2016 Air Quality Annual Status Report (ASR)

In fulfilment of

Part IV Environment Act 1995
Local Air Quality Management

September 2017

Local Authority Office	Portsmouth City Council
Department	Regulatory Services
Address	Civic Offices, Guildhall Square, Portsmouth, PO1 2AL
Telephone	023 9283 4245
E-mail	redouan.sadak@portsmouthcc.gov.uk
Report Reference number	ASR 2016
Date	September 2017

Executive Summary: Air quality in Portsmouth

Overview of air quality in Portsmouth

This overview is a summary of the state of Portsmouth Local Air Quality (LAQ) and progress on actions that Portsmouth City Council (PCC) is taking to improve air quality.

This report covers air quality monitoring data for the period 2012 to 2016.

The principal issues and findings of this Annual Status Report (ASR) are:

- PCC recognises the impact of pollution upon public health and is committed to the continuous reduction of pollution levels;
- Monitoring of Nitrogen Dioxide (NO_2) using continuous monitoring and passive Nitrogen Dioxide Diffusion Tubes (NDDT) during 2016 indicates that 6 locations exceeded the National Air Quality Objective (NAQO) levels;
- PCC confirms that the most significant source of air pollution in the city is from road traffic;
- As a result of forthcoming committed development and concerns raised from members of the public in respect to specific levels of NO_2 a number of new monitoring locations have been set up in areas where road traffic may have an influence on sensitive receptors. These locations will be reported upon in the next ASR;
- All responsible agencies within PCC who's role is likely to impact upon LAQ are committed to working together to deliver improvements through Local Air Quality Management (LAQM);
- PCC recognises the need to co-ordinate work with external partners and the public in order to improve LAQ;
- To confirm its commitment to improving LAQ PCC has published a Local Air Quality Strategy (LAQS).

Air quality in Portsmouth

The main pollutant of concern in Portsmouth is NO_2.

Monitored concentrations of this pollutant in recent years have exceeded the annual mean NAQO at a number of varying locations throughout the city.

PCC currently has five Air Quality Management Areas (AQMAs) declared on the grounds of monitored or modelled exceedances of the UK annual mean NO_2 NAQO.

The LAQ monitoring program was not significantly changed in the course of 2016.

NO_2

The NO_2 continuous monitoring program for the period stretching between 2012 and 2016 concluded that:

- The 2016 NO_2 annual mean level increased a cross the four Continuous Air Quality Monitoring Stations (CAQMS) compared to that of 2015 but did not exceed the NO_2 annual mean NAQO at all but the London Road CAQMS. These results are indicative of a worsening in LAQ. The maximum recorded NO_2 annual mean was at London Road kerbside CAQMS and was 41.21µg/m^3. This level breaches the NO_2 annual mean NAQO.

The 2016 adjusted NDDT data shows that exceedances are concentrated predominantly in the declared AQMAs with the exception of:

- Albert Road (location reference AR118) where the 2016 NO_2 annual mean concentration exceeded the NAQO. This monitoring site is located close to one of the busiest junctions in Southsea. The NO_2 long-term development over the last five years at this location has exhibited a slight upward trend since 2012 (Figure F21, Appendix F).

- Northern Road (location reference NR-6) where the 2016 NO_2 annual mean concentration exceeded the NO_2 annual mean NAQO. This monitoring site is located close to one of the busiest junctions linking Southampton Road / A3 / Havant Road in Cosham. The NO_2 long-term development over the last five years at this location exhibited upward trends since 2012 (Figure F9, Appendix F).

In addition, the 2016 NDDT survey data concluded that NO_2 annual mean levels were in excess of the NO_2 annual mean NAQO at the following monitored locations:

- Lord Montgomery Way (AQMA 7);
- London Road (AQMA 6) continuous monitoring station;
- 117 Kingston Road (AQMA 6);
- The Tap Public House London Road (AQMA 6).

The overall trend emerging from the 2016 NDDT survey data reveals that a downward trend emerged at 53.57 % of monitored locations in the last five years since 2012. This can be translated to a worsening in LAQ compared to the five year trend commenced from 2011 where 78.57% of the monitored locations developed a downward trend.

Particulate Matter (PM_{10})

Particulate matter (PM_{10} and $PM_{2.5}$) concentrations are considered to be well below the PM_{10} annual mean NAQO throughout the city.

There has been no exceedance of the PM_{10} annual mean or the daily NAQO since 2012 at any of the CAQMSs. The highest registered PM_{10} annual mean since then was in 2015 at the kerbside CAQMS along London Road and reached 34.36µg/m^3.

There has been no exceedance of the PM_{10} daily mean concentrations for the past five years.

The PM_{10} monitoring data at two CAQMSs exibits a downward trend at London Road and Gatcombe Park resulting in an improvement in LAQ while the remaining two at Mile End Road and Burrfields Road exibits an upward trend resulting in a worsening in LAQ (Figures F33 to Figure F36, Appendix F).

Particulate Matter ($PM_{2.5}$)

PCC monitors $PM_{2.5}$ at an urban background station at Gatcombe Park Primary School. This CAQMS is affiliated to the National Automatic Urban and Rural Network (AURN). The highest $PM_{2.5}$ annual mean registered at this station to date was recorded in 2014 and reached 14.26µg/m^3.

The overall trend over the monitored period since 2012 exhibits a downward trend resulting in an improvement in LAQ.

Source apportionment study

A Source Apportionment Study (SAS) of road traffic sources was carried out as part of the ongoing LAQM Review and Assessment (LAQMRA) processes in 2017 to:

- quantify the contributions of different road vehicle types to ambient pollutant concentrations in the areas of likely exceedance;
- determine the emissions reductions required to achieve compliance;
- identify the likely year of compliance with the NAQO;
- aid with the development of the LAQS and Local Air Quality Action Plan (LAQAP).

The SAS study covered mainly NO_2 as the pollutant of concern locally. SAS covered also $PM_{2.5}$ and PM_{10} and concluded the following:

- Total background percentage concentrations of NO_2 in 2020 are, in the vast majority of locations, greater than those generated by local vehicular traffic sources;
- In 2020 the largest reductions required to meet the NO_2 annual mean NAQO are estimated at sensitive receptor locations along the London Road / Kingston Road / Fratton Road corridor within AQMA 6;
- It is estimated that reductions in road nitrogen oxide (NO_x) emissions of up to 15% in 2020 would be required in order to achieve the NAQO at all modelled receptor locations within AQMA 6. Elsewhere annual mean NO_2 annual mean concentrations are predicted to be below the NO_2 annual mean NAQO and so reductions in road NO_x emissions to attain the NO_2 annual mean NAQO are not required;

- Making the simplifying assumption that reductions in road NO_X between 2015 and 2020 continue beyond 2020 at the same rate it would be expected that all areas of Portsmouth will achieve compliance with the NO_2 annual mean NAQO by 2022;

- The $PM_{2.5}$ and PM_{10} annual mean concentrations in 2020 are predicted to be well below the annual mean NAQO at all locations in Portsmouth and so reductions to attain the NAQO are not required.

DEFRA's Air quality action plan to tackle NO_2

In June 2017 PCC responded to DEFRA's AQAP to tackle NO_2. Subsequently, DEFRA has confirmed that its data for Portsmouth demonstrates that the current areas of exceedance of the NAQO will fall within compliance levels by 2021. The forthcoming installation of a new DEFRA funded CAQMS in Anglesea Road is likely to assist in validating these results.

Although this compliance date differs from our own predictions of compliance, DEFRA has confirmed, within their the publication of their NAQAP on the 26th July 2017, that there is no formal requirement for PCC to work closer with their experts in respect to alternative strategies beyond those we proposed through LAQM and that Portsmouth has not been named within the Government's Air Quality Strategy to tackle NO_2 as an urban area with higher levels of pollution.

LAQM actions to improve air quality

PCC is committed to working in partnership to improve and maintain a healthy air quality in the city. Despite the challenges faced, significant progress has been made to improve air quality in the city over the past few years and to drive forward further improvements in the coming years.

In order to improve local air quality in Portsmouth, our LAQS has been produced. This strategy outlines the consistent approach that is needed to improve air quality across the city and will drive forward improvements through the review of the LAQA taking into account the findings of the 2017 SAS whilst embedding air quality at the heart of decision making. The local LAQS will support improvements in delivering a healthier city for all.

PCC acknowledges that fact that DEFRA will continue to take a keen interest in our work, particularly in the creation our LAQAP following publication of the LAQS to drive forward improvement in local air quality.

Table of Contents

List of Tables

List of Maps

List of Figures

1 Local Air Quality Management

Primarily this report is intended to provide an overview of Portsmouth's LAQ since 2012 up to and including 2016.

It fulfils the requirements of LAQM as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities (LAs) to regularly review and assess LAQ in their areas and to determine whether or not the NAQOs are likely to be achieved.

Where an exceedance is considered likely the LA must declare an AQMA and prepare a LAQAP setting out a set of mitigating measures it intends to put in place in pursuit of the NAQOs.

Secondly this ASR fills PCC's annual requirement to report upon our strategies employed to improve LAQ and any progress that has been made.

The statutory NAQOs applicable to LAQM in England can be found in Table E1 in Appendix E.

2 Actions to improve air quality

2.1 Air Quality Management Areas

AQMAs are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an AQAP within 12-18 months setting out measures it intends to put in place in pursuit of the objectives.

A summary of AQMAs declared by PCC can be found in **Table 2.1**.

Further information relating to declared or revoked AQMAs, including maps of AQMA boundaries are available online at https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=198.

Table 2.1 – Declared AQMA

AQMA Name	Pollutants and Air Quality Objectives	Description	Action Plan
AQMA 6	NO_2 annual mean	An area encompassing a large number of residential properties 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	Portsmouth City Council's Air Quality Action Plan has been, and will continue to be, set up as a citywide AQAP rather than specifying actions for individual AQMAs.
AQMA 7	NO_2 annual mean	An area encompassing a number of residential properties along Hampshire Terrace and St Michaels Road gyratory.	
AQMA 9	NO_2 annual mean	An area encompassing a number of residential properties near to the southernmost section of Eastern Road from Sword Sands Road south into Velder Avenue and its junction with Milton Road.	
AQMA 11	NO_2 annual mean	This area encompasses a large number of residential properties east of the west transport corridor extending along part of the M275 and Mile End Road stretching from Rudmore roundabout south to Church Street roundabout.	
AQMA 12	NO_2 annual mean	An area encompassing a number of residential properties along Queen Street mainly an area stretching from The Hard to St James's Road.	

2.2 Historical air quality priorities

As part of the 2009 Further Assessment (FA), a SAS was carried out that enabled PCC to identify the sources causing the highest level of air pollution and those upon which any LAQAP should focus and prioritise. The conclusions of the 2017 SAS confirm that these priorities remain equally valid in terms of their potential benefit in 2017.

The following were considered to be the priorities of the 2012 AQAP:

- Priority 1:
  - HGVs in 2010 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 was therefore highly significant and needed 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)
- Priority 2:
  - Car traffic in 2010 was 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.
- Priority 3:
  - Buses in 2010 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.
- 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 2010 LAQAP stated 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 2009 FA 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:
  - In 2007, industrial sources were found to contribute only 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 NO_2 hotspots within the five 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.

Additionally, 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;
- Retention of five remaining AQMAs (6,7,9,11 and 12);
- 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 2007 draft AQAP was then 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.

On 11th January 2011 PCC adopted a LAQAP, which was annexed to the Local Transport Plan 3 (LTP3).

2.3 Progress and impact of measures to address air quality

Improving the air in Portsmouth with its high population and limited space is 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 proposals within any LAQAP / LAQS is the message that in order to deliver the improvements needed everyone needs to play their part and take steps to improve LAQ.

PCC is committed to working in partnership to improve and maintain a healthy air quality in the city. Despite the challenges faced, significant progress has been made to improve LAQ in the city and to drive forward further improvements in the coming years.

A key element of work that has contributed towards encouraging and supporting modal change and awareness of sustainable travel has been undertaken through the Sustainable Travel Transition Year fund.

