Air Quality Progress Report for Plymouth

April 2008

Plymouth City Council
Public Protection Service

Submitted November 2008

Executive Summary

Contained within this report are the results of annual air quality monitoring carried out by Plymouth City Council (PCC) within the city of Plymouth for 2007. Data is derived from both diffusion tube monitoring and continuous analysis as part of the Automatic Urban and Rural Network (AURN), plus additional monitoring data from continuous analysers in two of the AQMA's.

There are currently three Air Quality Management Areas (AQMA) within the Plymouth boundary, which were declared in 2005 as a result of the exceedence of the Air Quality Objectives (AQO) for NO_2 and for benzene. Monitoring has continued for NO_2 and benzene within three AQMA's using both passive and active methods resulting in continued improvements since 2003 with levels for 2007 being slightly higher than 2006 levels.
For benzene, results have shown a consistent reduction in the levels of ambient benzene experienced within the AQMA. This reduction can be attributed largely to the installation of stage II vapour recovery at the Exeter Street petrol station. A detailed assessment is currently underway as the process of revoking the AQMA commences.

Additional work is ongoing in relation to the action plan for the AQMA's, and detailed assessments for other sites of concern.

Other monitoring reported as part of the Progress Report includes ozone concentrations, radiation monitoring and details of dust and odour complaints.

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Nomenclature

AQMA	Air quality management area
NO_2	Nitrogen dioxide
PM_{10}	Particulate matter of less than 10 microns in size
$\mu g/m^3$	micrograms per metre cubed
CA	Continuous analyser

1 Introduction

The Environment Act was introduced in 1995, and established the statutory provisions for local air quality management for the first time in the UK. This implemented the UK National Air Quality Strategy.

Part IV of the Environment Act 1995 requires each local authority periodically to review air quality in its area. The Air Quality Regulations 1997 were introduced in December 1997 and later revised in January 2000. In addition to the objectives set out in the Air Quality Regulations 2000, and the Air Quality (Amendment) Regulations 2002 ('the Regulations'), the EU has set limit values in respect of nitrogen dioxide and benzene, to be achieved by 2010, as well as indicative limit values for $PM_{10,}$ also to be achieved by 2010. Local authorities have to consider the present quality of the air in their district and that for future years. It is necessary to assess which pollutants, if any, will exceed the prescribed objectives (Table 1.1).

A timetable for the completion of the review and assessment process was provided to local authorities in the technical guidance document LAQM.TG (03). The following table specifies the objectives and the timescales, as specified in the Air Quality Strategy.

Pollutant	Objective	Measured as	To be achieved by
Benzene	5 µg/m^3	Annual Mean	31 December 2010
1,3-Butadiene	2.25 µg/m^3 (1 ppb)	Running Annual Mean	31 December 2003
Carbon monoxide	10 mg/m^3 (10 ppm)	Running 8 Hour Mean	31 December 2003
Lead	0.5 µg/m^3	Annual Mean	31 December 2004
	0.25 µg/m^3	Annual Mean	31 December 2008
Nitrogen dioxide*	200 µg/m^3 (105 ppb) Not to be exceeded more than 18 times per year	1 Hour Mean	31 December 2005
	40 µg/m^3 (21 ppb)	Annual Mean	31 December 2005
Particles (PM_{10})	50 µg/m^3 Not to be exceeded more than 35 times per year	24 Hour Mean	31 December 2004
	40 µg/m^3	Annual Mean	31 December 2004
Sulphur dioxide	266 µg/m^3 (100 ppb) Not to be exceeded more than 35 times per year	15 Minute Mean	31 December 2005
	350 µg/m^3 (132 ppb) Not to be exceeded more than 24 times per year	1 Hour Mean	31 December 2004
	125 µg/m^3 (47 ppb) Not to be exceeded more than 3 times per year	24 Hour Mean	31 December 2004

Notes:
µg/m^3 - micrograms per cubic metre
mg/m^3 - milligrams per cubic metre
ppb - parts per billion
ppm - parts per million
*** The objectives for nitrogen dioxide are provisional**

Table 1.1: Summary of objectives of the UK Air Quality Strategy

1.1 Summary of Review and Assessment Process

This report is the progress report for the 2007 data, submitted in 2008. The last updating and screening assessment report was submitted in 2007, reporting on the 2006 data. A number of reports are to be submitted shortly

- Action Plan for the two AQMA's for NO_2
- Detailed assessment with the intention of revoking the benzene AQMA
- Submission of additional work undertaken as part of the Stage 4 assessment for the AQMA's.

1.2 Purpose and Role of Progress Reports

The Progress Report is intended to ensure continuity in the LAQM process. Its objective is to provide an annual review and update on air quality issues, including new monitoring data and developments that might be significant to air quality. Any significant developments can then be acted upon immediately, rather than waiting for the next full round of review and assessment. The benefits to Local Authorities are set out in Box 1.1 of the Progress Report Guidance LAQM.PRG (03), but these include the following:-

- To provide a readily accessible source of up to date information on air quality, which may be useful to Local Authority staff for dealing with enquiries from members of the public, developers carrying out environmental assessments, and to assist in other areas such as transport and land use planning.
- To ensure continuity in maintaining resourcing, capability and staff skills for LAQM within the Local Authority.
- Helping to get maximum value from the monitoring carried out by the Local Authority.

This Progress Report has two main aims, as follows:

- To report on progress being made with the implementation of LAQM in Plymouth City Council and
- To report on progress in achieving and maintaining concentrations below the air quality objectives.

New monitoring data within Plymouth City Council and new developments that might affect local air quality are the focus of this report, and are the minimum requirements for Review and Assessment Progress Reporting purposes. Each is considered in turn, using the Progress Report Checklist made available by government on their air quality Review and Assessment Helpdesk Website (www.uwe.ac.uk/aqm/review). Table 1.2 below provides an indication of what is expected of local authorities in their progress reporting.

Monitoring Data	The minimum requirement is to report monitoring data and trend over recent years. To maximise the value of air quality monitoring, careful attention should be paid to the type of equipment used and the locations where the monitors are placed, as well as the QA/QC and data verification procedures.
New Developments	A consideration of new development with the potential to affect local air quality (mainly through the generation of traffic or the introduction of relevant exposure), such as residential developments, industrial processes, retail premises, roads and quarries. In addition to the minimum requirements, the government recommends that local authorities report upon a number of additional elements in their Progress Reports. These additional elements are listed in Table 2.

Table 1.2 Minimum reporting requirements: - Monitoring data

Additional Monitoring Data	Projecting the measured concentrations forward to the objective years is helpful in providing early indication of likely exceedences that may not have been previously identified. Local authorities may also find it helpful to report on their monitoring for pollutants not covered by the regulations, e.g. ozone, polycyclic aromatic hydrocarbons (PAH), as well as other air quality data, i.e. odour complaints, dust deposition, radiation monitoring.
Air Quality Action Plans	Any progress on the implementation of Air Quality Action Plans where appropriate.
Local or Regional Air Quality Strategies	Government guidance strongly recommends that all authorities, particularly those without AQMAs but who have areas close to the exceedence levels, should consider drawing up a Local Air Quality Strategy. Progress Reports provide the opportunity for local authorities to report on the development of local or regional strategies. Local authorities should report upon the extent to which the local authority has developed or implemented an air quality strategy, how to access the strategy and when the strategy is to next be reviewed (as appropriate).
Planning policy	Any relevant updates on planning policies that relate specifically to air quality. Policies within Local Development Frameworks (formally Local Plans) determine the local

	authority approach to the relationship between planning and air quality, with new developments judged against these policies. Reference to any supplementary planning guidance to address air quality matters should be referenced.
Planning applications	A list of planning applications that have the potential to affect local air quality should be provided. The land-use planning system is recognised as playing an integral part in improving air quality. This requires close co-operation between planners and Environmental Health Officers. Some local authorities have developed procedures to help ensure that planning applications that might have impacts on air quality are forwarded to the Environmental Health department for comment. Review and Assessment Progress Reports, provide the opportunity to log planning applications for new developments to give a picture of areas where changes may take place and where combined impacts from several developments may become important. The information provided should therefore include a list of any major developments under consideration that might affect air quality. Such a list could be based on those applications or which an Air Quality Assessment has been provided or for which an Air Quality Assessment has been requested.
Local Transport Plans and Strategies	Progress on implementing those elements of the Local Transport Plan (LTP) that might affect air quality should be provided. Measures to improve air quality on a local scale are closely related to the LTP. Local authorities should reference those measures within the LTP that relate specifically to bringing about air quality improvements. Local authorities should also report on any other measures aimed at addressing transport-related air quality issues that have not been (or will not be) reported in the LTP Annual Progress Report.

Table 1.3 Recommended additional reporting requirements

2.0 New Monitoring Data

Since Plymouth City Council's last progress report there has been continued monitoring of air quality from the following;

- The City centre AURN background urban site where continuous monitoring takes place for NO_2, CO, SO_2, O_3 and benzene.
- The Mutley Plain AQMA for NO_2 with continuous monitoring of NO_2 supplemented with seven NO_2 diffusion tubes
- The Exeter Street AQMA for NO_2 with continuous monitoring of NO_2 and PM_{10} supplemented with nine NO_2 diffusion tubes
- The Exeter Street AQMA for benzene with continuous/pumped benzene monitoring supplemented with benzene diffusion tubes.
- Further 23 NO_2 diffusion tubes have been deployed around the city in areas of known congestion with relevant exposure outside of the current AQMA's.

2.1 Update on AURN monitoring for nitrogen dioxide

Plymouth is part of the national air quality monitoring network, with an AURN monitoring site in an urban background location. Various monitoring has been underway as shown in the table below.

<table>
<tr><td rowspan="2">  </td><td>Pollutant</td><td>Start Date</td><td>End Date</td></tr>
<tr><td>Carbon Monoxide
Nitrogen oxides
Ozone
Sulphur Dioxide
PM10 Particulates(Hourly Measured</td><td>29/09/1997
29/09/1997
29/09/1997
29/09/1997
29/09/1997</td><td>30/09/2007
-
-
30/09/2007
28/02/2007</td></tr>
<tr><td>SITE ADDRESS:
Armada Way,
Plymouth, Devon</td><td>Volatile PM10 Particulates (Hourly Measured)</td><td>01/03/2007</td><td>-</td></tr>
<tr><td>OS Grid Reference:
SX477546
Site Type: Urban Centre
Pollutants Measured:</td><td>Non-Automatic Hydrocarbons</td><td>01/03/2007</td><td>-</td></tr>
<tr><td colspan="4">The monitoring station is within an existing brick building located in the main pedestrianised shopping area in the city centre. The nearest road is approximately 200 metres from the station and is a busy 2/4 lane urban carriageway. The manifold inlet is approximately 3 metres high. The surrounding area comprises business and retail outlets in an urban environment</td></tr>
</table>

Table 2.1 Details of monitoring carried out at the AURN site.
Monitoring for sulphur dioxide and carbon monoxide over the last 12 months has not resulted in any breaches of the air quality objectives.

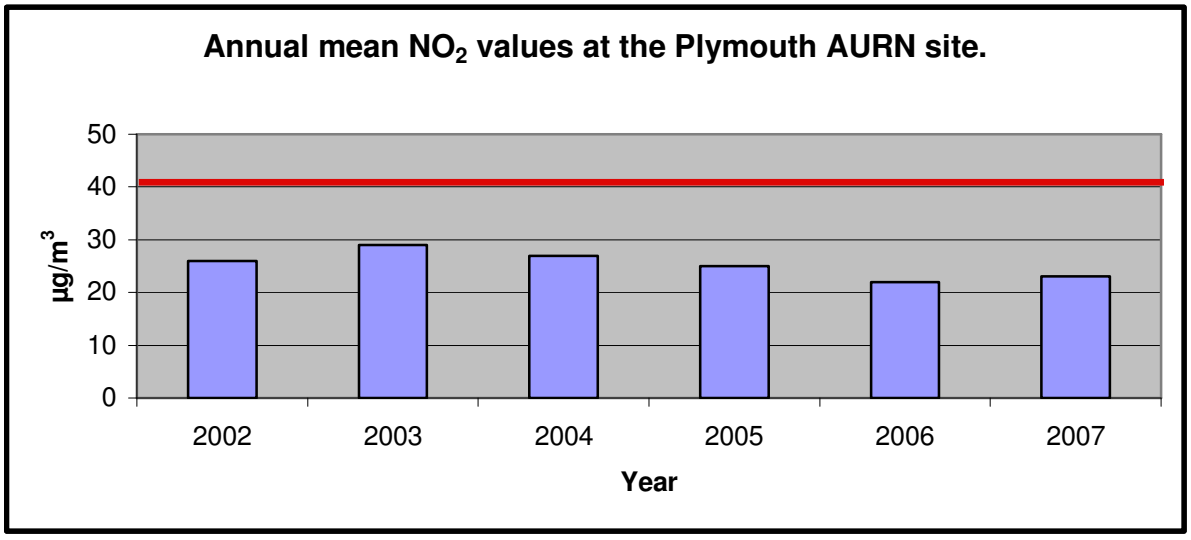


Figure 2.1 Annual Mean NO_2 concentrations at the AURN site in Plymouth

The trend over the last five years, demonstrated in Figure 2.1 has shown NO_2 to be falling year on year, however results for 2007 report a slight increase over 2006 levels. Despite this, the annual mean is 23 ug/m^3 and far below the objective of 40 ug/m^3. The AURN site is home to the triplicate diffusion tubes used in a co-location exercise to obtain a bias adjustment factor. This was calculated using automatic data and triplicate co-located tube data with LAQM (TG03) guidance box 6.4.

