Portsmouth CITY COUNCIL

Local Air Quality Management
Pollution Control Team – Environment Health Service

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Air Quality Progress Report 2016

Local Air Quality Management – Progress Report 2016

Executive Summary

The 2016 Air Quality Progress Report (PR) is a statutory requirement under the Local Air Quality Management (LAQM) regime. It is an update on Local Air Quality (LAQ) issues within the boundary of Portsmouth. The report has been undertaken in accordance with Department of Environment Food and Rural Affairs (DEFRA) Progress Report Technical Guidance LAQM.TG(09).

This PR covers:

- all NO_2 data for 2014 and 2015 and assesses the data against the National Air Quality Objectives (NAQOs)
- any development changes that may have an impact on LAQ
- updates on the Review and Assessment (R&A) process and any relevant strategy and/ or policy changes
- progress on Air Quality Action Plan (AQAP)
- updates on the publication of Portsmouth air quality strategy (AQS)

Monitoring of NO2 in 2013 concluded that:

- NO_2 levels for 2013 did not exceed the NAQO at any of the four continuous air quality monitoring stations
- the NO_2 NAQO was exceeded at four other locations:
    - Lord Montgomery Way Air Quality Management Area (AQMA) 7
    - 221 Fratton Road (AQMA 6)
    - The Tap Public House, London Road (AQMA 6)
    - Addison Madden, Hampshire Terrace (Adjacent to AQMA 7).

Monitoring of NO2 in 2014 concluded that:

- The NO_2 levels for 2014 increased across the four AQM stations compared to that of 2013. The London Road station exceeded the NAQO as it recorded 45.68$\mu g/m^3$. This demonstrated a worsening in LAQ as it increased by just under 6$\mu g/m^3$ compared to the levels recorded in 2013
- The Nitrogen Dioxide Diffusion Tube Survey (NDDT) levels increased compared with those of 2013 at 65.51% of the monitored locations across the city. The highest increases were recorded at 17 Kingston Road (AQMA 6), Addison Madden, Hampshire Terrace (adjacent to

AQMA7), 7 Velder Avenue (AQMA 9), 4 Merlyn Drive, Market Tavern (Mile End Road, AQMA 11), 103 Elm Grove, Larch Court (Church Road (Corner) adjacent to AQMA 11), 121A High Street, Anchorage Road, 116 Albert Road, and 2 Victoria Road North with increases of 13.49, 12.46, 7.15, 5.60, 5.30, 4.48, 3.84, 3.57, 3.00, 2.29, and 2.11$\mu g/m^3$ respectively

- The NDDS also concluded that NO_2 annual mean levels were in excess of the annual mean NAQO in 2014 at the following seven monitored locations:

    - Lord Montgomery Way (AQMA 7)
    - London Road (AQMA 6) continuous monitoring station
    - 221 Fratton Road (AQMA 6)
    - 117 Kingston Road (AQM6)
    - Market Tavern Mile End Road (AQMA 11)
    - The Tap public house London Road (AQMA 6)
    - "AM" Hampshire Terrace (Adjacent to AQMA 7)

The 2015 NDDTS concluded that:

- the NO_2 levels for 2015 decreased compared to that of 2014 at levels that did not exceed the NAQO at any of the four continuous air quality monitoring station. This represented an improvement in LAQ. The maximum recorded concentration was again at London Road station (38.4 $\mu g/m^3$) which that was close to breaching the NO_2 NAQO

- the NDDT levels decreased compared with those of 2014 at 72.41% of the monitored locations across the city signifying an improvement in air quality

- the most significant improvements were registered at Addison Madden (Hampshire Terrace), 117 Kingston Road, Market Tavern (Mile End Road), 103 Elm Grove, Anchorage Road (Column 6), 221 Fratton Road, Larch Court (Church Road (Corner)), 2 Victoria Road North, 7 Velder Avenue, and 4 Milton Road with decreases of 12.95, 10.39, 9.81, 5.81, 4.40, 4.18, 3.25, 2.74, 2.16, and 1.99ug/m3 respectively

- the highest increases were recorded at 88 Stanley Road, Queen Street, The Tap Public House in London Road, 106 Victoria Road North, and Montgomery Way with increases of 11.21, 2.57, 2.32, 2.20, and 1.76$\mu g/m^3$respectively

- The NO_2 annual mean levels was exceeding the annual mean NAQO in 2015 at:

    - 117 Kingston Road (AQM 6)
    - The Tap public house London Road (AQMA 6)
    - Montgomery Way (AQMA 7)

    - 88 Stanley Road (AQMA11) (it is important to note that the Stanley Road location is represented with NDDT data for only two months that was subjected to all necessary corrections)

- The NO_2 levels for 2015 decreased to levels lower than those reported in 2013

The 2014 annual mean concentrations measured across each of the four continuous air quality monitoring stations increased from 2013 levels before dropping back in 2015 to slightly lower levels than those recorded in 2013.

The trend emerging from each of the four continuous monitoring stations exhibits a downward trend in NO_2 annual mean levels in the last three years. Hence we can conclude that LAQ improved in the last three years in Portsmouth.

A closer look at the NDDTS data for Portsmouth revealed a downward trend that was recorded at 55.17% of the NDDT monitored locations in the last three years, hence an improvement in LAQ.

NDDT data demonstrated that 2014 NO_2 levels were exceptionally high compared to those of 2013 and 2015.

On average NDDT data exhibited no change overall.

It is not possible to categorically state why the levels of pollutant in Portsmouth increased during 2014 and decreased in 2015 as a multitude of factors influence pollution levels.

Factors are wide ranging and complex. Localised influences such as route popularity or road changes / roadworks may be two of the causes, while others may be of a regional nature perhaps dictated by the meteorological conditions. National or international stimuli such as a requirement for improved vehicle emissions technologies are also likely to play a part.

Glossary

AADT	Annual Average Daily Traffic (vehicles per day).
AQMA	Air Quality Management Area
AQA	Air Quality Assessment
AQAP	Air Quality Action Plan
AQS	Air Quality Strategy
AURN	Automatic Urban and Rural Network
CHP	Combined Heat and Power
DA	Detailed Assessment.
DEFRA	Department of Environment Food and Rural Affairs
DTS	Diffusion Tube Survey
EIA	Environmental Impact Assessment
EPUK	Environmental Protection UK
FA	Further Assessment
TfSH	Transport for South Hampshire
HDV	Heavy Diesel Vehicles
HGV	Heavy Goods Vehicles
LA	Local Authority
LAQ	Local Air Quality
LAQM	Local Air Quality Management
LAQM.TG(09)	Local Air Quality Management. Technical Guidance (2009)
LDF	Local Development Framework
LTP3	Local Transport Plan 3
NAQO(s)	National Air Quality Objective(s)

NDDT	Nitrogen Dioxide Diffusion Tube
NDDTS	Nitrogen Dioxide Diffusion Tube Survey.
NETCEN	National Environmental Technology Centre Network (UK)
NO_2	Nitrogen Dioxide
NO	Nitric oxide
PCC	Portsmouth City Council
PM_{10}	Particulate Matter with diameter less than 10µm
PUAAZ	Portsmouth Urban Area Agglomeration Zone (UK0012)
PR	Progress Report
QA/QC	Quality Assurance / Quality Control
R&A	Review and Assessment
SO_2	Sulphur dioxide
SED	Solvent Emissions Directive
SPD-AQ	Supplementary Planning Document for Air Quality
TEOM-FDMS	Tapered Element Oscillating Microbalance- Filter Dynamics Measurement System
TRC	Tipner Regeneration Company
USA	Updating and Screening Assessment
µg/m³	Micrograms of the pollutant per cubic metre of air ($x10^{-6}$ g/m^3)

Table of Contents

1 An introduction to progress reporting

1.1 Project background

Although the conclusions presented within this progress report (PR) relate to monitoring data collated prior to the publication of the 2015 Detailed Assessment (DA), this report is relevant to the ongoing and continual assessment of air quality within Portsmouth.

Despite the changes to the reporting process as required by the Department of Environment Food and Rural Affairs (DEFRA) and the need to produce an Annual Status Report (ASR) in 2016, this report is considered necessary to comment upon the quality of air in Portsmouth since the creation of the previous assessment completed in the 2011 PR.

Part IV of the Environment Act 1995 places a statutory duty on Portmsouth City Council (PCC) to periodically review and assess (RA) the LAQ within Portmsouth.

The publication of this PR is a statutory requirement.

1.2 Scope and Methodology of the PR

The main aim of this report is to report progress on:

- LAQM within Portsmouth
- The implementation of air quality related remedial actions as identified in the 2010 air quality action plan (AQAP)

The R&A processes were introduced to provide greater continuity and a longer-term vision to LAQM. R&A allows LAQ monitoring data, and any changes due to development within an area that may impact on air quality, to be assessed. R&A also informs discussions in relation to measures required to improve LAQ.

To undertake this PR, monitoring data was collated from our monitoring sites. Where long term monitoring has taken place (normally considered as five years or longer) evidence of trends has been taken into consideration.

Data has been collated on local developments to provide an update on those that impact sources or receptors that may affect LAQ e.g. industry, developments granted (or applying for) planning permission, or traffic management schemes.

Within this PR an update is provided on existing developments where further information has become available e.g. industrial upgrade programmes, emissions monitoring results, or recent complaints.

This PR has been structured in accordance with the Checklist[1] provided in PR Guidance (LAQM. PRG (03)):

- New monitoring results
- New local developments
- Planning and policies
- Local transport plan and strategies
- Action Plans update (where appropriate)
- Local air quality strategy (LAQS) update

1.3 Summary of LAQM reporting since 2009

The 2009 Updating Screening Assessment (USA) concluded the following:

- based on the monitoring data, it was assumed that air quality is improving in Portsmouth, and that PCC should start considering revoking air quality management areas (AQMAs). PCC's road traffic management unit however suggested that the 2008 road traffic flows dropped significantly as result of the economic downturn and therefore the data may not be conclusive

- there was no need to identify a need to implement a DA for any of the pollutants covered by the report

The 2009 FA identified the need to consider the following actions:

- revocation of eight AQMAs (AQMA 1, 2, 3, 4, 5, 8, 10, and 13) based on 2008 monitoring data as labelled in black on *map 1, appendix A*

- retention of five AQMAs as labelled in red on *map 1, appendix A*

- continued assessment of AQMA 6 and 11 based on the predicted breach of the NO_2 annual mean NAQO

- continued assessment of AQMA 7 and 9 based on the monitored breach of the NO_2 annual mean NAQO

- continued assessment of AQMA 12 based on a lack of historical monitoring data to justify a revocation

- a review of the geographical extent of AQMA 11 based on the 40µg/m^3 contour line of the 2007 base-line dispersion modelling output.

The 2009 FA also identified the following:

- that based on monitoring data, the 24-hour mean particle matter with diameter less than 10µm (PM_{10}) was in excess of 50 µg/m^3 at all monitored stations in 2007 and 2008. However, as the number of

[1] Box A.1, Appendix A Checklist, Progress Report Guidance (LAQM. PRG (03))

exceedances was not in excess of the 35 annual exceedance allowance, and the 2008 monitored PM_{10} annual mean levels at all stations were not in excess of 32µg/m^3 , it was considered unlikely that there would be future exceedances of the PM10 24-hour mean NAQO. PM10 monitoring at Mile End Road, London Road and Gatcombe Park stations continues and PM10 pollutant levels continue to be reviewed

The 2007 draft AQAP was revisited and updated according to the 2009 FA findings to focus on AQMAs that were retained (AQMA 6, 7, 9, and 11).

On the 23rd March 2010 PCC revoked eight AQMAs (1, 2, 3, 4, 5, 8, 10 and 13), retaining four AQMAs (6, 7, 9 and 12) and re-designating AQMA 11. The five remaining AQMAs are as follows:

- AQMA 6: Extending north along Fratton Road; from Fratton Bridge into Kingston Road, continuing into London Road until the roundabout junction with Stubbington Road and Gladys Avenue. This area was retained as a result of predicted breaches of the NO_2 annual mean NAQO for a further six years. In addition monitoring data is exhibiting NO_2 levels in excess of the NAQO

- AQMA 11: Redesigned in March 2010, AQMA 11 extends from Rudmore roundabout south to Church Street roundabout. This area was retained as a result of predicted breaches of the NO_2 annual mean NAQO for a further two years

- AQMA 7: Focusing on Hampshire Terrace and St Michaels Road gyratory. This area was retained as a result of monitored breaches of the NO2 annual mean NAQO

- AQMA 9: Focusing on the southernmost section of Eastern Road from Sword Sands Road south into Velder Avenue and its junction with Milton Road. This area was retained as a result of monitored breaches of the NO_2 annual mean NAQO

- AQMA 12: Encompassing the greater part of Queen Street from The Hard to St James's Road. This area was retained, as there is insufficient historical monitoring data to justify the revocation at this stage

On 11 January 2011 PCC adopted an AQAP, which was annexed to the LTP 3.

In late 2011 PCC published an air quality PR assessing the data collected in 2010.

2. Legislation and Policy

2.1 European Air Quality Directives

The Air Quality Framework Directive (96/62/EC)[2] on ambient air quality assessment and management defines the policy framework for 12 air pollutants known to have a harmful effect on human health and the environment. Ambient concentration limit values for the specific pollutants are set through a series of Daughter Directives.

Following the Daughter Directives, Council Directive 2008/50/EC[3] on ambient air quality and cleaner air for Europe came into force in 2008, and was transposed into national legislation in 2010[4]. It consolidated existing air quality legislation and made provisions for member states to postpone limit value attainment deadlines and allow an exemption from the obligation to meet limit values for certain pollutants, subject to strict conditions and assessment by the European Commission (EC).

2.2 National Air Quality Legislation

The provisions of Part IV of the Environment Act 1995 establish a national framework for air quality management, which requires all LAs to conduct local air quality reviews.

Section 82(1) of the Act requires these reviews to include an assessment of the current air quality in the area and the predicted air quality in future years. Should the reviews indicate that the objectives prescribed in the UK Air Quality Strategy[5] (AQS) and the Air Quality Standards Regulations 2010 will not be met, the LA is required to designate an AQMA. Action must then be taken at a local level to ensure that air quality in the area improves.

The UK AQS identifies nine ambient air pollutants that have the potential to cause harm to human health. These pollutants are associated with local air quality problems, with the exception of ozone, which is instead considered to be a regional problem. Similarly, the Air Quality Regulations 2010 set objectives, but for just seven of the pollutants that are associated with local air quality. These objectives aim to reduce the health effects of the pollutants to negligible levels.

The air quality objectives and limit values currently applicable to the UK can be split into two groups. Each has a different legal status and is therefore handled differently within the framework of UK air quality policy. These are:

- UK air quality objectives set down in regulations for the purposes of local air quality management; and

[2] Air Quality Framework Directive (96/62/EC) on ambient air quality assessment and management

[3] Council Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe

[4] The Air Quality Standards Regulations 2010 Statutory Instrument 2010 No. 64

[5] Defra (2007) The Air Quality Strategy for England, Scotland, Wales and Northern Ireland

- European Union (EU) limit values transcribed into UK legislation for which compliance is mandatory.

2.3 Current compliance with EU standards

The EU Ambient Air Quality Directive sets legally binding limits for ambient concentrations of certain pollutants in the air. For NO_2 there are two limit values for the protection of human health. These require Member States to ensure that:

- annual mean concentration levels of NO_2 do not exceed 40µg/m3; and

- hourly mean concentration levels of NO_2 do not exceed 200µg/m3 more than 18 times a calendar year

Member states were required to meet these limits by 1 January 2010 unless an extension was granted for up to five years to 1 January 2015.