A number of schemes were implemented through this work, such as personalised journey planning, workplace travel planning initiatives, travel to school initiatives and developing and promoting cycling. All of these measures have played a part in raising awareness of, and making improvements to local air quality.

Similarly, a number of schemes developed through the LTP have contributed to local improvements, such as the introduction of cycle lanes, traffic calming and junction improvements, reducing speeds, creating safer pedestrian environments, and improving vehicle flow.

PCC is moving forward with LAQ improvements through use of new technology, after successfully securing funding to develop an innovative IoT (Internet of Things) and Big Data platform for Portsmouth's Traffic Management Centre.

This project will develop capabilities in monitoring traffic conditions on the network, and provide an understanding of current journey patterns through the collection of data sources into one platform. Understanding more about journey patterns and travel demand will help to develop schemes to encourage modal shift to more sustainable options.

PCC's progress on delivering LAQ improvement is summarised in the Table 2.2.

2.4 Local air quality strategy

In order to continue to improve LAQ in Portsmouth, the new LAQS has been published, consulted upon and was formally adopted by PCC on the 17th July 2017.

This strategy outlines the consistent approach that is needed to improve air quality across the city.

Embedding air quality at the heart of decision making, the LAQS will support improvements in delivering a healthier city for all through a revision of the 2011 LAQAP measures details in Table 2.2.

PCC acknowledges the serious impact that poor LAQ has on health and the need for co-ordinated action to reduce air pollution.

2.5 Source Apportionment Study

In early 2017 PCC commissioned AECOM (an air quality Consultancy) to undertake a SAS of road traffic sources as part of the ongoing Local Air Quality Management's Review and Assessment (LAQRA) process.

This was based on a detailed dispersion modelling of LAQ in accordance with Defra's Technical Guidance LAQM.TG(16)[1], using the AAQuIRE detailed dispersion model, to identify geographical areas of the city where ambient pollutant concentrations exceed or are likely to exceed the relevant NAQO.

The SAS calculations were carried out to quantify the contributions of different road vehicle types to ambient pollutant concentrations in the areas of likely exceedance, to determine the emissions reductions required to achieve compliance, and to identify the likely year of compliance.

The conclusions of the study are as follows:

2.5.1 SAS and NO_2

PCC's monitoring data for 2015 has shown that annual mean NO_2 concentrations exceeded the annual mean NO_2 NAQO of 40µg/m^3 at 4 locations within the city. The monitored exceedances are within the boundaries of the existing AQMAs.

The results of the detailed dispersion modelling for 2015 are consistent with the monitoring data with areas predicted to exceed the annual mean NO_2 NAQO being confined to the London Road / Kingston Road / Fratton Road route corridor and the M275 / A3 corridor.

Exceedances of the annual mean NO_2 NAQO are predicted at 11 sensitive receptor locations in 2015. All of the predicted exceedances are at locations within the existing AQMA boundaries. The highest predicted annual mean NO_2 concentration in 2015 at modelled receptor location is 48.9µg/m^3 at London Road within AQMA 6.

The annual mean NO_2 NAQO exceedances were predicted at 8 other receptor locations along the London Road / Kingston Road / Fratton Road corridor within AQMA 6. The annual mean NO_2 NAQO is also predicted to be exceeded at 2 receptors within AQMA 11, located alongside Commercial Road. Annual mean NO_2 concentrations at receptor locations within AQMA 7, AQMA 9 and AQMA 12 are predicted to be below the annual mean NO_2 NAQO in 2015.

The SAS calculations indicate that at those receptors predicted to exceed the annual mean NO_2 NAQO, local traffic sources are estimated to account for 46% to 58% of total NO_2 concentrations. Cars and taxis are, on average, the most significant contributor to annual mean NO_2 concentrations at those receptors where NO_2 concentrations are predicted to exceed the annual mean NO_2 NAQO, accounting for 20% to 29% of annual mean NO_2 concentrations. Buses are estimated to account for 6% to 19% of annual mean NO_2 whilst LGVs account for 6% to 10%. Heavy goods vehicles (OGV1 and OGV2) are estimated to contribute up to 7% of annual mean NO_2 concentrations at receptors predicted to exceed the annual mean NO_2 NAQO.

In order to achieve the annual mean NO_2 NAQO at all modelled receptor locations within AQMA 6 in 2015, reductions in NO_2 concentrations of up to 8.9µg/m^3 are required. This corresponds to reductions in road NO_X emissions of up to 35%. Reductions in road NO_X emissions of around 14% are likely to be needed to attain the NAQO at all receptor locations in AQMA 11. Since the annual mean NO_2 NAQO is expected to be achieved within AQMA 7, AQMA 9 and AQMA 12, no reductions in road NO_X emissions are required in these areas in order to attain the annual mean NO_2 NAQO in 2015.

[1] Defra Local Air Quality Management Technical Guidance TG(16). https://laqm.defra.gov.uk/documents/LAQM-TG16-April-16-v1.pdf

In the 2020 scenario, exceedances of the annual mean NO_2 NAQO are predicted at four sensitive receptors within AQMA 6 along the London Road / Kingston Road / Fratton Road corridor. The highest predicted annual mean NO_2 concentration in 2020 at modelled receptor locations is 43.2µg/m^3 at 16 London Road (Receptor 32). Annual mean NO_2 concentrations at receptor locations within AQMA 7, AQMA 9, AQMA 11 and AQMA 12 are predicted to be below the annual mean NO_2 NAQO in 2020.

The SAS calculations indicate that at those receptors predicted to exceed the annual mean NO_2 NAQO local traffic sources are estimated to account for 54% to 55% of total NO_2 concentrations. Cars and taxis are, on average, the most significant contributor to annual mean NO_2 concentrations at those receptors where NO_2 concentrations are predicted to exceed the annual mean NO_2 NAQO, accounting for 24% to 29% of annual mean NO_2 concentrations. Buses are estimated to account for 12% to 18% of annual mean NO_2 whilst LGVs account for 9% to 11%. Heavy goods vehicles (OGV1 and OGV2) are estimated to contribute up to 4% of annual mean NO_2 concentrations at receptors predicted to exceed the annual mean NO_2 NAQO.

In order to achieve the annual mean NO_2 NAQO at all modelled receptor locations within AQMA 6 in 2020, reductions in NO_2 concentrations of up to 3.2µg/m^3 are required. This corresponds to reductions in road NO_X emissions of up to 15%. Since the AQO is expected to be achieved within AQMA 7, AQMA 9, AQMA 11 and AQMA 12, no further reductions in road NO_X emissions are required in these areas in order to attain the annual mean NO_2 NAQO in 2020.

The results of the detailed dispersion modelling of annual mean NO_2 concentrations in Portsmouth indicates that exceedances of the annual mean NO_2 NAQO are likely to remain in a few small areas in 2020 if no additional action is taken to improve LAQ.

Making the simplifying assumption that reductions in road NO_X between 2015 and 2020 continue beyond 2020 at the same rate it would be expected that all areas of Portsmouth will achieve compliance with the annual mean NO_2 NAQO by 2022.

2.5.2 SAS and particulate Matter (PM_{10} and $PM_{2.5}$)

PCC's monitoring of PM_{10} and $PM_{2.5}$ has shown that the annual mean UK NAQO (PM_{10}) and EU Limit Value ($PM_{2.5}$) have been achieved in Portsmouth in recent years and exceedances are unlikely to occur anywhere within the city.

The results of the detailed dispersion modelling for 2015 are consistent with the monitoring data. Annual mean PM_{10} concentrations in 2015 are predicted to be 22µg/m^3 and less at all modelled locations within the study area. The highest annual mean PM_{10} concentration at specific receptor locations in 2015 is 20.4µg/m^3 at St. Edmund House, which is located alongside Alfred Road to the north of the junction between Alfred Road, Queen Street and Anglesea Road.

Source apportionment calculations indicate that background sources are the largest contributors to annual mean PM_{10} concentrations at modelled receptor locations. Local traffic sources account for 6% to 20% of annual mean PM_{10} concentrations at modelled receptor locations, with cars and taxis the most significant contributing vehicle type (3% to 13%). LGVs (1% to 4%) and buses (up to 3%) are the next largest contributing local traffic sources.

Annual mean $PM_{2.5}$ concentrations in 2015 are predicted to be 15µg/m^3 and less at all modelled locations within the study area. The highest annual mean $PM_{2.5}$ concentration at specific receptor locations in 2015 is 14.1µg/m^3 at Kingston Road.

The SAS calculations indicate that background sources are the largest contributors to annual mean $PM_{2.5}$ concentrations at modelled receptor locations. Local traffic sources account for 5% to 18% of annual mean $PM_{2.5}$ concentrations at modelled receptor locations, with cars and taxis the most significant contributing vehicle type (3% to 12%). LGVs (1% to 3%) and buses (up to 3%) are the next largest contributing local traffic sources to annual mean $PM_{2.5}$ concentrations.

Annual mean PM_{10} concentrations in 2020 are predicted to be 21µg/m^3 and less at all modelled locations within the study area. The highest annual mean PM_{10} concentration at specific receptor locations in 2020 is 19.4µg/m^3 at St. Edmund House, which is located alongside Alfred Road to the north of the junction between Alfred Road, Queen Street and Anglesea Road.

The SAS calculations indicate that background sources are the largest contributors to annual mean PM_{10} concentrations at modelled receptor locations. Local traffic sources account for 5% to 19% of annual mean PM_{10} concentrations at modelled receptor locations, with cars and taxis the most significant contributing vehicle type (3% to 13%). LGVs (1% to 4%) and buses (up to 2%) are the next largest contributing local traffic sources.

Annual mean $PM_{2.5}$ concentrations in 2020 are predicted to be 14µg/m^3 and less at all modelled locations within the study area. The highest annual mean $PM_{2.5}$ concentration at modelled receptor locations in 2020 is 13.0µg/m^3 at 48-50 Kingston Road.

The SAS indicate that background sources are the largest contributors to annual mean $PM_{2.5}$ concentrations at modelled receptor locations. Local traffic sources account for 4% to 16% of annual mean $PM_{2.5}$ concentrations at modelled receptor locations, with cars and taxis the most significant contributing vehicle type (2% to 11%). LGVs (1% to 3%) and buses (up to 2%) are the next largest contributing local traffic sources to annual mean $PM_{2.5}$ concentrations.

2.6 DEFRA's plans

In June 2017 PCC responded to DEFRA's draft NAQAP to tackle NO_2. As the UK’s only island city, PCC acknowledged the fact we faced a number of unique challenges in improving Portsmouth's LAQ.

PCC stated that as a densely populated city with high visitor numbers and only three roads linking Portsea Island to the mainland, there is significant potential for congestion within some parts of the city, particularly at peak times.

In addition to the impacts of local sources, the city is impacted by harmful transboundary pollutants which can be blown into Portsmouth from sources beyond its direct control and influence.

PCC stated that the current legal limits on ambient LAQ are now being met across the majority of the city, particularly where sensitive receptors are located and that although NO_2 levels in hotspot areas still exceed these limits, our published data (at the time we submitted our comments) demonstrated that levels were generally improving (since contradicted in some areas by the 2016 ASR) and the contribution of NO_2 from vehicles was in decline (confirmed by the 2017 SAS).

Additionally, PCC contended that while national modelling provides estimates of background concentrations and contributions from nationally-managed roads, it did not attempt to accurately model concentrations in urban areas or contributions from locally-managed roads.

PCC modelling of impact and levels of NO_2 through the 2017 SAS developed with the air quality specialist AECOM represented an assessment at a considerably higher resolution following the input of robust locally obtained data specific to our unique circumstances. This demonstrated that in a 'do-nothing' scenario compliance across Portsmouth may "best case" be achieved by 2020.

We acknowledged the fact that this is not good enough and highlighted its ambitious plans which are currently underway to continue to improve the air quality within the city to deliver improvement within the shortest possible timeframe.

Portsmouth is building an alliance of leading organisations across the city to promote improvements in air quality to achieve compliance within the shortest possible time, recognising that the LA cannot independently implement all improvements to LAQ.

