roadside	SM948154	NO_2	Y	Y Facade	<1m	Y
PCC19 Albert St Haverfordwest	Roadside	SM248154	NO_2	Y	Y Facade	<1m	Y
PCC20 Albert St Haverfordwest	Roadside	SM248154	NO_2	Y	Y Facade	<1m	Y
PCC21 Albert St Haverfordwest	Roadside	SM248154	NO_2	Y	Y Facade	<1m	Y

PCC22 Albert St Haverfordwest	Roadside	SM248154	NO_2	Y	Y Facade	<1m	Y
PCC23 Albert St Haverfordwest	Roadside	SM248154	NO_2	Y	Y Facade	<1m	Y
PCC24 Albert St Haverfordwest	Roadside	SM248155	NO_2	Y	Y Facade	<1m	Y
PCC25 Albert St Haverfordwest	Roadside	SM248155	NO_2	Y	Y Facade	<1m	N

PCC 26 Albert St Haverfordwest	Roadside	SM248155	NO_2	Y	Y Facade	<1m	Y
PCC 27 Albert St Haverfordwest	Roadside	SM248155	NO_2	Y	Y Facade	<1m	Y
PCC28 Albert St Haverfordwest	Roadside	SM248155	NO_2	Y	Y Facade	<1m	Y
PCC29 Barn St Haverfordwest	Roadside	SM949159	NO_2	N	Y Facade	1m	Y
PCC30 Barn St Haverfordwest	Roadside	SM949159	NO_2	N	Y Facade	1m	Y
PCC31Merlins Bridge Haverfordwest	Roadside	SM947144	NO_2	N	Y 1m	1m	Y
PCC32 Merlins Bridge Haverfordwest	Roadside	SM947144	NO_2	N	Y 1m	1m	Y
PCC33 Haroldston Terrace Haverfordwest	Roadside	SM947144	NO_2	N	Y 1m	1m	Y
PCC34 Quay St Haverfordwest	Roadside	SM955155	NO_2	N	Y Facade	1m	Y
PCC35 Quay St Haverfordwest	Roadside	SM955155	NO_2	N	Y Facade	<1m	Y
PCC36 High St Narberth	Roadside	SN108146	NO_2	N	Y Facade	1m	Y
PCC37 Air Quality Unit Princes Gate	Rural	SM954157	NO_2	N	n/a	n/a	n/a
PCC38 Air Quality Unit Princess Gate	Rural	SM954157	NO_2	N	n/a	n/a	n/a
PCC39 Air Quality Unit Princess Gate	Rural	SM954157	NO_2	N	n/a	n/a	n/a
PCC40 Main St Pembroke	Roadside	SR982017	NO_2	N	Y Facade	2m	Y
PCC41 Main St Pembroke	Roadside	SR982017	NO_2	Y	Y Facade	1m	Y
PCC42 Main St Pembroke	Roadside	SR983016	NO_2	Y	Y Facade	1m	Y
PCC43 Main St Pembroke	Roadside	SR983016	NO_2 Benzene	Y	Y Facade	1m	Y
PCC44 Main St Pembroke	Roadside	SR984015	NO_2	Y	Y Facade	1m	Y
PCC45 Main St Pembroke	Roadside	SR984015	NO_2	Y	Y Facade	1m	Y
PCC46 Main St Pembroke	Roadside	SR985014	NO_2	Y	Y Facade	1m	Y
PCC47 Main St Pembroke	Roadside	SR986013	NO_2	N	Y	1m	Y
PCC48Main St Pembroke	Roadside	SR986013	NO_2	N	Y	1m	Y

Pembrokeshire County Council's supply and analysis of NO_2 diffusion tubes for 2016 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_2 PT Round AR006, 7, 9, 10, 12, 13, 15 and 16**

analyses of NO_2 diffusion tubes and **gradko environmental** are ranked as a **Satisfactory** laboratory based upon the aforementioned testing regime. See Appendix 1.

The Authority carries out a bias adjustment study by co-locating three diffusion tubes at the local automated monitoring facility. The results of which are entered into the AEA Energy and Environment spreadsheet application for Checking Precision and Accuracy of Triplicate Tubes; the results are contained at Appendix 2 with all the diffusion tube measurements for the 2016 period. 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 and utilised in the production of the National Diffusion Tube Bias Adjustment Factor Spreadsheet (v.06/17) 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_2 diffusion tube results. The spreadsheet has been updated in June 2017 and details use of an overall bias adjustment factor of **0.92** for diffusion tubes supplied by gradko services and derived from twenty seven studies utilising the same sampling method.

The specific bias adjustment factor for Pembrokeshire for 2016 is **0.78** but has not been utilised for the following reasons. Consulting with the LAQM Helpdesk it was advised that the factor closest to that utilised for previous years is used. Also use of Box 3.3 within the Local Air Quality Management Technical Guidance (LAQM.TG(09)) 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.06/17), the Overall Factor of 0.92 detailed above has been utilised to bias adjust the annual mean averages for 2016 diffusion tube monitoring.

Table 2.7 details the annual mean levels derived from the Authority’s diffusion tube monitoring network for the last three years. These 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_2 levels are detailed within Table 2.8.

