



WEST DORSET DISTRICT COUNCIL

LOCAL AIR QUALITY MANAGEMENT

DETAILED ASSESSMENT REPORT

APRIL 2008

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Executive Summary

Part IV of the Environment Act 1995 places a statutory duty on local authorities to review and assess the air quality within their area and to take account of Government guidance when undertaking such work. This Detailed Assessment follows on from the Progress Report 2007, which concluded that a detailed assessment was required for nitrogen dioxide from road traffic emissions in High West Street and High East Street in Dorchester and East Road in Bridport.

The results show that the annual mean for nitrogen dioxide have exceeded at 1 location in East Road, Bridport, and in High West Street, Dorchester, while levels in High East Street were just under the annual mean objective for nitrogen dioxide.

The recommendations of this detailed assessment are as follows:

- ADMS modelling to be undertaken in East Road to determine whether the residential property located in-between the 2 diffusion tube sites would exceed the UK national objectives set for nitrogen dioxide.
- To continue Diffusion tube monitoring at East Road, Bridport and at High East Street, Dorchester
- To relocate the diffusion tube at High West Street to a site that is representative of relevant exposure

The report has been undertaken in accordance with the technical guidance LAQM.TG (03).

LOCAL AIR QUALITY MANAGEMENT

Part IV of the Environment Act places a statutory duty on local authorities to periodically 'review and assess' the air quality within their area under the Local Air Quality Management (LAQM) regime. This involves consideration of present and likely future air quality against the national Air Quality Strategy objectives prescribed within the Air Quality Regulations. Where the LAQM Review and Assessment process finds that pollutant concentrations are unlikely to meet the AQS objectives by their target dates in areas where the AQS objectives apply, the Local Authority are required to declare an Air Quality Management Area (AQMA) under Section 83(1) of the Environment Act 1995. The areas in which the AQS objectives apply are defined in the AQS as locations outside buildings or other natural or man-made structures above or below ground where members of the public are regularly present and might reasonably be expected to be exposed to pollutant concentrations over the relevant averaging period of the AQS objective.

The seven regulated pollutants are:

- Carbon Monoxide
- Benzene
- 1,3 Butadiene
- Lead
- Nitrogen Dioxide
- Particulates (PM₁₀)
- Sulphur Dioxide

Guidelines for the 'Review and Assessment' of local air quality were first published in the 1997 National Air Quality Strategy (NAQS) along with associated policy guidance and technical guidance. The First Round of Review and Assessment recommended that local authorities fulfil their statutory duty under the LAQM regime by undertaking a three-stage assessment, increasing in detail at each stage.

In 2000, Government reviewed the NAQS and published the revised AQS, to which an addendum was issued in February 2003. Associated revised LAQM Technical Guidance (LAQM.TG(03)) and Policy Guidance (LAQM.PG(03)) were issued on behalf of DEFRA in January 2003.

This guidance sets the framework for the requirements of review and assessment for future years, taking account of experiences from the previous rounds of review and assessment. This current framework for review and assessment begins with an Updating and Screening Assessment (USA) that considers the likelihood of all the AQS objectives being achieved across the Local Authority's administrative area. If the USA identifies that an AQS objective may not be met, then the Local Authority must proceed to a Detailed Assessment for that pollutant. If the results of the Detailed Assessment confirm that, an AQS objective is unlikely to be met they are required to declare an AQMA.

SUMMARY OF WEST DORSET DISTRICT COUNCIL'S PREVIOUS REVIEW AND ASSESSMENT

West Dorset District Council undertook the first round of review and assessment in 2001. It was found that there was no requirement to proceed to the next stage, as exceedences in the seven regulated pollutants were not likely.

The second round of review and assessment commenced in 2003. Similar to Stage One of the first round, there was a consideration of the seven pollutants of concern to health and an assessment was made as to whether air quality objectives for these pollutants would be met. West Dorset District Council completed this in 2003. This assessment was accepted by Defra in 2004 with a requirement to proceed to a detailed assessment in Chideock, Bridport and Dorchester. Due to staff shortages this assessment was not completed until 2006. The detailed assessment concluded that there was no need to proceed to an AQMA at any of the identified areas, however after discussions held with Defra it was concluded that an AQMA be declared in Chideock and that further monitoring along with additional tubes were to be located in Dorchester and Bridport.