Correspondingly, PCC welcomed the Government's targeting of factors which contribute to the background pollution observed within the city, which our modelling suggests is an increasingly significant contributor to pollution levels recorded in Portsmouth.

Subsequently, DEFRA confirmed that its data for Portsmouth shows that the current areas of exceedance of the NAQO will fall within compliance levels by 2021. The forthcoming installation of the new monitoring station in Anglesea Road is likely to assist in validating these results in the near future.

Within the 2017 NAQAP, DEFRA have confirmed that Portsmouth is not named within the Government's Air Quality Strategy as an urban area with higher levels of pollution.

Full details of DEFRAs plan to tackle nitrogen dioxide can be found at https://www.gov.uk/government/publications/air-quality-plan-for-nitrogen-dioxide-no2-in-uk-2017

2.7 Recommendations

Following analysis of the 2016 ASR data, the conclusions of the 2017 SAS and strategic intentions of the 2017 LAQS the following is recommended:

- A new detailed LAQAP be developed in order to deliver the overarching principles as set out within the 2017 LAQS. High regard being given to the conclusions of the 2016 ASR data sets in terms of pollution levels, trends and hotspot areas and the findings of the 2017 SAS in respect to the composition and contribution of pollution sources and the predicted improvements necessary to delivery compliance with NAQO in the shortest possible timeframe;

- AQMA 7 is kept closely under review during the next 12 months with a view to defining its geographical extent. The result of monitoring data, as presented during the last 6 years, being consistently and considerably below the NO_2 annual mean NAQO clarifies the levels of NO_2 within Queen Street in particular and therefore it is possible that this particular area is revoked;
- AQMA 12 is kept closely under review during the next 12 months with a view to complete revocation. The result of monitoring data, as presented during the last 6 years, being consistently below the NO_2 annual mean NAQO.

Table 2.2 – Progress on Measures to Improve Air Quality

EU Categories

VFE	Vehicle Fleet Efficiency
PI	Public Information
PTA	Promoting Travel Alternatives
TPI	Transport Planning and Infrastructure
TM	Traffic Management
PGDC	Policy Guidance and Development Control
APV	Alternative to Private Vehicle Use
FDM	Freight and Delivery Management
PLET	Promoting Low Emission Transport

Progress on Measures to Improve Air Quality								
Theme: Public Information								
Measure ID	**Measure and Description**	**EU Category**	**EU Classification**	**Lead Authority**	**Start Dat**	**End Date**	**Target Area**	**Progress to Date**
PI1	**Air Quality Information** Provision of information regarding air quality, including real time monitoring data and information regarding assessments of air quality to enable public awareness of issues and success of actions implemented	PI	Via the internet	PCC	2017	On-going	Citywide	Whilst some actions have already been carried out in this area, more can be done to provide air quality information to enable public awareness, and will be progressed.
PI2	**Sustainable Travel Behaviour Change**	PI	Via the internet, via leaflets, via other mechanisms	PCC	2012	On-going	Citywide	Much good work has been carried out through Local Sustainable Transport Fund and Sustainable Travel Transition Year Grant. Further behaviour change work will be conducted in the future, through promotion and awareness raising of schemes and initiatives.
PI3	**On Street Travel Advisors**	PI	Via other mechanisms	PCC	2016	2017	Citywide	Travel Advisors played a big role in the Personal Journey Planning work through the Sustainable Travel Transition Year programme. Where funding is available on street travel advisors will be used at various events held across the city.
PI4	**Idling engines**	PI	Via the internet, via other mechanisms	PCC	2009	On-going	Citywide, particularly all AQMA's	An awareness campaign was carried out in 2011 to encourage drivers to switch off engines when stationary for more than a minute or two. Further awareness raising campaigns will be carried out in the future, to further encourage consideration of switching off engines to prevent idling.

Progress on Measures to Improve Air Quality								
Theme: Cycling								
Measure ID	**Measure and Description**	**EU Category**	**EU Classification**	**Lead Authority**	**Start Date**	**End Date**	**Target Area**	**Progress to Date**
C1	**Promote cycling** Road Safety & Active Travel initiatives set and prioritised around improving road safety, the cycle network and behaviour change. Educational programmes in schools include Bikeability, Transition years and Pompey Monster. Road safety behaviour change with students and commuters - Be bright, Share the Road's, bike security and businesses using light good vehicles. Cycle promotion through community based cycle events to promote Quieter routes and 'Glow Ride'. Cycle Hub to support events with the provision of Bike Dr. Stake holder engagement to support British cycling set up Community cycle groups.	PTA	Promotion of cycling	PCC	2010	2030	Citywide	An Active Travel Strategy in place for the period 2010 to 2030. It is being taken forward in conjunction with other departments notably Public Health. This strategy will be reviewed in accordance with the latest Government's walking and cycling strategy. 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 stakeholders such as Portsmouth Cycle Forum continues.
C2	**Cycle Parking** The provision of appropriate cycle parking at key destinations across the city	TPI	Cycle Network	PCC	On-going	On-going	Citywide	Cycle parking is continually introduced and improved as required and funding is available. Most recently a number of cycle parking stands were provided at a wide range of locations across the city as part of the Sustainable Travel Transition Year scheme. Further cycle parking will be provided at various locations through ongoing schemes.

C3	**Community Cycle Hub** Continued partnership working to support and generate income through community events and initiatives using Bike Dr.	PTA	Promotion of cycling	PCC	2011	2023	N/A	Ongoing - introduction of a cycle hub providing maintenance, training and retail of cycle goods. Cycle hire provision also available. Continuation of the Bike Dr maintenance sessions across the city.
C4	**LTP Programme**	TPI	Cycle Network	PCC	On-going	On-going	Citywide	On-going schemes being developed through the LTP will provide improvements to local air quality.
C5	**Winston Churchill Avenue** Segregated cycle route.	TPI	Cycle Network	PCC	2017	2021	Winston Churchill Avenue	Development of a fully segregated East West route.
C6	**Bike Hire Scheme**	PTA	Promotion of cycling	PCC	2017	Ongoing	Citywide	Implementation of a city wide bike hire scheme.
C7	**Healthy Streets Application**	PTA	Promotion of cycling	PCC	2017	Ongoing	Citywide	Considering applying the London healthy streets concept in Portsmouth.
C8	**Family Cycle Grants and Family Cycle Training**	PTA	Promotion of cycling	PCC	2017	Ongoing	Citywide	Successfully delivered in 2016/17, enabling lower income families to access safe cycling and move away from the private car.
C9	**Events Programme**	PTA	Promotion of cycling	PCC	2017	Ongoing	Citywide	Successfully delivered Pedal Portsmouth events, Glow Ride, Changing Places and Be bright be seen in 2016/17. Events programme planned for 2017/18.
C10	**Supply of pool bikes for staff travel**	PTA	Promotion of cycling	PCC	On-going	Ongoing	Citywide	Have pool bikes for staff business use.
C11	**Active Steps - Job Seekers**	TPI	Other	PCC	2016	2017	Citywide	Adult cycle training was provided through the Sustainable Travel Transition Year work, in partnership with Sustrans. Adult cycle training was also provided by PCC.

C12	**Quieter Routes**	PTA	Promotion of cycling	PCC	2016	2017	Citywide	A network of 'Quieter Routes' has been highlighted in the city, with a map being produced to illustrate these routes. Coloured stickers on lampposts mark out the routes, with five being between the north and south of the city, and five being between the east and west. These routes will assist people wishing to cycle through the city on quieter routes, away from main roads.

Progress on Measures to Improve Air Quality								
Theme: Walking								
Measure ID	**Measure and Description**	**EU Category**	**EU Classification**	**Lead Authority**	**Start Date**	**End Date**	**Target Area**	**Progress to Date**
W1	**Promote walking** Road Safety & Active Travel initiatives set and prioritised around improving road safety for pedestrians and behaviour change. Educational programmes in schools such as, pedestrian training, Junior Road Safety Officers and Pompey Monster Walk to School Challenge, along with supporting measures such as Park and Stride. Partnership work with Routes4U and local action groups to support local walking initiatives.	PTA	Promotion of walking	PCC	2010	2030	Citywide	Active Travel Strategy in place for the period 2010 to 2030. It is being taken forward in conjunction with other departments notably Public Health. This strategy will be reviewed to ensure it is kept current and fit for purpose. 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 continue. Wayfinding system introduced to make it easier to navigate the city centre by foot. 61 totem style maps and 23 finger posts are displayed in the three retail/tourist centres of city centre, Southsea and The Harbour area.
W2	**Rights of Way / Way finding and signage rationalisation** Routes4U Piloted programme (City-centre) to detail accessible routes for the elderly, visually and physically impaired. Reactive response to rights of way requests. Sustainable way finding signage and repair of damage.	TPI	Other	PCC	2012	Ongoing	Citywide	Ongoing - 61 totem style maps and 23 finger posts are displayed in Portsmouth's main city centre areas and tourist attractions.
W3	**Healthy Streets Application**	PTA	Promotion of walking,	PCC	2017	Ongoing	Citywide	Considering applying the London healthy streets concept in Portsmouth.

W4	**Duisburg Way pedestrian crossing facility**	TM	Other	PCC	2016	May 2017	Duisburg Way	A controlled toucan crossing has been implemented at Duisburg Way to link the existing footway and shared use facilities in the area. Also offers a controlled crossing facility to pedestrians and cyclists within the area who wish to attend the Events that are held within the area of Southsea Common.
W5	**Victoria Road North - Bradford Rd junction / pedestrians crossing**	TM	Other	PCC	2016	March 2017	Victoria Road North/ Bradford Road	To improve the layout of the existing junction and provide a safe crossing point for both pedestrians and cyclists within the area.

Progress on Measures to Improve Air Quality								
Theme: Energy								
Measure ID	**Measure and Description**	**EU Category**	**EU Classification**	**Lead Authority**	**Start Date**	**End Date**	**Target Area**	**Progress to Date**
E1	**Domestic heating emissions**	PGDC	Other policy	PCC	2014	2030	Citywide	Ongoing - control of replacement gas-fired boilers through building control and private sector housing teams - careful consideration of CHP.
E2	**Energy saving measures**	PGDC	Other policy	PCC	2014	2030	N/A	Ongoing - 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.

Progress on Measures to Improve Air Quality								
Theme: Schools								
Measure ID	**Measure and Description**	**EU Category**	**EU Classification**	**Lead Authority**	**Start Date**	**End Date**	**Target Area**	**Progress to Date**
S1	**Safer Routes to School Minor Remedial Works**	TPI	Other	PCC	2014	2030	Citywide	This work is on-going and will be completed year on year.
S2	**School travel plans**	PTA	School Travel Plans	PCC	2014	On-going	Citywide	Small scale travel planning is taking place. Benefits from Safer Routes to School capital programme and the new partnership between Transport Environment and Business Support, Public Health and the Cycle Forum toward working with more schools.
S3	**Upper Arundel Street improvement**	TPI	Other	PCC	2016	2018	Arundel Street	Improvements made in summer 2016.Ongoing - Alterations to parking to ensure safer access to the school by foot.
S4	**Pompey Monster Walk to School Challenge - school behaviour change**	PTA	Promotion of walking	PCC	2016 / 17	On-going	Citywide	The Pompey Monsters Scheme was introduced in 2016/7, and a trial of the scheme was carried out at three schools in the city, as part of the STTY scheme. This successful initiative was popular with the children and encouraged an increase in walking to school. It is hoped that this initiative can be extended to other schools if further funding becomes available.