The UK assesses compliance with these limits through a UK wide system of over 145 air quality monitoring stations known as the Automatic Urban and Rural Network (AURN), together with a Pollution Climate Mapping (PCM) model.

The UK is required to report air quality data on an annual basis. In 2013 seven zones exceeded the limit value for annual mean NO2 concentrations, but were within the annual mean limit value plus margin of tolerance. Portsmouth Urban Area has been identified as one of these zones.

2.4 Background information on NO_2 - the pollutant of main concern in Portsmouth

With reference to the objectives highlighted above, meeting the annual mean objective has been and is expected to be considerably more demanding than achieving the one-hour objective.

The annual mean objective of 40 µg/m^3 is currently widely exceeded at roadside sites throughout the UK, with exceedances also reported at urban background locations in major conurbations. Exceedances are associated almost exclusively with vehicle emissions.

There are considerable year-to-year variations in the number of exceedances of the hourly objective, driven by meteorological conditions which give rise to winter episodes of poor dispersion and summer oxidant episodes.

Analysis of the relationship between one-hour and annual mean NO_2 concentrations at roadside and kerbside monitoring sites indicates that exceedances of the one-hour objective are unlikely where the annual mean concentrations are less than 60µg/m^3.

NO_2 and nitric oxide (NO) are both oxides of nitrogen, and are collectively referred to as NO_2. All combustion processes produce NO_2 emissions, largely

in the form of NO, which is then converted to NO_2, mainly as a result of its reaction with ozone in the atmosphere. Therefore, the ratio of NO_2 to NO is dependent on the concentration of ozone and the distance from the emission source.

3 PCC's AQAP

3.1 PCC's AQAP

In 2010, PCC reviewed the 2007 draft AQAP to target the remaining 'hotspot' areas. The revised AQAP set out measures in pursuit of achieving the national objectives to deliver cleaner ambient air. Although aiming to deliver city wide improvements in air quality, the primary purpose of the AQAP was to explore measures which would combat the areas of poor air quality within Portsmouth's remaining five AQMAs.

As part of the 2009 FA, a source apportionment study was undertaken. This concluded that:

- in 2007, the predominant source of NO_x emissions was determined to be Heavy Goods Vehicles (HGVs), closely followed by car emissions; and
- in 2010, the influence of cars and background concentrations was greater than those of 2007 but HGVs remained the highest polluter comparatively when considering the number of each type of vehicle.

The results of the source apportionment study enabled PCC to identify the sources causing the highest level of pollution and those upon which the AQAP should focus and prioritise.

The following were considered to be priorities of the AQAP:

Priority 1:

- HGVs:
  In 2010, HGVs were predicted to contribute between 23.2% and 24.5% of the NO_X within AQMAs 6 and 11. Therefore any percentage decrease in HGVs passing through these areas would have a significant beneficial impact upon local air quality. Another factor is the effect of HGVs' reduced speed, as the very lowest speeds are disproportionately more polluting. Congestion impairing HGV movement is therefore highly significant and needs to be reduced. Furthermore, HGVs contribute directly to the problem of congestion when making deliveries. This is particularly relevant on the London Road / Kingston Road / Fratton Road corridor (AQMA 6).

- Mitigation measures:
  - applying a weight restriction to prevent HGVs entering London Road, south of Stubbington Road, to ensure that Stamshaw Avenue is not used as an alternative route by HGVs;
  - improving traffic light signals to speed traffic movement at the junction of Kingston Crescent and London Road. These are more responsive to vehicle demand and are able to immediately react to

changing vehicle flows, reducing queuing and congestion and leading to an improvement in air quality;
    - removing the on-street parking bays to the north of the junction with Kingston Crescent to improve the movement of traffic; and
    - improving signage to car parks. Currently Stubbington Avenue car park is only operating at around 40%–50% capacity, so a review of pricing policies, and improving signage, lighting and security in order to increase take up of this underused facility may help.

Priority 2:

- **Car traffic:**
  In 2010, cars were predicted to contribute between 24.3% and 32.0% of NO_x emissions within AQMAs 6 and 11. Reducing congestion across the road network is therefore essential if air quality is to improve.

- Mitigation measures:
    - the introduction of new traffic management systems at key locations to reduce congestion and pollution, such as the use of MOVA (Microprocessor Optimised Vehicle Actuation);
    - junction improvements on the St Michael's Gyratory as during the afternoon peak hour, large queues form on Hampshire Terrace due to the large number of vehicles exiting Portsmouth, and the pedestrian crossing signals. Traffic signal control should be introduced to improve traffic flow on Hampshire Terrace;
    - the introduction of the Park-and-Ride scheme and a review of parking charges.

Priority 3:

- **Buses**
  In 2010, buses were predicted to contribute between 4.9% and 14.4% of the NO_x emissions within AQMA 6 and 11. The continued introduction of bus priority measures and introduction of improved bus exhaust technology therefore play an important part in ensuring public transport can offer a realistic and sustainable alternative to the private car.

- Mitigation measures:
    - targeted schemes to improve bus services, to increase usage and reduce emission levels in co-ordination with bus operators and partner authorities.

Priority 4:

- **Domestic, commercial and background sources**

As background concentrations are influenced by pollution generated from outside Portsmouth's boundaries, emissions are difficult to specify or control. The AQAP states that wherever possible, PCC needs to encourage a reduction of unnecessary discharges from residential and industrial premises and encourage the use of more efficient heating systems.

Priority 5:

- **Shipping sources**
  The Further Assessment confirmed that the emissions from shipping did not exceed 10% of the total NO_X contribution in AQMA 11. This contribution is relatively small given the economic importance of shipping to Portsmouth.

Priority 6:

- **Industrial sources**
  In 2007, industrial sources were found to contribute between 0.2% and 0.4% to the NO_X levels in AQMA 6 and 11.

Priority 7:

- **Continuous improvement**
  Although the current legal limits on ambient air quality are now met across the majority of Portsmouth, the remaining NO2 'hotspots' within the 5 AQMAs mean that exposure in these areas is still highly significant. Even where the objectives have been achieved, effort is needed to maintain air quality given pressures from Portsmouth's increasing population and demands on transport and land use.

4 Progress on LAQM

As part of the LAQM process, in 2013 PCC carried out a desktop feasibility study "Optimisation of Road Traffic Management Control System(s)" (ORTMCS). This project looked at how road traffic management control system can be optimised to be employed for the purpose of local air quality improvement. In addition PCC carried out a DA of air quality. The findings of both these projects were published in 2015.

4.1 ORTMCS Project

ORTMCS was a desk top study set up by PCC to explore possible improvements road traffic management controls for the purpose of achieving possible local air quality improvement.

This was a pioneering project focusing on testing ways to regulate and improve road traffic flow management to achieve an improvement in local air quality without creating new air pollution hotspots.

A key measure adopted in the AQAP was to review the existing traffic management control systems in Portsmouth in order to ensure that road traffic is ‘maintained at maximum fluidity to keep transport-related pollution to a minimum’. ORTMCS successfully delivered this action.

The project comprised three consecutive packages:

- extensive road traffic surveys at pre-selected junctions
- vehicle micro-simulation modelling based traffic impact assessment of each proposed scenario and analysis of instantaneous road emission (AIRE) modelling to produce estimates of road traffic emissions
- air Quality Impact Assessment (AQIA) to test various proposed scenarios using more advanced dispersion modelling

The domain study was confined to the road networks in five separate areas identified as corridors and were not confined to the five remaining AQMAs (AQMA 6, 7, 9, 11, and 13).

The proposed scenarios consisted of a set of four models developed for each corridor. The first two model runs were considered as baseline models and the other two as scenarios put forward for assessment. Corridor 4 was an exception as one baseline model was considered followed with three proposed model runs:

- Base Year Scenario (BYS) 2013
- Do-Minimum Scenario (DMS): includes all changes implemented or planned between the base year (2013) and assessment year (2015)
- Do-Something 1 Scenario (DS1S)

- Do-Something 2 Scenario (DS2S)

- Do-Something 3 Scenario (DS3S) [Only for corridor 4]

In general the conclusions of the ORTMCS study demonstrated a consistency throughout the three packages.

The performance analysis of various scenarios on the five corridors illustrated that:

- the annual mean NO_2 objective will not be exceeded at any modelled sensitive receptor location in 2013 or 2015 should additional traffic management measures not be implemented. However, the predicted annual mean NO_2 concentrations, particularly for the 2013 DMS, were close to the annual mean objective at several modelled receptor locations

- any revocation of AQMAs should consider both the predictions made throughout the corridors via the contour maps and local monitoring data

- the proposed traffic management measure scenarios are unlikely to result in significant changes in ambient air quality in Portsmouth

- the predicted changes in annual mean NO_2 concentrations at all modelled sensitive receptor locations are negligible

It was therefore not possible to make any air quality based recommendation for any scenario, in any corridor, that would result in a significant improvement in local air quality.

ORTMCS concluded however that should a decision be made to address road traffic congestion, air quality should be considered a material consideration regardless of significance determined by the AQIA:

- ✓ Corridor 1

    - DMSc1: To incorporate the following changes to the network, which have either already been implemented on site, or are due to be implemented shortly:

        - signalisation of the Rudmore roundabout, bus lane and bus gate along the southbound (SB) off slip and alterations to lane allocations

        - the merge of traffic from Rudmore roundabout SB on slip with the M275 flyover has been altered so that the slip road traffic merges with the nearside lane of the flyover, resulting in a lane drop

        - extending the existing bus lane along Mile End Road southbound through the Church Street roundabout,

Commercial Road and Marketway roundabout to join up with the current bus lane along Marketway, with lane alterations and signal time changes at the Church Street roundabout

- signalising Anglesea Road approach and opposing circulatory to allow pedestrian facilities, and altering the Cambridge Road triple crossings to run in isolation at St Michael's gyratory

- DS1Sc1: To utilise the DMS model layout with alterations made to the Holbrook Road / Lake Road roundabout. Two flares have been introduced on the Church Street and Lake Road (E) approaches for left turning traffic only to provide more capacity for the ahead and right turning traffic.

✓ Corridor 2

- DMSc2: To modify several signalised junctions throughout Corridor 2

- DS1Sc2: To amend bus stops throughout the network (where possible)

- DS2Sc2: To improve junction in line with the recommendations made within the South East Hampshire Bus Rapid Transit (BRT) highway design priorities study undertaken in February 2014.

✓ Corridor 3

- DMSc3: This scenario consists of the following planned improvements

  - signalisation of London Road / Northern Parade junction. This improvement includes prohibiting southbound to northbound U-turn manoeuvres. As a result, southbound vehicles originating from the Portsbridge roundabout or Military Road intending to go north along Northern Parade will be routed through the London Road / Copnor Road circulatory

  - geometric improvements and installation of MOVA at the Milton Road / Goldsmith Avenue junction. The geometric improvement includes reconfiguring of the northbound approach to provide one through lane and one left turn lane, along with provision of signalised pedestrian crossings

  - installation of MOVA at the Milton Road / Velder Avenue junction

  - optimisation of signal timing and stage sequence at the Milton Road / St. Mary's hospital entrance junction

- optimisation of signal timing and stage sequence at the Copnor Road / Stubbington Avenue / Burrfields Road junction

- DS1Sc3 This scenario included the following:

  - Replacement of on-street bus stops with laybys at the following locations:

    - Norway Road Eastbound, East of Copnor Road
    - Copnor Road Southbound, south of Stubbington Avenue / Burrfield Road
    - Milton Road Northbound, north of Locksway mini-roundabout
    - Milton Road Northbound, south of Priory Crescent
    - Milton Road Southbound, south of Priory Crescent

  - additional parking/loading restrictions on the southbound section of Milton Road between Dover Road and St Mary's roundabout

- DS2Sc3: To construct southbound right turn lane into the fuel station located approximately 50m north of the Copnor Road / Stubbington Avenue / Burrfields Road junction. Currently, traffic turning right into the fuel station blocks the southbound through traffic resulting in excessive delays for the SB movement at this junction. The right turn lane will provide storage for the right turning traffic without blocking the southbound through traffic.

✓ Corridor 4

- DS3Sc4: To alter the lane allocation to allow a double right turn to A3 Southampton Road. Therefore, the middle lane will be to travel right or ahead and the nearside will be a left or ahead lane as it has also been assumed that the widening of the approach has taken place as per DS1S. The bus gate has not been included in this scenario.

✓ Corridor 5

- DMSc5: This scenario proposes the removal of stage 3 from the signalised junction of Victoria Road, Outram Road and Elm Grove, converting the right turn movement from Victoria Road South to Outram Road to gap seeking during stage 2, and reducing the number of northbound lanes to 1 to accommodate a cycle lane;

- **DS1Sc5:** The conversion of the bus stops on the carriageway into bus laybys where it is considered feasible;

- **DS2Sc5:** The removal of the on street parking provision at locations where it impedes two way traffic flows.

4.2 Detailed Assessment 2015

Local authorities have a statutory obligation to review and assess local air quality from time to time to determine whether it is likely to meet the NAQO set out in the Air Quality (England) Regulations 2000 (as amended).

Where these objectives are not expected to be met, the local authority must declare AQMA and draw up an AQAP to assist in moving towards compliance with the NAQOs.

PCC produced the 2015 DA report to satisfy our obligations under Part IV of the Environmental Act 1995. The DA aimed to:

- Carry out a DA of NO_2

- Review the extent of predicted exceedance of NO_2 annual NAQO in the AQMAs (AQMA 6, 7, 9, 11, and 13)

The information used the DA was sourced from both the road traffic micro-simulation modelling and the AQIA sections of the ORTMCS report.

As NO_2 remains the main pollutant of concern locally annual mean NO_2 concentrations were predicted using the regional dispersion model AAQuIRE at sensitive receptor locations within five individual route corridors.

This was completed for the BYS and for the DMSs for the assessment years of 2013 and 2015. The potential impacts associated with each of the DMS were then assessed.

This DA report covered the three following tasks:

- development of a BYS air quality dispersion model using the pre-collected road traffic data from the extensive traffic surveys. The BYS model is developed to predict the annual mean NO_2 concentrations for 2013 and used for model verification purposes

- development of DMS air quality dispersion model for all corridors with the exception of Corridor 4 using the road traffic micro-simulation predictions to predict the annual mean NO_2 concentrations for assessment years, 2013 and 2015

- prediction of NO_2 concentrations at sensitive receptor locations and to produce contour plots of predicted NO_2 concentrations.

The 2015 DA concluded that:

- there are no predicted exceedances of the annual mean NO_2 NAQO at any modelled receptor location in any of the five route corridors in the BYS, DMSs (2013) and DMSs (2015)
- the maximum predicted annual mean NO_2 concentration in the DMSs (2013) was 39.1µg/m^3
- the maximum predicted annual mean NO_2 concentrations in the DMSs (2013) by route corridor at sensitive receptors were
    - Corridor 1: 39.1µg/m^3
    - Corridor 2: 37.0µg/m^3
    - Corridor 3: 35.0µg/m^3
    - Corridor 4: 34.4µg/m^3 (BYS result as there is no DMS for Corridor 4)
    - Corridor 5: 34.2µg/m^3
- the maximum predicted annual mean NO_2 concentration in the DMSs (2015) was 37.8µg/m^3
- the maximum predicted annual mean NO_2 concentrations in the DMSs (2015) by route corridor are:
    - Corridor 1: 37.8µg/m^3
    - Corridor 2: 35.7µg/m^3
    - Corridor 3: 33.0µg/m^3
    - Corridor 4: 33.2µg/m^3 (projected base year result)
    - Corridor 5: 34.2µg/m^3

4.3 Conclusions of the DA

1. The DA results indicate that the annual mean NO_2 NAQO would not be exceeded at any modelled sensitive receptor location in 2013 or 2015 should additional traffic management measures not be implemented
2. The predicted annual mean NO_2 concentrations, particularly for the DMSs (2013) are close to the annual mean objective at several modelled receptor locations
3. Due to inherent uncertainties within the dispersion modelling process, where predicted concentrations are within 10% of annual mean NO_2 NAQO, it is possible that exceedance of the annual mean NO_2 NAQO would occur

4. Within the corridors and at the sensitive receptors six annual mean NO_2 concentrations were predicted to be within 10% of the annual mean objective

5. Any revocation of an AQMA should consider both the predictions made throughout the corridors via the contour maps and local monitoring.