The bias adjustment factor for the co-location study in 2007 is **0.94**

Appendix 1 gives diffusion tube results for 2002 – 2007. The results have been subjected to the following correction factors**.**

- Tube bias
- Future year correction

2.2 New NO_2 diffusion tube monitoring data outside of the AQMA's

Monitoring has continued at various sites within Plymouth along major transportation routes where there is a relevant exposure i.e. residential property in close proximity to the roadside. A map showing the monitoring locations is attached as Appendix 2. In total 35 sites are monitored monthly (excluding control and triplicate tubes), 23 of which are outside the AQMA's. The results from these tubes including 2010 predictions are reported in table 2.2.

As a result of the high readings reported from Tavistock Road, Molesworth Road and Royal Parade, a further six tube locations were added to the monitoring programme during 2007. The results for these tubes run from April onwards

providing nine months of data in total. The NO_2 levels recorded by these tubes are consistently above the AQO of 40 µg/m^3. This site will be the subject of a detailed assessment, which will be submitted as a separate document to the progress report. All diffusion tubes have been supplied and analysed by Gradko, using the 20% TEA in water tube preparation method. The tubes are exposured at four weekly intervals. QA/QC details are provided in Appendix 3.

Tube Number	Location of Tube	Type of site	Distance of relevant exposure to road (m's)	Mean Average	Bias Adjusted 0.94	Prediction 2010	Number of periods monitored
1	Control			0	0	0	13
2	St Catherine's House	R	2.88	36.7	34.48	30.85	13
3	81a to 85a Vauxhall Street	R	4.11	36.5	34.32	30.71	12
12	Embankment Road (Portakabin)	R	1.90	35.3	33.18	29.69	13
13	2 Woodford Avenue	R	9.32	32.2	30.26	27.07	13
14	422 Tavistock Road	R	9.34	37.6	35.33	31.61	11
15	45 Tavistock Road	R	8.39	48.2	45.31	40.54	12
16	203 Crownhill Road	R	10.58	22.2	20.84	18.39	13
17	Outland Road	R	12.37	37.6	35.33	31.61	13
18	161 Molesworth Road	R	3.71	47.0	44.22	39.56	13
19	Pennycomequick (flats)	R	12.42	36.6	34.42	30.80	13
20	Caprera Place	R	1.75	37.8	35.57	31.82	9
28	Coburg Street	R	8.39	40.6	38.15	34.13	9
29	Oxford Street	R	1.61	35.9	33.71	30.16	13
30	Royal Parade	R	9.30	63.2	59.38	53.13	10
31	AURN 1	UB	N/A	28.4	26.69	23.88	12
32	AURN 2	UB	N/A	29.4	27.62	24.71	12
33	AURN 3	UB	N/A	28.0	26.33	23.56	12
34	Milehouse Road (Straton Creber)	R	5.33	48.9	46.00	40.58	9
35	Devonport Road (Traffic Lights)	R	3.22	48.4	45.47	40.11	8
36	Morshead Road (No8)	R	3.94	43.1	40.47	35.70	9
37	Great Berry Rd	R	5.34	54.4	51.10	45.08	8
38	Royal Parade (Adj N01)	K	2.85	59.9	56.29	49.66	8
39	Derry's Cross (Halifax)	K	5.71	61.0	57.33	50.58	9
K=Kerbside, R = Roadside, UB = Urban Background							

Table 2.2 Table to show the annual mean concentrations of NO_2 for monitoring in Plymouth in 2007, and the predictions for 2010, using Box 6.6 of LAQM.TG (03), using the Plymouth 2007 bias adjustment figure of 0.94.
The new monitoring sites are labelled 34 to 39. Each site was chosen to represent areas of relevant exposure where earlier monitoring had indicated an exceedence of the air quality objective. These sites will form part of a detailed assessment report that is due to be submitted in April 2009.

- Tubes 34 and 35 are sites which are assisting with the extent of the air quality problem in the location of Molesworth Road, (tube number 18), which is a busy traffic light junction with congestion caused by queuing traffic at the lights. Both sites are within 5 metres of the roadside.

- Tube sites 36 and 37, are linked to tube number 15, and represent relevant exposure of residential properties on a busy junction with congested traffic. Both sites are within 10 metres of the roadside.

- Tubes 38 and 39 are in a busy city centre location which is used predominantly by buses. One tube is located at each end of Royal Parade on busy congested roundabouts, where previous shop or office accommodation has been converted in to residential flats. Both sites have pedestrian crossings just outside the flat entrances, resulting in heavily congested traffic for the majority of the day time hours.

These areas highlighted will form part of a detailed assessment submission in 2009.

2.3 Nitrogen Dioxide monitoring within the AQMA's.

Two transport related AQMAs were declared within Plymouth in May 2005.

2.3.1 Mutley Plain AQMA

There are seven diffusion tubes monitoring levels of NO_2 within the Mutley Plain AQMA. The diffusion tube monitoring sites are shown in Figure 2.2 overleaf.

The continuous analyser was re-sited in August 2007 and as a result the data is from August to December 2007 only.

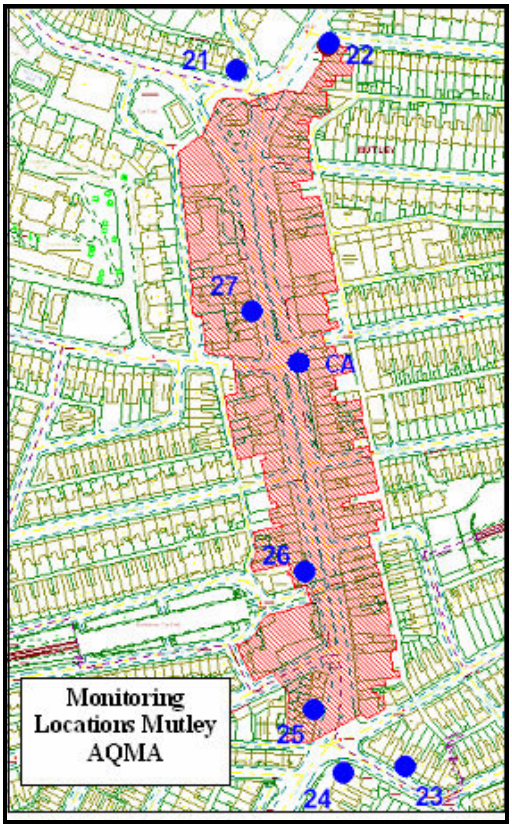


Figure 2.2. Map to show monitoring locations within Mutley Plain AQMA. The numbered blue dot represents the monitoring sites, as shown in the table of results in Table 2.3 and CA denotes the location of the continuous analyser.

Tube Number	Location	Type of site	Distance of relevant location to road (m's)	Mean Average	Bias adjusted 0.94	Estimated 2010	Number of monitoring periods
21	2 Hyde Park Rd	R	5.01	37.9	35.63	31.88	13
22	Connells (Manamead Rd)	R	2.3	40.1	37.69	33.72	12*
23	6 Alexandra Place, Greenbank Rd	R	5	41.3	38.82	34.73	10*
24	140 North Hill	R	11.02	34.3	32.24	28.85	13
25	14a Mutley plain	R	3.2	52.0	48.88	43.73	12*
26	22 Mutley Plain	R	4.1	52.7	49.54	44.32	12*
27	64 Mutley Plain	R	4.1	56.3	52.92	47.35	13

* Indicates where the numbers of periods monitored fluctuates due to missing tubes, affecting the numbers of periods monitored.
R = Roadside

Table 2.3 Table to show the annual mean concentrations for NO_2 diffusion tube monitoring at locations around the Mutley Plain AQMA in 2007, and the predictions for 2010, using Box 6.6 of LAQM.TG (03)

2.3.2 Mutley Plain NO_2 Continuous Analyser Results

The following data is reported from the new continuous analyser monitoring site in Mutley Plain. All data has been scaled and ratified. As a result of the recent relocation the first six months of data is reported in lieu of the expected 12 months. The results from the continuous analyser and a diffusion tube located close by have been compared.

Start Date	End date	1 hour mean exceedences	Analyser Mean in µg/m3	Diffusion tube bias adjusted 0.94
31/07/2007	28/08/2007	0	37.83*	53.93
28/08/2007	25/09/2007	0	43.08	53.90
25/09/2007	23/10/2007	0	51.88	48.36
23/10/2007	20/11/2007	0	52.71	61.44
20/11/2007	18/12/2007	0	50.86	49.66
18/12/2007	15/01/2008	0	54.47**	50.13
Average		0	48.47	52.90

*Data is from 01/08/07-28/08/07
** Data is from 18/12/07-31/12/07

Table 2.4 Table to show the results of the chemiluminescent monitoring data from Mutley Plain compared to the diffusion tube data.

The mean value for six months of continuous automatic analysis of NO_2 levels within the Mutley AQMA is 48.47 $\mu g/m^3$. The mean for the bias adjusted diffusion tube is 52.90 $\mu g/m^3$. These data reveal an over read from the diffusion tubes of 9.1%. Exceedences of the 40 $\mu g/m^3$ objective are recorded on an almost monthly basis and the prediction for 2010 is still over the objective, confirming the continued requirement for an AQMA for NO_2. The tubes appear to be giving different results, and the suggested reason for this is the fact that the continuous analyser was relocated and is now in a different location to the diffusion tube used previously for verification purposes. As a result, it has been decided that a new diffusion tube will be co-located with the analyser in future.

As per Box 6.5 on pages 6-8 of guidance LAQM-TG (03) the estimation of the annual mean for the continuous analysers needs to be calculated as the readings are only for five months. The method is the same for Mutley Plain and later reported for Exeter Street. The two nearby sites that have been chosen for comparison data are Plymouth AURN and Exeter.

Long Term Site	Annual Mean 2006 (Am) ug/m^3	Period Mean 2007(Pm) ug/m^3	Ratio (Am/Pm)
Plymouth AURN	22	27.0	0.814
Exeter	38.82	45.4	0.855
		Average (Ra)	0.835

Table 2.5 Annual mean figures of NO_2 for Exeter and Plymouth AURN sites.

By using the calculation in LAQM.TG (03), the annual average NO_2 result for continuous analyser is predicted to be (48.47*0.835) = 40.47µg/m^3. To forward forecast to 2010 for the continuous analyser for Mutley, using the forecast calculator gives a prediction of 35.70 µg/m^3.

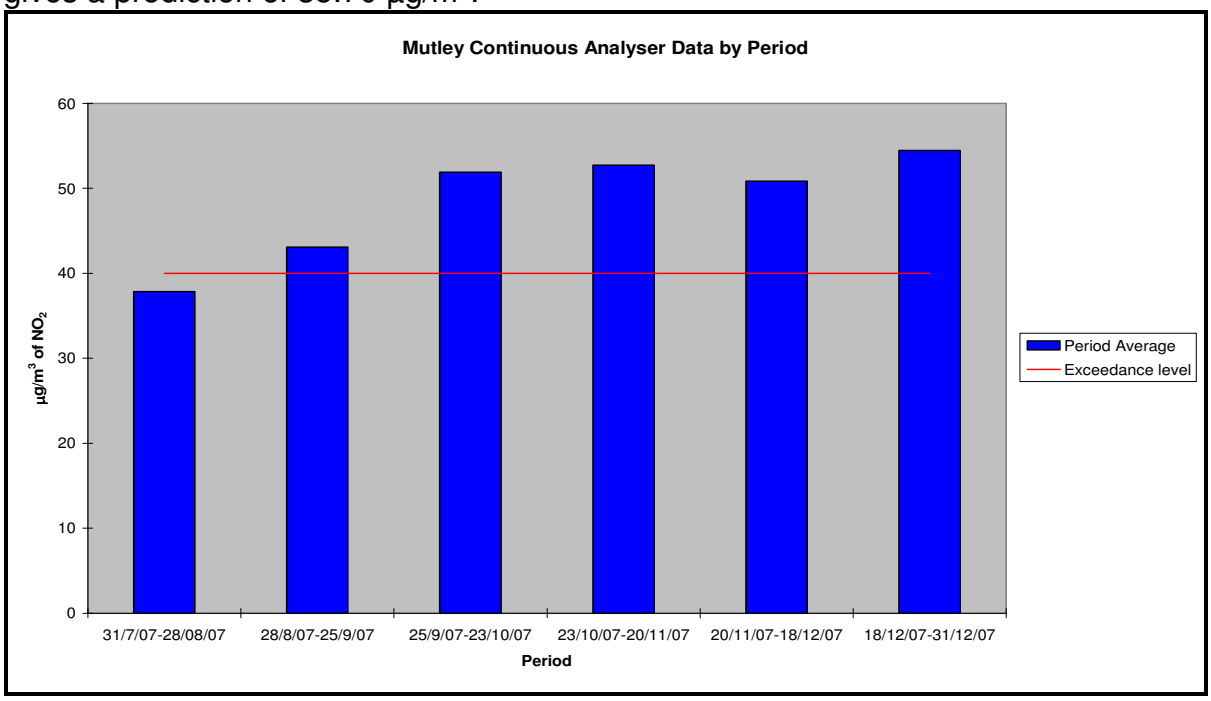


Figure 2.3 The results of the first six months of automatic continuous analyser NO_2 survey in Mutley Plain AQMA.