Progress on Measures to Improve Air Quality								
Theme: Network Management								
Measure ID	**Measure and Description**	**EU Category**	**EU Classification**	**Lead Authority**	**Start Date**	**End Date**	**Target Area**	**Progress to Date**
NM1	**Variable message signs**	PI	Via other mechanisms	PCC	2009	On-going	Citywide	Several VMS signs are already in place. Further signs to be rolled out at car parks and other locations providing route guidance. In late 2017 five new signs displaying live car park occupancy information will be installed.
NM2	**Junction improvements**	TM	UTC, Congestion management, traffic reduction	PCC	2013	On-going	Various locations	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 (completed 2016); Kingston Rd / New Rd(to be delivered 2017/18); Fratton Rd / Arundel St (to be delivered 2017/18); roundabout at Fratton Rd – Victoria Rd North – Goldsmith Ave; Review all junctions citywide, starting with AQMAs, to increase effectiveness and prevent unnecessary congestion.
NM3	**Traffic Signal Reconfiguration 2014/15 and 16/17**	TM	UTC, Congestion management, traffic reduction	PCC	2014	On-going	Citywide	Minor improvements to the current traffic signal infrastructure. Goldsmith Ave/Priory Crescent identified so far for potential alterations to signals in 17/18.
NM4	**Tourist sign on M275**	TM	Other	PCC	2016	2018	N/A	To provide the initial tourist destination sign for the primary tourist destinations in Portsmouth coming into the city via the M275. This will ensure private vehicles drive the most direct route to their destination reducing traffic in the city centre.

NM5	**Eastern Corridor Works**	TM	UTC, Congestion management, traffic reduction	PCC	2017	2018	Eastern Corridor including AQMA 9	A comprehensive study is being conducted of the Eastern Road corridor, which will deliver identifiable solutions for this key corridor into the city. The study will identify problems of current uses and identify future uses and solutions.
NM6	**LTP Programme**	TM	UTC, Congestion management, traffic reduction	PCC	On-going	On-going	Citywide	On-going schemes being developed through the LTP will provide improvements to local air quality.
NM7	**Wightlink increased capacity**	TM	UTC, Congestion management, traffic reduction	PCC	2017	2018	Gunwharf terminal	Works to facilitate increased capacity, improved loading and vehicle waiting facilities.
NM8	**City Centre Road**	TM	Strategic highway improvements, re-prioritising road space away from cars, including access management, selective vehicle priority, bus priority, high occupancy vehicle lane	PCC	2017	On-going	City centre	Improved road layout to the city centre, increasing capacity and prioritising public transport, walking and cycling.
NM9	**A27 Upgrade**	TM	Other	PCC	2017	2018	A27	Traffic safety measures which will also assist with traffic flow.

NM10	**Smart Motorways M27 Jct. 11to Jct 12**	TM	UTC, Congestion management, traffic reduction	PCC	2017	On-going	M27 Jct. 11 to 12	Request to HE for an upgrade and improvements from M27 Junction 11 to the A27/A3 (M) junction to include: Smart Motorways, ALR, and off-HE network investment in connecting junctions including Farlington and Portsbridge roundabouts. Upgrade of the A27 between Junction 12 M27 to the A27/A3 (M) junction to motorway standard as part of RIS 2.
NM11	**Integration of air quality data with Stratos System**	TM	Other	PCC	2017	On-going	Citywide	Investigating the possibility of integrating air quality data with the Stratos system.
NM12	**Speed Reduction Schemes 16/17**	TM	Other	PCC	2016	2017	Citywide	Schemes delivered to reduce speed.
NM13	**Signs and Lines**	TPI	Other	PCC	2016	2017	Citywide	Small city wide improvements to existing road signage and markings and 2016/17.
NM14	**Anglesea Rd/ Market Way Traffic Signal Corridor**	TM	UTC, Congestion manageme nt, traffic reduction	PCC	2016	2016	Anglesea Rd / Market Way	Completed: Signal refurbishment completed 2016.
NM15	**Western Road - Northern Parade Improvements**	TM	UTC, Congestion manageme nt, traffic reduction	PCC	2017	2017	AQMA 13	South of AQMA 13 - speed limit reduced on Western Way to 50mph - implemented
NM16	**Traffic Calming schemes - Lonsdale Rd / Salisbury Rd**	TM	Other	PCC	2016	2017	Lonsdale Road/ Salisbury Road	Introduction of speed tables

Progress on Measures to Improve Air Quality								
Theme: Public Transport								
Measure ID	**Measure and Description**	**EU Category**	**EU Classification**	**Lead Authority**	**Start Date**	**End Date**	**Target Area**	**Progress to Date**
PT1	**Promoting bus use**	TPI	Public transport improvement - interchanges stations and services	PCC	2009	On-going	Citywide	Increasing bus vehicle miles and bus patronage is the responsibility of the bus operators. Portsmouth City Council work closely with the operators to encourage usage and increased punctuality so making public transport more attractive.
PT2	**Upgrade bus fleet**	VFE	Promoting Low Emission Public Transport	PCC	2009	On-going	Citywide	Upgrade fleet and improve emission technologies by bus operators. PCC will work closely with operators to encourage an upgrade of their fleet and technologies.
PT3	**Public transport ticketing**	TPI	Public transport improvement - interchanges stations and services	PCC	2011	2017	Citywide	Smart card ticketing has been implemented across the bus network. Ongoing work will see contactless payment being introduced by Autumn 2017.
PT4	**Public transport information**	PI	Via leaflets, via the internet, via other mechanisms	PCC	2012	On-going	Citywide	SMS/ texting / bus timetable downloads; Improved Shelters with 85 real-time passenger information units have been installed.
PT5	**Station Travel Plans**	PTA	Other	PCC	2012	On-going	Citywide	Station Travel Plans have been written. Further work needs to be undertaken in order to take forward the actions in these plans with the new franchise.

PT6	**Public transport infrastructure**	TPI	Public transport improvement - interchanges stations and services	PCC	2016	On-going	N/A	Phase 1 and 2 were completed through Local Sustainable Transport Fund, and there is scope for phase 3 to be completed in the future. This project will enhance the availability of Real Time Passenger Information (RTPI) along bus corridors in Portsmouth. Encouraging people to use Public Transport over private cars.
PT7	**Traveline**	PI	Via the internet, via other mechanisms	PCC	2016	On-going	Citywide	Traveline consists of a national database for all bus stops and timetables which is updated daily, providing comprehensive information and is used to populate all journey planning engines.
PT8	**Commercial Road South**	PI	Via leaflets, via the internet, via other mechanisms	PCC	2017	2018	Commerci-al Road South	Improvements to the legibility of the bus network.
PT9	**Park and Ride decking**	APV	Bus based park and ride	PCC	2017	On-going	City centre, Hard	This proposal is at the feasibility stage, and if developed will provide increased parking space availability at the Park and Ride site, allowing for increased usage of the service.
PT10	**Working with First/MTR to implement investments through the new South Western Rail Franchise**	TPI	Public transport improvements -interchanges stations and services	PCC	2017	On-going	Rail stations	To meet with new franchisee in August.
PT11	**Re-development of Hard Interchange**	TPI	Public transport improvement interchanges stations and services	PCC	2014	May 2017	The Hard and Portsmouth and Southsea Interchange	Re-development of The Hard Gateway and Portsmouth and Southsea interchange - sub-regional hubs. Providing improved links to rail and ferry services and improving pedestrian and cycle links to Gunwharf Quays and city centre principle shopping areas. These improvements will help to make public transport easier and more attractive to use.

PT12	LTP delivery of improved and integrated network of public	TPI	Public transport improvement interchanges stations and services	PCC	2016	2017	Citywide	Improvements have taken place in traffic signalling (reducing waiting times for all traffic including buses).

Progress on Measures to Improve Air Quality								
Theme: Freight								
Measure ID	**Measure and Description**	**EU Category**	**EU Classification**	**Lead Authority**	**Start Date**	**End Date**	**Target Area**	**Progress to Date**
F1	**Freight quality partnership**	FDM	Route Management Plans / Strategic routing strategy for HGV's	PCC	2008	On-going	Citywide with particular focus on AQMA 6 and 11	Further work is required in this area, working closely with freight supplies (particularly local) to ensure the most appropriate routes are undertaken through AQMAs particularly through AQMA 6 (Norway Rd International Port).

Progress on Measures to Improve Air Quality								
Theme: Workplace								
Measure ID	**Measure and Description**	**EU Category**	**EU Classification**	**Lead Authority**	**Start Date**	**End Date**	**Target Area**	**Progress to Date**
WP1	**Workplace travel plans (WPTP)**	PTA	Workplace Travel Planning	PCC	2014	On-going	Citywide	40 WTP in total 1 signed off in 2010-11. Between 2012 and 2015 there have been a further 9 Travel Plans. More WTPs expected. 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, & electric vehicle for employees of member organisation.
WP2	**Workplace Sustainable Travel Fund (WSTF)**	PTA	Workplace Travel Planning	PCC	2016 /17	On-going	Citywide	The WSTF was carried out in 2016/17 through STTY. It is hoped that further WSTF schemes can be delivered with local businesses in the future, should funding become available.
WP3	**Eco Driver Training**	VFE	Driver training and ECO driver aids	PCC	2013	2017	Citywide	Eco Driver Training was delivered as part of the STTY project, with the training being offered to local businesses.

Progress on Measures to Improve Air Quality								
Theme: Technology								
Measure ID	**Measure and Description**	**EU Category**	**EU Classification**	**Lead Authority**	**Start Date**	**End Date**	**Target Area**	**Progress to Date**
T1	**Explore new technology**	PGDC	Other	PCC	2017	On-going	Citywide	Undertake research into new technologies to reduce levels of NOx and consider their potential use within future strategies

Progress on Measures to Improve Air Quality								
Theme: Accessibility								
Measure ID	**Measure and Description**	**EU Category**	**EU Classification**	**Lead Authority**	**Start Date**	**End Date**	**Target Area**	**Progress to Date**
A1	**Access for people with disabilities**	TPI	Other	PCC	2016	On-going	Citywide	To provide low cost measures Portsmouth citywide where improvements to the kerb lines, signing and street furniture will aid mobility for the disabled and parents with young children in prams and pushchairs. Encouraging active travel modes.

Progress on Measures to Improve Air Quality								
Theme: Planning								
Measure ID	**Measure and Description**	**EU Category**	**EU Classification**	**Lead Authority**	**Start Date**	**End Date**	**Target Area**	**Progress to Date**
P1	AQ improvements through the planning process	PGDC	Other	PCC	On-going	On-going	Citywide	

Progress on Measures to Improve Air Quality								
Theme: Other								
Measure ID	**Measure and Description**	**EU Category**	**EU Classification**	**Lead Authority**	**Start Date**	**End Date**	**Target Area**	**Progress to Date**
O1	Bidding for Funding	PGD	Other	PCC	Ongo ing	Ongoing	Citywide	We will seek funding opportunities to assist with air quality initiatives wherever possible.
O2	Review of PCC fleet and moving away from diesel vehicles	PLET	Company vehicle procurement - prioritising uptake of low emission vehicles	PCC	On going	Ongoing	Citywide	Future consideration to be given to PCC fleet procurement, with a view to moving away from Diesel vehicles.

2.9 $PM_{2.5}$ – Local authority approach to reducing emissions and or Concentrations

As detailed in Policy Guidance LAQM.PG16 (Chapter 7) LAs are expected to work towards reducing emissions and/or concentrations of $PM_{2.5}$. There is clear evidence that $PM_{2.5}$ has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

Given that the main source of air pollution in Portsmouth is road traffic related and that the main sources of PM_{10} and NO_2 are the same as that of $PM_{2.5}$ PCC is taking no specific measure(s) to reduce $PM_{2.5}$. Dealing with one automotive related pollutant such as PM_{10} and NO_2 will inherently deal with $PM_{2.5}$.

3 Air quality monitoring data and comparison with air quality objectives and national compliance

3.1 Summary of monitoring undertaken

3.1.1 Automatic monitoring sites

This section sets out what monitoring has taken place and how it compares with NAQOs.

PCC has been undertaking automatic monitoring at four CAQMSs for many years. Table A1 in Appendix A shows the details of the sites.

Maps showing the locations of the CAQMS sites are provided in Map 1 in Appendix D.

Additionally, Map 2, Map 3, Map 4 and Map 5 show individual monitoring locations of Gatcombe Park, London Road, Burrfield Road and Mile End Road station locations respectively.

Details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

3.1.2 Non-automatic monitoring sites

PCC has undertaken non- automatic (passive) monitoring of NO_2 at 40 sites for many years (including four colocation sites).

Table A2 in Appendix A shows the details of the monitored sites.

The locations of the monitoring sites are provided on Map 6 in Appendix D.