WDDC submitted its 2007 Progress Report in May 2007. This report concluded that a detailed assessment was required in Dorchester and Bridport for nitrogen dioxide due to road traffic emissions.

SCOPE AND METHODOLOGY OF THE DETAILED ASSESSMENT

The approach to the Detailed Assessment is to provide the Local Authority with an opportunity to supplement the information they have gathered in their earlier review and assessment work. It provides a mechanism of more accurately assessing the impact of pollution sources on local receptors at identified hotspots, in High East Street and High West Street in Dorchester and East Road in Bridport, through diffusion tube monitoring.

In general terms, the approach taken to the detailed assessment was:

- The retention of existing diffusion tube monitoring sites for improved analysis of long-term trend and continuance of data collection
- A greater spatial spread of monitoring data obtained from new diffusion tube monitoring sites in order to establish the likely extent or areas of air quality objective exceedences.
- Minimum monitoring periods of 12 months from commencement of the detailed assessment to account for seasonal variation and to allow for direct comparison with UK air quality objectives.

For the purpose of this detailed assessment, the existing long-term sites were retained and the air quality monitoring provision in WDDC has been expanded to encompass the following:

- One additional tube in East Road, Bridport
- One additional tube in High East Street, Dorchester

GENERAL INFORMATION ON DETAILED ASSESSMENT AREAS

DORCHESTER

Dorchester is the county town of Dorset and lies at the junction of the A35 South Coast Trunk Road and the A37 to Yeovil to the north. The head offices of Dorset County Council and West Dorset District Council are located in Dorchester. The town has a population of 16,310. The predominant source of NO₂ emissions is from road traffic. There are no significant industrial point sources close to sampling locations.

High West Street Diffusion Tube

The diffusion tube is located on the façade of the West Dorset District Council Offices 2.5m from the roadside. The grid reference is 369126 90726. The nearest receptor is approximately 15m away.

High East Street 1 - Diffusion Tube

The diffusion tube is located on the façade of a residential dwelling 4.34m from the roadside. The grid reference is 369385 90744.

High East Street 2 - Diffusion Tube

The diffusion tube is located on the façade of a residential dwelling 1.9m from the roadside. The grid reference is 369477 90758.

BRIDPORT

Bridport is a small market town with a population of 13,070. The town is located on the A35 South Coast Trunk Road. The predominant source of NO₂ emissions is from road traffic. There are no significant industrial point sources close to the sampling locations.

East Road 1 - Diffusion Tube

The diffusion tube is located on a telegraph pole on the pavement. The nearest dwelling is 15.87m from the road. The grid reference for the diffusion tube is 347613 93049.

East Road 2 - Diffusion Tube

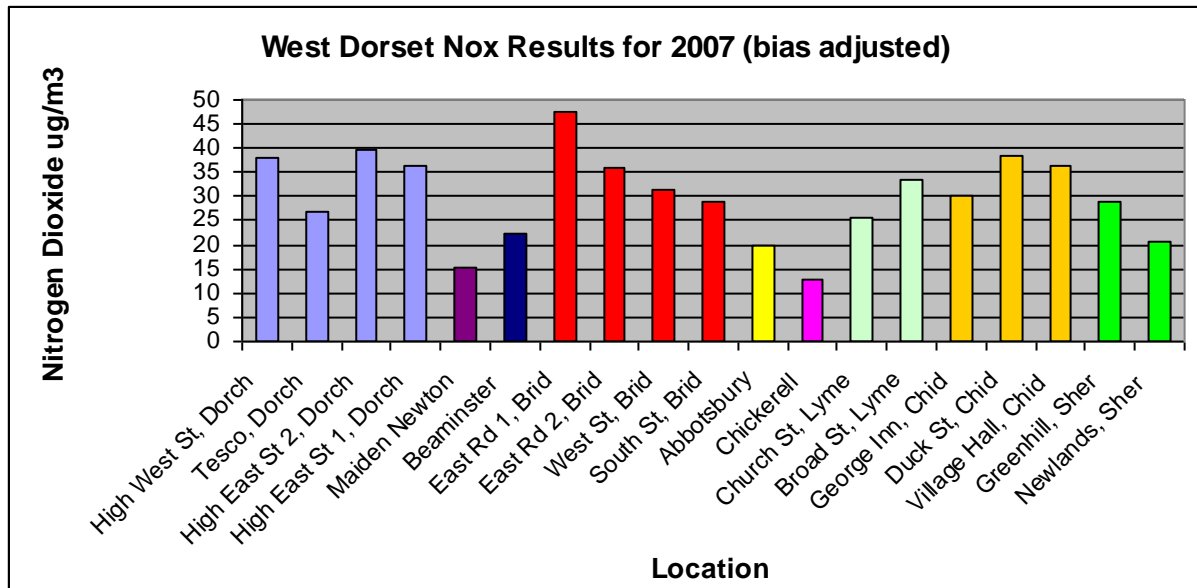
The diffusion tube is located on a lamppost on the pavement. The façade of the nearest dwelling is on the pavement, however the dwelling nearest the diffusion tube is 12.3m from the road. The grid reference for the diffusion tube is 347547 93018.