Table 2.7: Annual mean NO_2 levels 2014 - 2016

Location	AQMA	Annual mean NO_2 level μg/m^3 (Number of months monitoring in brackets (Bold indicates result has been adjusted for short term monitoring, <9 months data as Box 3.2 LAQM.TG09))		
		2014	2015	2016
PCC1	N	24.3 (11)	25.1 (12)	23 (12)
PCC2	Y	36 (11)	28 (12)	29.1 (12)
PCC3	Y	31.9 (10)	29.3 (12)	26.4 (11)
PCC4	Y	37.9 (11)	37.1 (12)	36.1 (12)
PCC5	Y	47.5 (11)	43.4 (11)	42.3 (120
PCC6	Y	45.6 (9)	37.7 (12)	37 (11)
PCC7	Y	46.5 (10)	43 (11)	41.8 (12)
PCC8	Y	**42.3 (5)**	34.5 (12)	33.8 (12)
PCC9	Y	28.8 (11)	27.9 (12)	24.2 (12)
PCC10	N	21.8 (10)	20.3 (12)	18.7 (10)
PCC11	Y	38.4 (10)	34.2 (11)	33 (9)
PCC12	Y	41.7 (11)	34 (11)	31.4 (11)
PCC13	Y	37.2 (11)	33.9 (12)	31.9 (12)
PCC14	Y	31.4 (9)	28.2 (12)	26.8 (12)
PCC15	Y	38 (10)	33.1 (12)	32 (11)
PCC16	N	21.6 (11)	22.4 (12)	22 (12)
PCC17	Y	31.2 (11)	33.3 (11)	33.5 (12)
PCC18	Y	49 (11)	38.6 (12)	42.4 (12)
PCC19	Y	22.2 (11)	27.3 (12)	28.6 (12)
PCC20	Y	34.2 (9)	42.5 (12)	43.8 (12)
PCC21	Y	33.1 (11)	20.1 (12)	19.3 (11)
PCC22	Y	**31.1 (8)**	40.2 (12)	42 (12)
PCC23	Y	49.2 (9)	32.1 (11)	27.9 (10)
PCC24	Y	45.8 (11)	43 (11)	41.5 (11)
PCC25	Y	49.6 (11)	30.9 (12)	26.7 (12)
PCC26	Y	54 (10)	41.5 (12)	41.9 (12)
PCC27	Y	37.3 (11)	27.7 (10)	**29 (6)**
PCC28	Y	31.4 (9)	24.1 (10)	22.4 (10)
PCC29	N	24.7 (11)	24.1 (12)	25.2 (12)
PCC30	N	18.6 (10)	16.6 (12)	17.3 (12)
PCC31	N	33.4 (11)	34.2 (12)	31.7 (12)
PCC32	N	39 (11)	37 (12)	35.7 (11)
PCC33	N	28.1 (11)	25.6 (12)	24.2 (12)
PCC34	N	**33.7 (7)**	26.7 (11)	23.5 (12)
PCC35	N	30.9 (11)	12 (12)	13.9 (12)
PCC36	N	27.1 (10)	25.4 (11)	24.8 (12)
PCC37	N	6.9 (11)	3.8 (11)	4.5 (12)
PCC38	N	6.9 (11)	3.8 (12)	4.4 (12)
PCC39	N	6.8 (11)	3.6 (12)	4.2 (12)
PCC40	N	28.3 (10)	22.2 (11)	21.9 (12)
PCC41	Y	37.9 (9)	25 (12)	25.4 (12)
PCC42	Y	41 (9)	25.3 (12)	22.4 (11)
PCC43	Y	47.8 (11)	32.2 (8)	34.2 (12)
PCC44	Y	**33.7 (7)**	37 (12)	36.6 (12)
PCC45	Y	29 (11)	41 (12)	44 (11)
PCC46	Y	26.3 (9)	33.5 (10)	36.4 (12)
PCC47	N	26.8 (10)	24.6 (12)	26.4 (12)
PCC48	N	16.2 (9)	14.3 (12)	14.2 (12)

Table 2.8: Bias adjusted annual mean NO_2 levels 2014 - 2016.

Location	Bias A adjusted annual mean NO_2 level μg/m^3 (Bias A x Mean)		
	2014 Bias A = 0.81	2015 Bias A = 0.91	2016 Bias A = 0.92
PCC1	19.7	22.8	21.2
PCC2	29.2	25.5	26.8
PCC3	25.8	26.7	24.3
PCC4	30.7	33.8	33.2
PCC5	38.5	39.5	38.9
PCC6	36.9	34.3	34
PCC7	37.7	39.1	38.5
PCC8	34.3	31.5	31.1
PCC9	23.3	25.4	22.3
PCC10	17.6	18.5	17.2
PCC11	31.1	31.1	30.4
PCC12	33.8	30.9	28.9
PCC13	30.1	30.8	29.3
PCC14	25.4	25.7	24.6
PCC15	30.8	30.1	29.5
PCC16	17.5	20.4	20.2
PCC17	25.3	30.3	30.8
PCC18	39.4	35.1	39.1
PCC19	18	24.8	26.3
PCC20	27.7	38.7	**40.3**
PCC21	26.8	18.3	17.8
PCC22	25.2	36.6	38.7
PCC23	39.8	29.2	25.7
PCC24	37	39.1	38.2
PCC25	**40.2**	28.1	24.6
PCC26	**43.7**	37.8	38.6

PCC27	30.2	25.2	26.7
PCC28	25.4	21.9	20.6
PCC29	20	21.9	23.2
PCC30	15.1	15.1	15.9
PCC31	27	31.1	29.2
PCC32	31.6	33.7	32.9
PCC33	22.8	23.3	22.3
PCC34	27.3	24.3	21.6
PCC35	25	10.9	12.8
PCC36	21.9	23.1	22.8
PCC37	5.6	3.5	4.1
PCC38	5.6	3.5	4
PCC39	5.5	3.3	3.9
PCC40	22.9	20.2	20.1
PCC41	30.7	22.7	23.4
PCC42	33.2	23	20.6
PCC43	38.7	29.3	31.5
PCC44	33	33.7	33.7
PCC45	23.5	37.3	**40.5**
PCC46	21.3	30.5	33.5
PCC47	21.7	22.4	24.3
PCC48	13.1	13	13

*** 2016 Bias A adjustment calculated via use of spreadsheet v.06/17 on the Review and Assessment website.**

A further one year's air quality data has now been collated for these locations and forms the basis for the NO_2 assessment contained within this latest Progress Report 2017.

Figure 2.1: Map of Non-Automatic Monitoring Sites High St, Haverfordwest. Bias Adjusted NO_2 levels.