3.2 Individual Pollutants

There has been no significant change to PCC's air quality monitoring program within the period 2012 to 2016. However, at the beginning of 2017 both London Road and Mile End Road station were both refurbished with HORIBA APDA-372 $PM_{2.5}$ / PM_{10} analysers, replacing the elderly Eberlines. Data from these analysers will be reported in the 2017 ASR.

NO_2, and PM_{10} are being monitored continuously at four CAQMSs, while $PM_{2.5}$ is being monitored continuously at three CAQMSs. In addition, NO_2 is being monitored using diffusion at 40 locations across the city.

Emphasis in Section from 1.37 and 1.39; including Box 1.1; in the LAQM.TG (16) has been placed, for the annual mean NAQO, on monitoring and assessing non-occupational above or below ground level outdoor locations, where members the public might be regularly exposed. These include:

- Building facades of residential properties;
- Schools, hospitals, care homes, library facades etc.

PCC's NO_2, $PM_{2.5}$ 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 / Quality Control (QA / QC) protocols documented in Appendix C.

Each of the CAQMS is fitted with NO_2 and $PM_{2.5}$ / PM_{10} analysers with the exception of C6 that is not fitted with $PM_{2.5}$. These are located as follows:

- 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 (Map 3, Appendix D).

  This station was recently newly refurbished (January 2017) with a new HORIBA's APDA-372; $PM_{2.5}$ / PM_{10} analyser; that replaced the elderly Eberline to meet DEFRA's AQ monitoring requirement.

  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 station is located 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-like sitting with slow moving road traffic often causing congestion.

- Station C4: An Automatic Urban and Rural Network (AURN) station located in an urban background location at Gatcombe Park Primary School, Curtis Mead (Map 2, Appendix D). At this station $PM_{2.5}$ is monitored in addition to NO_2 and PM_{10}.

- Station C6: This is a fixed roadside station established in 2007 to monitor NO_2 and PM_{10} generated by the road traffic along Burrfield Road (Map 4, Appendix D). This station is located at a junction 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 road traffic related pollution generated from the adjacent Burrfield Road / Copnor Road junction within the revoked AQMA 3.

- Station C7: This is a fixed Roadside station established in 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 (Map 5, Appendix D).

  This station was recently newly refurbished (January 2017) with a new HORIBA APDA-372; $PM_{2.5}$/PM_{10} analyser; that replaced the elderly Eberline to meet DEFRA's AQ monitoring requirement.

  This station 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 A.1, appendix A and the NO_2 continuous monitoring data for 2012, 2013, 2014, 2015 and 2016 are presented on last four rows of Table A.3, Appendix A.

The LAQ monitoring results presented in these sections were subjected to various corrections depending on the pollutants, monitoring means and period and locations.

3.2.1 NO_2

The NO_2 continuous monitoring program is supplemented by a non-automatic passive monitoring survey using an extensive NDDT survey implemented in 2004.

These sites are located mainly near busy junctions, at kerbside and roadside locations, at relevant exposure locations as defined in Box 1.1 of the LAQM.TG(16) guidance. This monitoring program is primarily focused on both declared and revoked AQMAs.

The NDDT survey covers 40 locations across the City. Four of these locations are dedicated to collocation studies.

Data generated from NDDT survey was firstly annualised where monitoring had been carried out for less than twelve months, yearly projections as prescribed in Box 7.10 of LAQM.TG(16).

Secondly the data was subjected to bias correction using locally generated bias correction factor from local co-location study. These were generated using spreadsheet based "Local Bias Adjustment Factor" tool.

In addition, monitored data at locations that are not on the façade of building of sensitive receptors are corrected to the nearest façade of building with relevant exposure.

The non-continuous NDDT survey locations and monitoring site characteristics are summarised in Table A2, Appendix A and illustrated on Map 6, Appendix D.

NDDT survey has been conducted in accordance with the QA / QC outlined in Appendix C.

The NDDT survey data were bias adjusted using the bias correction factor generated from the local co-located study. This involved the exposure of three NDDTs at each of the four CAQMSs.

The bias correction factors was generated following the approach prescribed from Section 7.190 to 7.198 of LAQM.TG (16) using the calculating precision and accuracy spreadsheet (http://laqm.defra.gov.uk/documents/AEA_DifTPAB_v04.xls).

For 2016 as the reporting year the NDDT collocation study generated the following bias correction factors:

- tubes exposed at the London Road station (kerbside station) generated 0.96 as the bias correction factor;
- tubes exposed at both Mile End Road and Burrfield Road stations (both roadside stations) generated 1.05 and 1.07 respectively as the bias correction factors;
- tubes exposed at the Gatcombe Park station (urban background station) generated 1.02 as the bias correction factor;

The above bias correction factors were averaged using the methodology prescribed in Section 7.192 of the LAQM.TG(16).

The 2016 NDDT survey results were bias adjusted using 1.023 as the average of all the above mentioned bias correction factors.

The 2012, 2013, 2014, 2015 and 2016 NDDT survey data was subjected up to three stage adjustments to be directly compared to the NO_2 annual mean NAQO:

- Annualised: NDDT locations with less than 8 month data were projected for 12 months first
- Bias Correction: bias corrected using the local co-location bias correction factor.
- Distance corrections: To predict the level of the pollutant at the façade of the receptors property should the monitoring location be at some distance from the receptor. 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 receptor location that is close to a monitoring site, but nearer or further to the kerb than the monitor.

Two NDDT 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.

The two locations are:

- 106 Victoria Road North
- Anchorage Road

Table A.3 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past 5 years with the NO_2 annual mean NAQO of 40µg/m^3.

For diffusion tubes, the full 2016 dataset of monthly mean values is provided in Table B1, Appendix B.

The adjusted NDDT survey data as prescribed above for all monitored sites in the city are presented on Table A3 in Appendix A.

3.2.1.1 NO_2 data sets

NDDT

The results for 2012, 2013, 2014, 2015 (and 2016) adjusted NDDT survey data shows that all exceedances are concentrated predominantly in the declared AQMAs with the exception of:

- Addison Madden location on Hampshire Terrace, where the 2014 NO_2 annual mean concentration exceeded the NO_2 annual mean NAQO. This monitoring site is located close to one of the busiest junctions in Southsea that centres in AQMA 7. The NO_2 long-term trend over the last five years at this location exhibited slight downward trends since 2012 (Figure F27, Appendix F).
- Albert Road (AR116) where the 2016 NO_2 annual mean concentration exceeded the NO_2 annual mean NAQO. This monitoring site is located close to one of the busiest junctions in Southsea in a revoked AQMA. The NO_2 long-

term trend over the last five years at this location exhibited slight upward trends since 2012 (Figure F21, Appendix F).

- Victoria Road North (VRN-106) where the 2012 NO_2 annual mean concentration exceeded the NO_2 annual mean NAQO. This monitoring site is located close to one of the busiest junctions linking Fratton to Southsea. The NO_2 long-term trend over the last five years at this location exhibited downward trends since 2012 (Figure F20, Appendix F).
- Northern Road (NR-6) where the 2016 NO_2 annual mean concentration exceeded the NO_2 annual mean NAQO. This monitoring site is located close to one of the busiest junctions linking Southampton Road/ A3/ Havant Road in Cosham in a revoked AQMA. The NO_2 long-term trend over the last five years at this location exhibited upward trends since 2012 (Figure F9, Appendix F).

2012 NDDT

The 2012 NDDT survey data concluded that NO_2 annual mean NAQO was exceeded at four locations:

- Lord Montgomery Way (AQMA 7).
- 106 Victoria Road North.
- 117 Kingston Road (AQMA 6).
- The Tap Public House in London Road (AQMA 6).

2013 NDDT

The 2013 NDDT survey data concluded that NO_2 annual mean NAQO was exceeded at four locations:

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

2014 NDDT

The 2014 NDDT survey data concluded that NO_2 annual mean levels increased compared with those of 2013 at 65.51% of the monitored locations across the City:

- the highest increase was recorded at the 17 Kingston Road location (AQMA 6) and at the 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, and 3.00 $\mu g/m^3$ respectively

- the NDDT survey data of 2014 also concluded that NO_2 annual mean levels were in excess of the NO_2 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).

2015 NDDT

The 2015 NDDT survey data concluded that:

- 2015 NO_2 annual mean levels decreased compared with those of 2014 at 72.41% of the monitored locations across the City resulting in an improvement of LAQ.
- 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 $\mu g/m^3$ respectively.
- The highest increase was recorded at 88 Stanley Road, in Queen Street, the Tap Public House in London Road, 106 Victoria Road North and Lord Montgomery Way with an increase of 11.21, 2.57, 2.32, 2.20, and 1.76 $\mu g/m^3$ respectively. However, Data capture at 88 Stanley Road was very poor (two month of readings only) and therefore the increase at this location by 11.21 $\mu g/m^3$ can be considered as incorrect and not recorded as an exceedance of the NO_2 annual mean NAQO in 2015 at this location.
- NO_2 annual mean levels were in excess of the NO_2 annual mean NAQO 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 this location is represented by NDDT survey data for only two months which was subjected to all necessary corrections].

2016 NDDT

The 2016 NDDT survey data concluded that NO_2 annual mean levels were in excess of the annual mean NAQO at the following monitored locations:

- Lord Montgomery Way (AQMA 7).
- Northern Road.

- Albert Road.
- London Road (AQMA 6) continuous monitoring station.
- 117 Kingston Road (AQM6).
- The Tap Public House London Road (AQMA 6).

A closer examination at the NDDT survey data reveals that a downward trend emerged at 53.57 % of the NDDT monitored locations in the last five years since 2012 and this can be translated to a worsening in LAQ compared to the five year trend commenced from 2011 that shown that 78.57%of the NDDT monitored locations showed a downward trend (From Figure F1 to Figure F28, Appendix F).

It is not possible to categorically state why the NO_2 levels increased across the city in 2014, decreased in 2015, and to increase again in 2016 as a multitude of factors influence pollutant generation and their subsequent dispersion. Such influences 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.

CAQSM 2012 - 2016

The NO_2 continuous monitoring program for the period stretching between 2012 and 2016 concluded that:

- The 2012 NO_2 annual mean levels exceeded the NO_2 annual mean NAQO only at the kerbside London Road CAQMS (43.9µg/m^3).
- The 2013 NO_2 annual mean levels did not exceed the NO_2 annual mean NAQO at any of the four CAQMSs. The maximum recorded concentration was close to breaching the NO_2 annual mean NAQO at London Road station (39.68µg/m^3).
- The 2014 NO_2 levels increased across the four CAQMSs compared to that of 2013, exceeding the NO_2 annual mean NAQO at the kerbside London Road CAQMS (45.68µg/m^3). This demonstrated a worsening in LAQ in this year.
- The 2015 NO_2 annual mean levels fell compared to that of 2014 to a level below the NO_2 annual mean NAQO at all four CAQMSs. This demonstrates an improvement in LAQ. The maximum recorded concentration was at London Road kerbside CAQMS (38.4µg/m^3). This level was close to breaching the NO_2 annual mean NAQO.
- The 2016 NO_2 annual mean level increased a cross the four CAQMS compared to that of 2015 to a level below the NO_2 annual mean NAQO at all but London Road CAQMSs to result in a worsening in LAQ. The maximum recorded concentration was at London Road kerbside CAQMS (41.21µg/m^3). This level breaches the NO_2 annual mean NAQO.
- The largest increase in 2016 NO_2 annual mean was registered at Mile End Road CAQMS as it increased by 5.23µg/m^3 compared to the level recorded in 2015.

- NO_2 annual mean levels for 2015 decreased to a level lower than those of 2013. However, NO_2 annual mean levels for 2016 increased to a level slightly higher than those of 2013.
- NO_2 annual mean trends between 2012 and 2016 (Figures F29 to Figure F32, Appendix F) exhibit an upward trend translated into a worsening in LAQ.

Table A4 in Appendix A compares the ratified continuous monitoring NO_2 hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m^3 (not to be exceeded more than 18 times per year).