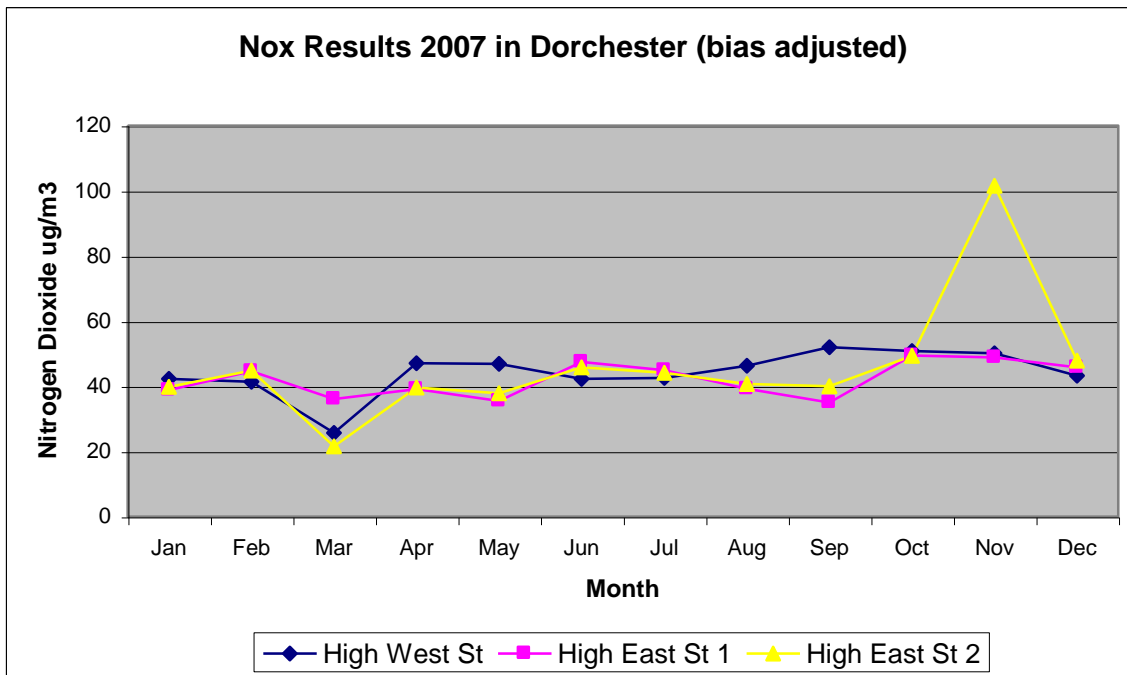
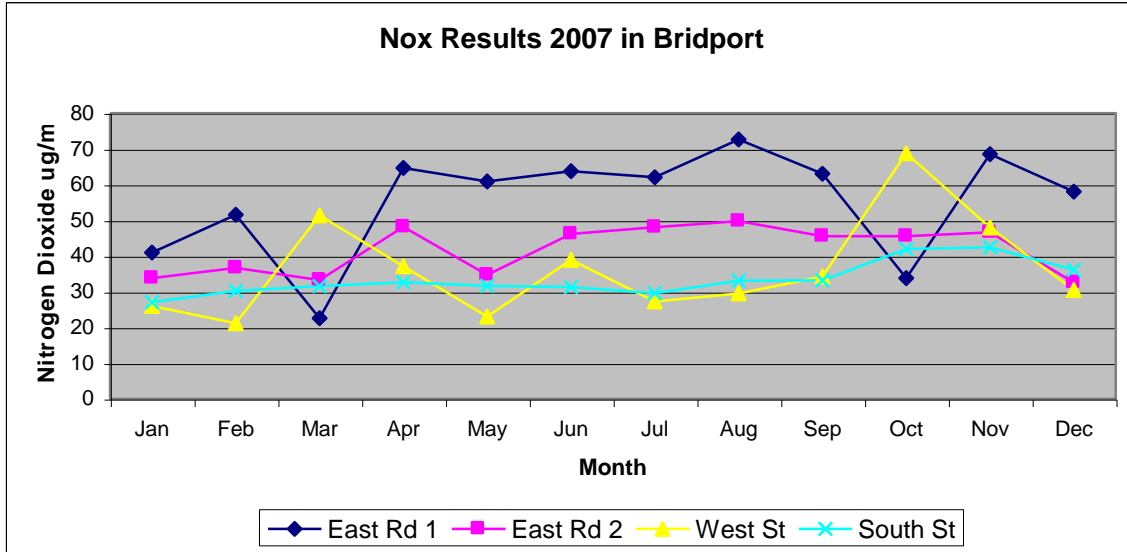
RESULTS