5 New monitoring results

There has been no change to PCC's air quality monitoring program within the period 2009 to 2016.

NO_2 and PM_{10} are still being monitored continuously at four AQ monitoring station in addition to a NO_2 diffusion network across the city.

5.1 Continuous NO_2 Monitoring Data

Emphasis in Box 1.4 in the LAQM.TG (09) has been placed, for the annual mean NAQO, on monitoring and assessing non-occupational near-ground level outdoor locations, where the public might be regularly exposed. These include:

- residential facades
- schools, hospitals and library facades

PCC NO_2 and PM_{10} monitoring programmes are annually assessed to ensure that the LAQ monitoring requirements of the R&A process are met.

Continuous monitoring has been carried out in accordance with the Quality Assurance and Quality Control method (QA/QC) documented in *appendix B.*

Continuous monitoring station locations are shown on *map 3 appendix A.*

All continuous monitoring stations, with the exception of C6 are fitted with both NO_2 and PM_{10} analysers. They are located as follows:

- **Station C4**:
  An Automatic Urban and Rural Network (AURN) station located in an urban background location at Gatcombe Park Primary School, Curtis Mead *(see map 4, appendix A)*

- **Station C2**:
  This is a fixed kerbside station set up to monitor NO_2 and PM_{10} generated by the road traffic along London Road *(see map 5, appendix A)*. This station is located in a narrow busy roadside shopping area where large numbers of pedestrians are present (with pavements in places approximately only 2 metres). This location is within AQMA 6. Buildings in the immediate vicinity are predominantly commercial. However, residential units are located further north and south of the site typically at first floor level above retail outlet units. This shopping location has some of the characteristics of a street canyon with slow moving road traffic often causing congestion

- **Station C6**:
  This is a fixed roadside station established in April 2007 to monitor NO_2 and PM_{10} generated by the road traffic along Burrfield Road *(see*

map 6, appendix A). This station is located at a junction area with large numbers of pedestrians and residential properties. Buildings in the immediate vicinity are a mixture of both commercial and residential. This station was mainly set up to monitor emissions generated from road traffic related pollution generated from the adjacent Burrfield Road / Copnor Road junction within AQMA 3

- **Station C7**:
  This is a fixed Roadside station established in April 2007 to monitor NO_2 and PM_{10} generated by the road traffic along Mile End Road and the southern end of the M275 into the City *(see map 7, appendix A)*. It is located within AQMA 11 approximately 6.5 metres from Mile End kerbside in a residential area. Buildings in the immediate vicinity are all residential.

The locations and characteristics of all continuous monitoring sites are summarised in *table 3, appendix C* and the NO_2 continuous monitoring data for 2013, 2014 and 2015 are presented on *table 5, appendix D.*

The NO_2 continuous monitoring program for the period stretching between 2013 and 2015 concluded that:

- the NO_2 levels for 2013 did not exceed the NAQO at any of the four continuous air quality monitoring station. The maximum recorded concentration was at London Road station (39.68 $\mu g/m^3$) that was close to breaching the NO_2 NAQO

- the NO_2 levels for 2014 increased across the four AQM stations compared to that of 2013 to exceed the NAQO at London Road station as it recorded 45.68$\mu g/m^3$. This translated in a worsening in LAQ. This is a kerbside station

- the NO_2 levels for 2015 decreased compared to that of 2014 at levels that did not exceed the NAQO at any of the four continuous air quality monitoring station. This translated in an improvement in LAQ. The maximum recorded concentration was again at London Road station (38.4 $\mu g/m^3$) that was close to breaching the NO_2 NAQO

- the 2014 NO_2 annual mean increased by just under 6$\mu g/m^3$ compared to the levels recorded in 2013 before dropping by 7.28$\mu g/m^3$ in 2015

- the 2014 annual mean concentrations measured across the four continuous air quality monitoring stations increased from 2013 to 2014 before dropping back to slightly lower levels than the 2013 in 2015

- the NO_2 levels for 2015 decreased at levels lower to those of 2013

- the trend emerging from each of the four continuous monitoring stations exhibits a downward trend in NO_2 annual mean levels in the last three years. Hence LAQ improved in the last three years in Portsmouth

5.2 Passive Monitoring Data

The continuous NO_2 monitoring program is supplemented by a non-automatic passive monitoring survey using an extensive NO_2 diffusion tubes survey (NDDTS) since 2004.

These are located mainly near busy junctions, at kerbside and roadside locations, at relevant exposure as defined in Box 1.4 of the LAQM.TG(09) guidance. This monitoring program is primarily focused in AQMAs.

The NDDTS covers 40 locations across the City. Four of these locations are dedicated to collocation studies. Data generated from DTS have been subjected to both bias correction, and where monitoring had been carried out for less than twelve months, yearly projections as prescribed in Box 3.2 of LAQM.TG(09).

The locations of all non-continuous NDDTS monitoring sites and site characteristics for each monitoring location are summarised in *table 4, appendix C* and illustrated on *map 8, appendix A*.

NDDTS has been conducted in accordance with the QA/QC method documented in *section 2 of appendix B*.

The results from the NDDTS were initially adjusted for bias using the factors generated from the local collocated study. This involved the exposure of three NDDTs at station C2 (kerbside site), C6 (roadside site), C4 (urban background site), and C7 (roadside site).

The data generated from this exercise were used to generate bias correction factors following the approach described in Box 6.4 of LAQM.TG (03) using the calculating precision and accuracy spreadsheet.

The NDDT collocation study for 2014 generated the following bias correction factors:

- tubes exposed at the London Road Station (kerbside station) generated 0.84 as the bias correction factor

- tubes exposed at both Mile End Road and Burrfield Road stations (both roadside stations) generated 0.94 and 1.02 respectively as the bias correction factors

- tubes exposed at the Gatcombe Park Station (urban background station) generated 0.9 as the bias correction factor

The 2014 NDDTS results were bias adjusted using 0.925 as the average of all above bias correction factors generated from the 2014 NDDTS local co-location studies.

The NDDT collocation study for 2015 generated the following bias correction factors:

- tubes exposed at the London Road Station (kerbside station) generated 0.8 as the bias correction factor

- tubes exposed at both Mile End Road and Burrfield Road stations (roadside stations) generated 1 and 1.04 respectively as the bias correction factors

- tubes exposed at the Gatcombe Park Station (urban background station) generated 1.03 as the bias correction factor

The 2015 NDDTS results were bias adjusted using 0.967 as the average of all above bias correction factors generated from the 2014 NDDTS local co-location studies.

Where the results were only available for a period of less than 12 months in any calendar year, a further seasonal adjustment was carried out to project annual means following the approach recommended in Box 6.5 of LAQM TG (03) using 2010 urban background monitoring data from Bournemouth, Portsmouth and Southampton.

Most of 2013, 2014 and 2015 NDDTS results were subjected to bias adjustment only, while others were subjected to a 2-stage adjustment so that they could be directly compared to the NAQO:

- NDDT location with less than 12 month data was projected for 12 months first

- secondly data was bias corrected using local co-location bias correction factor

Two NDDTS locations were however subjected to a further adjustment as the monitoring points at these locations are distant from the façade of the nearest relevant exposure. These data is represented in green in *table 8, appendix C.*

This was carried out using the calculator that was made available by ‘Air Quality Consultants’. This tool is provided to local authorities to predict the annual mean NO_2 concentration for a location ("receptor") that is close to a monitoring site, but nearer or further to the kerb than the monitor.

The two locations are:

- 106 Victoria Road North

- Anchorage Road

The adjusted NDDTS data as prescribed above for all monitored sites in the city are presented on *table 8, appendix C.*

The 2013, 2014, and 2015 adjusted NO_2 data show that all exceedances are concentrated predominantly in the declared AQMA with the exception of

Addison Madden location on Hampshire Terrace, where the 2014 NO_2 annual mean concentration exceeded the NAQO. This monitoring site is located close to one of the busiest junctions in Southsea that centres AQMA 7. However, the NO_2 long-term trend over the last three years at this location exhibited downward trends since 2013.

The 2013 NDDTS survey concluded that:

- The NO_2 NAQO was exceeded at four locations:
    - Lord Montgomery Way (AQMA 7)
    - 221 Fratton Road (AQMA 6)
    - The Tap" London Road (AQMA 6)
    - Addison Madden Hampshire Terrace (Adjacent to AQMA 7)

The 2014 NDDTS survey concluded that:

- the NO_2 levels increased compared with those of 2013 at 65.51% of the monitored locations across the City
- the highest increase was recorded at 17 Kingston Road location along (AQMA 6), Addison Madden (Hampshire Terrace adjacent to AQMA7), 7 Velder Avenue (AQMA 9), 4 Merlyn Drive, Market Tavern (Mile End Road AQMA 11), 103 Elm Grove, Larch Court (Church Road (Corner) adjacent to AQMA 11), 121A High Street, Anchorage Road, 116 Albert Road, and 2 Victoria Road North with an increase of 13.49, 12.46, 7.15, 5.60, 5.30, 4.48, 3.84, 3.57, 3.00, 2.29, 2.11$\mu g/m^3$ respectively
- the NDDS also concluded that NO_2 annual mean levels were in excess of the annual mean NAQO in 2014 at the following seven monitored locations:
    - Lord Montgomery Way (AQMA 7)
    - London Road (AQMA 6) continuous monitoring station
    - 221 Fratton Road (AQMA 6)
    - 117 Kingston Road (AQM6)
    - The Market Tavern Mile End Road (AQMA 11)
    - The Tap public house London Road (AQMA 6)
    - Addison Madden Hampshire Terrace (Adjacent to AQMA 7)

The 2015 NDDTS concluded that:

- the NO_2 levels decreased compared with those of 2014 at 72.41% of the monitored locations across the City resulting in an improvement of air quality
- the most significant improvement was registered at Addison Madden (Hampshire Terrace), 117 Kingston Road, Market Tavern (Mile End Road), 103 Elm Grove, Anchorage Road (Column 6), 221 Fratton Road, Larch Court (Church Road (Corner)), 2 Victoria Road North, 7 Velder Avenue, 4 Milton Road with a decrease of 12.95, 10.39, 9.81, 5.81, 4.40, 4.18, 3.25, 2.74, 2.16 and 1.99 respectively

- the highest increase was recorded at 88 Stanley Road, Queen Street, the Tap Public House in London Road, 106 Victoria Road North, and Montgomery Way with an increase of 11.21, 2.57, 2.32, 2.20, and 1.76$\mu g/m^3$ respectively

- the NO_2 annual mean levels were in excess of the annual mean NAQO in 2015 at:

    - 117 Kingston Road (AQM6)
    - The Tap" London Road (AQMA 6)
    - Montgomery Way (AQMA 7)
    - 88 Stanley Road (AQMA11) (It is important to note that Stanley Road location is represented with NDDT data for only two months which was subjected to all necessary corrections)

A closer look at the NDDTS data for Portsmouth reveals that a downward trend emerged at 55.17% of the NDDT monitored locations in the last three years since 2013, hence an improvement in LAQ.

NDDT data demonstrated that 2014 NO_2 levels were exceptionally high compared to those of 2013 and 2015.

On average NDDT data exhibited no change overall monitored locations.
It is not possible to categorically state why the levels of pollutant in Portsmouth increased during 2014 and decreased in 2015 as a multitude of factors influence pollution levels.

Factors are wide ranging and complex. Localised influences such as route popularity or road changes / roadworks may be part of the cause. Others may be of a regional nature perhaps dictated by the meteorological conditions. National or international stimuli such as requirement for improved vehicle emissions technologies are also likely to play a part.

6 New local developments

There are many developments that are either already under construction, committed, or planned in Portsmouth in the next 5 to 10 year period: examples are:

- Somerstown regeneration: A number of planning permissions have been granted and some schemes have been completed / under construction which will result in the creation of a new community centre (spanning Winston Churchill Avenue) and a net gain of 64 new homes over the next 5 years

- The Hard Interchange: Under construction due to be complete and operational by the end of 2016

- North Harbour / Lakeside: Phased development (for which various planning consents have been granted) for a series of buildings planned along the 14 acre lake, including 185sqm to 7,155sqm of office space; statement office buildings providing 2,325sqm to 7,435sqm of Grade A corporate headquarters; a courtyard area with a particular focus on office use and SMEs; a 7,710sqm medical facility and a 150 bedroom hotel

- Fratton Park (Portsmouth Football Club): Planning permission granted and construction is completed for a new Tesco Superstore (10,475sqm) and petrol filling station on land adjacent to Fratton Park, accessed from Fratton Way

- Tipner interchange (M275) - now complete

- Tipner interchange regeneration - the site is now cleared and ground remediated and planning process is already underway for residential, light industrial and commercial developments

- Tipner interchange Park and Ride is completed and fully operational

- Port Solent - The Portsmouth Plan allocates the site for an additional 500 homes and 3.4 ha for marina related operations (a mixture of retained and new marina operations / employment space) to be delivered in the later part of the plan period (2020 - 2027)

- 'City Deal Sites' - Tipner (East and West) and Horsea Island. PCC is working with other landowners, including the Homes & Communities Agency (HCA) and the Tipner Regeneration Company (TRC) to transform these derelict sites into a thriving new community and gateway for the city. These sites currently have conditional outline planning permission for the construction of just over 600 homes. HCA's land has been remediated and house building is expected to commence in 2016 together with land remediation of the TRC land.

- through the Government's City Deal program, Portsmouth City Council has secured £48.75m to help enable development of Tipner West &

Horsea Island (including a new bridge access to Horsea Island). The City Deal includes the transfer of MOD land at Tipner Firing Range and part of Horsea Island to the city council for development

- **City Centre regeneration:** PCC city center master plan (adopted in 2013) identifies 20 development opportunities / sites to be delivered by 2027. A number of the sites have permission or are under construction. This includes:

    - Robert Gamlen Homes has secured planning consent for a 16-18 storey hotel (228 rooms) on 8 Surrey Street (site 7 within the city center masterplan)

    - Knightsbridge Student Housing Ltd has secured planning consent for the conversion and extension to the former Zurich House for 1,000 bed student halls of residence (parts of sites three and four within the city center masterplan). This is currently under construction due to be complete by September 2017

    - Premier Inn has secured planning consent for a six-storey hotel (84 rooms) with ground floor café (Class A3) and shop (Class A1) uses, (part of site 11 within the city center masterplan). This development has been completed

    - Unite have secured planning consent for a part 7 / part 9 / part 17 / part 25 storeys building comprising a halls of residence for students containing 836 study / bedrooms and the construction of 1,249sqm (13,445sqft) of floor space for use as storage units (Class B8) on part of ground floor (Site 14 within the city center masterplan). This is currently under construction due to be complete by September 2016

- HM Naval base Trafalgar Gate link road - completed in 2011 and is fully operational

- newly proposed Aldi Food Store at Southampton Road, Paulsgrove. The site is brownfield and was previously occupied by an industrial unit which has recently been demolished. The proposals include the construction of a 1,804sqm food store, with 124 car parking spaces and provision for cycle parking

All the above developments have been identified as requiring a detailed AQA as their construction is anticipated to impact on local air quality. This has to be addressed as part of the planning application process to demonstrate they conform to the AQAP, SPD-AQ and the Local Development Framework (LDF).