Data collected at PCC CAQMSs did not register any exceedance of the NO_2 hourly mean NAQO since 2012. The highest annual mean registered was 45.68µg/m^3 in 2014 at the London Road kerside station.

The NO_2 hourly mean was in excess of 200µg/m^3 seven times in 2012 and once in 2014 at London road kerbside CAQMSs. These do not amount to any exceedances of the NO_2 hourly mean NAQO.

3.2.2 Particulate Matter (PM_{10})

Table A5 in Appendix A compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3.

There has been no exceedance of the PM_{10} annual mean NAQO since 2012 at any of the CAQMSs. The highest registered annual mean since then was in 2015 at the kerbside CAQMS along London Road and was 34.36µg/m^3.

Table A6 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past 5 years with the daily air quality NAQO of 50µg/m^3 not to be exceeded more than 35 times per year.

The PM_{10} monitoring data at both C2 and C4 CAQMSs exibits an downward trend while that of the C6 and C7 exibit a upward trend (Figures F33 to Figure F 36, Appendix F).

Registered PM_{10} annual mean was in excess of 50µg/m^3 in some of the stations but did not exceed PM_{10} annual mean NAQO. The worst location was the roadside the urban background C4 station which recorded an annual mean in excess of 50µg/m^3 on nine occassions in 2012. This did not amount to an exceedance of the PM_{10} daily NAQO.

3.2.3 Particulate Matter ($PM_{2.5}$)

PCC monitors $PM_{2.5}$ at the urban background station of Gatcombe Park (C4), and commenced monitoring $PM_{2.5}$ from January 2017 at the C2 and C7. The C4 CAQMS is affiliated to the National Automatic Urban and Rural Network (AURN). Table A7 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past 5 years. The highest $PM_{2.5}$ annual mean recorded in Portsmouth was 14.26µg/m^3 back in 2014.

The overall trend over the monitored period exhibits a downward trend (Figure F37, Appendix F).

Appendix A: Monitoring Results

Table A1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
C2	London Road	Kerbside	464925	102129	NO_2 $PM_{2.5}$ PM_{10}	Y	Chemiluminescent; Eberline/ HORIBA's APDA- 372	1.8m of the kerbside further to the south of the station	1m	1.8m
C4	Gatcombe Park Primary School	Urban Background	465403	103952	NO_2 PM_{10} $PM_{2.5}$ O_3	N	Chemiluminescent, FDMS	0m	119 m	2.5m
C6	Burrfields Road	Roadside	466004	102348	NO_2 PM_{10}	N	Chemiluminescent; Eberline	0.5m	4.5m of Burrfields Road & 5.5m of Copnor Road	1.8m
C7	Mile End Road	Roadside	464397	101270	NO_2 $PM_{2.5}$ PM_{10}	Y	Chemiluminescent; Eberline/ HORIBA's APDA- 372	2m	6.5m	1.8m

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property).

(2) N/A if not applicable.

(3) $PM_{2.5}$ Monitoring commenced in January 2017 at C2 and C7 therefore $PM_{2.5}$ data was not reported.

(4) $PM_{2.5}$ and $PM_{2.5}$ data reported for C2 and C7 were generated by the Eberline up to the end of 2016.

Table A2 – Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA ?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
1	Lord Montgomery Way (FST)	Roadside	463872	99874	NO_2	Y	0	3.7m	N	2m
2	12 Chadderton Gardens (CG-12)	Urban background	463705	99371	NO_2	N	0	N/A	N	2m
3	High Street (HS-121A)	Roadside	463408	99460	NO_2	Y	0	3.1m	N	2m
4	Queen Street (QS-Col 30)	Roadside	463190	100390	NO_2	Y	N/A	3m	N	2m
5	119 Whale Island Way (WIW-119)	Roadside	464230	102194	NO_2	N	0	16.23m	N	2m
6	88 Stanley Road (SR-88)	Roadside	464331	102197	NO_2	N	0	9.88m	N	2m
7	138 Lower Derby Road (LDR-138)	Urban background	464291	102279	NO_2	N	0	37.57m	N	2m
8	492 Hawthorn Crescent (HC-492)	Urban background	466690	104355	NO_2	N	0	34m	N	2m
9	6 Northern Road (NR-6)	Roadside	465621	105528	NO_2	N	0	5.43m	N	2m
10	20 Stroudley Avenue (SA-20)	Urban background	467107	104850	NO_2	N	0	N/A	N	2m
11	Anchorage Road (AR-Col6)	Roadside	466869	103457	NO_2	N	11.76M	6.56m	N	2m
12	2 Hobby Close (HC-2)	Roadside	466074	103747	NO_2	N	0	10.11m	N	2m
14	4 Merlyn Drive (MD-4)	Roadside	466109	103736	NO_2	N	0	11.26m	N	2m
15	29 Milton Road (MR-29)	Roadside	466120	101324	NO_2	N	0	7.04m	N	2m
16	Parade Court, London Road (LR-PC)	Roadside	465474	104205	NO_2	N	5.32m	5.15m	N	2m
18	4 Milton Road (MR-4)	Roadside	466097	101332	NO_2	N	0	6.13m	N	2m
19	7 Velder Avenue (VA-7)	Roadside	466392	100226	NO_2	Y	0	4.44m	N	2m
20	136 Eastney Rd (ER-136)	Roadside	466712	99415	NO_2	N	0	6.23m	N	2m
21	118 Albert Road (AR-116)	Roadside	465209	98964	NO_2	N	0	2.36m	N	2m
22	2 Victoria Road North (VRN-2)	Roadside	464778	99306	NO_2	N	0	5.53m	N	2m
23	106 Victoria Road North (VRN-106)	Roadside	464974	99766	NO_2	N	2.37m	2.42m	N	2m
24	221 Fratton Road (FR-221)	Roadside	465111	100737	NO_2	Y	0	4.21m	N	2m
25	117 Kingston Rd (KR-117)	Roadside	465036	101547	NO_2	Y	0	2.46m	N	2m
26	The Tap London Road (Tap)	Kerbside	464900	101976	NO_2	Y	0	1.91m	N	2m
28	65 Kingston Crescent (KR-65)	Roadside	464825	101933	NO_2	N	0	9.21m	N	2m
29	Estella Road (ER-74)	Roadside	464551	101787	NO_2	Y	0	20.04m	N	2m
30	Market Tavern (Mile End Rd) (MT)	Roadside	464478	101457	NO_2	Y	0	12.73m	N	2m
32	Larch Court, Church Rd (CR-Corner)	Roadside	464559	100980	NO_2	N	0	5.84m	N	2m
34	Sovereign Gate, Commercial Rd (UF)	Roadside	464425	100893	NO_2	Y	0	4.40m	N	2m
35	Hampshire Terrace (AM)	Roadside	463837	99759	NO_2	N	0	4.9m to 10.74m	N	2m
36	Elm Grove (EG-103)	Roadside	464501	99329	NO_2	N	0	2.26m	N	2m
37	London Road	Kerbside	464925	102129	NO_2	Y	1.8 m	1m	Y	1.8
38	Gatcombe Park Primary School	Urban background	465403	103952	NO_2	N	0	119m from London Road (as the major road)	Y	2.5m
39	Burrfields Road	Roadside	466004	102348	NO_2	N	0.5 M	4.5m of Burrfields Road & 5.5m of Copnor Road	Y	1.8m
40	Mile End Road	Roadside	464397	101270	NO_2	Y	2m	6.5m		1.8m

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on/adjacent to the façade of a residential property) (2) N/A if not applicable.

Table A3– Annual Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [(1)]	Valid Data Capture 2016 (%) [(2)]	NO_2 Annual Mean Concentration (µg/m^3) [(3)]				
					2012	2013	2014	2015	2016
1	Roadside	Diffusion Tube		83.33	42.54	41.9	42.57	44.33	43.52
2	Urban background	Diffusion Tube		100.00	17.48	16.5	16.55	15.74	17.40
3	Roadside	Diffusion Tube		100.00	26.63	22.1	25.67	24.07	25.75
4	Roadside	Diffusion Tube		91.67	36.35	31.51	27.97	30.54	34.70
5	Roadside	Diffusion Tube		100.00	28.62	27.49	28.93	27.53	29.52
6	Roadside	Diffusion Tube		58.33	35.62	38.29	34.85	46.06	36.08
7	Urban background	Diffusion Tube		83.33	29.78	30	26.53	26.05	28.09
8	Urban background	Diffusion Tube		100.00	28.81	27.22	28.37	28.43	29.94
9	Roadside	Diffusion Tube		100.00	35.07	31.95	33.88	34.98	40.86
10	Urban background	Diffusion Tube		91.67	17.91	17.66	16.66	16.48	19.54
11	Roadside	Diffusion Tube		66.67	31.76	29.54	33.29	28.27	28.10
14	Roadside	Diffusion Tube		100.00	22.68	21.61	27.21	26.87	22.20
15	Roadside	Diffusion Tube		83.33	28.82	28.15	27.57	26.21	28.97
16	Roadside	Diffusion Tube		91.67	36.44	33.98	32.32	32.01	36.45
18	Roadside	Diffusion Tube		100.00	29.52	27.8	28.9	26.91	29.30
19	Roadside	Diffusion Tube		91.67	34.52	30.1	37.24	35.08	39.61
20	Roadside	Diffusion Tube		100.00	26.07	27.42	28.9	27.58	29.12
21	Roadside	Diffusion Tube		100.00	35.79	32.88	35.18	35.28	40.05
22	Roadside	Diffusion Tube		91.67	31.61	28.69	30.8	28.06	31.23
23	Roadside	Diffusion Tube		91.67	41.05	30.4	28.8	31	37.00
24	Roadside	Diffusion Tube		91.67	39.12	42.48	40.49	36.32	37.74
25	Roadside	Diffusion Tube		83.33	44.58	38.69	52.18	41.79	43.65
26	Kerbside	Diffusion Tube		91.67	50.48	50.93	40.81	43.12	49.16
30	Roadside	Diffusion Tube		75.00	37.97	38.83	44.12	34.31	39.34
32	Roadside	Diffusion Tube		100.00	35.99	31.09	34.93	31.68	33.51
34	Roadside	Diffusion Tube		91.67	38.8	34.65	35.52	34.65	36.06

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
					2012	2013	2014	2015	2016
35	Roadside	Diffusion Tube		100.00	31.1	28.96	41.42	28.48	30.68
36	Roadside	Diffusion Tube		100.00	32.84	30.33	34.81	29	33.32
C2	Kerbside	Automatic		82.37	43.9	39.68	45.68	38.4	41.21
C4	Urban background	Automatic		93.76	21.1	20.27	22.17	18.78	20.05
C6	Roadside	Automatic		96.55	36.1	33.52	35.93	32.81	34.34
C7	Roadside	Automatic		81.94	36.9	35.94	36.51	30.25	35.48

Notes: Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in bold.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in bold and underlined.

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

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

(3) Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per Technical Guidance LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Levels in excess of the NAQO are highlighted in red

Levels corrected to the façade using 'air quality consultants' are highlighted in green

Table A4 – 1-Hour Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
					2012	2013	2014	2015	2016
C2	Kerbside	Automatic		82.37	7	0	1	0	0
C4	Urban background	Automatic		93.76	0	0	0	0	0
C6	Roadside	Automatic		96.55	0	0	0	0	0
C7	Roadside	Automatic		81.94	0	0	0	0	0

Notes: Exceedances of the NO_2 1-hour mean objective (200µg/m^3 not to be exceeded more than 18 times/year) are shown in bold.

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

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

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

Table A5 – Annual Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	PM_{10} Annual Mean Concentration (µg/m^3) (3)				
				2012	2013	2014	2015	2016
C2	Kerbside		70.56	22.10	30.72	32.43	34.36	20.04
C4	Urban background		66.73	17.96	18.17	18.48	16.16	18.15
C6	Roadside		89.16	8.11	15.39	26.92	26.45	19.75
C7	Roadside		60.59	14.74	16.33	17.53	23.45	11.88

Notes: Exceedances of the PM_{10} annual mean objective of 40µg/m^3 are shown in bold.