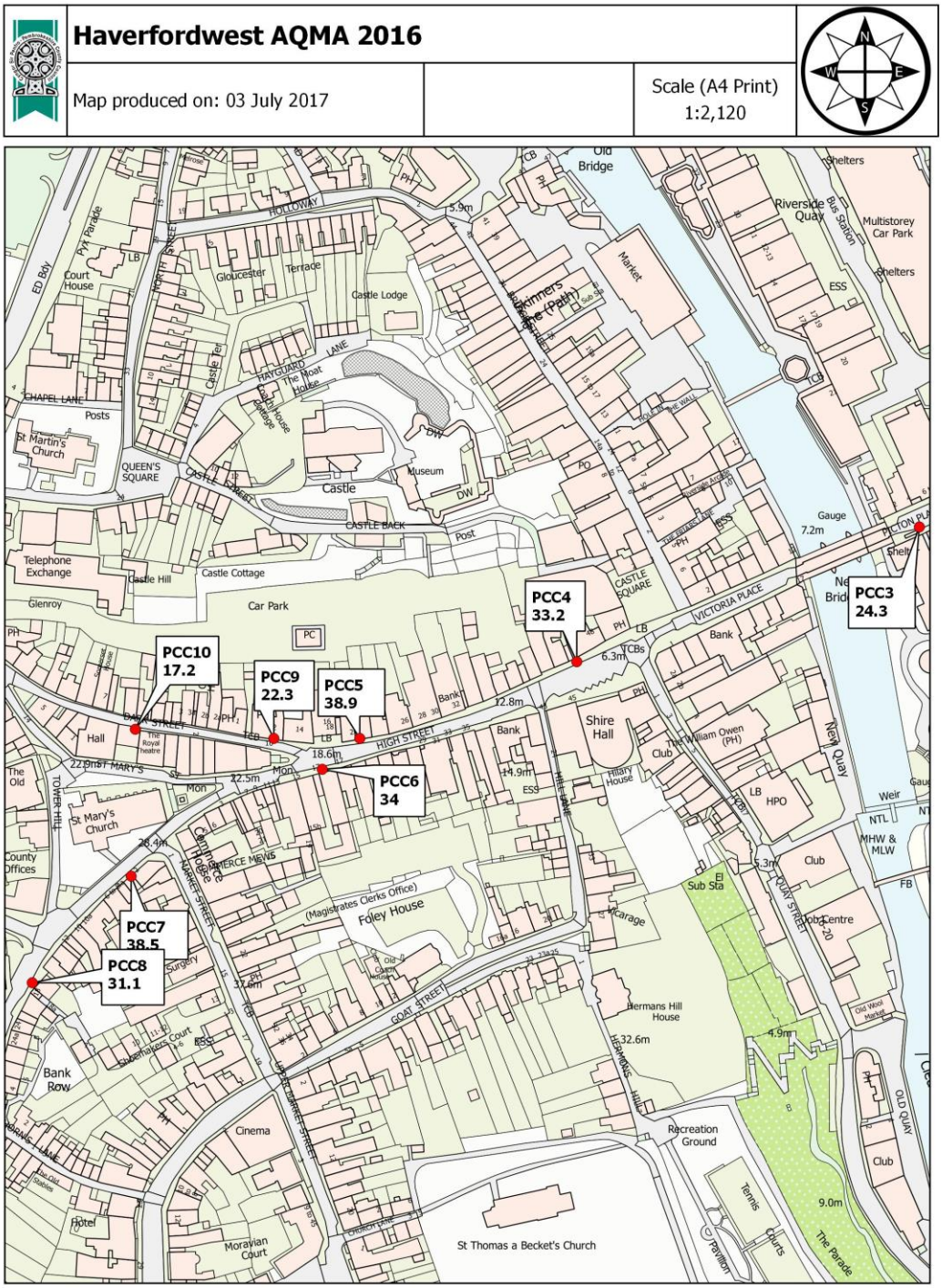


Figure 2.2: Map of Non-Automatic Monitoring Sites Dew St, Haverfordwest. Bias Adjusted NO_2 levels.

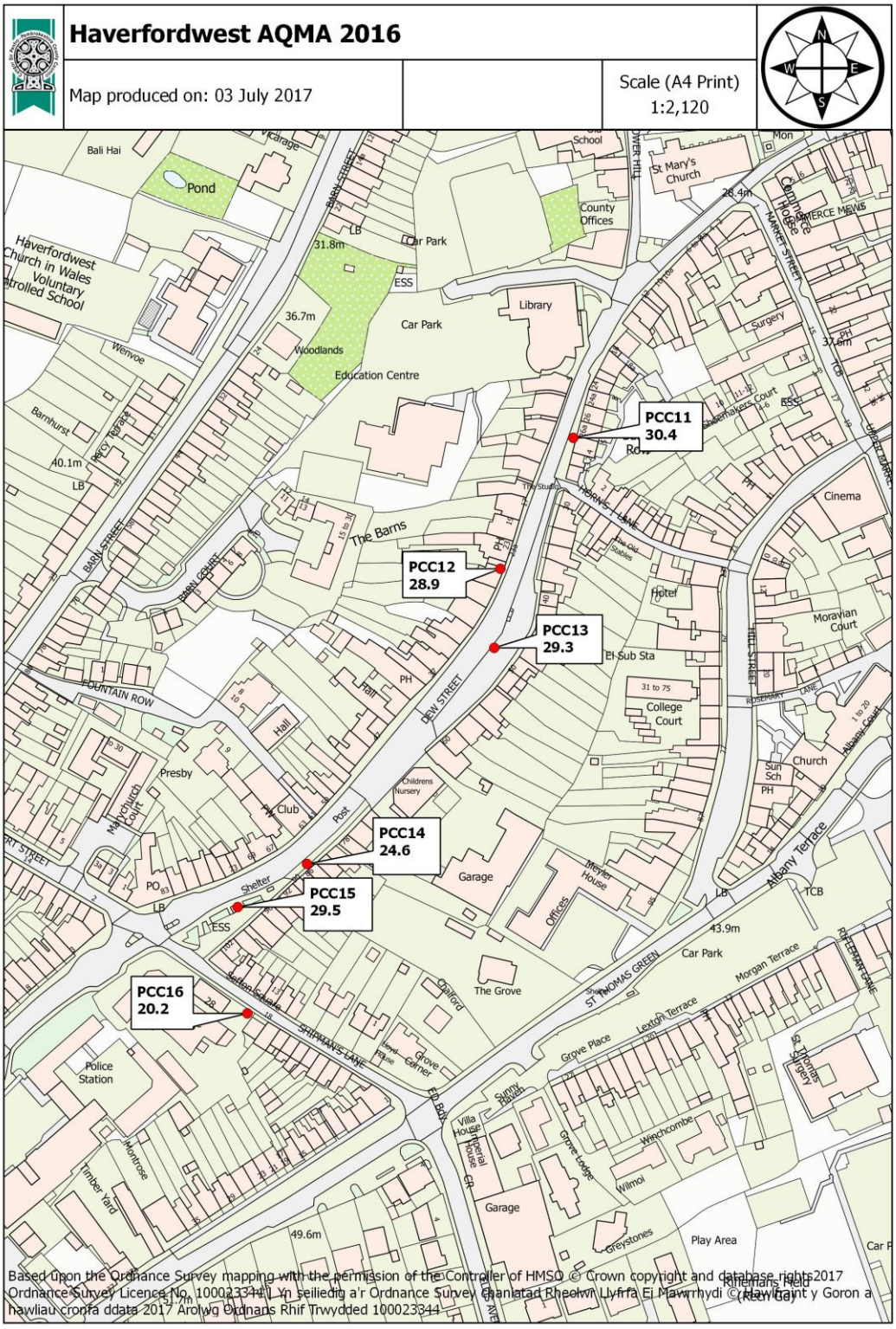


Figure 2.3: Map of Non-Automatic Monitoring Sites Albert St, Haverfordwest. Bias Adjusted NO_2 levels.