2.3.3 Exeter Street AQMA

The Exeter Street AQMA was declared in May 2005. There are eight diffusion tubes and a continuous chemiluminescent analyser monitoring NO_2 levels within the AQMA. All of the sites monitored are shown in Figure 2.4, below. The numbered blue circles indicate the location of the tubes and corresponds with the table of results in Table 2.4 with CA denoting the location of the continuous analyser.

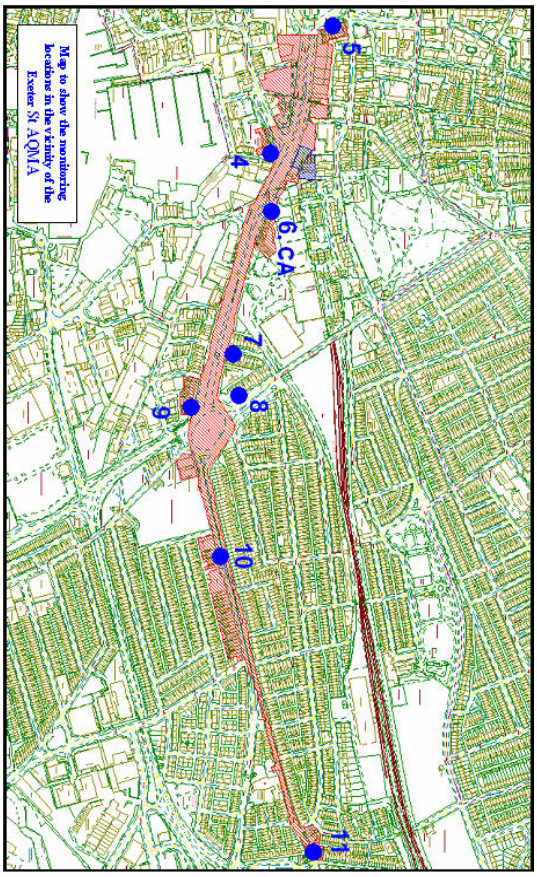


Figure 2.4 Map to show the monitoring locations in Exeter Street AQMA

Tube Number	Location	Type of site	Distance to relevant location	Mean Average	Bias Adjusted 0.94	Estimated 2010	Number of periods monitored
4	**Mariners Court**	**R**	8.51	35.5	33.37	29.86	10*
5	**Charles Cross**	**R**	10.8	48.0	45.12	40.37	12*
6	**Exeter Street(flats 1073 - 111)**	**R**	5.57	42.9	40.33	36.08	13
7	**4 St Judes Road**	**R**	4.99	32.5	30.55	27.33	13
8	**11 Tothill Road**	**R**	12.93	33.9	31.87	28.51	13
9	**212a Exeter Street**	**R**	6.78	43.2	40.61	36.33	12*
10	**48 Embankment Road**	**R**	3.05	49.2	46.25	41.38	12*
11	**211 Embankment Road**	**R**	3.87	42.5	39.95	35.74	12*

- Indicates where the number of monitoring periods fluctuates due to missing tubes
- R =Roadside

Table 2.6 Table to show the annual mean concentrations for 2007, for monitoring at locations in Exeter Street AQMA, and the predictions for 2010, using Box 6.6 of LAQM.TG (03)

The diffusion tube survey reveals that NO_2 levels continue to exceed the AQO of 40 $\mu g/m^3$ within the AQMA, with two sites predicted to exceed the annual mean objective by 2010.

2.3.4 Exeter Street NO2 Continuous Analyser Results

In August 2007 a continuous analyser for NO_2 and PM_{10} was installed within the AQMA. This site corresponds well with relevant exposure locations and is the same distance from the roadside as the residential block of flats next to the analyser. It is 8.03 metres from the roadside. Details of the QA/QC procedures are attached in Appendix 3.

Start Date	End date	1 hour mean exceedences	Mean in µg/m3	Diffusion tube 6 bias adjusted 0.94
31/07/2007	28/08/2007	0	40.26*	35.74
28/08/2007	25/09/2007	0	30.29	36.06
25/09/2007	23/10/2007	0	40.94	37.12
23/10/2007	20/11/2007	0	40.30	47.97
20/11/2007	18/12/2007	0	37.23	41.00
18/12/2007	15/01/2008	0	36.07**	35.64
Average		0	37.52	38.93
*Data is from 01/08/07-28/08/07 ** Data is from 18/12/07-31/12/07				

Table 2.7 Table to show the results of the chemiluminescent monitoring data from Exeter Street compared to the diffusion tube data.

The mean value for six months of continuous automatic analysis of NO_2 levels within the Exeter Street AQMA is 37.52 $\mu g/m^3$. The mean for the bias adjusted diffusion tube is 38.93 $\mu g/m^3$. These data reveal an over read from the diffusion tubes of 3.75%. Exceedences of the 40 $\mu g/m^3$ objective are recorded, however they are slight. Predictions for 2010 using tube data alone, again predict exceedences only slightly above the objective for two locations. Differences between levels recorded by tubes may be explained by different patterns of traffic movement throughout the AQMA.

To calculate the predicted annual mean, for the continuous analyser, the same calculation is used and this gives a predicted annual average of $37.52*0.835=31.33ug/m^3$. To forecast this result to 2010, gives a predicted concentration of 27.64 $\mu g/m^3$.

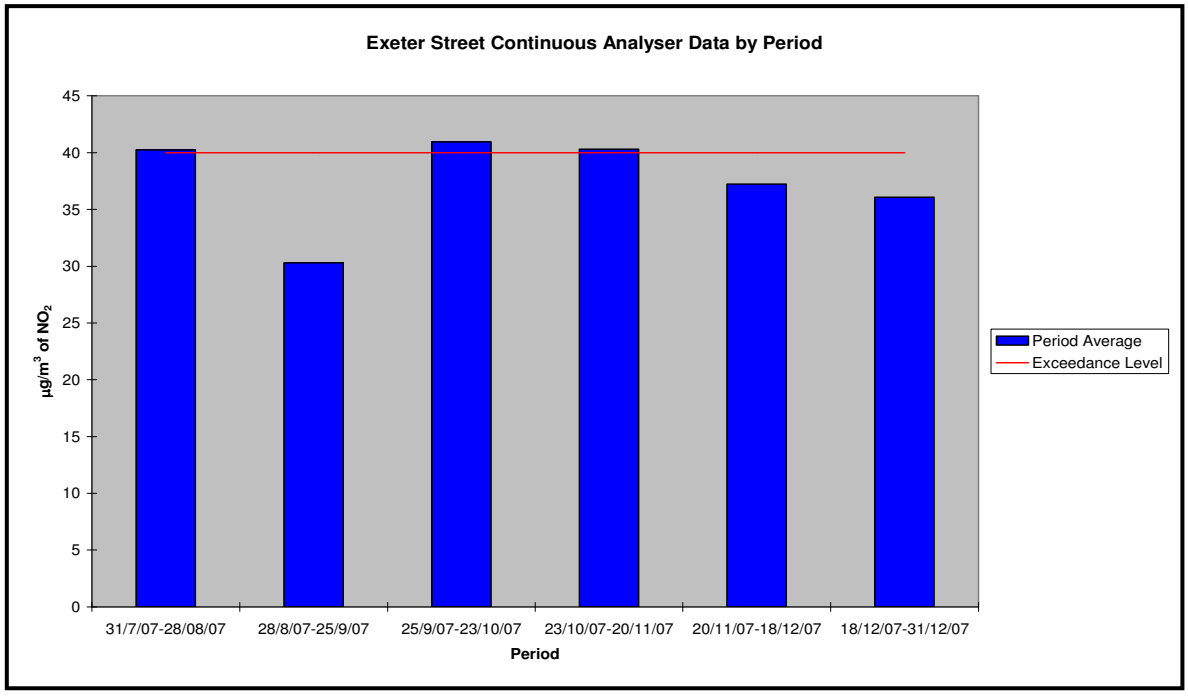


Figure 2.5 Monthly NO_2 concentrations in Exeter Street AQMA continuous analyser

2.4 Update on new benzene monitoring data from the AURN

Monitoring has been carried out at the Plymouth AURN site using a pumped benzene sampler as part of the Hydrocarbon Network since May 2002. The tubes are exposed bi-weekly and are attached to a pump so the air flow through the tube can be measured. The annual levels of benzene from the pumped benzene sampler at the AURN site are available on www.airquality.co.uk and are shown below in Figure 2.6.

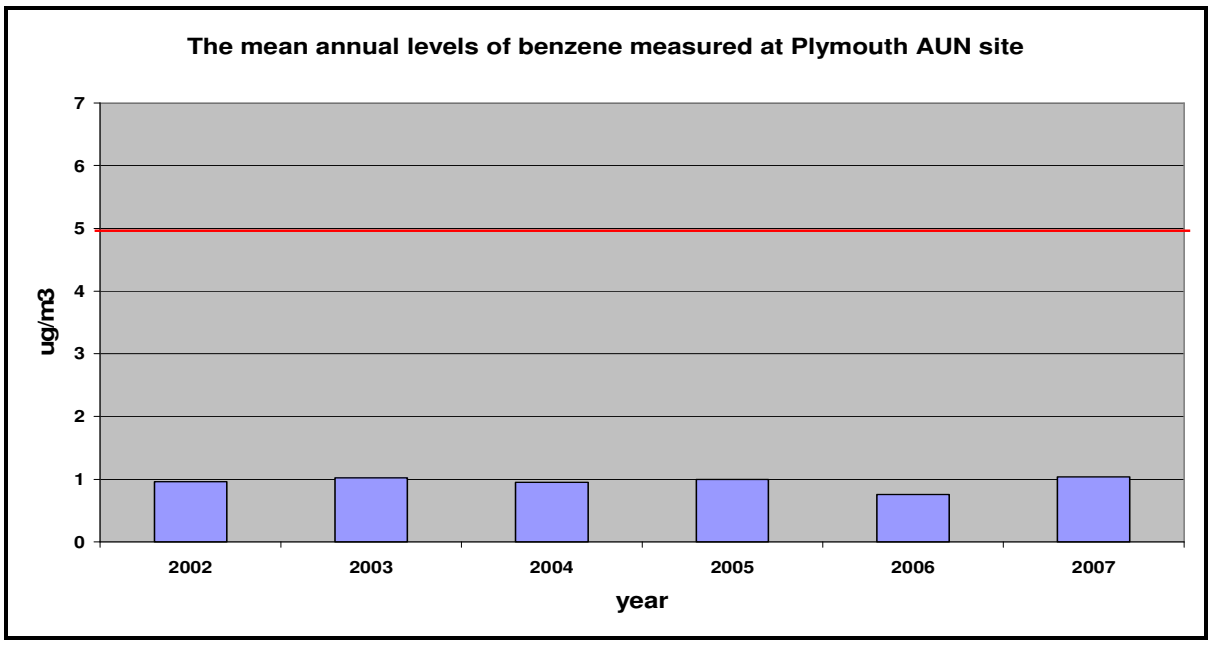


Figure 2.6 to show the mean annual benzene levels at the Plymouth AURN site

The 2007 monitoring data for the AURN and co-located diffusion tube are shown in Table 2.8 below. Most of the data is comparable, but there are however a few anomalies where the data is not. Three months of co-location data were lost when the co located diffusion tube from the roof of the AURN site went missing during April, May and June 2007. However, the results indicate that the general trend is for the diffusion tubes to over read slightly, as shown in Figure 2.7.

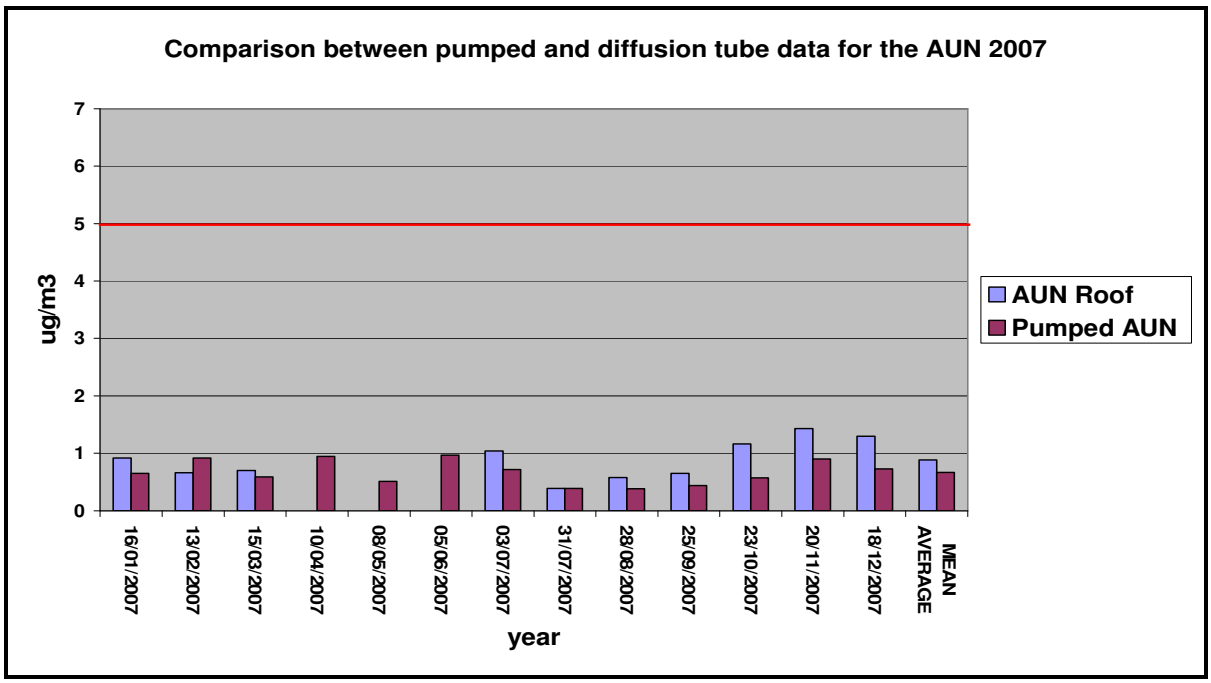


Figure 2.7 Graph to show mean results for the pumped benzene sampler at the AURN site in Plymouth and diffusion tubes for benzene 2007.