HM Naval base Trafalgar Gate link road is in operation. It is considered as being a major highway restructuring development located within AQMA 11. It has been identified as the only major committed development, which may

have a remedial impact on LAQ. The EIA's AQA concluded that the development would have a minor positive impact on LAQ.

7 Industrial processes

Some industrial facilities could harm the environment or human health unless they are controlled. The environmental permitting regime requires operators to obtain permits for some facilities, to register others as exempt and provides for ongoing supervision by regulators.

The aim of the regime is to:

- protect the environment so that statutory and Government policy environmental targets and outcomes are achieved
- deliver permitting and compliance with permits and certain environmental targets effectively and efficiently in a way that provides increased clarity and minimises the administrative burden on both the regulator and the operators
- encourage regulators to promote best practice in the operation of facilities
- continue to fully implement European legislation

A list of all premises currently subject to permitting control under the Environmental Permitting Regulations 2010 is provided below:

	PROCESS	Name	Address
1	Active Part B Powder Coating	LBL 2 (Tomburn)	Gunstore Road, PO3 5HL
2	Active Part B Melting	SELEX ES	Neville Shute Road, PO3 5RT
3	Active Part B Coating of Metal	BAE Systems Surface Ships Ltd	Portsmouth Naval Base, PO1 3AQ
4	Active Part B Cement Batching	Hope Construction	Tipner Wharf, PO2 8QA
5	Active Part B Cement Batching	K.R.M. Concrete Ltd	Kendalls Wharf, Eastern Road, PO3 5LY
6	Active Part B Solvent Degreasing	Queensbury Shelters Ltd	Fitzherbert Road, PO6 1SE
7	Active Part B Cement Batching	Cemex UK Materials Limited	Walton Road, PO6 1UJ
8	Active Part B Carbon Black	GKN Aerospace Services Ltd (invoice to FPT Industries)	Airport Service Road, PO3 5PE
9	Active Part B SED Adhesive / Textile	GKN Aerospace Services Ltd (invoice to FPT Industries)	Airport Service Road, PO3 5PE
10	Active Part B Crusher	Hughes Waste Ltd	Ackworth Road PO3 5NS

11	Active Part B Crusher	Portsmouth Demolition & Salvage	419 Victory Business Centre, Somers Road North, Portsmouth, PO1 1PJ
12	Active Part A2	Multi Packaging Solutions	Limberline Road, PO3 5JF
13	Active Respray Part B	Adams Morey	Burfields Road, PO3 5NN
14	Active Respray Part B	Nationwide Crash Repair Centres Ltd	Portfield Road, PO3 5FJ
15	Active Respray Part B	ERB	Claybank Road, PO3 5NH
16	Active Respray Part B	Apollo Motor Group	Unit 6 Fitzherbert Road PO6 1RU
17	Active Respray Part B	A & J Lawrence Vehicle Repairs	Unit A, The Kinard Centre, Northarbour Road, PO6 3TF
18	Active WOB Part B	Welfare Garage Ltd	Portsmouth Naval Base, PO1 3HH
19	Active WOB Part B	Fairway Garage	4-6 Bourne Road Paulsgrove PO6 4JS
20	Active WOB Part B	Richmond Cars Ltd - Mr Clive Griffiths	Fitzherbert Road Portsmouth PO6 1RU
21	Active Dry Cleaners Part B	Solent Cleaners Ltd, 31 Market Parade, Havant, Hants PO9 1PY	44B High Street, PO6 3AG
22	Active Dry Cleaners Part B	Look smart	149 Copnor Road, PO3 5BS
23	Active Dry Cleaners Part B	Guestcare Hotel Valet Services Ltd	145 Albert Road, PO4 0JW
24	Active Dry Cleaners Part B	Impress (Palmerston Rd)	72 Palmerston Road, PO5 3PT
25	Active Dry Cleaners Part B	Washeteria	279 London Road, PO2 9HF
26	Active Dry Cleaners Part B	Smarty pants	36 London Road, PO2 0LN
27	Active Dry Cleaners Part B	Kingston Cleaners Ltd.	35 Kingston Road, PO2 7DP
28	Active Dry Cleaners Part B	Solent Cleaners Ltd, 31 Market Parade, Havant, Hants PO9 1PY	253 Albert Road, PO4 0JR
29	Active Dry Cleaners Part B	Impress	169 / 171 Albert Road, PO5 3PT
30	Active Dry Cleaners Part B	Solent (Farlington), Solent Cleaners Ltd, 31 Market Parade, Havant, Hants PO9 1PY	Unit 5 Mountbatten Business Park, Jackson Close, PO6 1UR

31	Active Dry Cleaners Part B	Impress	98A London Road, North End, PO2 0LZ
32	Active Dry Cleaners Part B	Hilsea Laundry & Dry Cleaning Centre	309 Copnor Road, PO3 5EG
	PETROL STATIONS		
33	Active Part B	All Saints Service Station, Commercial Road	
34	Active Part B	Green Road Service Station Ltd, Green Road	
35	Active Part B	Texaco, Eastern Road Service Station	
36	Active Part B	Tesco Stores Ltd, Northarbour, Clement Atlee Way	
37	Active Part B	Shell Victory, Kettering Terrace	
38	Active Part B	J Sainsburys Petrol plc, Fitzherbert Rd	
39	Active Part B	Portsbridge Service Station Limited, Portsmouth Rd	
40	Active Part B	Esso, Milton Road	
41	Active Part B	Tesco Copnor Esso Express, Copnor Rd	
42	Active Part B	Malthurst Fuels Ltd, Northern Road	
43	Active Part B	White Heather Transport Ltd, Richmond Road	
44	Active Part B	Esso, Kingston Road	
45	Active Part B	Shell Farlington, Eastern Road Service Station	
46	Active Part B	Shell Bastion, London Rd	
47	Active Part B	ASDA Stores Ltd, Bridge Centre	
48	Active Part B	Shell Fratton, Goldsmith Avenue	
49	Active Part B	Tesco, Fratton Way	

8 Portsmouth Local Transport Plan (LTP)

In 2011 PCC produced and adopted the 3rd Local Transport Plan **(LTP3)** for the city.

The LTP3:

- sets out PCC's transport policies and their relation with national and local policy objectives within a single document
- takes into account an increasing emphasis on maintenance and road safety, the need to support Portsmouth's economy, emerging LDF priorities, sustainability and the worsening public finance outlook
- is a corporate document, relevant to Portsmouth but meets government expectations on content
- provides guidance on transport issues for LDF but leaves open the possibility of an early 'refresh' should funding allocations change significantly from expected levels
- contains two key components - a strategy and an implementation plan. The LTP3 long-term strategy covers the period from 2011 - 2031 supported by a three year implementation plan which will detail planned transport improvements. The long-term strategy will be developed jointly by the constituent authorities of Transport for South Hampshire (TfSH)

The long lifespan of the LTP3 will help ensure consistency with the timescale for the new Regional Strategy and the LDF. The longer timeframe will also enable PCC to set, and help deliver, longer-term strategic priorities.

9 Air Quality Action Plan (AQAP)

In addition to the work conducted at a national and sub-regional level, in accordance with the overarching objectives in the LTP3 to improve and increase the use of sustainable modes, a comprehensive program of improvements is underway.

Under Section 84(2) of the Environment Act 1995, PCC is required to submit an AQAP stating the strategy adopted by the council.

The AQMA aims:

- deliver cleaner air within and around the declared AQMAs
- maintain clean air across Portsmouth
- move toward attainment of the annual mean NAQO through policy measures

A holistic approach to cleaner air is being considered, however priorities will be also achieved through projects designed to specifically target poor air quality within hotspots such as AQMA 6 and AQMA 11.

PCC annexed the AQAP to the LTP3 given that the road traffic is the major contributor to LAQ exceedances of the NAQOs within AQMAs. Both documents have been adopted and become effective since the 1st of April 2011.

10 Progress on air quality action planning

Improving the air in Portsmouth with its high population and limited space is going to be no easy challenge, especially as trans-boundary harmful pollutants are also blown into Portsmouth from sources beyond our direct control and influence.

At the core of the proposals within AQAP is the message that everyone therefore needs to play their part to take steps to improve air quality, and as vehicular traffic is the main contributor, wherever possible we should endeavour to use a less polluting and more sustainable form of transport.

PCC set itself a number of priority areas to meet aims of the AQAP. Our progress on delivering these particular measures is summarised in the tables that follow within the next pages *(see pages 39 to* 50).

In December 2015 DEFRA additionally published the Portsmouth Urban Area agglomeration zone (UK0012) (PUAAZ) updated air quality plan for the achievement of the EU air quality limit values for NO_2.

This is an update to the air quality plan published in September 2011 (http://uk-air.defra.gov.uk/library/no2ten/).

This plan presents the following information:

- general information regarding the PUAAZ
- details of the NO2 exceedance situation within the PUAAZ
- details of local air quality measures that have been implemented, will be implemented or are being considered for implementation in the PUAAZ, including an updated list of all actions being implemented by PCC

The assessment undertaken for the PUAAZ indicates that the annual limit value was exceeded in 2013 but is likely to be achieved before 2020 through the introduction of measures included in the baseline.

Details of measures that address exceedances of the NO2 limit values within PUAAZ includes both measures that have already been taken and measures for which there is a firm commitment that they will be taken.

The extent to which it has been possible to incorporate the impacts of these measures into the baseline modelling carried out for this assessment is clarified within the report.

This air quality plan for the PUAAZ should be read in conjunction with the separate UK overview document and the list of UK and national measures. The UK overview document sets out, amongst other things, the authorities responsible for delivering air quality improvements and the list of UK and national measures that are applied in some or all UK zones.

The measures presented in the PUAAZ plan, the accompanying UK overview document and the list of UK and national measures show how the UK will ensure that compliance with the NO_2 limit values is achieved in the shortest possible time.

This plan should also be read in conjunction with the supporting UK Technical Report which presents information on assessment methods, input data and emissions inventories used in the analysis presented in this plan. The document can be found via:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/485702/aq-plan-2015-portsmouth-urban-area-uk0012.pdf

Measure	Update on progress - Non traffic related measures (background emissions)	Progress to date	Progress in last 12 months	Estimated completion date
Review and assess air quality	CITY WIDE Review and assess the air quality in the city using four continuous monitoring stations and numerous diffusion tubes. Produce annual action plan progress reports to assess implementation against indicators	Adoption of AQAP in 2010	Publication of Detailed Assessment in 2015. New contract agreed to ensure maintenance of equipment for a further four years. Additional abilities to monitor PM2.5 also secured	On going
Regulation of industrial processes	CITY WIDE Regulation of industrial emissions through integration of air quality considerations into local authority regulation of Pollution Prevention and Control Regulations. Reduction of organic solvent emissions in accordance with the solvent emission regulations	On going	See section 7	On going
Domestic heating emissions	CITY WIDE Control of replacement gas fired boilers through building control and private sector housing teams – careful consideration of CHP	On going	On going	On going

Measure	Update on progress - Non traffic related measures (background emissions)	Progress to date	Progress in last 12 months	Estimated completion date
Energy saving measures	CITY WIDE Promotion of energy saving measures leading to reductions in combustion emissions across the city. To be conducted through PSAG. Continued implementation of Portsmouth climate change strategy to reduce energy use for both organisations and housing across the city	On going	All partners of PSAG are working towards reducing their carbon footprints. An annual Green Fair is held which promotes energy saving measures to the residents of Portsmouth. Climate change strategy actions are being delivered	On going
Workplace travel plans (WPTP)	CITY WIDE Work continues - WPTP required as part of planning process	On going	40 WPTP in total 1 signed off in 2010-11. 2 in development for 2011-12. Between 2012 and 2015 there have been a further 9 Travel Plans. The majority of the travel plans are subject to a monitoring fee over a 5 year period. There are more travel plans expected but they have not yet been agreed. The SignPOST Travel Forum has been replaced by the easitPortsmouth network which meets 3X a year. Easit offers a range of benefits including discounts on peak train travel, cycling, and electric vehicle for employees of those organisations that are members. The BIG Green Commuter Challenge has been superseded by the My Journey Commuter Challenge. PCC are developing a travel plan monitoring tool	On going

Measure	Update on progress - Non traffic related measures (background emissions)	Progress to date	Progress in last 12 months	Estimated completion date
Promote walking	CITY WIDE Work continues – audit of walking routes commenced – development of 'walking map' linking places of interest. Work continues to improve safety in regional shopping areas with traffic engineers to identify and improve pedestrian crossing facilities. Raise public awareness of issues relating to AQ	Draft map completed - web based walking route planner in place for city (www.walkit.com).	Walking and cycling map reprinted and reissued. It has proven very popular. Further redesign of the map is required and will be taken forward Works in conjunction with ramblers and Portsmouth friends of the earth continues	On-going
Promote cycling	CITY WIDE Work continues – reduction of speed – cycling strategy being implemented as part of LTP programme. Schemes continue to promote the advantages of cycling as well as ensuring routes and secure storage provisions are enhanced. Raise public awareness of issues relating to AQ	LSTF funding (2012-2015) successful in providing opportunities for residents to mode shift away from cars and into cycling	Active Travel Strategy in place and being used in conjunction with other schemes / departments notably Public Health	On-going LSTF ended in 2015. PCC have reverted to LTP funding and potential external funding opportunities

Measure	Update on progress - Non traffic related measures (background emissions)	Progress to date	Progress in last 12 months	Estimated completion date
AQ information	CITY WIDE Provision of information regarding AQ, including real time monitoring data and information regarding assessments of AQ to enable public awareness of issues and success of actions implemented	On going	On going	On going
School travel plans	CITY WIDE Reduce single-pupil journeys and encourage alternatives to car travel such as route improvements, walking buses, cycle storage. Raise AQ awareness in schools	Small scale travel planning is taking place. Benefits from Safer Routes to School capital programme and the new partnership between Transport Environment and Business, Public Health and members of the Cycle Forum toward working with more schools	On going	On going

Measure	Update on progress - Traffic related measures – Transport schemes	Progress to date	Progress in last 12 months	Estimated completion date
Creation of PCC transport manager	CITY WIDE In place - January 2010 – ensuring all council vehicles are pooled to maximise sharing; all vehicle purchasing (including improving emissions), rationalisation of the vehicle fleet with the elimination of spare capacity	Completed	Completed	Late 2010 - now on going
High occupancy vehicle lanes	CITY WIDE Assess specific routes and consider feasibility of locations. Develop and undertake feasibility study. Implementation linked to TfSH traffic management strategy	None	None	None
Park and Ride (P&R)	AQMA11 Through redevelopment / regeneration of Tipner and Horsea Island. P&R facility offering 663 spaces together with a fast low emission bus service running regularly to city centre, Gunwharf and Southsea	Completed	Completed	April 2014 - now on going