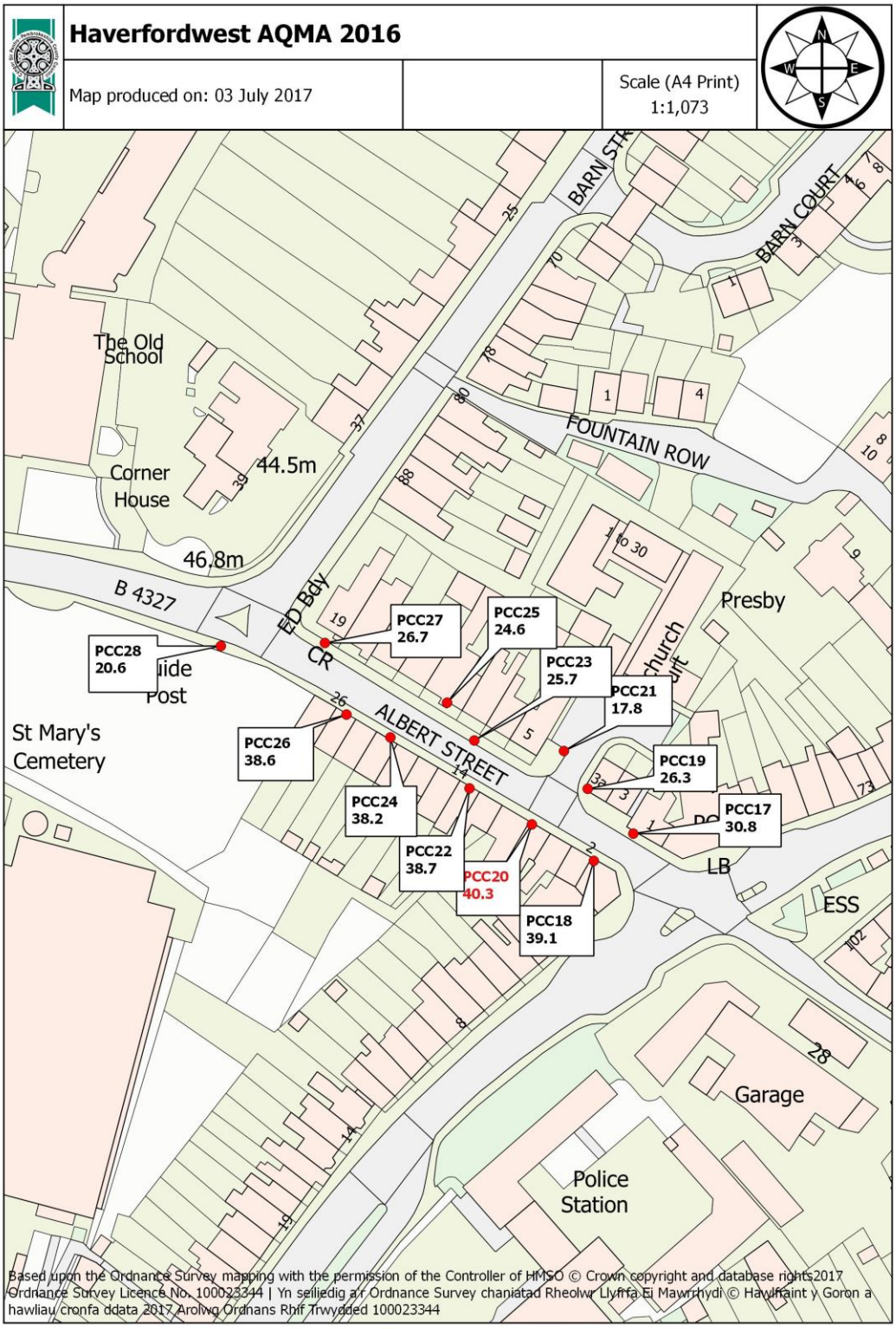
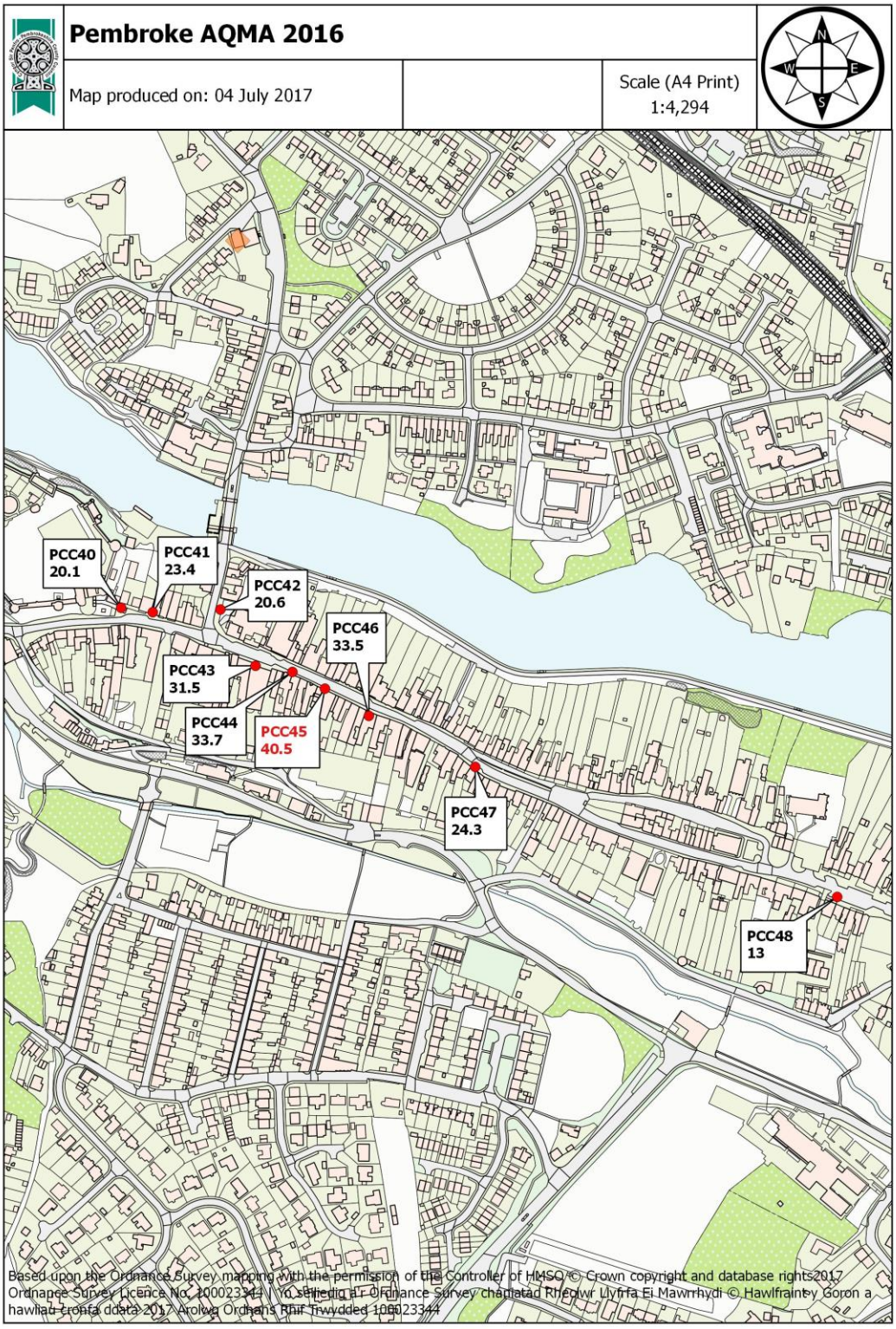