The annual mean results for the co-location study are shown in Table 2.8. From the results it can be seen that the average result for the diffusion tube is higher than that of the pumped sampler. The results of the co location exercise were used to calculate the bias adjustment factor.

	Diffusion Tube AURN Roof (Dm)	AURN Pumped Sampler (Cm)
Annual Mean	0.88	0.67

Table 2.8 Annual Average results for the co-location of benzene diffusion tubes and the pumped sampler for 2006.

The same approach as calculating a nitrogen dioxide bias correction factor from Box 6.4 in LAQM.TG (03) was used. The calculation and results are shown in Table 2.9.

Bias Adjustment A bias adjustment factor is calculated as follows. A = Cm/Dm Cm = Annual mean sampler concentration. Dm = Annual mean diffusion tube concentration. **School bias adjustment** Cm = 0.67 Dm = 0.88 A = 0.67/0.88 A = 0.76 **This means the tubes over read by 24%**

Table 2.9 Calculation for the bias correction factor for benzene diffusion tube data in 2007.

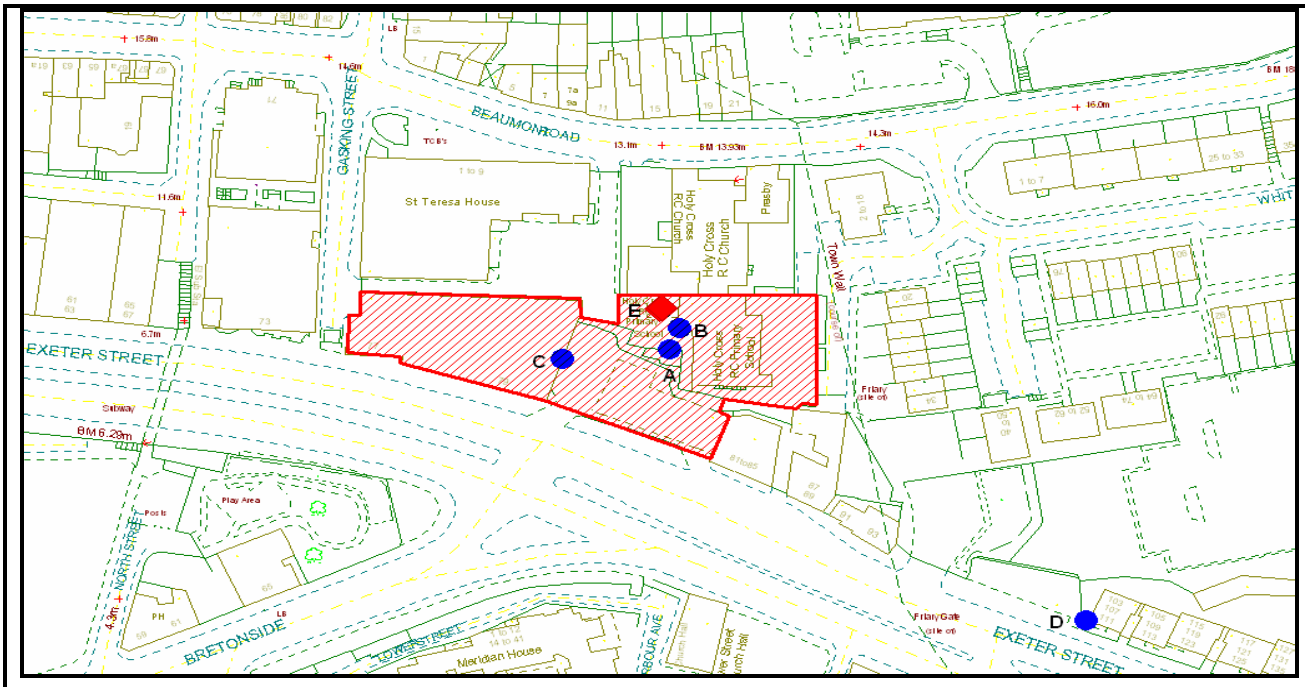
2.4.1 Exeter Street Benzene AQMA

The AQMA was declared in this location in May 2005. In January 2007, Stage II petrol vapour recovery was installed at the petrol station in Exeter Street, and monitoring has continued to assess the impact that the vapour recovery system has had on levels of benzene within the AQMA.

2.4.2 New monitoring within the Exeter Street benzene AQMA

Passive monitoring by diffusion tube has continued at two sites around the school grounds, and at the student residence at St Theresa's House, directly adjacent to the petrol station.

Active monitoring has also continued by the use of the pumped benzene sampler which was installed into a classroom in an area of relevant exposure at the school and is denoted in the following map as E (Figure 2.8). The results from this monitoring are shown overleaf.



Location	Tube
School Wall	A
School Door	B
St Theresa's House	C
Exeter Street Flats	D
Pumped School	E

Figure 2.8 Map to show the location of the diffusion tube monitors and the pumped sampler at Holy Cross School. (Blue dot represents diffusion tubes, and red diamond is the pumped sampler)

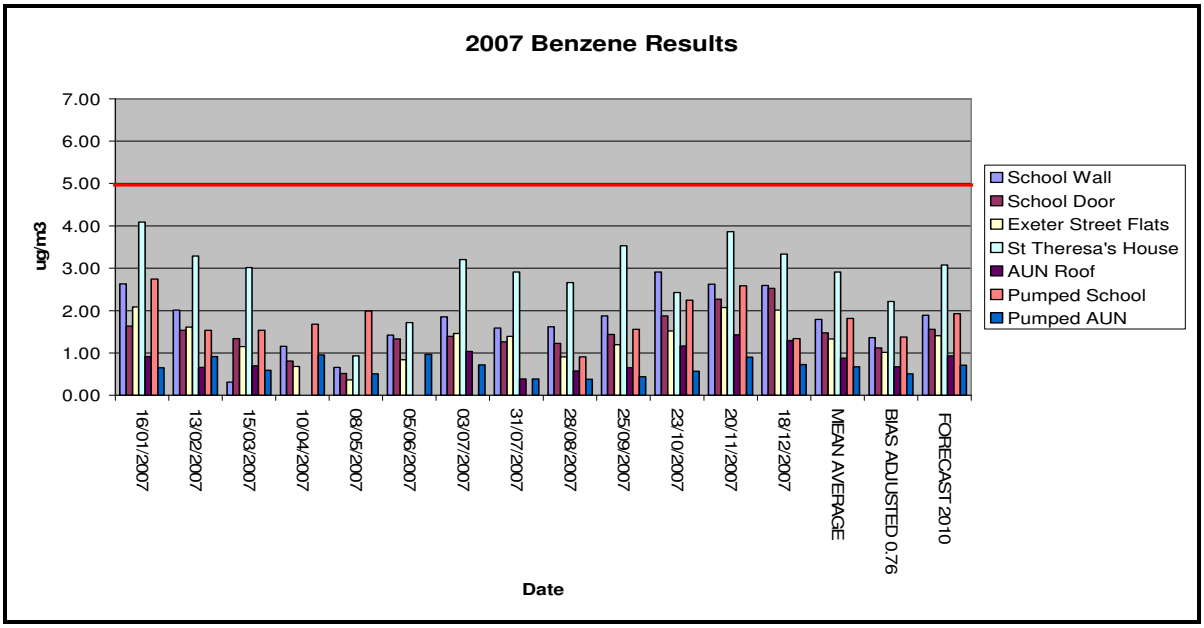


Figure 2.9 Results of monitoring in 2007 at Holy Cross School from diffusion tube monitoring.

From Figure 2.9, it is evident that the highest concentrations of benzene are at St Theresa's House. However, the mean has dropped from 4.35μg/m^3 in 2005 to 2.92μg/m^3 in 2007, as a result of the installation of vapour recovery.

The bias adjusted results for the last three years are shown in the following table.

LOCATION	TUBE	2005	2006	2007
		μg/m^3		
SCHOOL WALL	A	3.06	3.01	1.36
SCHOOL DOOR	B	2	2.35	1.12
EXETER STREET FLATS	D	1.41	2.18	1.01
ST THERESA'S HOUSE	C	4.35	3.84	2.92
PUMPED SCHOOL	E	2.84	2.7	0.67

Table 2.10 Bias adjusted results for Exeter Street benzene diffusion tube results for 2005, 2006 and 2007.

It can be seen from the bias adjusted results in table 2.10 that the highest concentration of benzene for the past three years has been recorded at St Theresa's House. This building is used as student accommodation block. The results show that the concentrations of benzene at each location have in general dropped in the last three years and all are comfortably below the 2010 objective of 5 μg/m^3. This is more clearly depicted in figure 2.10 below on the following page.

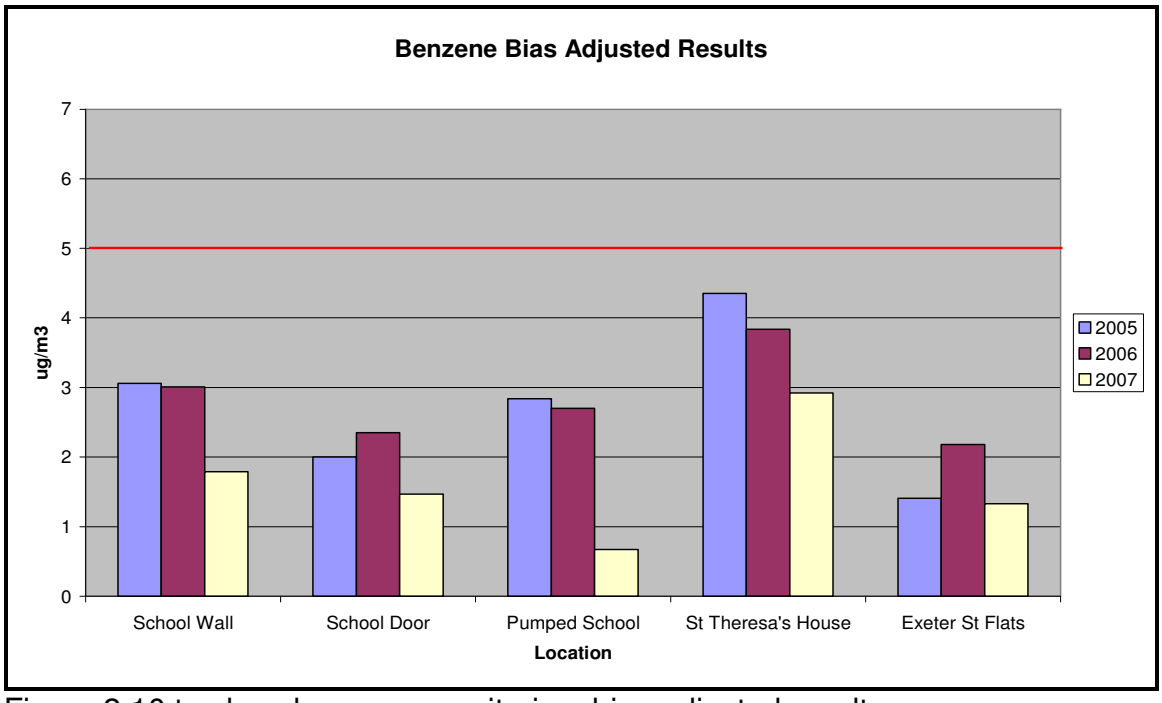


Figure 2.10 to show benzene monitoring, bias adjusted results

When these results are forecast to 2010, as shown in table 2.11 below using the Air Pollution - Year Adjustment Calculator (v1.1a) it indicates that the concentrations are predicted to fall well within the 2010 objective. The forecast takes into account the retrofitting of abatement technology and therefore takes into account the fitting of stage II vapour recovery at the petrol station in January 2007.

LOCATION	TUBE	2005	2006	2007	2008	2009	2010
School Wall	A	3.06	3.01	1.79	1.31	1.27	1.24
School Door	B	2	2.35	1.47	1.08	1.05	1.02
St Theresa's House	C	4.35	3.84	2.92	2.14	2.08	2.03
Exeter St Flats	D	1.41	2.18	1.33	0.97	0.94	0.92
Pumped School	E	2.84	2.7	0.67	1.33	1.29	1.26

Table 2.11 Results of benzene monitoring forward forecast to 2010.

The fall in concentrations are more clearly demonstrated in the following graph Figure 2.11.