The graph below shows the annual NO₂ results for West Dorset in 2007, which identifies that Dorchester and Bridport are two areas with elevated NO₂ levels.

A bias correction factor has been applied to the results. This was obtained from the DEFRA Review and Assessment Helpdesk Website, spreadsheet data version 02/08. The bias adjustment factor was 0.86.

The diffusion tubes were 50% TEA / Acetone, supplied and analysed by Gradko. Relevant quality control procedures were followed through their delivery, exposure and return to Gradko for analysis.





The table below shows 2007-2008 bias adjusted diffusion tube results for Dorchester and Bridport, and projections to 2010 using the LAQM Year Adjustment Calculator provided in the UK Air Quality Archive Website.

Site	2007 annual mean raw data (ug/m ³)	2007 annual mean Bias adjusted (ug/m ³)	Predicted to 2010 (ug/m ³)
DORCHESTER			
High West Street	44.23	41.13	36.96
High East Street 1	42.11	39.16	35
High East Street 2	46.11	42.88	38.37
BRIDPORT			
East Road 1	55.21	51.34	45.94
East Road 2	41.76	38.83	34.75

DISCUSSION

Bridport

Nitrogen Dioxide levels at East Road 1 clearly show an exceedence of the national air quality objective. However this tube is located approximately 15m away from the nearest residential property and East Road 2 has not exceeded the national objectives set for nitrogen dioxide when bias adjusted. However a residential property lies between the two diffusion tube sites and is the same distance away from the road as the tubes.

Previous discussions were had with the owner of this property regarding placing a diffusion tube on the façade of this property, however the owner was unwilling to cooperate, therefore the 2 sites in East Street were identified as the most suitable locations. Air quality modelling has not been undertaken due to lack of resources and staffing issues, however undertaking ADMS modelling in this area may show the extent of the exceedence in relation to the nearest residential property and whether or not an AQMA needs to be declared.

Dorchester

Peak levels were recorded High East Street 2 in November 2007, this result coincided with gas main works being undertaken on High East Street adjacent to the High East 2 diffusion tube, with temporary traffic lights erected at this location for approximately 1 month.

Both diffusion tubes in High East Street represent relevant receptors and came marginally under the objective for nitrogen dioxide when bias adjusted. The projected levels in 2010 show that there is likely to be a reduction of nitrogen dioxide levels and that by this year NO₂ measurements would not exceed the objectives set at these locations.

High West Street has exceeded the UK objective but the diffusion tube is sited where there is no residential occupation or probable regular 1-hour public exposure.