Measure	Update on progress - Traffic related measures – Transport schemes	Progress to date	Progress in last 12 months	Estimated completion date
Traffic control southbound M275 slip	AQMAs (6 & 11) Consider feasibility and introduction of priority signalling at M275 slip on to roundabout to prevent / control peak hour queuing, preventing 'queue jumping' AQMA11 and additional associated impacts upon Kingston Crescent and AQMA 6	Completed	Completed	January 2014
Traffic control Mile End roundabout	AQMA11 Introduction of measures to improve southbound traffic by introducing signals at Church Street, preventing traffic accessing Church Street from Hope Street. Elimination of 'queue jumping' by making All Saints Street one way (west)	Completed	AQMA 11. Introduction of measures to improve southbound traffic by introducing signals at Church Street, Elimination of 'queue jumping' by making All Saints Street one way (west)	January 2011

Measure	Update on progress - Traffic related measures – Transport schemes	Progress to date	Progress in last 12 months	Estimated completion date
Junction improvements	AQMA 6. Possible improvements to traffic controlled junctions throughout AQMA 6 (all 3 sections). Co-ordination of signal operation through MOVA (or similar). Particular attention paid to: London Rd / Stubbington Rd roundabout; London Rd / Kingston Crescent; Kingston Rd / New Rd; Fratton Rd / Arundel St; roundabout at Fratton Rd – Victoria Rd North – Goldsmith Ave; Review all junctions citywide, starting with AQMAs, to increase effectiveness and prevent unnecessary congestion	Completed	Traffic Signal Review submitted in March 2011	2011-2015
Variable message signs (VMS)	CITY WIDE Several already in place – further to be rolled at car parks and providing route guidance	On going	On going	On going

Measure	Update on progress - Traffic related measures – Transport schemes	Progress to date	Progress in last 12 months	Estimated completion date
Freight quality partnership	AQMAs (6, &, & 11) Working closely with freight supplies (particularly local) to ensure the most appropriate routes are undertaken through AQMAs and via PIGY and particularly AQMA 6 (Norway Road – Continental Ferry Port)	None	None	None
Regeneration of North End shopping area Traffic initiatives	Northern section of AQMA6 Combination of above and complex proposals designed to facilitate regeneration, improved road safety and to improve AQ	Weight Restriction Adopted by the Council and to be implemented from April 2011	Completed and implementation started since the End of April 2011	Completed - review implemented
Hampshire Terrace junction with St Michael's gyratory	AQMA 7 St Michael's gyratory The introduction of traffic signal controls	Study showed no improvement through changing roundabout priority.	Carried out in 2014	Not to be implemented
Queen Street junction with Anglesea Road	AQMA 12 Traffic management improvement at lights – linked to above scheme	On going	Implement SCOOT signal control with plan to fully refurbish and modernise the junction within 2016	2016

Measure	Update on progress - Public Information – Enforcement – Public transport patronage	Progress to date	Progress in last 12 months	Estimated completion date
Public transport initiative I	CITY WIDE Re-development of The Hard gateway and Portsmouth & Southsea interchange. Providing improved links to rail and ferry services and improving pedestrian, cycle links to Gunwharf Quays and city centre principal shopping areas	Delivery taking place	Under construction	2016-2017
Public transport initiative II	CITY WIDE LTP to deliver improved & integrated network of public transport services. Continue to improve transit systems, increase opportunities for interchange between the public transport network & all other modes of transport and promote demand-responsive transport services to sectors & areas with low accessibility	Most of the individual historic schemes have now been completed	Summary of completed schemes in last 12 months: • Weight restrictions at Anchorage Road • Speed reduction at Henderson Rd • All bus stops in the city now have raised kerbs Improvements in traffic signalling (reducing waiting times)	2010-2016

Measure	Update on progress - Policy / Technology	Progress to date	Progress in last 12 months	Estimated completion date
Idling engines	Identification of locations for the introduction of signage at key location where drivers should be encouraged to switch off engines when stationary for more than a minute or 2	On going	Poster and signage designed and appropriately positioned All taxi drivers advised of scheme through leafleting	Completed - now on going
VOSA emission testing /	CITY WIDE Undertake 4 emissions tests per year and publish the results on the *portair* website	VOSA no longer run the scheme	This initiative has been dropped	Not to be implemented
Vehicle testing / emission requirements - taxis	Introduce policy in relation to taxi fleet emissions	Completed	Recommendation contained within statement of licensing policy April 2016	On going
Bus transport & patronage	CITY WIDE. • increase vehicle miles and bus patronage and deliver increased punctuality • upgrade fleet and improve emission technologies • deliver improvements in ticketing, implement public information systems and increase use of website • continue to work towards improvements to zip routes – particularly through AQMA 6	Low floor buses Smart card ticketing/ SMS/ texting / bus timetable downloads Improved Shelters	85 real-time passenger information units have been installed in bus shelters and all bus stops (623) have had raised kerbs installed - completed in 2015. All First Bus & Stagecoach services have 100% low floor buses in Portsmouth	On going

Measure	Update on progress - Non traffic related measures (background emissions)	Progress to date	Progress in last 12 months	Estimated completion date
Implementation / incorporation of AQAP	CITY WIDE Inclusion of AQAP into national and regional policies and strategies to deliver the NAQO	AQAP was produced and adopted by the council as part of LTP3	AQAP was adopted by the council as part of LTP3	2010 - now on going
Planning / service liaison initiatives beyond SDP	CITY WIDE Development of stronger focused policy to deliver cleaner air / development of clearer links between climate change and AQ. A SPD was adopted in 2006 for air quality and air pollution. This is seen to be at the forefront of such guidance. Review SPD (or similar) taking account of impact and national, regional and local guidance. Consider the inclusion of guidance on financial contributions to address AQ issues	A draft of AQ-SPD has been produced	Discussions in progress with PCC planners	End of 2016

Measure	Update on progress - Non traffic related measures (background emissions)	Progress to date	Progress in last 12 months	Estimated completion date
Variable parking charges / CPZ	CITY WIDE Consider implementation of reduced cost parking for less polluting vehicles; Consider implementation of Control Parking Zones (CPZ) for all on street parking / or all parking within 500m of train stations / priority bus routes / regional retail centers	None	Subsequently rejected by Members - subject to review pending direction of DEFRA	Not to be implemented
Explore new technology	CITY WIDE Undertake research into new technologies to reduce levels of NOx and consider their potential use within future strategies	On going	None	On going

11 Portsmouth Air Quality Strategy

Portsmouth City Council is in the process of preparing the ground work for the publication of a new strategic policy document, "Portsmouth Air Quality Strategy" (LAQS) will be evolved around the following:

"Portsmouth City Council is committed to work collaboratively seeking to improve and maintain a healthy air quality in the City in order to protect public health and the environment".

This is a key policy document that will identify the importance of clean ambient air to the public health. It also provides a roadmap that focuses on the implementation of a more effective cross-departmental collaboration and communication.

The overriding aim of such policy document will remain the protection of public health through various implementation of a number of strategic measures.

Such strategy will also constitute the drive to maintain the updating of Portsmouth Air Quality Action Plan (PAQAP).

13 Conclusions

The 2013 NO_2 monitoring concluded that:

- the NO_2 levels for 2013 did not exceed the NAQO at any of the four continuous air quality monitoring stations

- the NO_2 NAQO was exceeded at four locations:

    - Lord Montgomery Way (AQMA 7).
    - 221 Fratton Road (AQMA 6)
    - The Tap" London Road (AQMA 6)
    - Addison Madden Hampshire Terrace (Adjacent to AQMA 7)

The 2014 NO_2 monitoring concluded that:

- the NO_2 levels for 2014 increased across the four AQM stations compared to that of 2013 to exceed the NAQO at London Road station as it recorded 45.68$\mu g/m^3$. This translated in a worsening in LAQ as it increased by just under 6$\mu g/m^3$ compared to the levels recorded in 2013

- the NDDT levels increased compared with those of 2013 at 65.51% of the monitored locations across the City. The highest increase was recorded at 17 Kingston Road location along (AQMA 6), Addison Madden (Hampshire Terrace adjacent to AQMA7), 7 Velder Avenue (AQMA 9), 4 Merlyn Drive, Market Tavern (Mile End Road AQMA 11), 103 Elm Grove, Larch Court (Church Road (Corner) adjacent to AQMA 11), 121A High Street, Anchorage Road, 116 Albert Road, and 2 Victoria Road North with an increase of 13.49, 12.46, 7.15, 5.60, 5.30, 4.48, 3.84, 3.57, 3.00, 2.29, 2.11$\mu g/m^3$ respectively

- the NDDS also concluded that NO_2 annual mean levels were in excess of the annual mean NAQO in 2014 at the following seven monitored locations:

    - Lord Montgomery Way (AQMA 7)
    - London Road (AQMA 6) continuous monitoring station
    - 221 Fratton Road (AQMA 6)
    - 117 Kingston Road (AQM6)
    - Market Tavern Mile End Road (AQMA 11)
    - The Tap public house London Road (AQMA 6)
    - Addison Madden Hampshire Terrace (Adjacent to AQMA 7)

The 2015 NDDTS concluded that:

- the NO_2 levels for 2015 decreased compared to that of 2014 at levels that did not exceed the NAQO at any of the four continuous air quality monitoring station. This translated in an improvement in LAQ. The maximum recorded concentration was again at London Road station (38.4 $\mu g/m^3$) that was close to breaching the NO_2 NAQO

- the NDDT levels decreased compared with those of 2014 at 72.41% of the monitored locations across the City resulting in an improvement of air quality

- the most significant improvement was registered at Addison Madden (Hampshire Terrace), 117 Kingston Road, Market Tavern (Mile End Road), 103 Elm Grove, Anchorage Road (Column 6), 221 Fratton Road, Larch Court (Church Road (Corner)), 2 Victoria Road North, 7 Velder Avenue, 4 Milton Road with a decrease of 12.95, 10.39, 9.81, 5.81, 4.40, 4.18, 3.25, 2.74, 2.16, and 1.99 respectively

- however, the highest increase was recorded at 88 Stanley Road, Queen Street, The Tap public house in London Road, 106 Victoria Road North, and Montgomery Way with an increase of 11.21, 2.57, 2.32, 2.20, and 1.76$\mu g/m^3$respectively

- the NO_2 annual mean levels was exceeding the annual mean NAQO in 2015 at:

    - 117 Kingston Road (AQM6)
    - The Tap public house London Road (AQMA 6)
    - Lord Montgomery Way (AQMA 7)
    - 88 Stanley Road (AQMA11) (It is important to note that Stanley Road location is represented with NDDT data for only two months which was subjected to all necessary corrections)

- The NO_2 levels for 2015 decreased at levels lower to those of 2013

The 2014 annual mean concentrations measured across each of the four continuous air quality monitoring stations increased from 2013 to 2014 before dropping back to slightly lower levels than the 2013 in 2015.

The trend emerging from each of the four continuous monitoring stations exhibits a downward trend in NO_2 annual mean levels in the last three years. Hence LAQ improved in the last three years in Portsmouth.

A closer look at the NDDTS data for Portsmouth revealed a downward trend that immerged at 55.17% of the NDDT monitored locations in the last three years since 2013, hence an improvement in LAQ.

NDDT data demonstrated that 2014 NO_2 levels were exceptionally high compared to those of 2013 and 2015.

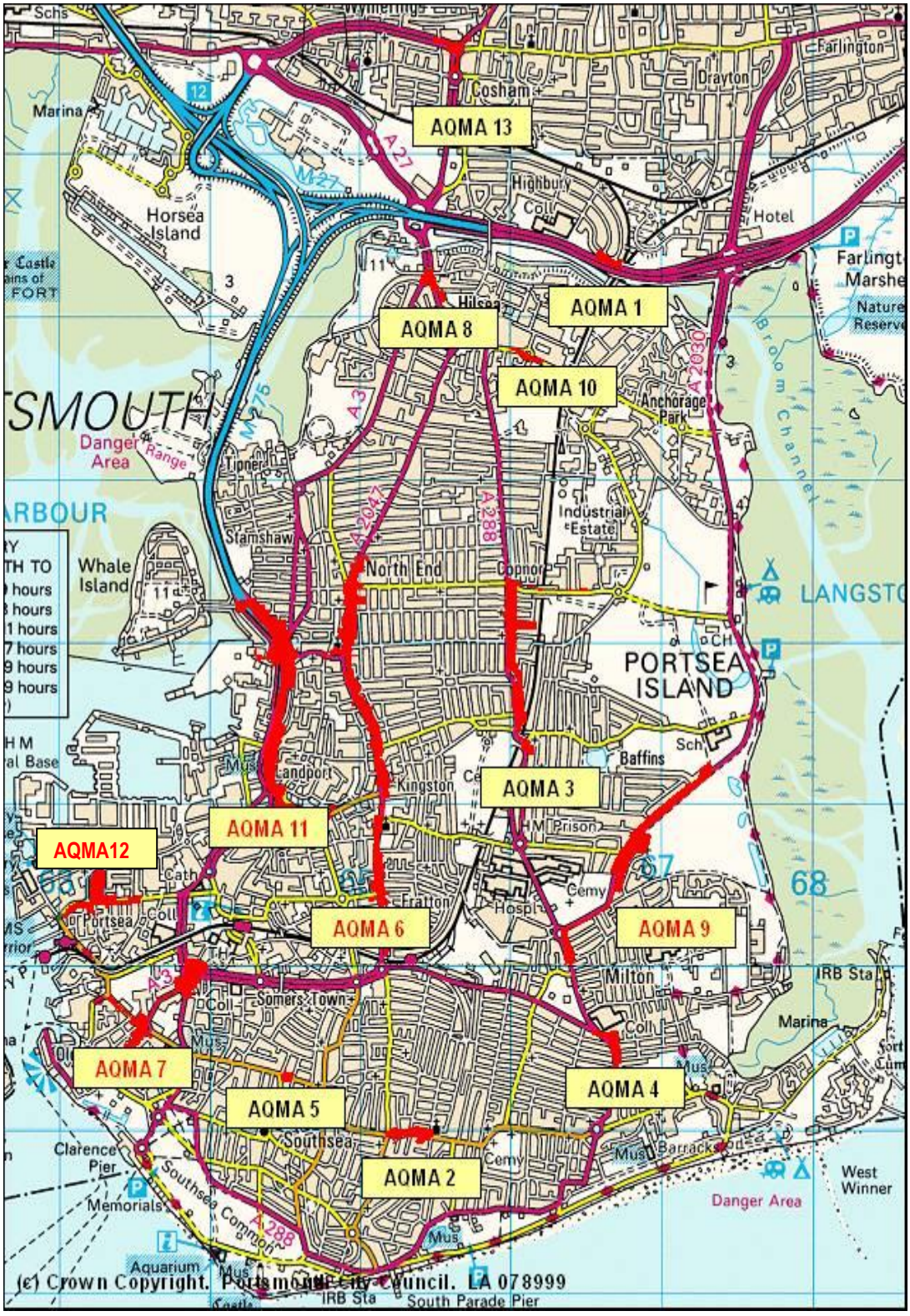
On average NDDT data exhibited no change overall monitored locations.

It is not possible to categorically state why the levels of pollutant in Portsmouth increased during 2014 and decreased in 2015 as a multitude of factors influence pollution levels.