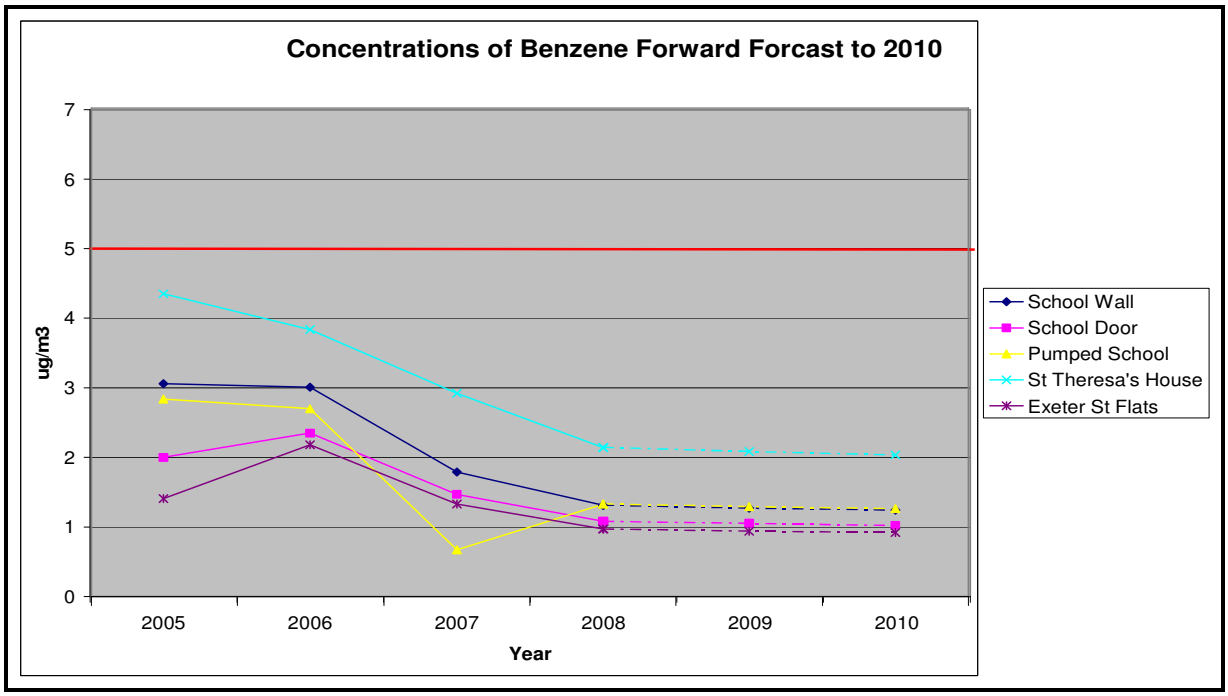


Figure 2.11 Concentrations of Benzene Forward Forecast to 2010

2.4.3 Further Developments

The above results show that there is currently not an exceedence of the of 5μg/m^3 objective and that with the forecasted continuing drop in benzene concentrations, the 2010 objective will be comfortably met. Stage Two vapour recovery has also been fitted at the petrol station in early 2007 but due to the sensitivity of the population, it has been decided to continue with the pumped benzene monitoring for the remainder of 2007 and in to 2008. This will ensure that enough monitoring data has been obtained to correctly assess any expected improvements.

If the results show significant improvement in the second half of 2008 then it is hoped that following the submission of a detailed assessment of benzene to DEFRA that the AQMA will be able to be revoked.

2.5 Particulates, PM_{10}

Monitoring of PM_{10} is carried out as part of the AURN as an urban background site, using a TEOM. The annual mean concentration for 2007 at the AURN site was 18.29μg/m^3 which is below the objective of 40μg/m^3. There were no exceedences of the 24-hour mean of 50μg/m^3. It is apparent that the concentrations within Plymouth are well within the air quality objective level.

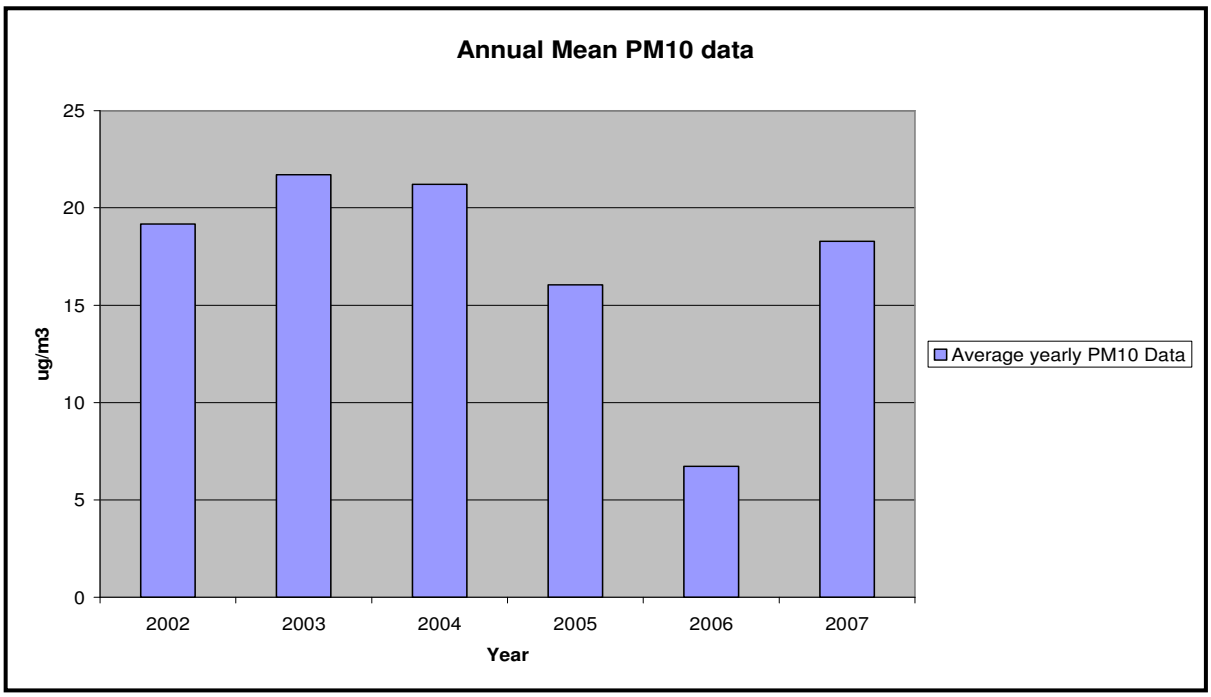


Figure 2.12 To show annual mean PM10 data from 2002 to 2007

A TEOM analyser was installed into the continuous analyser site in Exeter Street in July 2007. Details of QA/QC are contained in Appendix 3. Table 2.12 below shows the average monthly mean concentrations of PM10, which when compared to the annual mean air quality objective of 40μg/m^3, are well within the air quality objectives. It is accepted that monitoring has so far been undertaken for a period of 6 months, and the objective requires comparison of date over an annual period.

When this is compared to the number of exceedences accepted in any annual period, the numbers of exceedences so far are 8, out of a possible 35 before the air quality objective is breached.

Month	Average of Month	Number of exceedences of 50 ug/m^3 by 24hr Mean
August	14.40	0
September	25.26	2
October	33.26	2
November	24.50	0
December	34.57	4
Average	26.40	
Total		8

Table 2.12 Monthly mean PM10 data for Exeter Street

3 New Local Developments

A progress report should address any local developments that might affect air quality. This includes and new Part A/A1, A2 or B processes or types specified in Appendix 4 (E) of LAQM.TG (03). It is also important to include any processes with significantly changed emissions. New landfill sites or quarries with relevant exposure should be included, but developments should only be considered where planning permission has been granted.

New Part A/A2 Processes	Although outside the boundary of Plymouth, a new combined cycle gas turbine plant with distillate oil back up is being constructed at the far western end of the South Hams District, close to the A38 and the Plymouth City Council boundary. This proposal was examined in the first round of review and assessment by South Hams District Council and it was decided that investigation beyond stage 3 was not necessary. An IPPC authorisation was granted in 2000 but due to the time lapse a new permit application was required; this has now been determined by the Environment Agency. The new application for an A1 permit included the results of a new modeling exercise undertaken by the developers to predict the likely levels of PM_{10}, SO_2, CO and NO_2 around the plant. The expected levels will not be any higher than was anticipated by the original application. Therefore from these predictive models, it does not appear that the power station will cause any breach of air quality objectives. There has been no new part A2 Industrial Processes within Plymouth since the last review and assessment.
New Part B Processes	New permits have been issued for 7 dry cleaning processes within Plymouth in 2007 and for 2 metal surface cleaning processes. Reference was made to Appendix E of LAQM.TG (03) which stated that this will not have any impact on emissions of the air quality strategy pollutants and as such it has been regarded as insignificant. A complete list of permitted processes is contained in Appendix 4.
New residential development	Any new residential developments within Plymouth have been considered and are of minor developments which are generally in-fill plots of land from redevelopment of brownfield sites. They

	are in areas of existing development where the impact of traffic or other pollution sources have already been considered. Major new developments are currently in the pipe line which are being considered in the additional elements section.
New road scheme	There have not been any new major road developments within Plymouth since the last updating and screening assessment. In the last report, it was indicated that monitoring would take place around the new road scheme on the A386. Monitoring has now taken place at the site, shown as tube number 14 in table 2.2 which has given an annual mean of 35.33ug/m^3, below the objective level of 40 µg/m^3.
New mineral development	There are no new landfill, quarrying or mineral processes since the last round of the review and assessment process.
New landfill development	There are no new landfill, quarrying or mineral processes since the last round of the review and assessment process.
New mixed-use development	Outline permission for the redevelopment of Millbay was granted 2008. The scheme includes the building of mixed use development including over 1200 domestic residences and a variety of retail, food and drink and commercial premises. Individual developments have commenced for residential units but the large development has not yet started. The increased traffic flow may impact upon the Exeter Street AQMA as this route would be used to reach this area however there are alternative routes available. This has been fully examined in the outline application. The number of receptors in the area is currently low hence monitoring has not previously been undertaken, however further monitoring is planned.

Table 3.1 Local developments that may affect air quality

4.0 Additional recommended reporting for Progress Reports.

4.1 Additional monitoring data

4.1.1 Ozone Monitoring

Ozone monitoring has been carried out in Plymouth since 1992 independently, and as part of the AURN site since 1995. As can be seen in figure 4.1, during 2007, no exceedences of the 8 hour mean occurred.

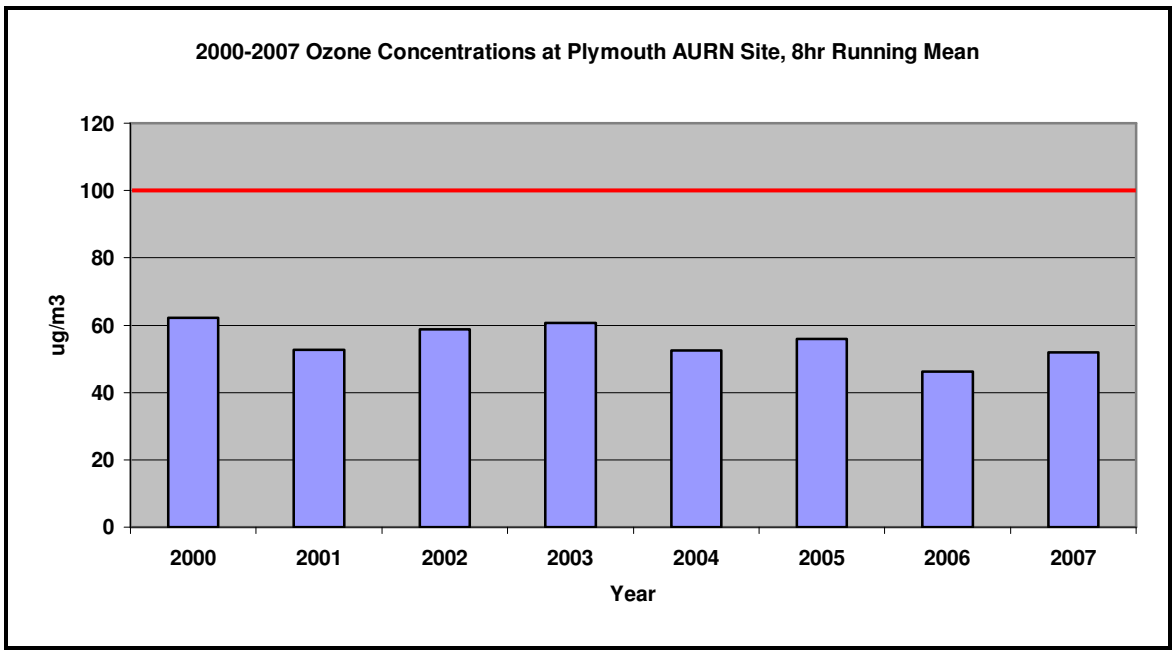


Figure 4.1 Ozone concentrations from 2000 at Plymouth AURN

4.1.2 Radiation Monitoring

Plymouth City Council is a member of the Southern England Radiation Monitoring Group and as such, radiation monitoring is carried out of fish, sea weed, shellfish, sediment and grass, and samples are sent to the University of Southampton for analysis. The results of the monitoring are available at http://www.sermg.org/sermg0607.pdf

4.1.3 Odour Complaints

Plymouth City Council has a statutory function to investigate complaints of odour. Numerous complaints are received each year regarding various sources of odour. Some of these fall under statutory nuisance regime and some relate to permitted processes that are regulated under the Environmental Protection Act 1990.

The main sources of odour complaints in 2007 have related to:-

- waste water treatment plants
- odour from one A2 permitted process

The complaints are investigated under the appropriate legislation.