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

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

(3) All means have been “annualised” as per Technical Guidance LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Table A6 – 24-Hour Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	PM_{10} 24-Hour Means > 50µg/m^3 (3)				
				2012	2013	2014	2015	2016
C2	Kerbside		70.56	1	0	0	1	1
C4	Urban background		66.73	9	2	0	2	2
C6	Roadside		89.16	1	0	7	4	1
C7	Roadside		60.59	2	0	0	1	0

Notes: Exceedances of the PM_{10} 24-hour mean objective (50µg/m^3 not to be exceeded more than 35 times/year) are shown in bold.

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

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

(3) If the period of valid data is less than 85%, the 90.4th percentile of 24-hour means is provided in brackets.

Table A7 – $PM_{2.5}$ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	$PM_{2.5}$ Annual Mean Concentration (µg/m^3) (3)				
				2012	2013	2014	2015	2016
C4	Urban background		90.52	13.63	14.11	14.26	10.5	11.63

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

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

(3) All means have been "annualised" as per Technical Guidance LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Appendix B: Full Monthly Diffusion Tube Results for 2016

Table B1– NO_2 Monthly Diffusion Tube Results for 2016

Site ID	NO_2 Mean Concentrations (µg/m³)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (1)
1	39.46	36.65	39.24	45.22	45.71	44.69	39.40			41.45	44.76	48.82	42.54	43.52
2	14.23	16.20	16.31	15.67	16.18	14.40	12.93	16.10	15.57	20.20	20.78	25.57	17.01	17.40
3	24.59	22.51	29.49	23.50	22.51	21.08	20.54	22.90	25.00	27.25	29.65	33.08	25.17	25.75
4	41.80	35.15	28.60	33.00		31.07	29.05	31.01	33.17	33.39	36.12	40.72	33.92	34.70
5	29.43	31.62	25.55	25.44	29.73	26.64	19.54	22.64	29.07	34.76	32.39	39.47	28.86	29.52
6	40.21	27.49	25.40		20.91	35.26				26.72	29.23		29.32	36.08
7	30.30	26.48	25.03	21.92			23.59	27.73	32.10	29.28	19.11	39.05	27.46	28.09
8	43.69	27.01	27.19	27.40	21.54	27.90	26.63	27.56	27.62	25.80	28.68	40.11	29.26	29.94
9	40.38	44.39	37.41	37.07	31.65	40.69	35.77	40.71	38.30	46.50	90.93	46.50	44.19	40.86
10	22.21	16.15	15.49	14.62	13.55		28.38	13.42	16.00	17.58	22.28	30.48	19.10	19.54
11	29.55	26.71			21.70	26.65	26.11	25.47	21.87			37.24	26.91	28.10
14	19.98	25.03	17.09	23.27	20.10	17.98	15.35	17.02	19.70	25.30	26.83	32.80	21.70	22.20
15	31.11	25.80	25.61	26.06	30.83	23.87	19.25			31.95	31.80	36.92	28.32	28.97
16	34.96	32.08	32.95	32.42	35.28	32.85	30.96		36.93	46.86	41.03		35.63	36.45
18	28.56	27.19	28.02	24.57	23.03	28.26	26.67	25.41	26.11	28.50	39.53	37.82	28.64	29.30
19	37.95		38.74	34.40	35.88	36.91	32.84	38.98	41.47	37.55	41.49	49.71	38.72	39.61
20	24.66	25.33	28.41	25.11	32.23	29.27	25.73	29.88	29.08	26.49	30.64	34.68	28.46	29.12
21	38.61	33.43	40.27	40.11	34.59	38.89	34.93	40.61	43.30	34.57	41.79	48.65	39.14	40.05
22		28.00	29.48	25.82	31.61	27.70	24.81	31.61	29.72	34.40	34.69	37.92	30.52	31.23
23	39.62	35.30	41.74	39.73	44.00	35.71	27.24		33.38	41.65	43.05	53.48	39.54	37.00
24	35.91	36.23	28.69		30.29	39.09	35.21	39.69	40.24	39.89	39.50	41.04	36.89	37.74
25	47.33	43.79	43.02	36.64	36.48	44.88	40.51		48.60	36.64		48.77	42.67	43.65

Site ID	NO_2 Mean Concentrations (µg/m^3)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (1)
26	47.46	43.69	44.81	54.12	41.20	47.83	43.20	44.98	52.38	47.04		61.89	48.06	49.16
30	40.69		40.00	31.38	33.15	37.10		36.87	41.55	39.40	45.95		38.45	39.34
32	31.08	29.01	31.29	27.35	31.98	28.97	31.25	30.81	34.27	40.52	43.37	28.94	32.40	33.51
34	29.03	28.22	30.17	31.41	39.50	31.47		35.35	35.05	41.17	40.58	45.81	35.25	36.06
35	27.40	27.48	24.77	31.91	29.97	25.26	21.75	28.83	31.07	35.86	36.50	39.09	29.99	30.68
36	26.47	34.15	29.55	33.73	34.22	29.07	26.20	28.32	29.77	40.28	37.99	41.12	32.57	33.32

(1) See Appendix C for details on bias adjustment.

Appendix C: Supporting technical information / air quality monitoring aata QA / QC

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 a dedicated staff member to operate the network of continuous air quality monitoring stations. He is trained in all aspects of the monitoring processes including routine site operations, field calibrations and data ratification. He is 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.

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, C4, 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 was based on three points, the third being span NO_2 to check the NO_2 Converter. However this was changed to two point calibration check. 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 were 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 were changed at least every six months but Hopcalite is changed more frequently due to the high levels of humidity in Portsmouth. These were changed with to be fitted with synthetic air cylinders supplied by Air Liquide 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

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:

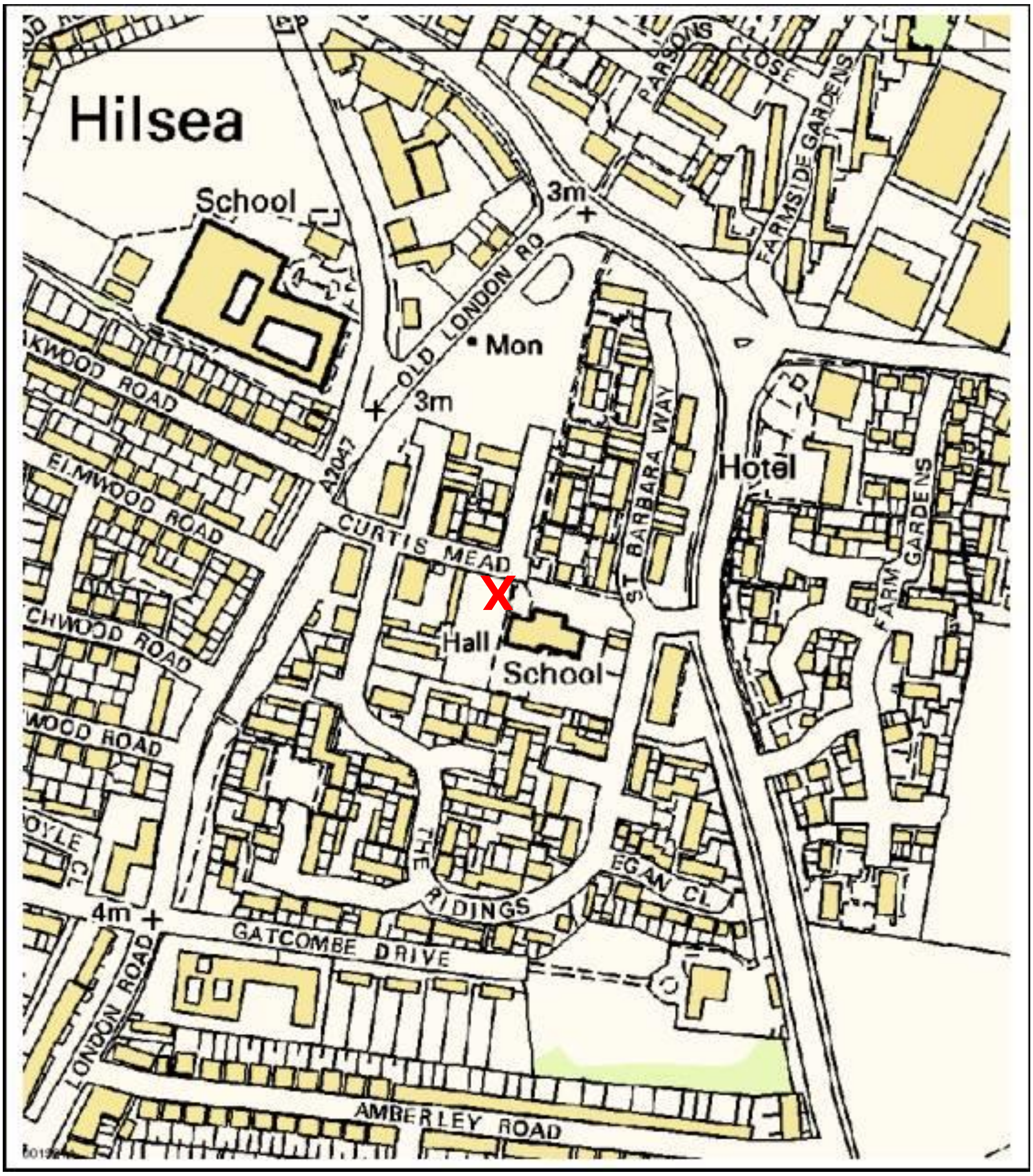
- Firstly, PCC use the data from the local collocation study of NO_2 diffusion tubes to calculate the bias following the approach prescribed in Box 6.4 of LAQM TG (09) using the appropriate continuous monitoring data from the local air quality monitoring network for individual NO_2 monitored site according to the site criteria;
- Secondly, the estimation of the NO_2 annual mean is deduced for individual NO_2 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 D: Map(s) of Monitoring Locations.

Map 1 – PCC's CAQMS locations (C2, C4, C6 and C7)