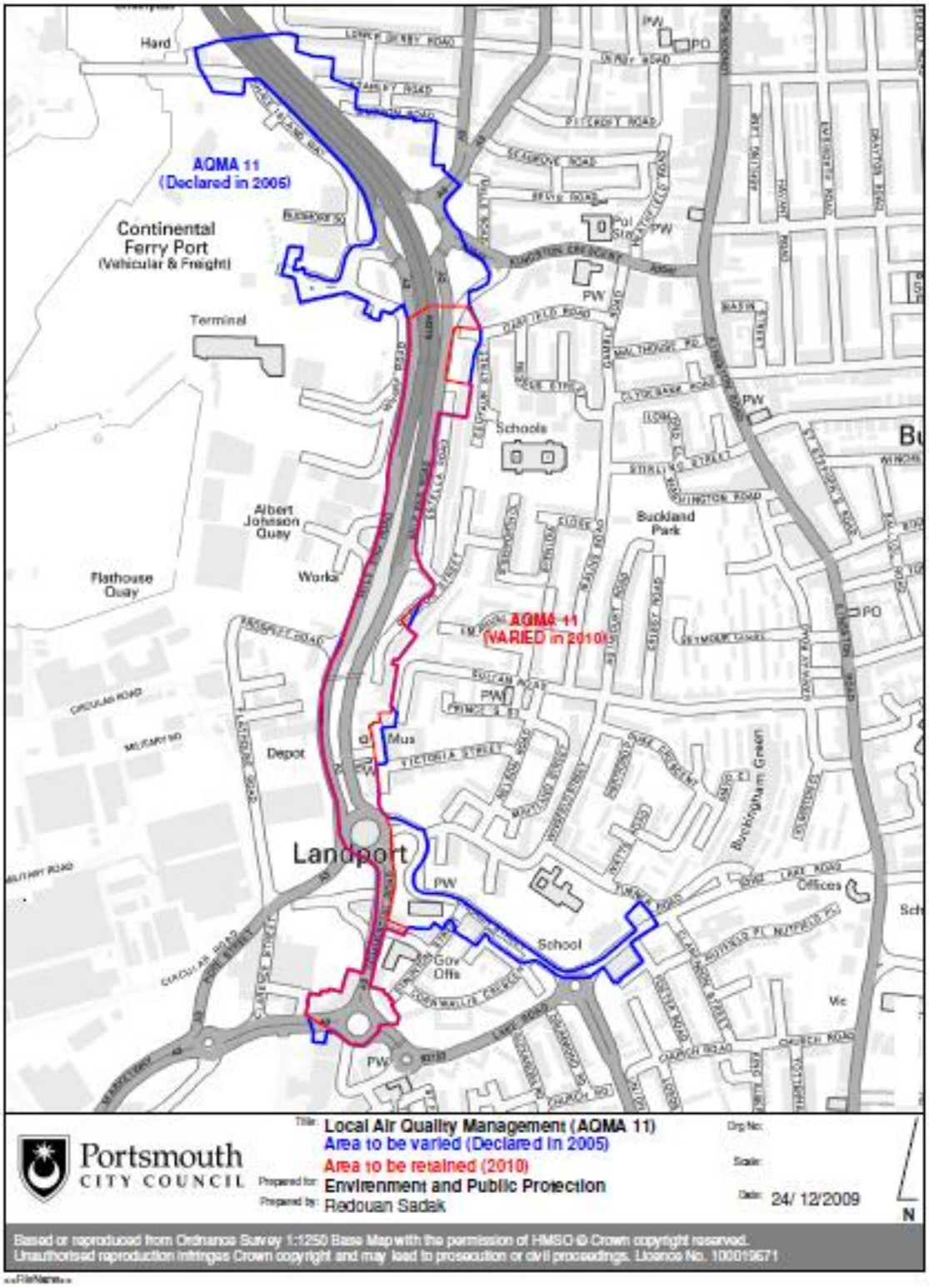
Factors are wide ranging and complex. Localised influences such as route popularity or road changes / roadworks may be part of the cause. Ohers may be of a regional nature perhaps dictated by the meteorological conditions. National or international stimuli such as requirement for improved vehicle emissions technologies are also likely to play a part.

Appendix A: Maps

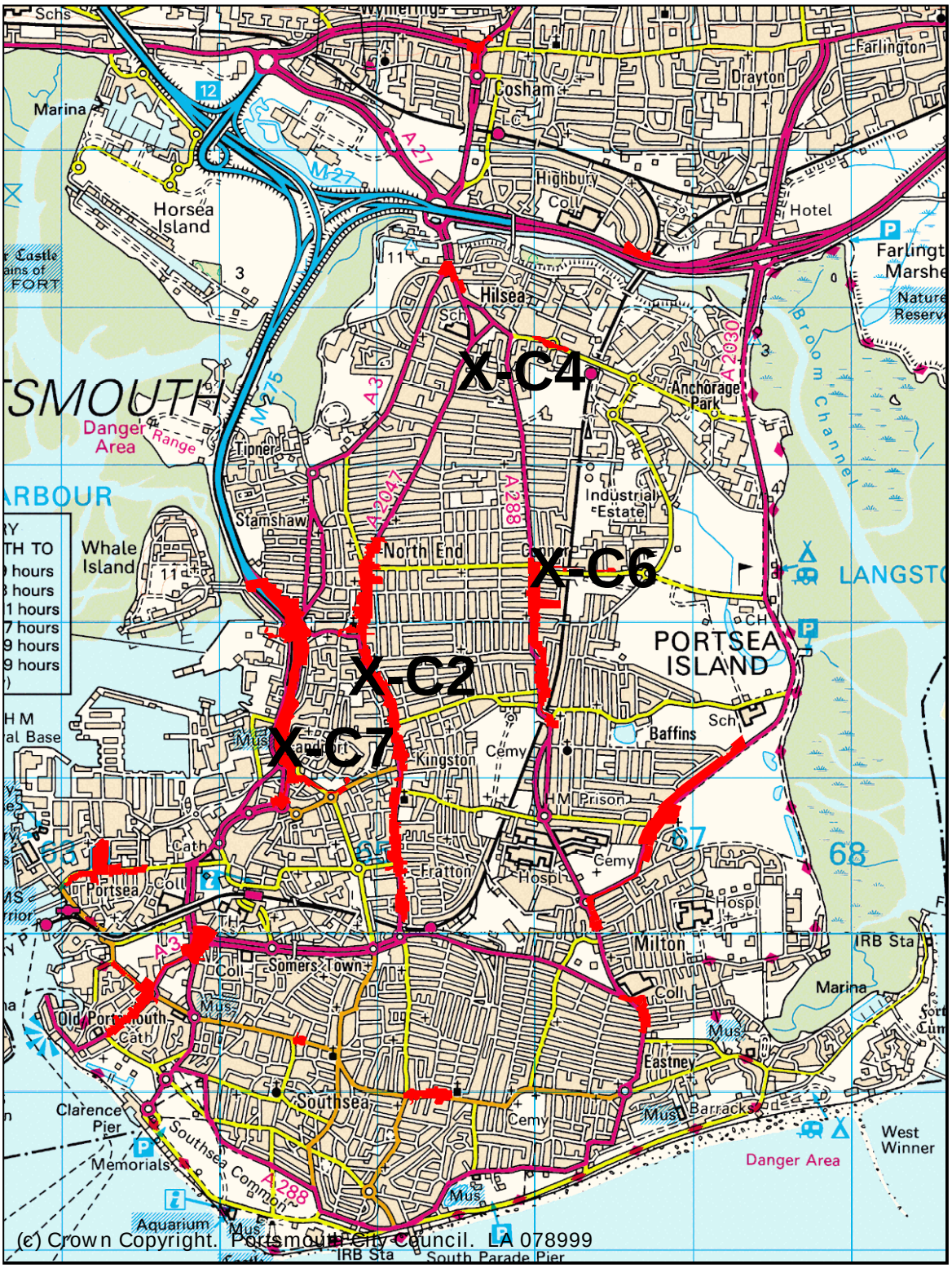
Map 1: The location of Portsmouth's Air Quality Management Areas



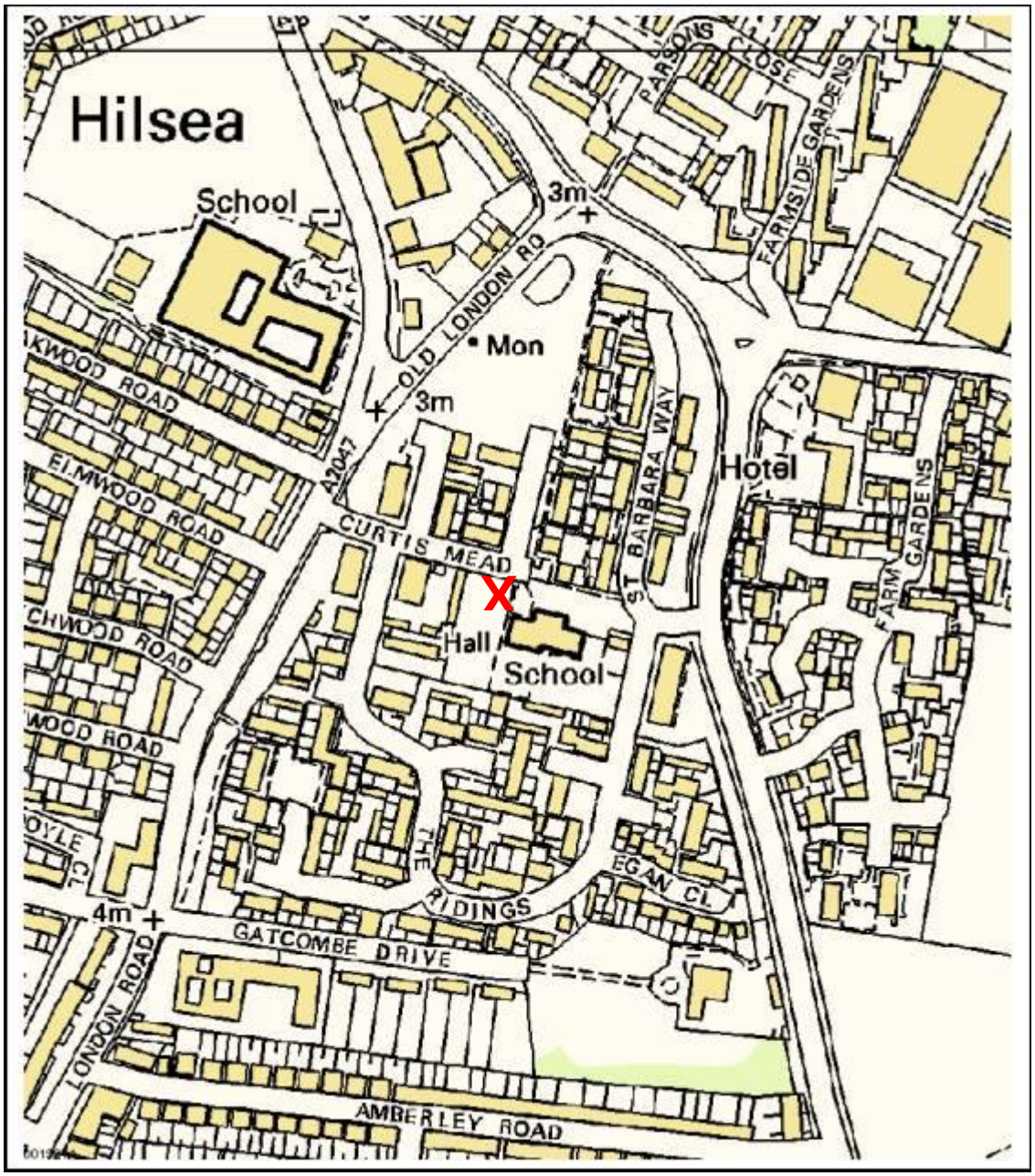
Map 2: The geographical representation of AQMA 11



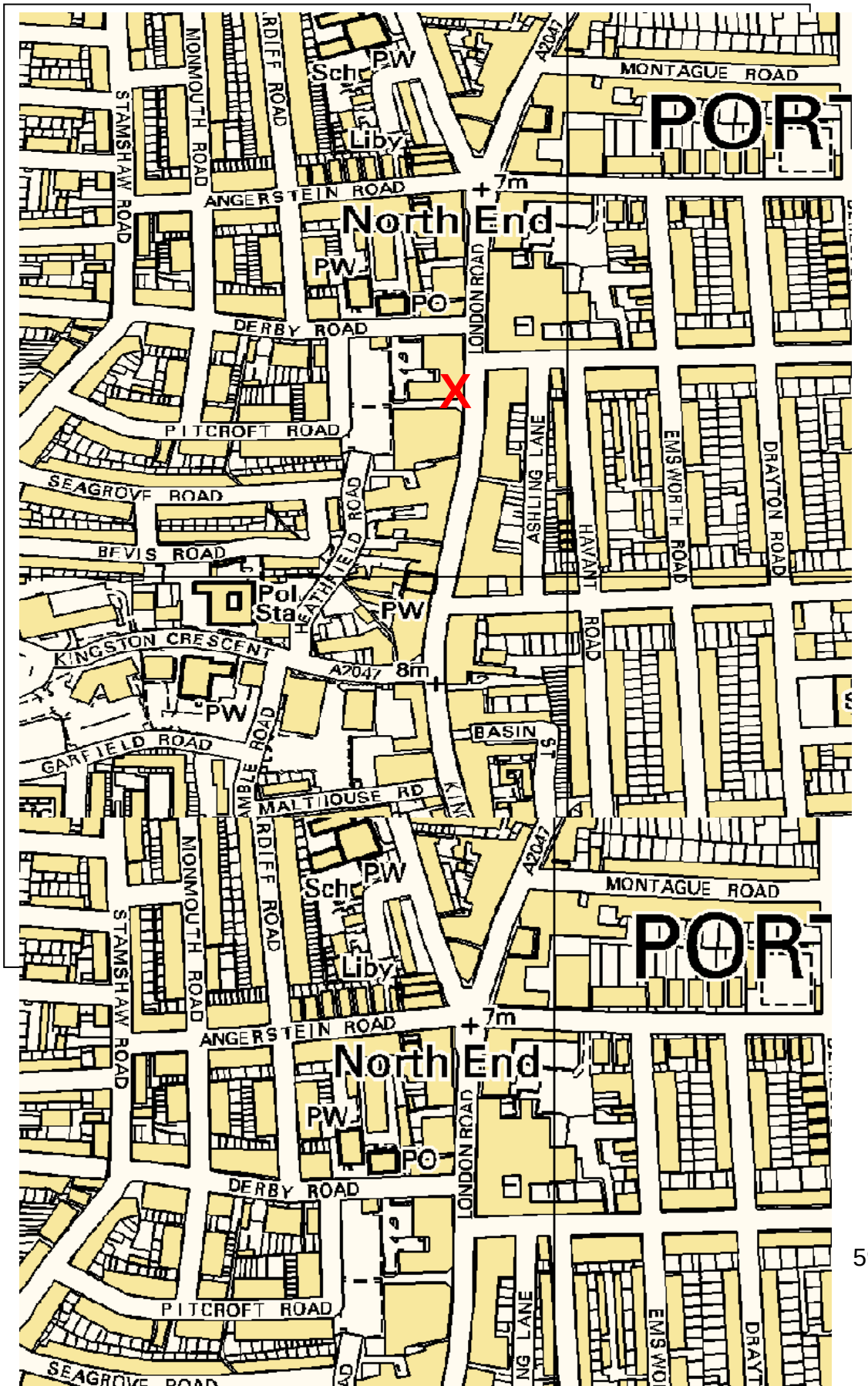
Map 3: The locations of the continuous monitoring stations C2, C4, C7 and C7 (with reference to the location of the AQMAs)