4.1.4 Dust Complaints

Plymouth, like many other cities has been undergoing significant redevelopment. A number of dust complaints have been received by the authority relating to the construction industry. Many of these sites have been located near to existing residential developments, as the increase in developments on brownfield sites has continued. In an effort to reduce the impact on existing developments, the council has published a Code of Practice for Construction and Demolition, which is available

to developers and is attached to planning permission for schemes, which have the potential to cause nuisance problems.

Other sources of complaints in 2007 relate to port activities of loading and unloading of dusty cargoes at a different site to that previously reported in air quality reports, but this site has not been confirmed as a statutory nuisance to date. Further investigations are continuing.

4.2 Action Plans

Formal declaration of the three AQMA Orders took place in May 2005. The draft action plan for the AQMA's has been submitted as a chapter of the LTP2. An update of this has been provided to the Department of Transport in July 2007.

4.3 Local or Regional Air Quality Strategies

There are currently no regional or local air quality strategies although it is the intention of the authority to produce a Local Air Quality Strategy. Regionally, however, an Air Quality Focus Group meets regularly amongst the Devon local authorities under the umbrella of the Environmental Protection Regional meetings, to discuss common work themes, and introduce policies across the region with regard to when to expect air quality impact assessments and future use of section 106 agreements in major developments for air quality improvements.

4.4 Planning Policy

As part of the Local Development Framework, (LDF) the local plan process has now been abolished and replaced with the LDF. The aim of the LDF is to provide a quicker process which is more specifically tailored to areas. This process is currently underway in Plymouth and following discussions with the LDF team, a number of new developments have been identified at the early stages of the planning process.

All new planning developments are passed to the Environmental Health team to identify and comment on which plans are of potential concern, and could impact on air quality. Major applications are examined in pre application discussions with the authority to determine the impact of new developments and indications are given during these discussions what assessments should be included as part of the application process so applications can be considered fully.

The overall strategic aim is to include 10,000 new homes within the boundary of Plymouth by 2016.

4.5 Planning Applications

4.5.1 Plymstock Quarry New Community

The site previously occupied by Blue Circle Cement, at Plymstock Quarry is still being considered by the local planning authority as a site for mixed use development including over 1500 dwellings with some commercial and employment use, including a school, health and leisure uses. This is located directly adjacent to the current landfill site which was due to cease operation in 2007. The major road link from this site will lead traffic to the major link road which will follow a route in to the city centre via Gdynia Way into the current AQMA for Exeter Street. The Deep Lane Junction and Marsh Mills junction will potentially be affected also.

It is currently being considered in outline application form and the full extent of the transport implications are not yet known. The application has been submitted with a Transport Impact Assessment and an Environmental Impact Assessment. The initial intention was to have first occupation of the site by 2007, with full occupation by 2016, but the planning application was subsequently withdrawn.

Further permission has been sought and discussion regarding the site is still ongoing with the hope that planning permission will be granted in early 2009.

4.5.2 Sherford New Town

A larger scale development is currently planned within the neighbouring council, South Hams, which includes the proposal for a new town, with 4500 new dwellings, in addition to 3 primary schools, one secondary school, a bus depot, park and ride sites and various employment land. This site is planned for occupation by 2016 and as such is only in the very initial stages of proposals. There are two transport links planned for this development, one connecting directly with the A38, outside the Plymouth boundary, which has no current air quality concerns due to lack of public exposure in a relevant location and the second connection through Plymstock. However, this site will have a requirement for a high quality public transport link, to be in place prior to the first homes being occupied.

Both this site and the Plymstock Quarry site have significant transport implications particularly for the access routes to the city centre which will directly link to the current AQMA in Exeter Street.

Assessments of these impacts have been looked at by consultants in the ‘Eastern Gateway Study’, where three options have been considered to provide theoretical options to the city to resolve the transport problems. In addition the transport department are carrying out an Eastern Corridor Study to look in further detail about the solutions.

4.5.3 Millbay

Outline permission for the redevelopment of the Millbay area of Plymouth was granted 2008. The scheme includes the building of mixed use development including over 1200 domestic residences and a variety of retail, food and drink and commercial premises. Individual developments have commenced for residential units but the large development has not yet started.

The increased traffic flow may impact upon the Exeter Street AQMA as this route would be used to reach this area however there are alternative routes available. This has been fully examined in the outline application.
The number of receptors in the area is currently low hence monitoring has not previously been undertaken, however further monitoring is planned.

4.6 Local Transport Plan

The Local Transport Plan has been submitted and the Draft Air Quality Action Plan has been submitted as a chapter. As air quality is a key theme of the LTP2, there has been significant interaction between both the transport and the environmental health teams. It is currently anticipated that the Action Plan for the two transport related AQMA's will be included in the Annual Performance Review of the LTP. This meets the guidance set out in LAQM.PGA (05), which suggests that action plans should be an integral chapter of the Local Transport Plan. Details of the progress made on the Interim Action Plan are contained in Appendix 5.

5.0 Conclusions from the Progress Report.

- From this report it can be concluded that the monitoring will continue in the two AQMA's for NO_2 in Mutley Plain and Exeter Street. Exceedences are continuing to occur in both locations, with predictions for 2010 exceedences.

- Stage 2 vapour recovery has now been installed at the petrol station, and the results of the monitoring within the benzene AQMA indicate that the levels are below the objective. A detailed assessment will be submitted shortly with the intention of revoking the benzene AQMA.

- A detailed assessment will be submitted of three new areas of concern where monitoring has continued, in Royal Parade, Molesworth Road and Tavistock Road

- Within Plymouth, no major developments have been identified that require current action. However, a new power station is under construction in South Hams District Council and this will be closely monitored in conjunction with South Hams when it becomes operational.

- Other residential and mixed use developments have been identified through the planning process that may have impacts on air quality and monitoring

regimes will be considered as these sites are developed. It is difficult to assess the current timescales for development in the current financial climate.

- An update on progress with the Interim Air Quality Action Plan is provided and a detailed action plan will be submitted in 2009.

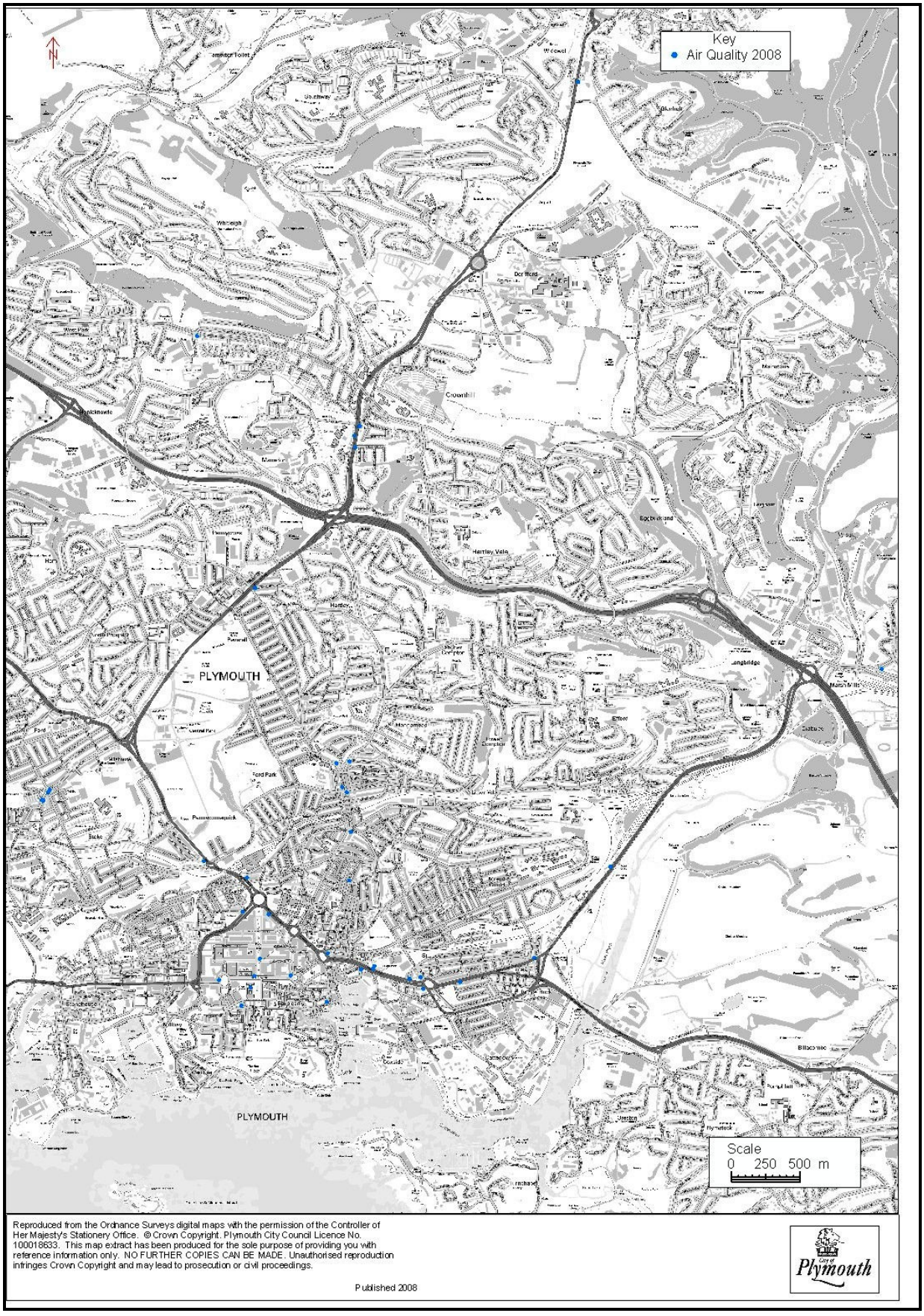
- Monitoring of PM_{10} has commenced in Exeter Street and full annual data will be reported at the next updating and screening assessment.

Appendix 1

Annual mean diffusion tube results for each site

2004 to 2007 Diffusion Tube Data (Bias Adjusted)					
		2004	2005	2006	2007
Tube No	Location	Bias Adjusted 0.96	Bias Adjusted 0.86	Bias Adjusted 0.84	Bias Adjusted 0.94
1	Control	0	0	0	0
2	St Catherines House		32.30	29.65	34.48
3	81a to 85a Vauxhall Street		29.68	25.70	34.32
4	Mariners Court	35	31.31	26.80	33.41
5	Charles Cross	42	36.31	37.46	45.13
6	Exeter Street (flats)	41	41.58	37.21	40.34
7	4 St Judes Road	34	30.51	30.16	30.58
8	11 Tothill Road	33	28.53	27.80	31.87
9	212a Exeter Street	44	35.29	34.10	40.63
10	48 Embankment Road	38	42.13		46.20
11	211 Embankment Rd	37	35.96	32.76	39.96
12	Embankment Rd (Portakabin)	30	26.01	28.31	33.15
13	2 Woodford Avenue	31	25.56	26.29	30.26
14	422 Tavistock Road "Garfield"			27.64	36.63
15	45 Tavistock Road			36.54	45.31
16	203 Crownhill Road			8.48	20.84
17	Outland Road	35	28.02	28.64	35.33
18	161 Molesworth Road				44.22
19	Pennycomequick (flats)	36	31.27	30.74	34.42
20	Caprera place	37	31.82	32.34	35.57
21	2 - Hyde Park Rd	30	29.46	30.07	35.60
22	Connells (Manamead Rd)	37	33.03	27.97	37.72
23	Alexndra Place, Greenbank Roa	36	30.68	31.08	38.80
24	140 North Hill	33	30.91	27.55	32.22
25	14a Mutley plain	49	40.77	38.89	48.92
26	22 Mutley Plain (con club)	43	42.46	41.92	49.54
27	Mutley Plain (shop)	50	44.01	43.01	52.94
28	Coburg Street		34.14	33.26	38.15
29	28 Oxford Street		31.68	29.65	33.71
30	Royal Parade				59.38
31	AUN 1	26	25.22	21.25	26.69
32	AUN 2	26	24.35	24.86	27.62
33	AUN 3	25	25.75	24.78	26.33
34	Milehouse Rd (Straton Creber)				46.00
35	Devonport Road (Traffic Lights)				45.47
36	Morsehead Road (No8)				40.47
37	Great Berry Rd				51.10
38	Royal Parade (Adj N01)				56.29

Appendix 2


Key
Air Quality 2008
PLYMOUTH
PLYMOUTH
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Published 2008
Plymouth

Appendix 3

Quality Assurance and Control Measures

Nitrogen Dioxide Diffusion Tubes

Where NO_2 is monitored using diffusion tubes, the standard method recommended by NETCEN and the analytical laboratory undertaking analysis (Gradko) is followed. Gradko are a fully accredited establishment and supply tubes to many local authorities.

NO_2 diffusion tubes are clear plastic tubes, with one open end and a closed end containing a NO_2 absorbing chemical matrix (triethanoamine). The types of tubes used are 20% TEA in water. The open end is sealed with a plastic cap before it is transported to the monitoring location. At the site the cap is removed and the tube is mounted vertically with the open end at the bottom.

The interval between preparation and deployment is kept to a minimum. During storage the tubes are kept in a sealed plastic bag in the refrigerator. A blank tube is sent which remains in the sealed bag during the monitoring period and is returned with the rest of the tubes to the laboratory for analysis.

Monitoring sites were identified upon relevant exposure or those that were considered to be representative of a relevant exposure location. The tubes were mounted mostly on drainpipes. Ideally, the tubes should be mounted on to spacer blocks and not attached directly to any surface. Tubes, however, are prone to theft and are, therefore, attached using strong tape above head height. The tubes are exposed for a period of four weeks and the exposure time noted in hours.