RECOMMENDATIONS

Based on this detailed assessment and review of the monitoring data the following recommendations are made for West Dorset District Council:

East Road, Bridport

- ADMS modelling to be undertaken in East Road to determine whether the residential property located in between the 2 diffusion tube sites would exceed the UK national objectives set for nitrogen dioxide.
- To continue Diffusion tube monitoring at these locations

High West Street, Dorchester

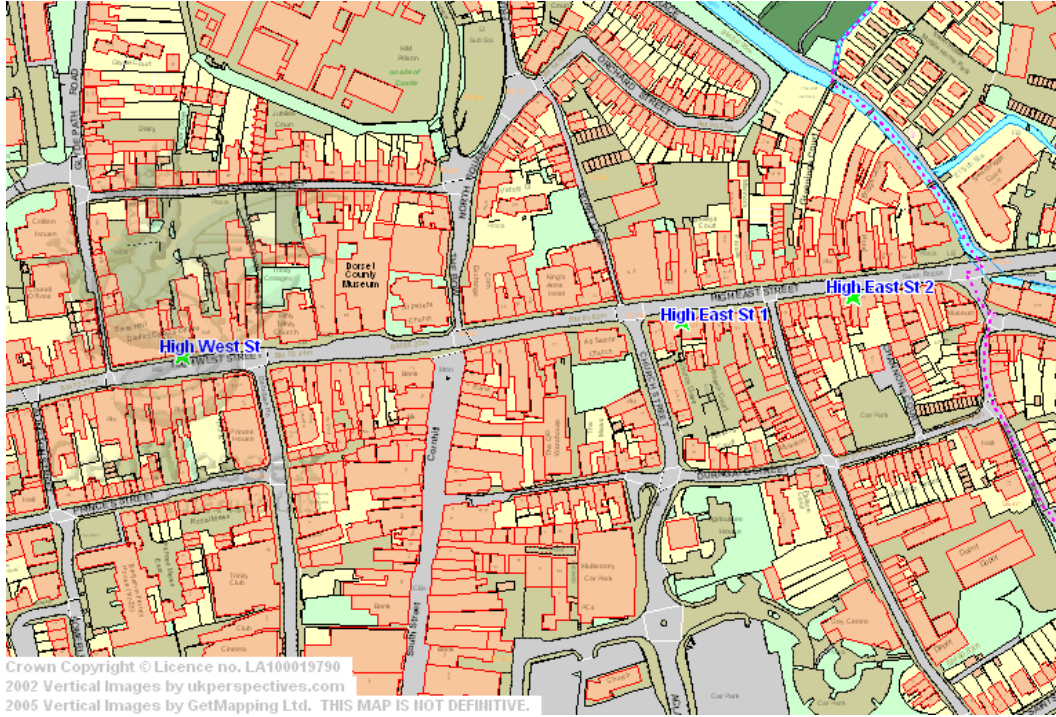
- To move the diffusion tube to a more relevant location on High West Street

High East Street, Dorchester

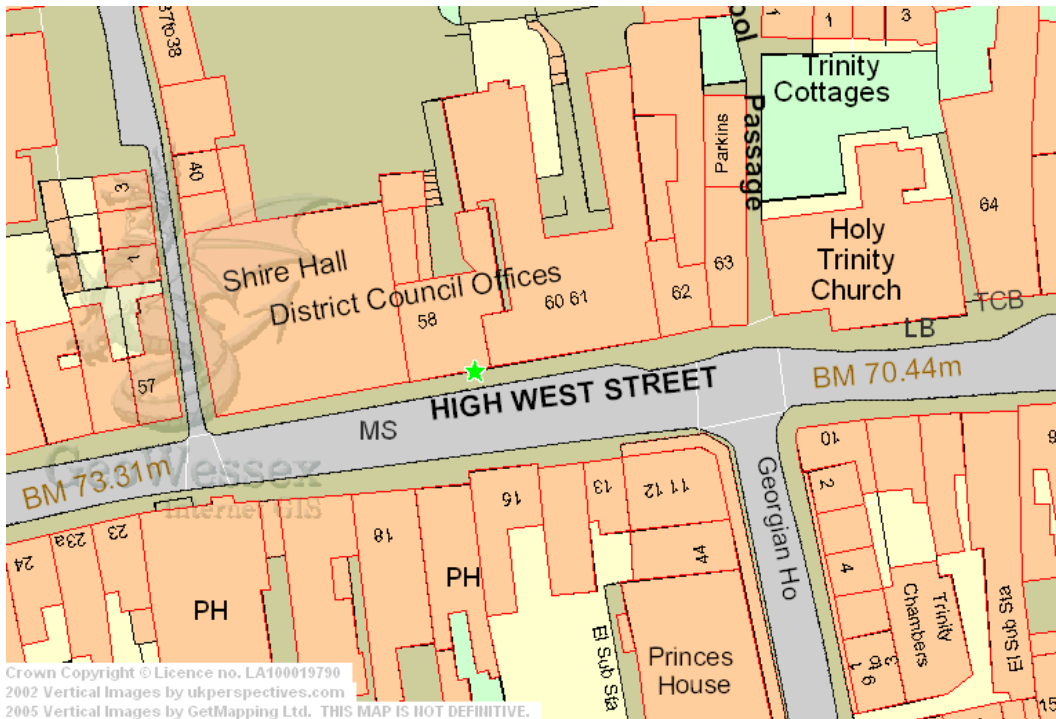
- There is no need for further assessment at this site as the objective at the receptor has not been exceeded and is predicted to be lower than the AQS objective by 2010. However WDDC will continue monitoring NO₂ at the current diffusion tube locations in order to ensure that any future changes in air quality are detected.