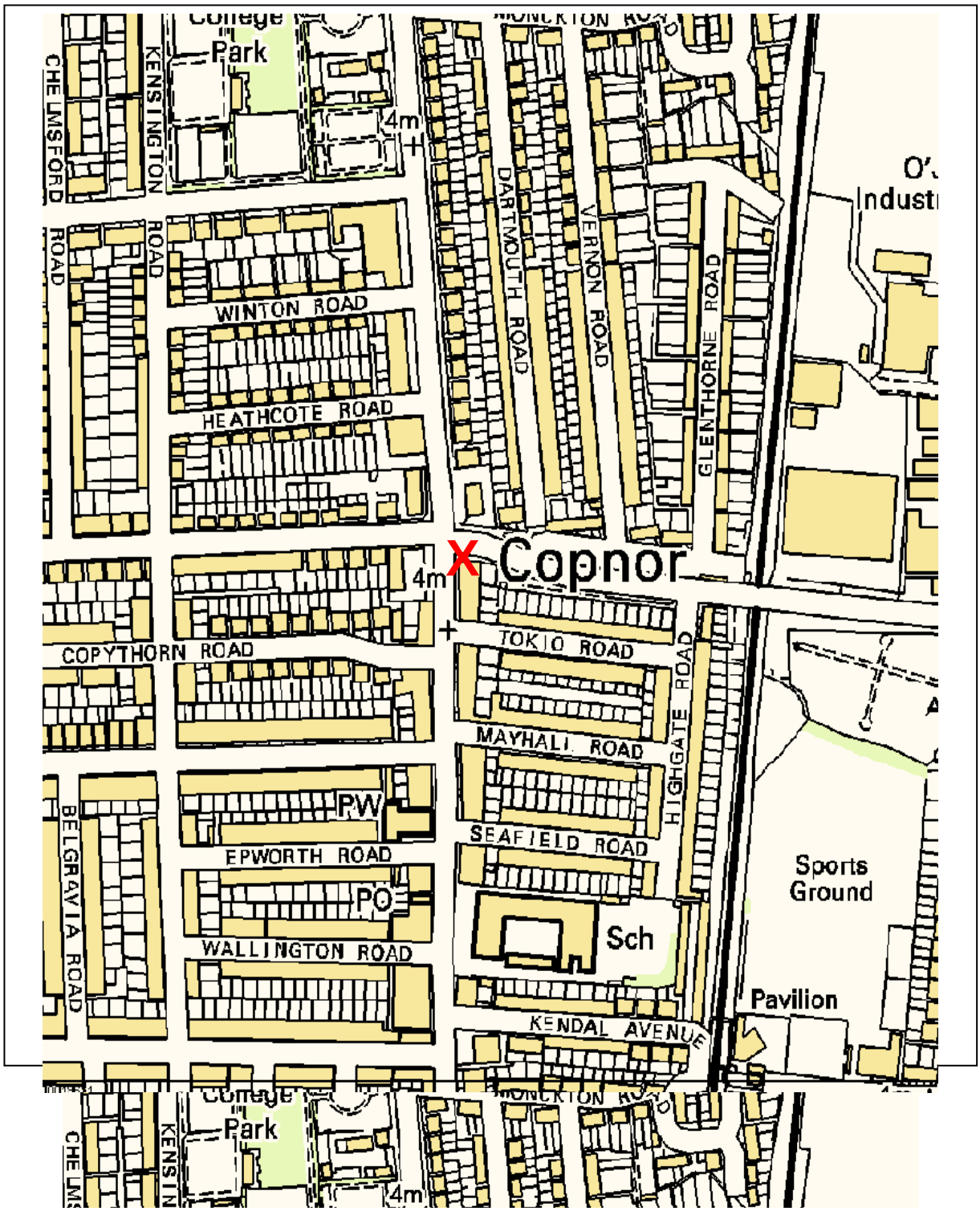
Map 4: C4 - AURN, Gatcombe Park Primary School urban background station at Curtis Mead, Hilsea



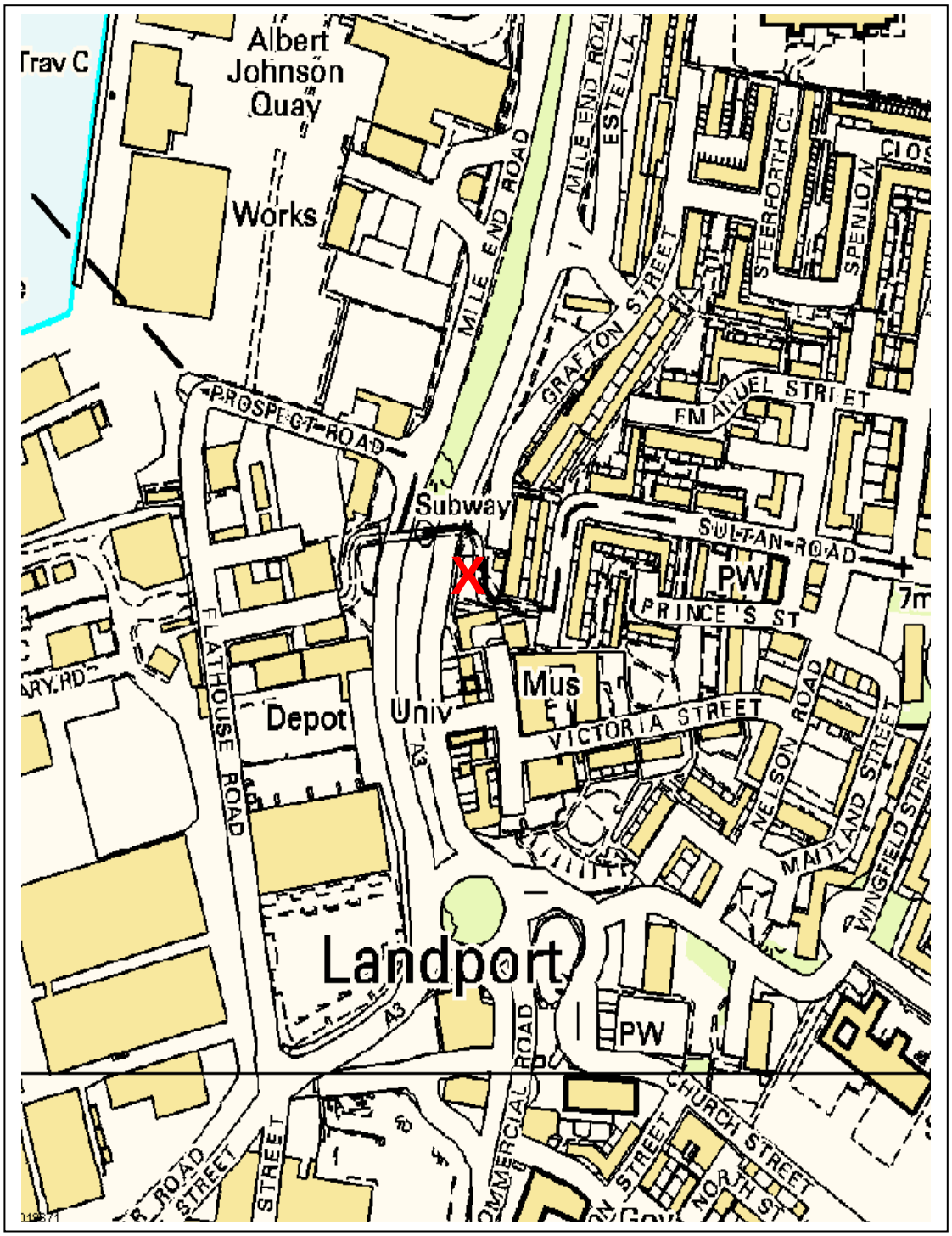
Map 5: C2 - London Road kerbside station, North End



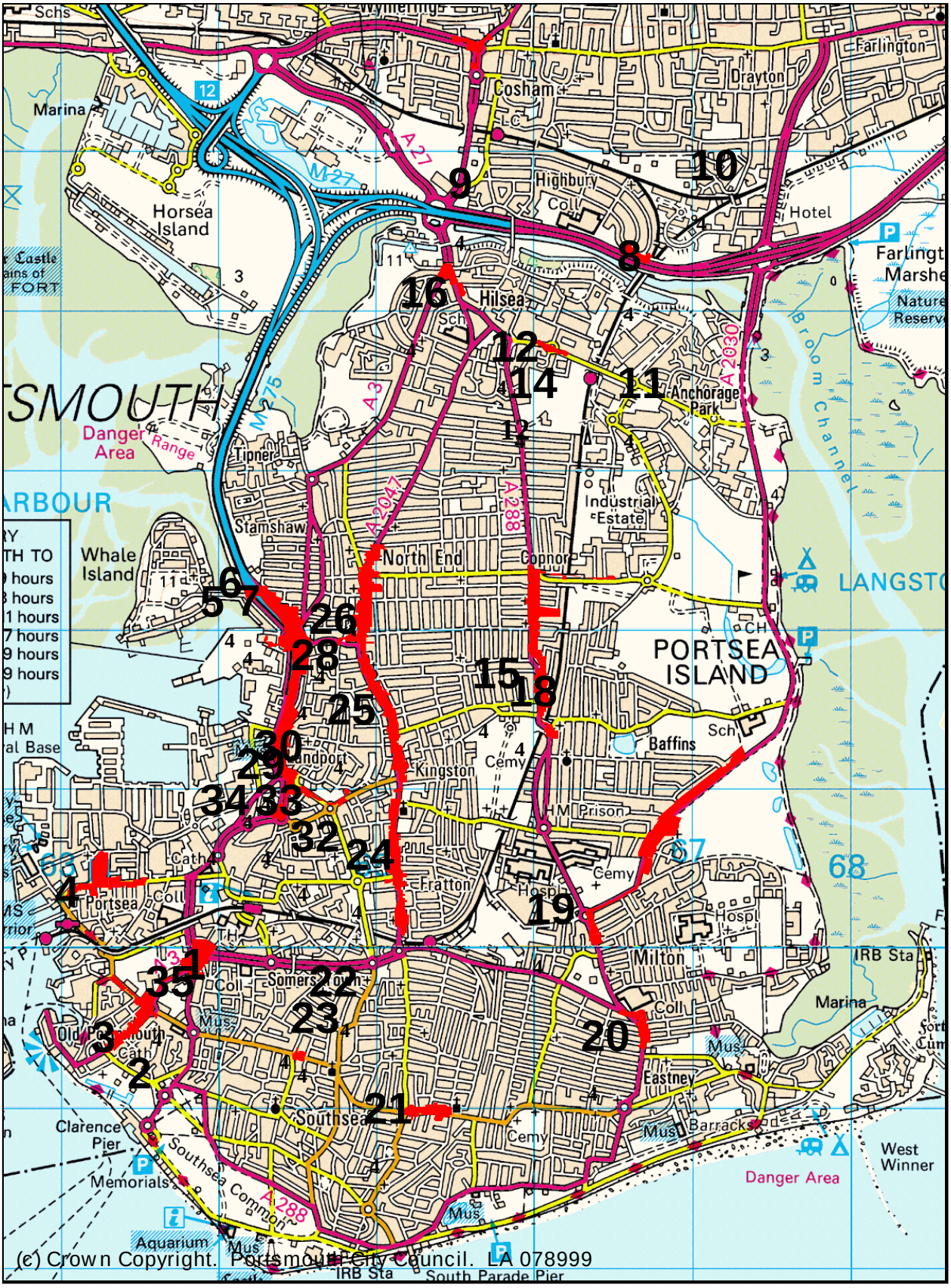
Map 6: C6 - Burrfields Road roadside station, Baffins



Map 7: C7 - Mile End Road roadside station, Buckland



Map 8: Approximate Nitrogen Dioxide Diffusion Tube Monitoring Locations



Appendix B: QA / QC Data

1 QA / QC of Automatic Monitoring

1.1 Continuous Air Quality Monitoring, Quality Assurance and Quality Control

PCC manages four air quality-monitoring stations. These are all fully equipped with PCC DEFRA / NETCEN approved real-time automatic continuous monitoring analysers. These are sophisticated automatic monitoring systems housed in purpose built air-conditioned enclosures. These analysers measure and record in real-time a combination of NO_2, PM_{10} and $PM_{2.5}$.

PCC compiled continuous air quality monitoring data for the Further Assessment using Horiba's APNA-370, NO_2 based on the chemiluminescent analysis method.

1.2 Routine Site Operations

PCC employs dedicated staff to operate the network of continuous air quality monitoring stations. These are trained in all aspects of the monitoring processes including routine site operations, field calibrations and data ratification. These are also the NETCEN trained Local Site Operator **(LSO)** for the local affiliated AURN station. This is to ensure that both a high-level of accurate data and an acceptable percentage of data capture are obtained.

All automatic monitoring equipment has both routine remote calibration check and routine (fortnightly) on-site checks. They also have maintenance visits, which follow documented procedures that stem from equipment manuals, manufacturer instructions and the UK Automatic Network Site Operators Manual.

Routine visits include:

- visual inspection of the station
- regular inlet-filter changes
- regular sampling head-cleaning and airflow
- a two-point calibration of the NO_2 analyser using a zero-air scrubber and a Nitric Oxide (NO) gas on-site
- AIR LIQUIDE supplies the NO_x span gas with the concentration certificate. This gas is traceable to national standards.

All equipment fitted within each station's enclosure (e.g. sample meteorological sensors, pumps, air conditioning units, modem etc.) is subject to independent routine maintenance and support via a service contract with Horiba. This includes:

- six-monthly minor service and equipment check visits by the manufacturer for Horiba's analysers, and approved engineers covering all non-Horiba

equipment following national protocols and traceable QA/QC procedures. Horiba is ISO 9001 accredited and carries out similar or identical support work for a number of AURN network stations across the UK.

- six-monthly major service where a full multi-point calibration is carried out on the NO_2 analyser, using zero-air, NO and NO_2 span gas (again traceable to national standards) meaning the analyser data slope and offset factors are reset. In addition to multi-point calibration the following checks are carried out:

    - linearity
    - noise
    - response time, leaks and flow
    - converter efficiency
    - stability of the on-site gas calibration cylinder

The local AURN station is also subject to external audit. Site Inter-calibration checks carried out by National Environmental Technology Centre Network engineers prior to each Horiba's major service.

Horiba also carries out non-routine site visits in response to equipment failure to the same standards. Contract arrangements ensure that visits are carried out within two to three days of the notification of call-out in order to minimise data loss. However, Horiba tends to respond within 24 hours.

All routine and non-routine site visits are fully documented and detail all works carried out, including any adjustments, modifications and repairs completed.

1.3 Calibration Check Methods

The calibration procedure for NO_x for sites C2, C6 and C7 is based on a two point zero / span calibration check being performed at intervals of two weeks. The calibration procedure for the NO_x analyser of the C4 AURN network is based on three points, the third being span NO_2 to check the NO_2 Converter. The methodology for the calibration procedure is followed according to the manufacturers' instruction handbooks:

- pre-calibration check - the site condition and status of the analyser is recorded prior to the zero / span check being conducted

- zero check – the response of the analyser to the absence of the gas being monitored. The stations are fitted with an integrated scrubber system incorporating a set of scrubbers, hopcalite, activated charcoal, purafil and drierite, to generate a dried gas with none of the monitored pollutants. All are changed at least every six months but hopcalite is changed more frequently due to the high levels of humidity in Portsmouth. The stations are also fitted with synthetic air cylinders supplied by Messer UK Ltd

- span check – the response of the analyser to the presence of the gas of a known concentration. Traceable gases are used for calibration checks supplied as part of the maintenance contract

- post calibration check - the site condition and status of the analyser upon completion of all checks

- all Horiba's APNA-370 analysers have their own built in data storage facility. They are built in a multi-drop set up. The calibration checks are done directly through the front panel. Each analyser zero / span check is fully documented with records being kept centrally.