Quality assurance is given by participation in the Working Sampling Proficiency Programme (WASP). These tests provide a regular independent check on the calibration. Gradko also participate in the Field Intercomparison Tube Survey carried out by NETCEN where diffusion tubes are co-located against an AURN site. This gives a bias adjustment factor A of 0.82+/- 0.1. When this is compared to the bias adjustment factor calculated using the co-location study at Plymouth AURN site a good correlation is found.

The analytical lab used was Gradko International Ltd., St Martins House, 77 Wales Street, Winchester, Hampshire SO23 0RH.

Benzene Diffusion Tubes

Benzene diffusion tubes are supplied by Gradko. Analysis is carried out using gas chromatography/ Thermal disorption techniques. Standard solutions are prepared covering the concentration range 10-2000ng and there is an uptake rate of 1.28ng per ppm per minute.

The exposed tubes are thermally disorped and the vapour phase transferred to a gas chromatography system. Calibration determinations are made for every batch of tubes analysed.

Results are issued in parts per billion and are then converted to µg/m^3. The interval between preparation and deployment is kept to a minimum and after tubes are dispatched they are stored within the refrigerator until deployment to site. A blank tube has now commenced with a tube being left within the refrigerator for the exposure period and returned with the tubes after exposure.

Monitoring locations have been chosen to represent relevant exposure locations to represent the annual mean concentration, although the accuracy of the tubes may be +/-25%. When the tubes are placed out at the monitoring locations, the red cap is removed and a filter is placed on the end of the tube. The tubes are left for 4 weeks and when collected, the filter is removed and the cap is placed on the tube. The tubes are then sent away to the laboratory for analysis.

Quality assurance is given by the participation in the WASP scheme. The analytical laboratory takes part in the Workplace Analysis Scheme for Proficiency (WASP) run by the UK Health and Safety Laboratories. Samples of BTEX loaded tubes are sent to each laboratory three times per year for analysis.

The laboratory methods and procedures used for this analysis form part of the Quality Management Systems which has been written to comply with the requirement of UKAS.

Pumped Benzene Diffusion Tube.

The National Physics Laboratory co-ordinate a national survey, that Plymouth participates in. The pumped sampler for the national survey is located at the AURN site, in Armada Way, and is considered an urban background site. Benzene tubes are provided fortnightly and the local site operator changes the tubes, checks and adjusts the flow rate accordingly. All procedures in the manual provided by NPL are followed.

NPL audit the sampler every six months to check that the box is not leaking, measure the flow through the two tubes and correct it if it is more than 10% out. If the flow is greater than 10% out then the data is scaled accordingly.
The absorbent is carbopack x. The uptake rate does not apply due to it being a pumped sampler.

The second NPL sampler installed at Holy Cross School is exactly the same equipment as above. All procedures are followed in an identical manner, and are analysed in the same way.

AURN Network

Monitoring data obtained from Plymouth City Council's automatic monitoring site in Armada Way is affiliated to the DEFRA's AURN network. As such it follows all QA/QC procedures set out in the local site operators' manual. Daily internal calibrations are conducted as well as fortnightly calibrations to check equipment performance and internal instrument parameters. Provisionally scaled data is available on the internet. Performance audits and inter calibrations are additionally conducted by agencies appointed by the DEFRA. The data is ratified every 6 months by NETCEN, and is reported every 6 months in the QA/QC Data Ratification Report for the Automatic Urban Network. This is, a report produced for the Department for Environment, Food and Rural Affairs, Scottish Executive, Welsh Assembly Government and the DoE in Northern Ireland.

NO_2 Chemiluminescent Monitor

Monitoring for Oxides of Nitrogen is carried out at Mutley Plain and Exeter Street by continuous analysers. These analysers are not linked to any particular network. The data obtained from the analysers is stored on secure servers at Air Monitors head office. The data can be accessed at any time through a license key held by the Public Protection Service. The data is examined for any spurious results or anomalies, and these are removed. The results have been averaged over 24 hours and calculated as monthly mean figures.

Routine site visits are carried out to maximise data capture and integrity of data. These operations include:-

- Ensuring the proper running of the equipment
- Performing instrument calibrations and diagnostic checks
- Minimising instrument down time by anticipating problems prior to them occurring
- Carrying out essential routine functions such as filter changes
- Performing checks of the automatic calibration system.

To enable the data to be scaled, it is necessary to calibrate the equipment using a gas mixture of know concentration. Calibrations are conducted automatically daily. These are carried out in accordance with the manual provided by the manufacturer.

An ongoing maintenance contract is in place with Air Monitors, the supplier of the equipment, who attend the sites every six months to service the equipment. The service contract also covers emergency attendance at the sites in the event of any breakdown of failure of equipment.

Appendix 4

ENVIRONMENTAL PERMITTING (ENGLAND & WALES) REGULATIONS 2007

Public Register

Permitted Processes In the Plymouth Area Regulated By The Environment Agency (A1)

Permit/Authorisation Number	Permit Issue Date	Operator	Address of Process or Installation	Industry Sector	Sector/ProcessGuidance Note
		Silicon Sensing Products (UK LTD)	Unit 18, Estover Road, PL6 7PY	Hydrogen Floride	
		Vapour Management Systems Ltd	85 St Modwen Road, Parkway Industrial Estate, PL8 8L	Halogens	
EA/PPC/VP3734SY	12/12/2003	Viridor	Derriford Hospital, Derriford, PL6 8HD	Incineration	

rmitted Processes in The Plymouth Area

Permit/Authorisation Number	Permit Issue Date	Operator	Address of Process or Installation	Industry Sector	Sector/ProcessGuidance Note
LAIPPC/A2/J11PL2175P/1/01	17/11/2004	Fine Tubes Ltd	Plymbridge Road Estover, Plymouth PL6 7LG	Degreasing of Metal	SG 6 (04)
LAIPPC/A2/104**WALL/1/01	18/03/2005	Interfish Ltd	Wallsend Industrial Estate, Cattedown road, PL4 ORW	Rendering of Fish Offal	SG 8 (04)

mitted Processes In The Plymouth Area

Permit/Authorisation Number	Permit Issue Date	Operator	Address of Process or Installation	Industry Sector	Sector/Process Guidance Note
EP/B/G10S10EFFO/1/01	24/07/2009	Efford Crematorium	Efford Road, Efford PL3 6NG	Crematoria	PG 5/2 (04)
EP/B/B03S18FERN/2/01	24/07/2009	Weston Mill Crematorium	Ferndale Road,Weston Mill PL2 2EP	Crematoria	PG 5/2 (04)
LAPPC/J05PG5ELBU/1/01	19/03/2004	Aggregate Ind	Moorcroft Quarry, Elburton Road PL9 8AJ	Quarry Process	PG 3/8 (96)
LAPPC/J05P**ELBU/1/01	19/03/2004	Ashcroft	Moorcroft Quarry, Elburton Road PL9 8AJ	Mobile Crusher	PG 3/16 (96)
LAPPC/JB/P**HAYE/1/02	02/03/2007	CEMEX	Moorcroft Quarry, Elburton Road PL9 8AJ	Cement Batching	PG 3/01 (04)
LAPPC/JBPA1EMBA/1/02	21/03/2007	Glendinning	Embankment Rd, Laira PL4 9JL	Cement Batching	PG 3/01 (04)
EP/B/J041**10sh/1/01	24/07/2008	Hanson Aggregates	10 Shapters Way, Cattedown PL4 ORU	Cement Batching	PG 3/01 (04)
LAPPC/ J13P**ROCK/ 2/ 02	19/03/2004	Tarmac	Rock Gardens, Billacombe Rd, PL9 7HY	Cement Batching	PG 3/01 (04)
LAPPC/B/03/J05P**BREA/1/01	28/05/2004	Paragon	Pomphlett Jetty, Breakwater Rd PL9 7HG	Cement Unloading	PG 3/01 (04)
LAPPC/B/V085**1013/2/01	19/03/2004	Curtis Ball	10/13 Manor St, Stonehouse PL1 3NF	Waste Oil Burner	PG1/1 (04)
LAPPC/B/V08S**4LIS/1/02	17/03/2007	Exway Coachworks	4 Lister Close, Newnham Industrial Estate, PL7 4BA	Vehicle Spraying	PG 6/34b (06)
LAPPC/B/V08R0512LI/1/02	23/03/2007	Ocean	12 Lister Close, Newnham Industrial Esate, PL7 4BA	Vehicle Spraying	PG 6/34b (06)
LAPPC/B/V01R**LONG/2/02	27/03/2007	Vospers	Longbridge Road, Marsh Mills,PL6 78AY	Vehicle Spraying	PG 6/34b (06)
LAPPC/B/V08V361MIL/1/02	27/03/2007	Plymouth Citybus	1 Milehouse Road, Milehouse, PL3 4AA	Vehicle Spraying	PG 6/34b (06)
LAPPC/B/V08V**FARA/1/02	27/03/2007	Rodgman & Williams	Faraday Mill Business Pk, Prince Rock, PL4 OST	Vehicle Spraying	PG 6/34b (06)
LAPPC/B/V08V**3STR/1/ 02	27/03/2007	Hall, Graves & Lee	3 Strode Road, Plympton, PL7 4AY	Vehicle Spraying	PG 6/34b (06)
LAPPC/B/V08V33BROX/1/02	27/03/2007	Nationwide	Pomphlett Farm Industrial Estate, Broxton Drive, PL9 7L	Vehicle Spraying	PG 6/34b (06)
LAPPC/B/CO4R14PLY/3/02	30/04/2007	The Barden Corporation	Plymbridge Road, Estover PL6 7LH	Surface Cleaning of Metal	PG 6/45 (04)
LAPPC/B/J08P02PENN/1/01	11/03/2005	Hellermann Tyton	Pennycross Close, Pennycross PL2 3NX	Adhesive Coating	PG 6/32 (04)
LAPPC/B/J11P2485AS/1/01	30/04/2007	Interlube	85a St Modwen Road, Marsh Mills PL6 8LH	Surface Cleaning of Metal	PG 6/45 (04)
LAPPC/B/JO2P13ERNE/1/01	11/03/2005	Kawasaki	Ernesettle Lane, Ernesettle PL5 2SA	Coating of Metal	PG 6/23 (04)
LAPPC/B/J11PL2175P/ 1/01	17/11/2004	Fine Tubes	Plymbridge Road, Estover PL6 7LG	Metal Treatment	PG 4/1 (05)
LAPPC/B/J12P**COYP/2/01	16/03/2005	Princess Yachts International PLC	Coypool Road, Marsh Mills, PL7 4NW	Coating of Wood	PG 6/33 (04)
LAPPC/B/J12P**COYP/ 3/ 01	25/11/2005	Princess Yachts International PLC	Coypool Road, Marsh Mills, PL7 4NW	Fibre Reinforced Plastics	PG 4/02 (05)
LAPPC/B/J12P**COYP/ 1/ 01	19/03/2004	Princess Yachts International PLC	Coypool Road, Marsh Mills, PL7 4NW	Manufacture of Timber and Wood-Based Produ	PG 6/02 (04)
LAPPC/B/B0153169HY/1/01	31/10/2007	Hyde Park Professional dry	69 Hyde Park Road, Peverell PL3 4JN	Dry Cleaners	PG 6/46(04)
LAPPC/B/B01S1523WU/ 1/01	24/10/2007	Johnson Cleaners UK Ltd	23 Wolesley Road, Milehouse, PL2 3AA	Dry Cleaners	PG 6/46(04)
LAPPC/B/B015162WOO/1/01	31/10/2007	Johnson Cleaners UK Ltd	4 Woolwell Crescent, Roborough, PL6 7RB	Dry Cleaners	PG 6/46(04)
LAPPC/B/B0153315PO/1/01	17/05/2007	WM Morrison Supermarket plc	15 Pomphlett Road, Plymstock, PL9 7HB	Dry Cleaners	PG 6/46(04)
LAPPC/B/B035062MO/1/01	31/10/2007	Priority Cleaners	22 Morshead Road, Crownhill, PL6 5AH	Dry Cleaners	PG 6/46(04)
LAPPC/B/B0153217ST/1/01	31/10/2007	St Stephens Cleaners	17 St Stephens Place, Ridgeway,PL7 2ZN	Dry Cleaners	PG 6/46(04)
LAPPC/B/B01510PLYM/1/01	31/10/2007	Timpson Ltd	Plymouth Road, Crabtree, PL3 6RL	Dry Cleaners	PG 6/46(04)
LAPPC/B/F07W**BREA/ 1/ 01	15/08/2005	SGS Strath Services Ltd	Mayflower Terminal, Breakwater Hill, Coxside PL4 ORJ	Petrol Terminal	PG 1/13 (04)
LAPPC/B/F07WA1OAKF/ 1/ 01	15/08/2005	Texaco Ltd	Oakfield Terrace Road, Cattedown PL4 ORY	Petrol Terminal	PG 1/13 (04)
LM/TC/012/06	31/03/2007	Pace Service Station	243 Manamead Road, PL3 5RJ	Petrol Station	PG 1/14 (06)
LM/TC/005/06	31/03/2007	Commercial Service Station	9-11 Chapel Street, PL1 4DP	Petrol Station	PG 1/14 (06)
LM/TC/018/06	31/03/2007	Tesco Express	137 Eggbuckland Road, PL3 5JU	Petrol Station	PG 1/14 (06)
LM/TC/013/06	31/03/2007	Pace Service Station	Plymouth Road, PL3 6EE	Petrol Station	PG 1/14 (06)
LM/TC/011/06	31/03/2007	Morley Service Station	6 Billacombe Road, PL9 7HP	Petrol Station	PG 1/14 (06)
LM/TC/019/06	31/03/2007	Tesco Filling Station	Transit Way, PL5 3TW	Petrol Station	PG 1/14 (06)
LM/TC/006/06	31/03/2007	Exeter Street Service Station	77-81 Exeter Street, PL4 OAH	Petrol Station	PG 1/14 (06)
LM/TC/014/06	31/03/2007	PACE Service Station	Wolseley Road, PL5 1UD	Petrol Station	PG 1/14 (06)
LM/TC/02/06	31/03/2007	Total UK Ltd	Forder Valley Road, PL6 8LE	Petrol Station	PG 1/14 (06)
LM/TC/002/06	31/03/2007	Smart Service Station	443 Tavistock RoadPL6 8HE	Petrol Station	PG 1/14 (06)
LM/TC/003/06	31/03/2007	Smart Service Station	Budshead Road, PL6 5DY	Petrol Station	PG 1/14 (06)
LM/TC/009/06	31/03/2007	Honicknowle Service Station	Crownhill Road, PL5 3SL	Petrol Station	PG 1/14 (06)
LM/TC/010/06	31/03/2007	Milehouse Service Station	23 Wolseley Road, PL2 3AA	Petrol Station	PG 1/14 (06)
LM/TC/023/06	31/03/2007	Weston Mill Filling Station	Wolseley Road, PL5 1BL	Petrol Station	PG 1/14 (06)
LM/TC/001/06	31/03/2007	ASDA Filling Station	Leypark Dri ve	Petrol Station	PG 1/14 (06)
LM/TC/015/06	31/03/2007	Morrisons Petrol Filling Station	Pomphlett Mill Quarry	Petrol Station	PG 1/14 (06)
LM/TC/016/06	31/03/2007	Sainsbury Petrol Filling Station	Plymouth Road	Petrol Station	PG 1/14 (06)
LM/TC/017/06	31/03/2007	Somerfield Petrol Filling Station	150 Plymouth Road	Petrol Station	PG 1/14 (06)
LM/TC/020/06	31/03/2007	Tesco Petrol Filling Station	2 Woolwell Crescent	Petrol Station	PG 1/14 (06)
LM/TC/022/06	31/03/2007	Vale Petrol Stattion	Alexandra Road, Plymouth	Petrol Station	PG 1/14 (06)
LM/TC/004/06	31/03/2007	Chaddlewood Gararge Filling Stati	251 Ridgeway, PL7 1AJ	Petrol Station	PG 1/14 (06)
LM/TC/007/06	31/03/2007	Hartley Petrol Filling Station	208 Manamead Road, Plymouth	Petrol Station	PG 1/14 (06)
LM/TC/008/06	31/03/2007	Home Park Filling Station	89 Outland Road	Petrol Station	PG 1/14 (06)