APPENDIX 1 – LOCATION MAPS OF DIFFUSION TUBES

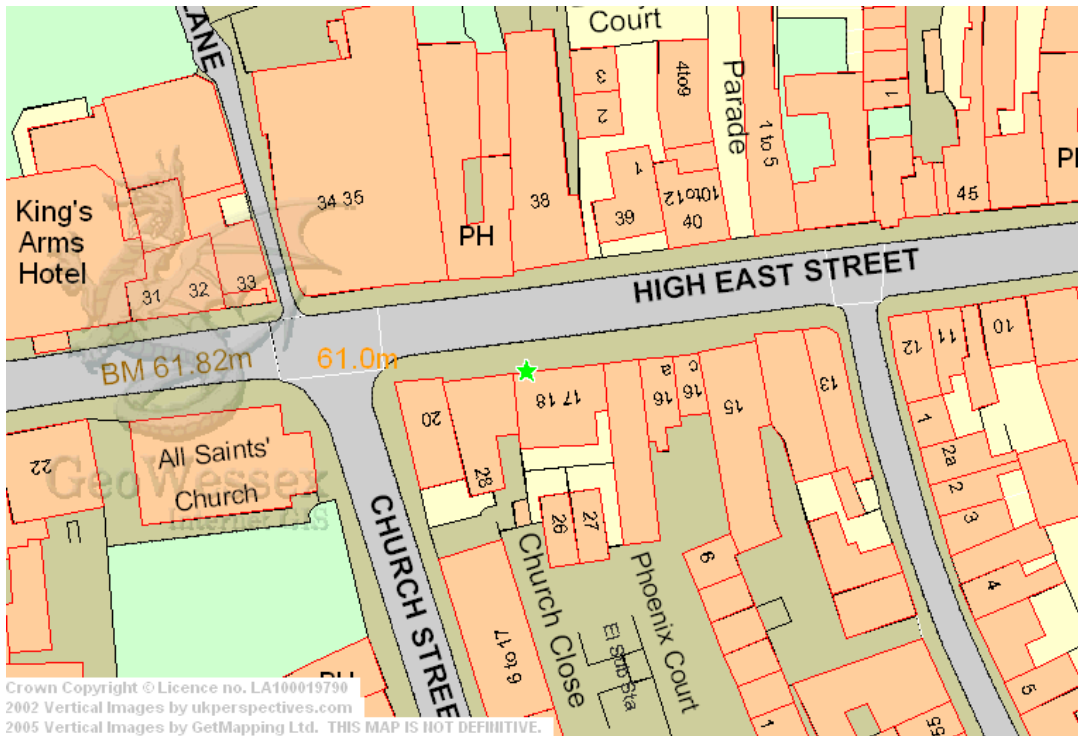
Dorchester High West Street & High East Street Diffusion Tube Locations