1.4 Automatic Data Handling

All the stations are remotely accessible from a desktop computer at the civic offices via a telemetry linkage by either landline or GSM system. The telemetry linkage software used is 'Data Communication Server'. It is set on a daily auto-dial collection mode for data retrieval. It is also set to run calibration checks every three days.

Once the connection is established, the 'Data Communication Server' software retrieves the overnight auto-calibration first and stores it in a temporary database and a calibration factor is generated according to the following steps:

- instrument span, F = C/(Vs-Vz) and

- pollutant concentration (ppb) = Fx(Va-Vz) where:

    - C is the set gas value on the gas certificate
    - Vs span value
    - Vz zero span value
    - Va is the sample value as recorded by the analyser

Raw measured data retrieved from the station data logger(s) is then subject to the calculated correction factors and stored in the final database as corrected. The latter is then made readily available to be queried via the 'IDAZRW Central Station', database access software.

Instrument status and internal auto-calibration data can be viewed in addition to the corrected collected measured monitoring data.

The air quality data ratification is carried out manually from this station.

1.5 Manual Data Handling

All collected data is screened or validated by visual examination to see if there are any unusual measurements. The affected data is then flagged in the database. Any further remaining suspicious data, such as large spikes, 'flat-lines' and excessive negative data is flagged for more detailed investigation. 'IDAZRW Central Station' is capable to trace back any change made at all times with the administrator's name. An original raw dataset is always kept in the data processing software.

When data ratification has been completed the data is then made available for further statistical and critical examination for reporting purposes.

Air quality monitoring data can be imported manually into a Microsoft Excel spreadsheet. This scaled data (where values are above the lower detectable limit is considered to be valuable data) is then further converted to generate data in the National Air Quality Objective format to enable direct comparison to the standards. A file of raw data is always kept for reference in the database.

2 QA / QC of Diffusion Tube Monitoring

2.1 Monitoring Technique

The continuous NO_2 monitoring network is complemented by a secondary network of passive NO_2 tubes that are located in suspected air quality hot spots. In addition, tubes are located at the relevant continuous monitoring sites to enable data adjustment. At a selection of sites three tubes are exposed simultaneously and the data compared. Where the data is consistent, the results are averaged. Where the tubes results show significant differences the data is discounted.

This method provides a cost-effective means of monitoring a wide range of monitoring locations. The accuracy of tubes however is variable depending on the tube handling procedures, the specific tube preparation, adsorbent mixture and the analysing laboratory. These tubes are supplied and analysed by Gradko International Ltd (GIL).

PCC's NO_2 diffusion tubes are prepared by the supplier using 50% Triethanolamine (TEA) in acetone. These tubes were exposed for one-month periods in accordance with LAQM.TG (09) guidance [5].

2.2 Tube Handling Procedures

Once received by post, NO_2 tubes are stored in cool location within the supplied packaging until use. The tube end caps are not removed until the tube has been placed at the monitoring location at the start of the monitoring period. The exposed tubes are recapped at the end of the monitoring period and returned as quickly as possible to a clean cool storage environment then sent to GIL for analysis.

2.3 Laboratory QA / QC

GIL is a UKAS accredited company for the analysis of NO_2. GIL take part in the WASP scheme on a quarterly basis. An inter-comparison of results from other laboratories demonstrates that GIL's performance is good in terms of accuracy and precision.

2.4 Data Ratification

Once analysed, the NO_2 diffusion tubes results which, were significantly within the documented limit of detection, were laboratory blank corrected.

The returned results are closely examined on a monthly basis to identify any spurious data (e.g. very high or very low data).

The data is subjected to a further series of corrections for the monitored period under consideration:

- firstly, PCC use the data from the local collocation study of NO_2 diffusion tubes to calculate the bias following the approach prescribed in Box 6.4 of LAQM TG (09) using the appropriate continuous monitoring data from the local air quality monitoring network for individual NO_2 monitored site according to the site criteria

- secondly, the estimation of the NO_2 annual mean is deduced for individual NO2 diffusion tube monitored locations following the approach prescribed in Box 6.5 of LAQM TG (09) using data from both Portsmouth and Southampton AURN stations

- the corrected results are then reported and used for comparison only, i.e. not for verification processes in the Further Assessment (Review and Assessment process)

Appendix C: Tables

Table 1: National Air Quality Objectives (NAQOs), as included in the Regulations for the purpose of Local Air Quality Management in England

Pollutant	Air Quality Objective		Date to be achieved by and maintained thereafter
	Concentration	Measured as	
Benzene All authorities	16.25 µg/m^3	Running Annual Mean	31.12.2003
Benzene Authorities in England and Wales	5.0 µg/m^3	Annual Mean	31.12.2010
1,3-Butadiene	2.25 µg/m^3	Running Annual Mean	31.12.2003
Carbon Monoxide	10.0 mg/m^3	Maximum Daily Running 8-hour Mean	31.12.2003
Lead	0.5 µg/m^3	Annual Mean	31.12.2004
	0.25 µg/m^3		31.12.2008
NO_2	200 µg/m^3 not to be exceeded more than 18 times a year	1 Hour Mean	31.12.2005
	40 µg/m^3	Annual Mean	
Nitrogen Oxides (for the protection of vegetation)	30 µg/m^3	Annual Mean	31.12.2000
Particles (PM_{10}) (gravimetric)	50 µg/m^3 not to be exceeded more than 35 times a year	24 Hour Mean	31.12.2004
	40 µg/m^3	Annual Mean	31.12.2004
Particles ($PM_{2.5}$) Exposure Reduction	25 µg/m^3	Annual Mean	2020
Particles ($PM_{2.5}$) Exposure Reduction UK Urban Areas	Target of 15% reduction in concentrations at urban background	Annual Mean	Between 2010 and 2020
Sulphur Dioxide	266 µg/m^3 not to be exceeded more than 35 times a year	15 Minute Mean	31.12.2005
	350 µg/m^3 not to be exceeded more than 24 times a year	1 Hour Mean	31.12.2004
	125 µg/m^3 not to be exceeded more than 3 times a year	24 Hour Mean	31.12.2004

NB: [a] 25 µg/ m^3 is a cap to be seen in conjunction with 15% reduction.

Table 2: Air Quality EU Limit Values

Pollutant	Objective	Measured as	Date to be achieved by and maintained thereafter
Benzene	5 µg/m^3	Annual Mean	1 January 2010
Carbon Monoxide	10.0 mg/m^3	Maximum Daily 8-Hour Mean updated hourly	1 January 2005
Lead	0.5 µg/m^3	Annual Mean	1 January 2005
NO_2	200 µg/m^3 not to be exceeded more than 18 times per year	1 Hour Mean	1 January 2010
	40 µg/m^3	Annual Mean	
Nitrogen Oxides (assuming as NO_2)	30 µg/m^3	Annual Mean	19 July 2001
Ozone (Target)	120 µg/m^3 not to be exceeded more than 25 times per year	Maximum Daily Running 8-hour Mean updated hourly	1 January 2010
Particles (PM_{10}) (gravimetric)	50 µg/m^3 not to be exceeded more than 35 times per year	24 Hour Mean	1 January 2005
	40 µg/m^3	Annual Mean	1 January 2005
Particles ($PM_{2.5}$) Exposure Reduction UK except Scotland	Target value 25 µg/m^3	Annual Mean	2010
Particles ($PM_{2.5}$) Exposure Reduction UK urban areas	Target of 20% reduction in concentrations at urban background	Annual Mean	Between 2010 and 2020
Sulphur Dioxide	350 µg/m^3 not to be exceeded more than 24 times per year	1 Hour Mean	1 January 2005
	125 µg/m^3 not to be exceeded more than 3 times per year	24 Hour Mean	1 January 2005
	20 µg/m^3 (for the protection of vegetation)	Annual Mean	19 July 2001

Table 3: Details of automatic monitoring sites

Site Name	Site Type	OS Grid Ref	Pollutants Monitored	In AQMA?	Relevant Exposure? (Y/N with distance [m] to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Worst-case Location?
C2: London Road, Somerfield	Kerbside	X 464925 Y 102129	NO_2 & PM_{10}	Y	Y (1.8 m of the kerbside further to the south of the station)	1 m	Y
C4: Gatcombe Park AURN	Urban Back-ground	X 465403 Y 103952	NO_2 & PM_{10}	N	Y (This station is located within a school perimeter)	119 m From London Road	N
C6: Burrfields Road	Roadside	X 466004 Y 102348	NO_2 & PM_{10}	Y	Y (Less than 0.5 meters)	4.5m of Burrfields Road & 5.5m of Copnor Road	Y
C7: Mile End Road	Roadside	X 464397 Y 101270	NO_2 & PM_{10}	Y	Y (2m)	6.5m	N (Worst Case location is at 1.8m West

Table 4: Details of non-automatic NO_2 diffusion tube monitoring sites

*RS = roadside / UB = Urban background / KS = kerbside

Site Number	Site Name	Site Type*	OS Grid Ref	In AQMA?	Relevant Exposure?	Distance to kerb (N/A if not applicable)
1	Lord Montgomery Way	RS	463872 99874	AQMA 7	On the façade	3.7m
2	12 Chadderton Gardens	UB	463705 099371	National Network	Y (Urban Background)	N/A
3	High Street	RS	463408 099460	AQMA 7	On the façade	3.1m
4	Queen Street	RS	463190 100390	AQMA 12	N (0.25m)	3m
5	119 Whale Island Way	RS	464230 102194	AQMA 11 (18.5m)	On the façade	16.23m
6	88 Stanley Road	RS	464331 102197	AQMA 11	On the façade	9.88m
7	138 Lower Derby Road	UB	464291 102279	AQMA 11	On the façade	37.57m
8	492 Hawthorn Crescent	UB	466690 104355	AQMA 1	On the façade	34m
9	6 Northern Road	RS	465621 105528	AQMA 13	On the façade	5.43m
10	20 Stroudley Avenue	UB	467107 104850	Special	Y (Urban Background)	N/A
11	Anchorage Road	RS	466869 103457	National Network	N (11.76m)	6.56m
12	2 Hobby Close	RS	466074 103747	AQMA 10	On the façade	10.11m
14	4 Merlyn Drive	RS	466109 103736	AQMA 10 (10m)	On the façade	11.26m
15	29 Milton Road	RS	466120 101324	AQMA 3	On the façade	7.04m
16	Parade Court, London Road	RS	465474 104205	AQMA 8	N (5.32m)	5.15m
18	4 Milton Road	RS	466097 101332	AQMA 3	On the façade	6.13m
19	7 Velder Avenue	RS	466392 100226	AQMA 9	On the façade	4.44m
20	136 Eastney Rd	RS	466712 099415	AQMA 4	On the façade	6.23m
21	116 Albert Road	RS	465209 098964	AQMA 2	On the façade	2.36m
22	2 Victoria Road North	RS	464778 99306	Special	On the façade	5.53m
23	106 Victoria Road North	RS	464974 099766	Special	N (2.37m)	2.42m
24	221 Fratton Road	RS	465111 100737	AQMA 6	On the façade	4.21m
25	117 Kingston Road	RS	465036 101547	AQMA 6	On the façade	2.46m
26	The Tap London Road	KS	464900 101976	AQMA 6	On the façade	1.91m
28	65 Kingston Crescent	RS	464825 101933	AQMA 6	On the façade	9.21m
29	Estella Road	RS	464551 101787	AQMA 11	On the façade	20.04m
30	Market Tavern (Mile End Rd)	RS	464478 101457	AQMA 11	On the façade	12.73m
32	Larch Court, Church Rd	RS	464559 100980	AQMA 11	On the façade	5.84m
33	Hallowell House, Commercial Rd	RS	464425 100861	AQMA 11	On the façade	10.97m
34	Sovereign Gate, Commercial Rd	RS	464425 100893	AQMA 11	On the façade	4.40m
35	Hampshire Terrace	RS	463837 099759	AQMA7	On the façade	4.9m to 10.74m

Table 5: 2013, 2014 and 2015 NO2 automatic monitoring results

	2013 (Levels µg/m^3 / Data capture %)	2014 (Levels µg/m^3 / Data capture %)	2015 (Levels µg/m^3 / Data capture %)
Gatcombe Park AURN station (C4)	20.27 / 83.85	22.17 / 74.34	18.78 / 91.8
London Road Station (C2)	39.68 / 91.56	45.68 / 66.87	38.4 / 94.24
Burrfields Road (C6)	33.52 / 93	35.93 / 71.27	32.81 / 98.13
Mile End Road Station (C7)	35.94 / 88	36.51 / 70.31	30.25 / 95.67

Monitored data highlighted in red represents an exceedence of NAQO

The AURN data highlighted in green was subjected to correction as data capture was less than 75%

Table 8: 2013, 2014 and 2015 NDDTS results

Reference	Address	2013	2014	2015
FST	1 St HREV, Montgomery Way	41.90	42.57	44.33
CG-12	12 Chadderton Gardens	16.50	16.55	15.74
HS-121A	121A High Street	22.10	25.67	24.07
QS-Column 29	Queen Street (Column 29)	31.51	27.97	30.54
WIW-119	119 Whale Island Way	27.49	28.93	27.53
SR-88	88 Stanley Road	38.29	34.85	46.06
LDR-138	138 Lower Derby Road	30.00	26.53	26.05
HC-492	492 Hawthorn Crescent	27.22	28.37	28.43
NR-6	6 Northern Road	31.95	33.88	34.98
SA-20	20 Stroudley Avenue	17.66	16.66	16.48
AR Col 6	Anchorage Road (Column 6)	29.54	33.29	28.27
HH-4	Holloway House	33.44	30.91	-
MD-4	4 Merlyn Drive	21.61	27.21	26.87
MR-29	29 Milton Road	28.15	27.57	26.21
LR-PC	Parade Court, London Road	33.98	32.32	32.01
MR-4	4 Milton Road	27.80	28.90	26.91
VA-7	7 Velder Avenue	30.10	37.24	35.08
ER-136	136 Eastney Road	27.42	28.90	27.58
AR-116	116 Albert Road	32.88	35.18	35.28
VRN-2	2 Victoria Road North	28.69	30.80	28.06
VRN-106-Col3	106 Victoria Road North (Column 3)	30.40	28.80	31.00
FR-221	221 Fratton Road	42.48	40.49	36.32
KR-117	117 Kingston Road	38.69	52.18	41.79
TAP	The Tap, Public House London Rd	50.93	40.81	43.12
MT-Pub	Market Tavern (Mile End Road)	38.83	44.12	34.31
CR-Corner	Larch Court, Church Road (Corner)	31.09	34.93	31.68
UF-CR	314 Sovereign Gate, Commercial Rd	34.65	35.52	34.65
AM	Addison Madden. Hampshire Terrace	28.96	41.42	28.48
EG-103	103 Elm Grove	30.33	34.81	29.00

Monitored data in red represents exceedences of NAQO

Monitored data in green represent locations whose data was subjected to correction to represent levels at the building façade.

Portsmouth CITY COUNCIL

Environment Health Service

Pollution Control Team

Civic Offices
Guildhall Square
Portsmouth PO1 2AL

Email: public.protection@portsmouthcc.gov.uk

www.portsmouth.gov.uk

You can get this Portsmouth City Council information in large print, Braille, audio or in another language by calling 023 9284 1121.

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