Appendix 5

Air Quality Action Plan Progress - LTP2

The interim Air Quality Action Plan (AQAP) is currently being reviewed. A final AQAP will be developed and submitted to DEFRA alongside the Further Assessment Report in April 2009. It will include measures both specific for the AQMAs and for the wider city area.

Action Plan Measure / Target	Original Timescale	Progress with Measure	Outcome to Date	Comments
Reallocation of road space and increased priority for buses, cyclists and pedestrians in AQMA's	LTP2	Detailed traffic modelling has been commissioned for Plymouth's Northern Corridor (which includes the Mutley Plain AQMA) to consider various public transport and traffic management options. This should be ready to inform the schemes to be delivered in the period 2009-11 and into LTP3. **Eastern Corridor HQPT Major Scheme (ECMS)** The Eastern Corridor High Quality Public Transport (HQPT) Major Scheme (ECMS) is progressing to timescale with the Phase 1 consultation on the initial options undertaken in July and August 2008. Results of which will be used to inform the development of more detailed options in 2009-10. Other significant stages of the Major Scheme process are: • Phase 2 Environmental Studies 2 and Air Quality Assessments	Modelling commissioned with results due to be available in January 2009 to inform transport schemes to be delivered from 2009-11. Phase 1 consultation on initial options (July/August 2008).	

		December – January 2009 • Preferred Options - May 2009 • DfT Submission – September 2009 • Approval - March/April 2012 • Construction start - June 2012 The City Council successfully submitted an outline business case bid for Community Infrastructure Funding (CIF) in April 2008. The CIF bid identifies and accelerates highway and transport improvements for the East–End area (Cattedown Roundabout to Laira Bridge) section of the ECMS. If the bid proves successful this will enable significant improvements to be made ahead of the ECMS timescale. A full Business Case for the CIF proposals was submitted to the DfT and the DCLG in October 2008. Assessment of the proposals indicate that there will be significant air quality benefits within the Exeter Street / Embankment Rd AQMA between Cattedown Rbt and Laira Bridge with traffic diverted away from Embankment Rd onto Gdynia Way instead. A study will be commissioned to consider all the issues related to the Mutley Plain area and will include the routes into, out of and adjacent to the	CIF Outline Business Case shortlisted in July 2008. CIF Full Business Case submitted in October 2008. The study should be complete to inform proposals for delivery from 2009.	We will find out if we have been successful by February 2009.

		AQMA.		
Tree Planting in the AQMAs	LTP2	Consideration of tree planting within the Mutley Plain and Exeter Street AQMAs will be given as plans are developed for them.	The feasibility of planting trees in the Exeter Street AQMA is currently being investigated.	
Travel Plans in the AQMAs		Encourage the implementation of School, Work and Residential Travel Plans.	9 work place travel plans and 1residential travel plan have been implemented in Exeter Street AQMA during 2007	
Land Use Planning	LTP2	Air quality issues have been recognised throughout the Local Development Framework (LDF) and Area Action Plan (AAP) processes. AAPs are being produced for the City Centre and the Derriford areas of the city with an anticipated adoption date of Autumn 2009. The Mutley Plain area of the city is contained within the Sustainable Neighbourhoods DPD. Further work will be undertaken to reinforce the relationship between the land-use planning and air quality issues.	The City Council's LDF Core Strategy and several key AAP have already been adopted. The approach and the documents produced so far have been recognised as best practice and an example to other authorities by the RTPI.	
Advice / incentives for cleaning up larger vehicles e.g. by retrofitting		Not at present		

Information and Awareness Raising	LTP2	Press release and article on the roadside emissions testing. European Mobility Week - Clean Air for All in September 2008 provided a focus on the AQMAs and air quality in Plymouth	Increased awareness of air quality and environmental issues. Press release to coincide with European Mobility Week - Clean Air for All	
Parking and delivery restrictions in AQMAs	LTP2	Plans for the AQMAs are being developed with parking and delivery restrictions amongst the issues to be considered		
Incentives to scrap older vehicles				
Traffic management at pollution hotspots	LTP2	The City Council has written a draft Intelligent Transport Systems (ITS) strategy that will be developed and finalised in the near future. Part of the ITS strategy is the use of Variable Message Signs (VMS) is to provide improved information to road users on the condition of the highway network reducing congestion and providing related air quality benefits. Additional continuous analyser sites have been identified for the City Centre, Alma Road and at Crownhill Village. Pollution-responsive traffic management will be developed for the AQMAs and on the Exeter Street, Mannamead Road and Outland Road routes using the real-time pollution data	The City Councils Free Text VMS network has been increased with an additional 5 more signs taking the total up to 8. This will provide coverage of all the principal traffic routes for the city.	VMS will be used to: • promote alternative travel modes such as the Park & Ride services serving the city, • inform people of current air quality levels, • where traffic is congested and quicker route information. 3 new continuous analysers to be installed by April 2008. Pollution-responsive traffic management plans

		available to determine routing choice. The Northern Corridor Traffic Modelling work will also be used to inform options for improved traffic management and traffic flow for all the significant routes and junctions on the A386 and the B3250.		developed for AQMAs and principal traffic routes.
Taxi emissions	LTP2	In 2007 the City Council's Licensing Unit undertook a review of its Taxi Licensing Policy. The proposed new policy covers many operational areas including fare levels, livery, 'on taxi' advertising, driver standards, technical specifications, vehicle testing and emission standards - for both hackney carriages and private hire vehicles. To enable the Council to realise its visionary goals and strategic objectives relating to health, wellbeing and the environment; its Local Transport Plan objectives in relation to Air Quality, and the Taxi Licensing Policy's own objectives, ambitious Euro emissions compliance deadlines were required Consultation on the original new policy resulted in a number of amendments including bringing forward the Euro IV standard deadline to 2012 and introducing a Euro V standard deadline	New Taxi Licensing Policy proposed with stricter standards: • Euro III standard deadline at 2010 • Euro IV standard deadline to 2012 and introducing a • Euro V standard deadline of 2014 Adoption subject to consultation responses being addressed.	Adoption of this policy will place Plymouth amongst the most progressive local authorities in terms of tackling the disproportionately high impact of taxi emissions standards on air quality

		of 2014. This led to the Licensing Unit undertaking a second public consultation process on these amendments in May 2008. Once this second consultation process is complete adoption of the new policy will be sought in 01.11.08.		
Safer Routes to School focus in AQMAs	LTP2	There are a number of schools and educational establishments that are sited within or adjacent to the declared AQMAs of Exeter Street and Mutley Plain. Some of these have approved Travel Plans with recognition of the role sustainable transport has in improving air quality and environmental issues. A number of educational establishments are yet to have travel plans but have been prioritized for such in the immediate future. • Plymouth College of Art & Design - Travel plan by 2010 • Plymouth College - Travel Plan by 2010 • Plymouth High School for Girls - Travel plan by 2010	The schools with approved Travel Plans are: • Hyde Park Infants approved 2005. • Hyde Park Juniors approved 2007 • Prince Rock - Approved 2007 • Holy Cross - Approved 2007	
Cycling facilities in AQMAs	LTP2	A review of cycling infrastructure and information has been undertaken for the city including both AQMAs.	A Strategic Cycle Map has been produced to identify and prioritise strategic cycle routes, to help secure third	The cycling review will enable gaps in the cycle network to be identified and targeted for action over the course of

		Off road cycle facilities have been provided within the Exeter Street AQMA	party and developer funding where appropriate.	LTP2 with priority given to provision of cycling facilities within and leading to the AQMAs.
Roadside Emissions Testing in AQMAs	LTP2	The City Council in partnership with the other South West authorities undertook roadside emissions testing at two sites in the city, in March and July 2008.	The results are currently being assessed to ascertain how many vehicles were tested and the percentage of failure rates.	Information letters will be sent to owners of all vehicles that were identified as not meeting the standard. The testing was reporting in the local press and on the City Council's website raising the profile of the air quality issue.
Enforce law against idling vehicles		Not at present		
Promote and assist freight emissions agreements		Not at present		
Implement actions in AQAP by including in APR updates.	LTP2	Progress on the actions identified in the AQAP has been included within the LTP2 Progress Review that is due to be submitted to the DfT in December 2008.	Draft report has been produced.	

Greener Council fleet	LTP2	**1 Plymouth City Council 10 Year Plan – Vehicle Fleet Replacement and Renewal** Plymouth City Council has a 10 year plan for the replacement and renewal of its vehicle fleet. It is expected that the vast majority of vehicles will be replaced by the end of 2009. The aim is to provide the best available vehicle with the best emissions possible. This is currently Euro V engines but Euro VI engines will soon be on the market. Over the next 5 years replacements that are economical and green friendly will be investigated. This will include electric vehicles, hybrids and any other low emission vehicles. At present the electric fleet is a possibility and will look to be the most progressed by 2013. **On going work** Outline Business Case for specialist fleet and plant is to be finalised in 2008 and will mean the rest of the fleet will be replaced by 2009. Other projects on-going.	At this point the replacements so far are: 171 Light Commercial Vehicle (LCV) fleet with the smallest emissions possible and smallest engines under our existing contract with Vauxhall 29 Refuse Collection Vehicle (RCV) with Euro V engines and emission controls called Adblue. This area also looked at work streams that reduced vehicle needs by 5 vehicles.	**Next phase** From 2009 to 2012 to look at the next phase of replacements for 2013 and to look at market trends and to carry out financial implications of the green fleet.

		• BIO FUEL – now in place at Prince Rock at 5% additives. But need to roll out to parks and all users. • Trackers for vehicles- OBC DONE awaiting acceptance, this will improve emissions by way of driver management. To improve on speeding and idling and better utilisation of vehicles on private use and abuse. This system will report on carbon footprint agenda. • Management system has been installed for 40k to improve utilisation of education and pool vehicles. • Policies for private use and driver management are to be written over the next year • Driver training will be rolled out for all PCC drivers to improve emission awareness and behaviour.		
PCC Staff Green Travel plans	LTP2	Preparation of Travel Plan is complete but is not yet adopted. Action Plan to deliver Phase 1 of the Travel Plan is underway focusing on walking, cycling, public transport, car sharing, train and travel information.	Benchmarking of PCC draft Travel Plan against other authorities travel plans. Monitoring of Green Travel Pass scheme and our Carshare Devon group as part of the Local Authority Carbon Management programme demonstrating	

			that the Authority has a commitment to sustainable travel.	
Tree Planting included at design stage for new road building / improvements to existing roads.	LTP2	Tree planting is now being considered during the feasibility and design stage of scheme development.	Identification of potential sites for planting of trees.	