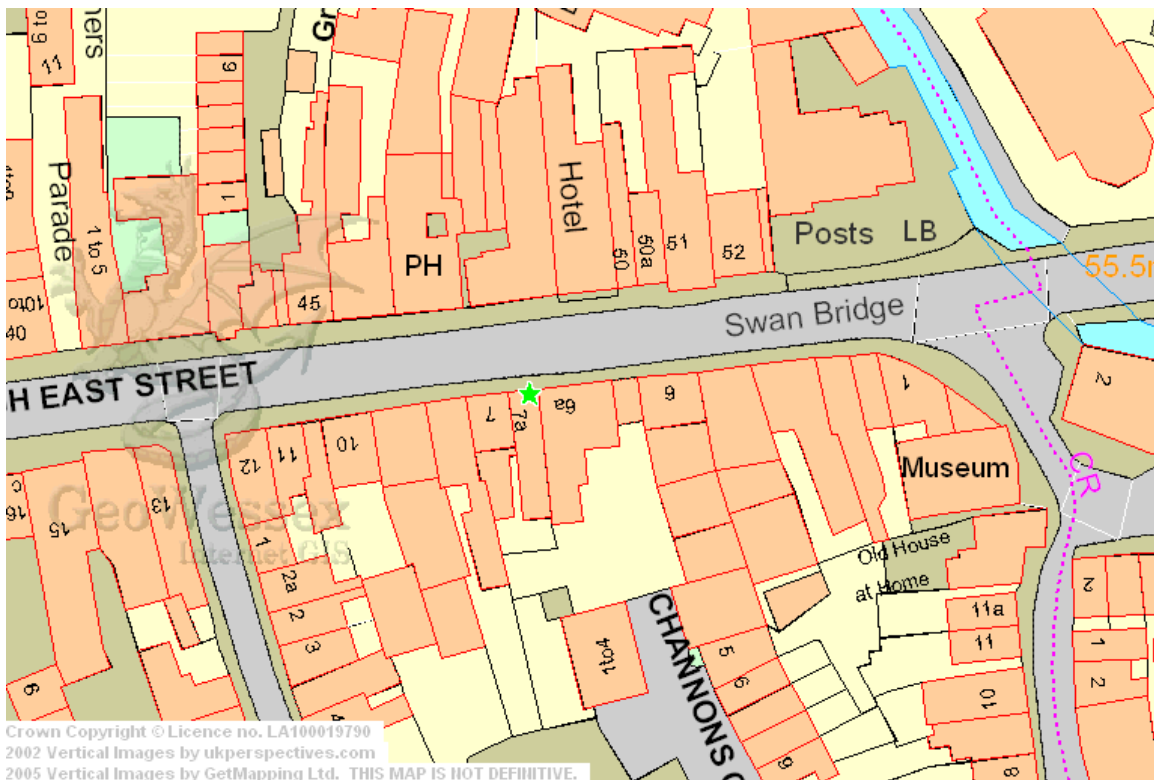
Location map of the diffusion tube in High West Street, Dorchester



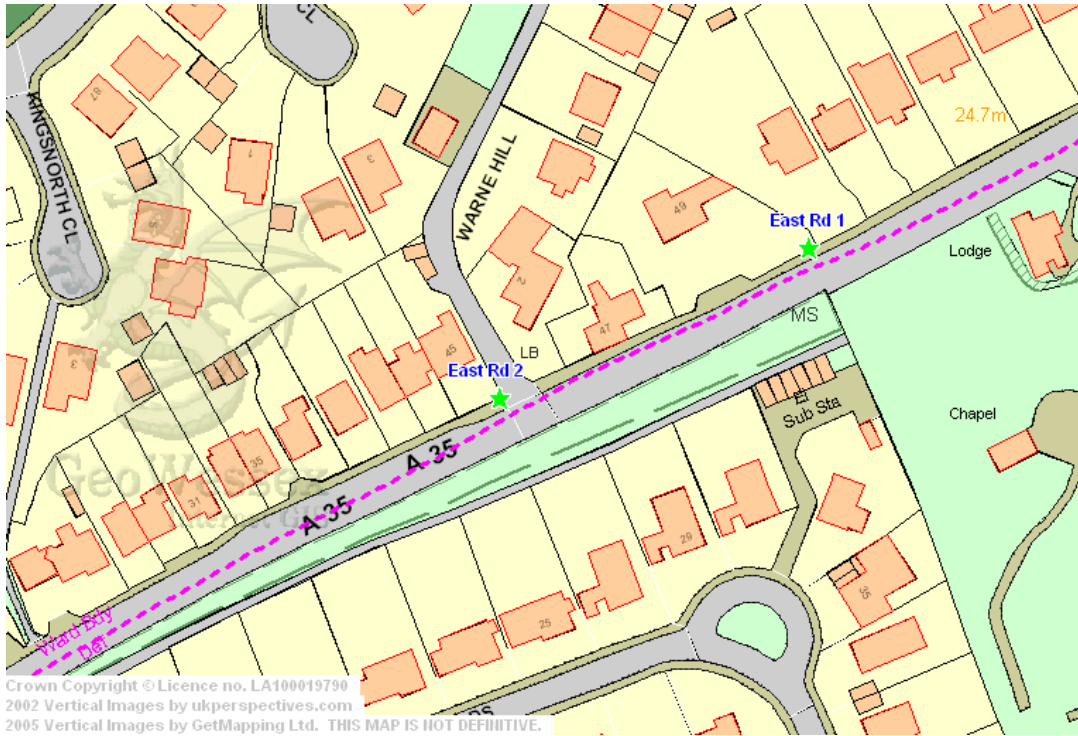
Location map of High East Street 1 diffusion tube, Dorchester