Figure 2.4: Map of Non-Automatic Monitoring Sites Main St, Pembroke. Bias Adjusted NO_2 levels.



2.2 Comparison of Monitoring Results with AQ Objectives

2.2.1 Nitrogen Dioxide

Diffusion tube monitoring for annual mean NO_2 levels within this Authority's area had indicated a gradual, steady reduction over the previous years most notably at the following locations;

- Albert Street, Haverfordwest
- Main Street, Pembroke

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. Haverfordwest and Pembroke provide central shopping high streets and Albert Street, Haverfordwest is wholly residential with the facades of premises at all locations being one meter or less to the kerbside. Table 2.11 details the annual mean NO_2 levels at the aforementioned locations for the last five years.

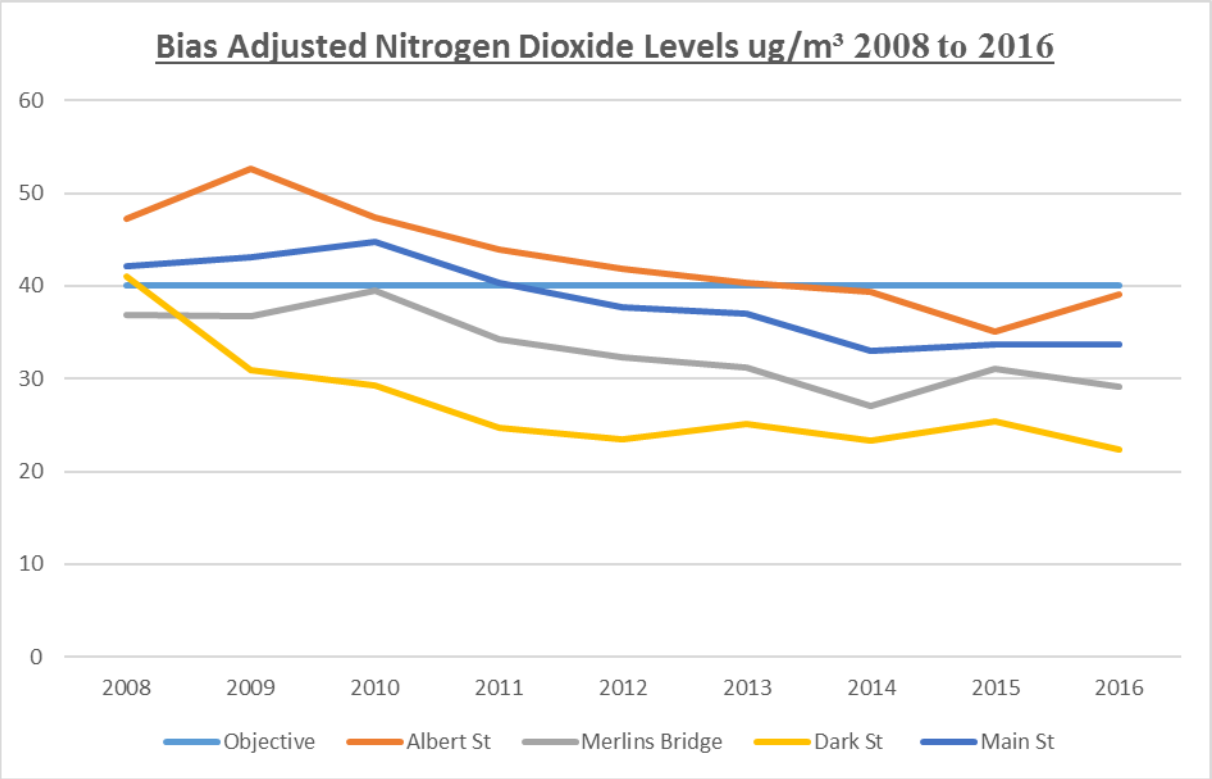
Table 2.9 Annual Raw Mean NO_2 levels 2012 - 2016

Location	Annual raw mean NO_2 level μg/m^3 (Number of months monitoring in brackets, bold indicates result has been adjusted for short term monitoring)				
	2012	**2013**	**2014**	**2015**	**2016**
PCC18 Albert St, Haverfordwest	53 (11)	50.5 (12)	49 (11)	38.6 (12)	42 (12)
PCC44 Main St, Pembroke	47.7 (12)	46.2 (11)	**40.7 (8)**	37 (12)	36.6 (12)(

The following Figure 2.5 graphically represents the downward trend of NO_2 levels at the historic locations detailed at Table 2.9 over the last five years. It is notable that the 2010/2011 trend is for a reduction in the level of NO_2 at all the monitoring locations compared to the steady rise over the previous years. This reduction has generally continued with 2016 but an exceedance has occurred at both AQMA's with the outlying diffusion tubes that provide the detailed assessment of the locations for Albert St, Haverfordwest and Main St Pembroke with the NO_2 objective.

The 2016 monitoring results provide the data set for the provision of the required Progress Report as recommended in guidance document LAQM.TG09.