Location map of High East Street 2 diffusion tube, Dorchester



Location map of diffusion tubes in East Road, Bridport



APPENDIX 2 - NATIONAL AIR QUALITY OBJECTIVES TABLE

Pollutant	Air Quality Objective		To be achieved by
	Concentration	Measured as	
Benzene			
All authorities	16.25 $\mu\text{g m}^{-3}$	Running annual mean	31 December 2003
England and Wales Only	5.00 $\mu\text{g m}^{-3}$	Annual mean	31 December 2010
Scotland and N. Ireland	3.25 $\mu\text{g m}^{-3}$	Running annual mean	31 December 2010
1,3-Butadiene	2.25 $\mu\text{g m}^{-3}$	Running annual mean	31 December 2003
Carbon Monoxide			
England, Wales and N. Ireland	10.0 mg m^{-3}	Maximum daily running 8-hour mean	31 December 2003
Scotland Only	10.0 mg m^{-3}	Running 8-hour mean	31 December 2003
Lead			
	0.5 $\mu\text{g m}^{-3}$	Annual mean	31 December 2004
	0.25 $\mu\text{g m}^{-3}$	Annual mean	31 December 2008
Nitrogen Dioxide			
	200 $\mu\text{g m}^{-3}$ not to be exceeded more than 18 times a year	1-hour mean	31 December 2005
	40 $\mu\text{g m}^{-3}$	Annual mean	31 December 2005
Particles (PM10) (gravimetric)			
All authorities	50 $\mu\text{g m}^{-3}$, not to be exceeded more than 35 times a year	24-hour mean	31 December 2004
	40 $\mu\text{g m}^{-3}$	Annual mean	31 December 2004
Scotland Only	50 $\mu\text{g m}^{-3}$, not to be exceeded more than 7 times a year	24-hour mean	31 December 2010
	18 $\mu\text{g m}^{-3}$	Annual mean	31 December 2010

Particles (PM2.5) (gravimetric) *	25 $\mu\text{g m}^{-3}$ (target)	Annual mean	2020
All authorities	15% cut in urban background exposure	Annual mean	2010 - 2020
Scotland Only	12 $\mu\text{g m}^{-3}$ (limit)	Annual mean	2010
Sulphur dioxide	350 $\mu\text{g m}^{-3}$, not to be exceeded more than 24 times a year	1-hour mean	31 December 2004
	125 $\mu\text{g m}^{-3}$, not to be exceeded more than 3 times a year	24-hour mean	31 December 2004
	266 $\mu\text{g m}^{-3}$, not to be exceeded more than 35 times a year	15-minute mean	31 December 2005
PAH *	0.25 ng m^{-3}	Annual mean	31 December 2010
Ozone *	100 $\mu\text{g m}^{-3}$ not to be exceeded more than 10 times a year	Daily maximum of running 8-hour mean	31 December 2005

* not included in regulations at present
 Shaded data shows new objectives