Figure 2.5



Year	2008	2009	2010	2011	2012	2013	2014	2015	2016
Objective	40	40	40	40	40	40	40	40	40
Albert St, H,West	47.2	52.6	47.4	43.9	41.9	40.4	39.4	35.1	39.1
Merlins Bridge, H,West	36.9	36.8	39.5	34.3	32.3	31.2	27	31.1	29.2
Dark St, H,West	41	31	29.3	24.7	23.5	25.1	23.3	25.4	22.3
Main St, Pembroke	42.2	43.1	44.7	40.4	37.7	37	33	33.7	33.7

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 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 but as detailed above has ceased 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.

Table 2.10: Results of Automatic Monitoring of Nitrogen Dioxide: Comparison with Annual Mean Objective of 40 μg/m³

Site ID	Site Type	Within AQMA?	Valid Data Capture for period of monitoring %[a]	Valid Data Capture 2016 % [b]	Annual Mean Concentration μg/m³		
					2014* [c]	2015* [c]	2016 [c]
Narberth	Rural	N	N/A	93	3.6	3	0
Pennar Cants	Rural	N	N/A	N/A	7.3	5	N/A

[a] i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
[b] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%.)
[c] Means should be "annualised" as in 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 2.11: Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour mean Objective of 200 μg/m³

Site ID	Site Type	Within AQMA?	Valid Data Capture for period of monitoring %[a]	Valid Data Capture 2016 % [b]	Maximum Hourly Mean μg/m³		
					2014* [c]	2015* [c]	2016 [c]
Narberth	Rural	N	N/A	93	70	45	61
Pennar Cants	Rural	N	N/A	N/A	63	52	N/A

[a] i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
[b] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%.)
[c] If the period of valid data is less than 90%, include the 99.8th 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 2.7, 2.8 and 2.10 for the years 2014, 2015 and 2016 respectively.

2.2.2 Particles (PM_{10})

The Annual Mean Objective for particulates are an annual mean level of 40μg/m^3 and a maximum of 35, 24-hour exceedances of 50μg/m^3 per annum. Tables 2.12 and 2.13 detail that neither of these objectives has been exceeded and there is not thought to be a likelihood of such an exceedance within the foreseeable future.

Table 2.12: Results of Automatic Monitoring of PM_{10}: Comparison with Annual Mean Objective 40μg/m^3

Site ID	Site Type	Within AQMA?	Valid Data Capture for monitoring Period %[a]	Valid Data Capture 2016%[b]	Confirm Gravimetric Equivalent (Y or NA)	Annual Mean Concentration μg/m^3		
						2014*[c]	2015*[c]	2016[c]
Narberth	Rural	N	N/A	95	Y	14	12	9
Pennar Cants	Rural	N	N/A	N/A	Y	19.7	17	N/A

[a] i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
[b] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%.)
[c] Means should be "annualised" as in Box 3.2 of TG(09), if monitoring was not carried out for the full year.
*Annual mean concentrations for previous years are optional.

2.13: Results of Automatic Monitoring for PM_{10}: Comparison with 24-hour mean Objective Allowance of 35/year

Site ID	Site Type	Within AQMA?	Valid Data Capture for monitoring Period %[a]	Valid Data Capture 2016%[b]	Confirm Gravimetric Equivalent (Y or NA)	Number of Exceedances of the 50 μg/m^3		
						2014*[c]	2015*[c]	2016[c]
Narberth	Rural	N	N/A	95	Y	0	0	0
Pennar Cants	Rural	N	N/A	N/A	Y	0	0	N/A

[a] i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
[b] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%.)
[c] if data capture is less than 90%, include the 90th percentile of 24-hour means in brackets
* Optional

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2.2.3 Sulphur Dioxide

Pembrokeshire County Council no longer monitors sulphur dioxide (SO2) concentrations within areas representative of relevant public exposure. Previous monitoring by the use of diffusion tubes has indicated that there is no risk of the air quality objective associated with sulphur dioxide being exceeded.

The following Table 2.14 details this Authority's automatic monitoring results for SO2 concentrations for the last year and indicates no exceedance of the relevant air quality objectives at this location**.**

Table 2.14: Results of Automatic Monitoring of SO_2: Comparison with Annual Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for monitoring Period %[a]	Valid Data Capture 2016 %[b]	Year	Number of Exceedences (percentile in bracket μg/m³)[c]		
						15-minute Objective (266 μg/m³)	1-hour Objective (350 μg/m³)	24-hour Objective (125 μg/m³)
Narberth	Rural	N	N/A	81	2014	0	0	0
					2015	0	0	0
					2016	0	0	0

[a] i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
[b] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%.)
[c] if data capture is less than 90%, include the relevant percentile in brackets
* Optional

2.2.4 Benzene

Table 2.15 details the annual mean concentrations achieved for the last three years which indicate that no exceedance of the relevant objective has taken place. Due to the continued compliance with benzene over many years within the areas most affected by vehicle emission's benzene monitoring has now ceased with no further monitoring proposed for future years.

Table 2.15: Results of Non Automatic Monitoring for Benzene: Comparison with annual mean Objective of 5 μg/m³

Site ID	Site Type	Within AQMA?	Valid Data Capture for period of monitoring %[a]	Valid Data Capture 2016 % [b]	Maximum Annual Mean μg/m³		
					2014* [c]	2015* [c]	2016 [c]
PCC9 Dark St Haverfordwest	Roadside	Yes	N/A	N/A	1	0.4	N/A
PCC44 MainSt Pembroke	Roadside	Yes	N/A	N/A	1.3	0.8	N/A

[a] i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
[b] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%.)
[c] If the period of valid data is less than 90%, include the 99.8th percentile of hourly means in brackets
*Number of exceedences for previous years are optional.

2.2.5 Other pollutants monitored

Ozone

The automated monitoring station at Narberth also monitors ozone levels and this Authority receives regular daily updates from AEA Energy and Environment and via the Welsh Air Quality Forum. Inspection of this data indicates that the air quality objective for ozone of an eight hour mean of 100 μg/m³ not be exceeded more than ten times per year has been exceeded eleven times at the Narberth station during 2016.

2.2.6 Summary of Compliance with Air Quality Objectives

Pembrokeshire County Council has examined the results from air quality monitoring in the County and have found that levels of NO_2, the main pollutant of concern, are generally continuing on a slow downward trend.

The NO_2 air quality objective has been the relevant cause for concern within the areas identified within the previous reports as per Updating and Screening Assessment's, Progress Report's and associated Detailed Assessment; namely Albert St, Haverfordwest and Main St, Pembroke. This objective was, for the first time in several years, met at all diffusion tube monitoring locations during 2015.

The number of exceedances has been reducing from eight in 2012 to five in 2013 and two exceedances in 2014 within the Haverfordwest AQMA only and no exceedances within 2015. With compliance of the NO_2, objective within the designated AQMA's taking place Pembrokeshire Council could revoke the designation but 2015 was the first year that compliance was achieved and the period experienced significant, far above average, weather conditions with extended periods of severe gale force wind and torrential episodes of rain as were many parts of the United Kingdom.

It was thought that these events may have influenced the ability of the relevant air quality monitoring technique of diffusion tubes to sample NO_2 concentrations. Therefore to be confident that a revocation of AQMA's could take place compliance with the NO_2 objective would be required for at least three consecutive years.

As detailed previously there have been two exceedances of the NO_2 objective with one exceedance taking place in each of the two AQMA's.

All other air quality parameters detailed within the legislation at Table 1.1 have been found to be below the relevant objective concentrations.

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.

However, Pembrokeshire County Councils planning department have been in receipt of a planning application for the development of a significant industrial operation by an applicant Egnadol Ltd who wish to construct a sustainable energy facility within a former military and subsequently industrial site alongside the Milford Haven waterway. The proposed development would include a biomass to energy facility in the form of a pyrolyser building and associated stack.

Pyrolysis is detailed as the thermo chemical decomposition of organic material at elevated temperatures, destructive fires in buildings often burn with limited oxygen supply resulting in pyrolysis reactions, and the longer residence times within a pyrolyser increase biomass conversion to a gas.

Biofuel feedstock materials are detailed as arriving by the waterway due to the refurbishment of the existing jetty with no vehicular access by local road systems taking place.

The applicants planning statement dated March 2017 details that Natural Resource Wales will permit the development and that the NRW Environmental Permit will contain conditions that will ensure environmental and public protection and will regulate the facility to the appropriate environmental standards.

Presently the applicant has to submit further details in relation to the proposal by December 2017 for determination in 2018.

4 Local / Regional Air Quality Strategy

Pembrokeshire County Council provide annual reports to the Wales Climate Charge 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 exeedence.

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.

5 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.

6 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.

7 Implementation of Action Plans

An Air Quality Action Plan (AQAP) details actions that are considered to be the most appropriate way to attempt to reduce a pollutant, for example nitrogen dioxide within areas declared as AQMA's. Such initiatives may also assist in the reduction of other pollutants including the greenhouse gas carbon dioxide.

Within Pembrokeshire cars have been identified as accounting for >80% of nitrogen dioxide (NO_2) emissions within the two AQMA's. Where road transport emissions are the largest single contributor to the pollution within an AQMA it is recommended that the AQAP is integrated into a Local Authorities Local Transport Plan. Pembrokeshire County Council is the authority responsible for transport planning and development of the LTP within the county. The Environment Act 1995 places a duty on this authority to propose actions that works towards meeting the air quality objectives within the AQMA's.

Pembrokeshire have submitted an AQAP directly to the Welsh Assembly Government developed in relation to the two AQMA's but specifically incorporated within the Pembroke AQMA.

Convenience parking within Main Street, Pembroke has been thought to have the potential to impede traffic flow and generate tail backs with vehicles idling within a canyon type environment with low air flow to aid dispersion of vehicle emissions.

Introduction of road markings and associated signage detailing that there should be no parking at any time has been introduced to the affected area within the AQMA.

However it is not apparently clear as to whether this strategy has been successful as vehicles are still known to ignore the road markings and traffic enforcement officers cannot patrol the one area constantly. Though, as this document details, nitrogen dioxide levels appear to be on a slow downward trend within the both the affected areas.

In July 2017 it was reported in the media that the UK Government had 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.

In the long term this would provide a resolution to AQMA's for NO_2 annual objective exceedances but short term issues, NO_2 annual exceedances and mitigation are still in effect.

8 Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring Data

Figure 2.5 of this report graphically represents a general downward trend for the monitoring of NO_2 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/m³ has been complied with at most monitoring locations within the identified AQMA's within Haverfordwest and Pembroke as well as outlying monitoring locations.

Unfortunately there have been two exceedance's within both the AQMA's within 2016 at one monitoring point in each AQMA. Though the downward trend in NO_2 levels are significant with eight exceedances within both AQMA's during 2013, five in 2014 and only two within one AQMA for 2014 and no exceedances for 2015 and the 2016 exceedance being breached by a small amount.

8.2 Conclusions from Assessment of Sources

The ongoing use of diffusion tubes in and around the areas where high NO_2 concentrations have taken place has enabled an assessment of the extent of the level of NO_2 levels within affected areas; thereby enabling recognition of the extent to which AQMA's are being affected over time and the changing shape of their boundaries and enabling designation or removal of AQMA status.

The 2016 data contained in this report represents the Progress Report of the air quality within Pembrokeshire.

This report confirms the requirement for the continued designation of two AQMA's within Haverfordwest and Pembroke as NO_2 levels at two of the monitoring locations are exceeding the NO_2 objective. Both the town centres one way traffic system's receives emissions from associated vehicles and the poor dispersion of air due to the narrow high sided nature of the adjacent buildings has resulted in the exceedance's taking place.

The Haverfordwest AQMA is still experiencing near exceedence NO_2 levels at monitoring locations PCC 5 (38.9µg/m³) and PCC 7 (38.5µg/m³) within High Street where the road incline steepens and vehicles would undoubtedly accelerate to climb the hill. This is also an area that experiences convenience car parking but the practice does not appear to hinder traffic flow.

Monitoring locations PCC 8 to PCC 15 within Dew Street, Haverfordwest AQMA reduce significantly as the road is relatively level throughout with a maximum result of 31.1µg/m³.

The final section of the AQMA is Albert Street which has historically been an area of concern and is still experiencing the same spatial exceedance where the left hand side of the street is high with a maximum at PCC 20 (40.3µg/m³). The right hand of

the street experiences concentrations within the objective with a maximum at PCC 17 of 30.8µg/m³.

The Pembroke AQMA NO_2 levels are generally low and on a continued downward trend though 2016 has experienced an exceedance at PCC 45 (40.5µg/m³). The monitoring location is at an area where convenience parking is a regular occurrence which may account for the increase.

Through Action Planning Main Street Pembroke has received increased restrictions on parking provision with no parking at any time signage and road markings incorporated in an attempt to prevent convenience parking and the associated impacts that it can have on reducing traffic flow. Even with on-going Traffic Warden Patrol's drivers still continue the practice of convenience parking and so it is not known whether the parking restrictions are being effective in deterring motorists from convenience parking locally especially considering the results of PCC 45.

8.3 Proposed Actions

The Progress Report 2017 confirms that the air quality objective for NO_2 has been exceeded at two locations, one within each of the designated AQMA's during 2016.

Pembrokeshire County Council intends to continue to declare two Air Quality Management Area's within part of Haverfordwest town centre and Pembroke town centre as detailed within Figure's 1.1 and 1.2 respectively within this report. Pembrokeshire County Council would not look to revoke the declarations until it is apparent that the objective for NO_2 has become a regular occurrence and not due to other potential influence's as discussed within this report and will;

Continue the present regime of diffusion tube monitoring at all locations detailed within this report to monitor future levels of the NO_2 annual objective and report on the findings accordingly.

References

- Pembrokeshire County Council's Updating and Screening Assessment December 2015
- Pembrokeshire County Council's Progress Report April 2014
- 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(09)
  February 2009
- 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
- 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

1 Laboratory QA/QC of Diffusion Tubes

2 Precision & Accuracy of Triplicate Tubes

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

Table 1: Laboratory summary performance for AIR NO_2 PT rounds AR006, 7, 9, 10, 12, 13, 15 and 16

The following table lists those UK laboratories undertaking LAQM activities that have participated in recent AIR NO_2 PT rounds and the percentage (%) of results submitted which were subsequently determined to be **satisfactory** based upon a z-score of ≤ ± 2 as defined above.

AIR PT Round	AIR PT AR006	AIR PT AR007	AIR PT AR009	AIR PT AR010	AIR PT AR012	AIR PT AR013	AIR PT AR015	AIR PT AR016
Round conducted in the period	January – February 2015	April – May 2015	July – August 2015	October – November 2015	January – February 2016	April – May 2016	July – August 2016	September – October 2016
Aberdeen Scientific Services	100 %	100 %	75 %	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	75 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Environmental Services Group, Didcot [1]	87.5 %	100 %	100 %	100 %	100 %	75 %	75 %	100 %
Exova (formerly Clyde Analytical)	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Glasgow Scientific Services	100 %	100 %	100 %	100 %	75 %	100 %	0 %	100 %
Gradko International [1]	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Kent Scientific Services	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Kirklees MBC	75 %	100 %	100 %	100 %	100 %	100 %	100 %	NR [2]
Lambeth Scientific Services	25 %	100 %	100 %	100 %	100 %	100 %	100 %	75 %
Milton Keynes Council	100 %	100 %	100 %	100 %	50 %	100 %	100 %	75 %
Northampton Borough Council	100 %	100 %	100 %	100 %	50 %	100 %	NR [2]	75 %
Somerset Scientific Services	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
South Yorkshire Air Quality Samplers	100 %	100 %	100 %	75 %	100 %	100 %	75 %	100 %
Staffordshire County Council	100 %	100 %	75 %	75 %	75 %	75 %	100 %	NR [2]
Tayside Scientific Services (formerly Dundee CC)	100 %	NR [2]	NR [2]	NR [2]	100 %	NR [2]	100 %	NR [2]
West Yorkshire Analytical Services	100 %	75 %	75 %	75 %	75 %	100 %	NR [2]	50 %

[1] Participant subscribed to two sets of test samples (2 x 4 test samples) in each AIR PT round.
[2] NR No results reported
[3] Kent Scientific Services, Cardiff Scientific Services and Exova (formerly Clyde Analytical) no longer carry out NO2 diffusion tube monitoring and therefore did not submit results.

Appendix 1

Appendix 2

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 μgm^{-3}	Tube 2 μgm^{-3}	Tube 3 μgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	06/01/2016	03/02/2016	6.8	6.3	6.5	7	0.3	4	0.7	5	100	Good	Good
2	03/02/2016	07/03/2016	4.6	4.7	4.4	5	0.2	4	0.4	3	46	Good	or Data Capture
3	07/03/2016	04/04/2016	4.5	4.0	4.4	4	0.3	6	0.6	4	100	Good	Good
4	04/04/2016	03/05/2016	3.4	3.0	2.9	3	0.2	7	0.6	3	100	Good	Good
5	03/05/2016	06/06/2016	2.4	2.7	2.5	3	0.1	5	0.3	4	100	Good	Good
6	06/06/2016	01/07/2016	3.0	2.9	2.9	3	0.0	1	0.1	3	98	Good	Good
7	01/07/2016	29/07/2016	2.8	2.6	2.5	3	0.2	7	0.5	1	95	Good	Good
8	29/07/2016	24/08/2016	3.3	3.0	2.9	3	0.2	7	0.5	2	99	Good	Good
9	24/08/2016	29/09/2016	2.9	2.7	2.5	3	0.2	8	0.5	2	99	Good	Good
10	29/09/2016	26/10/2016	7.7	8.0	7.1	8	0.4	6	1.1	5	98	Good	Good
11	26/10/2016	30/11/2016	4.6	5.1	4.7	5	0.3	6	0.7	3	85	Good	Good
12	30/11/2016	04/01/2017	8.6	8.6	7.6	8	0.6	7	1.4	6	100	Good	Good
13													
												Good precision	Good Overall DC

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

Overall survey -->

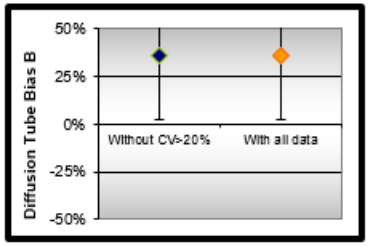
Site Name/ ID:	Princess Gate, Narberth.

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

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 11 periods of data	
Bias factor A	0.79 (0.62 - 1.07)
Bias B	27% (-7% - 61%)
Diffusion Tubes Mean:	4 μgm^{-3}
Mean CV (Precision):	6
Automatic Mean:	3 μgm^{-3}
Data Capture for periods used:	98%
Adjusted Tubes Mean:	3 (3 - 5) μgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 11 periods of data	
Bias factor A	0.79 (0.62 - 1.07)
Bias B	27% (-7% - 61%)
Diffusion Tubes Mean:	4 μgm^{-3}
Mean CV (Precision):	6
Automatic Mean:	3 μgm^{-3}
Data Capture for periods used:	98%
Adjusted Tubes Mean:	3 (3 - 5) μgm^{-3}



Jaume Targa
jaume.targa@aeat.co.uk
Version 03 - November 2006

Appendix 3

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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

33

[redacted]

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