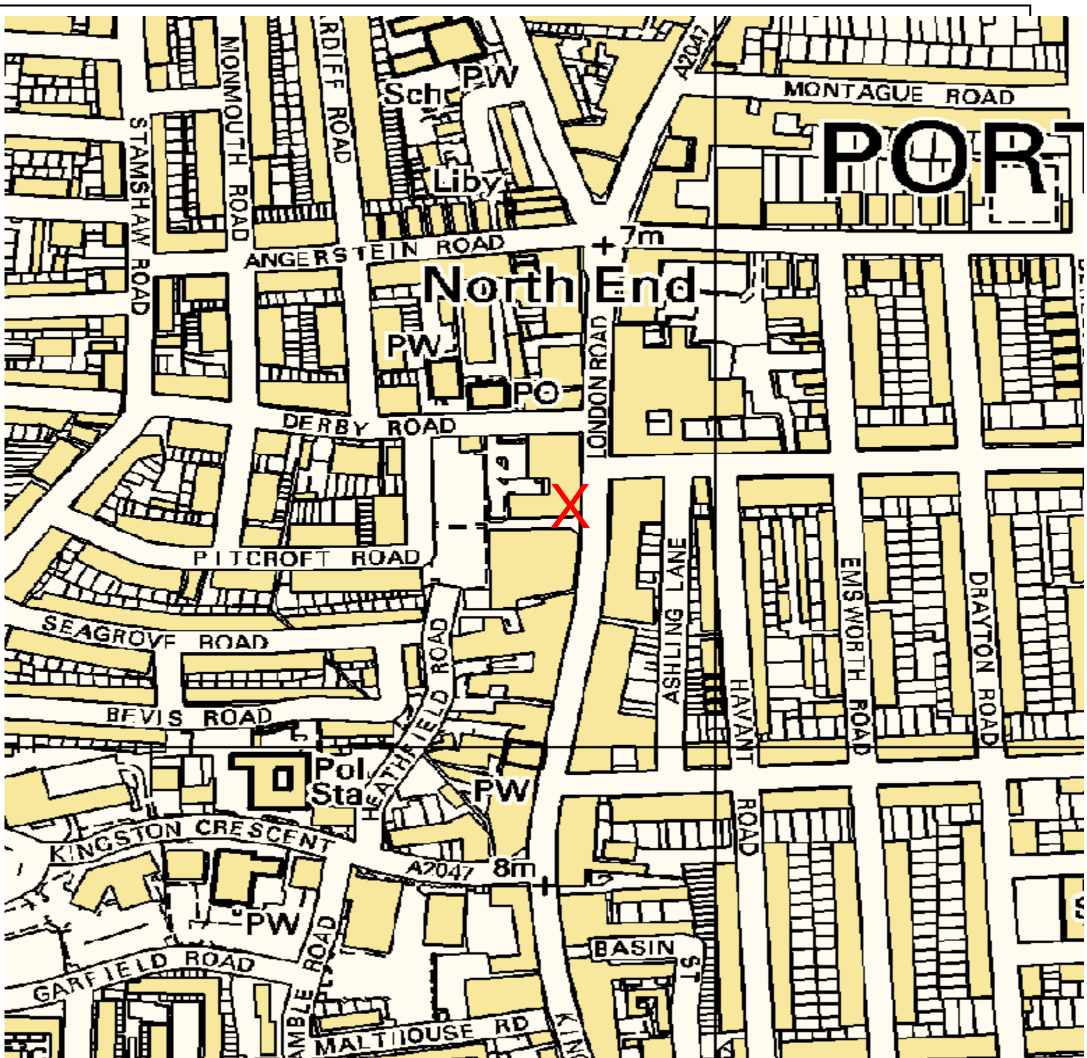
Map 2 – PCC's Background CAQMS

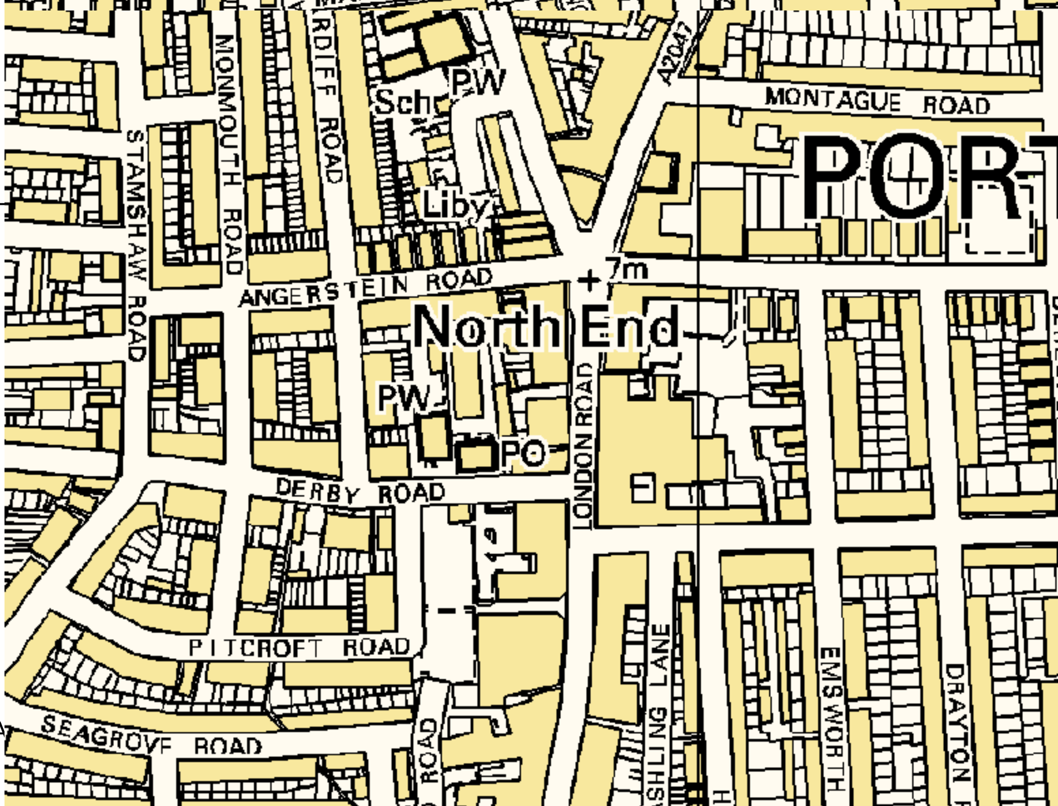
Location (C4) at Gatcombe Park Primary School, Hilsea



Map 3 – PCC's Kerbside CAQMS

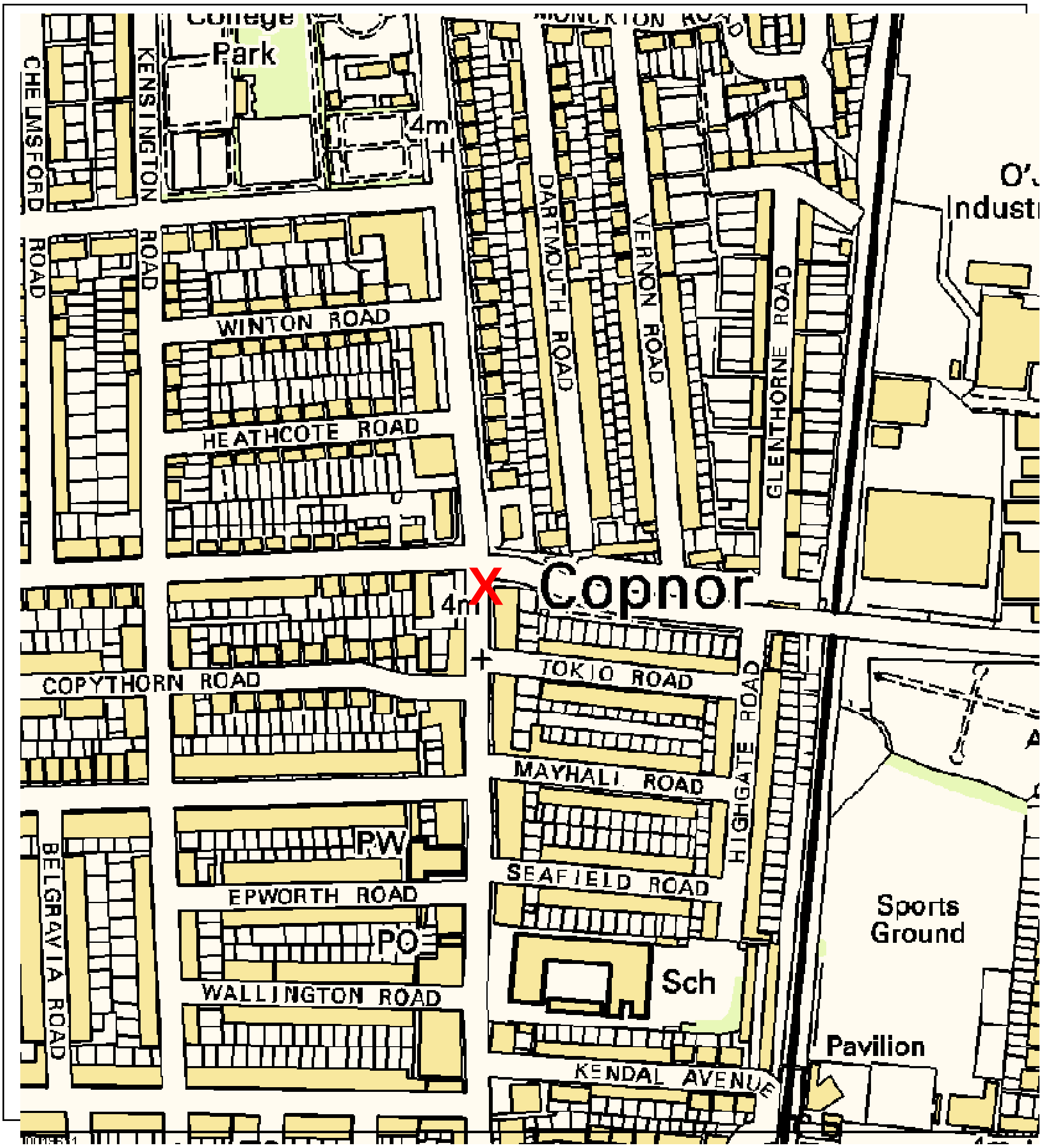
Location (C2) along London Road, North End





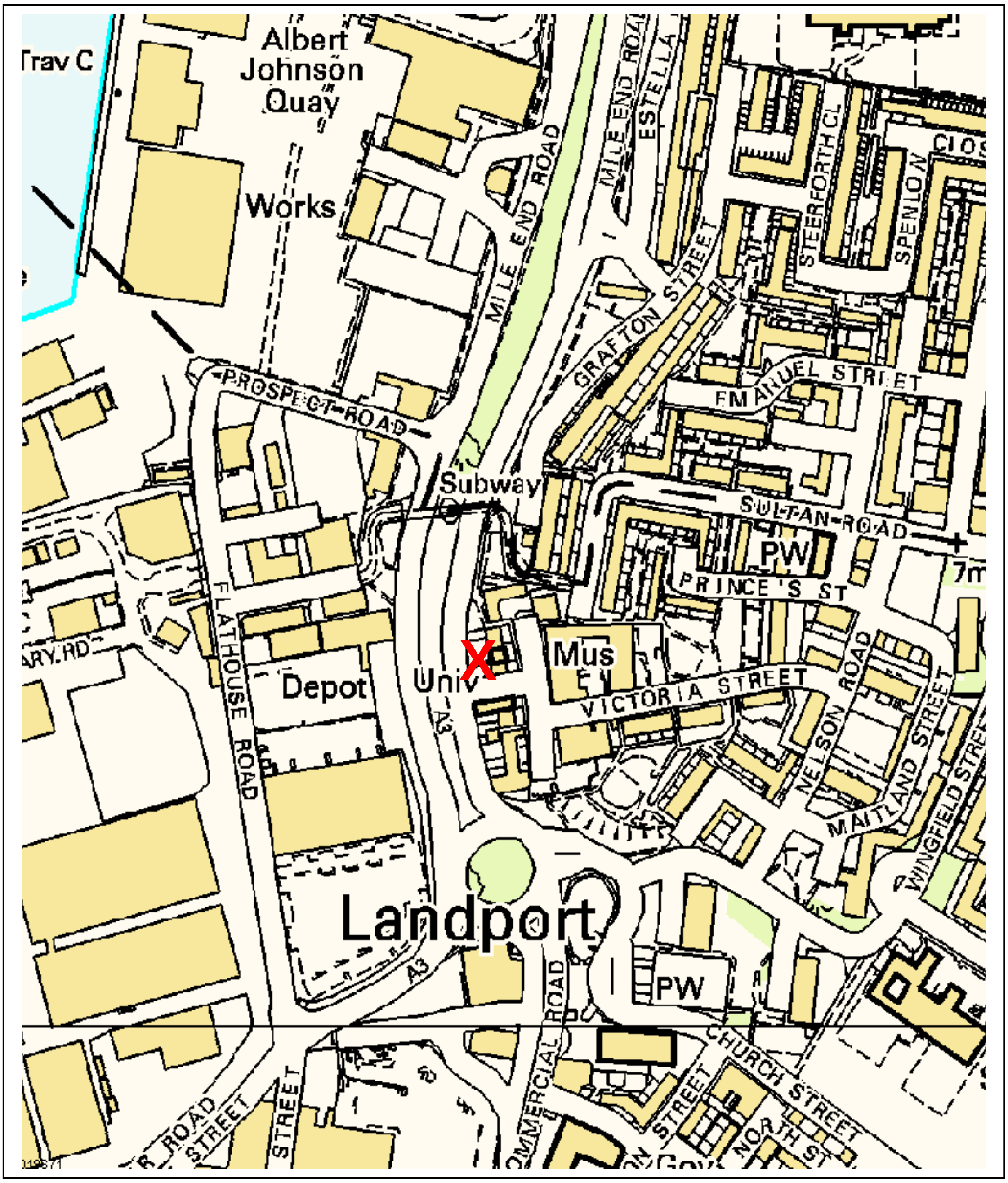
Map 4 – PCC's Roadside CAQMS

Location (C6) Along Burrfields Road, Baffins

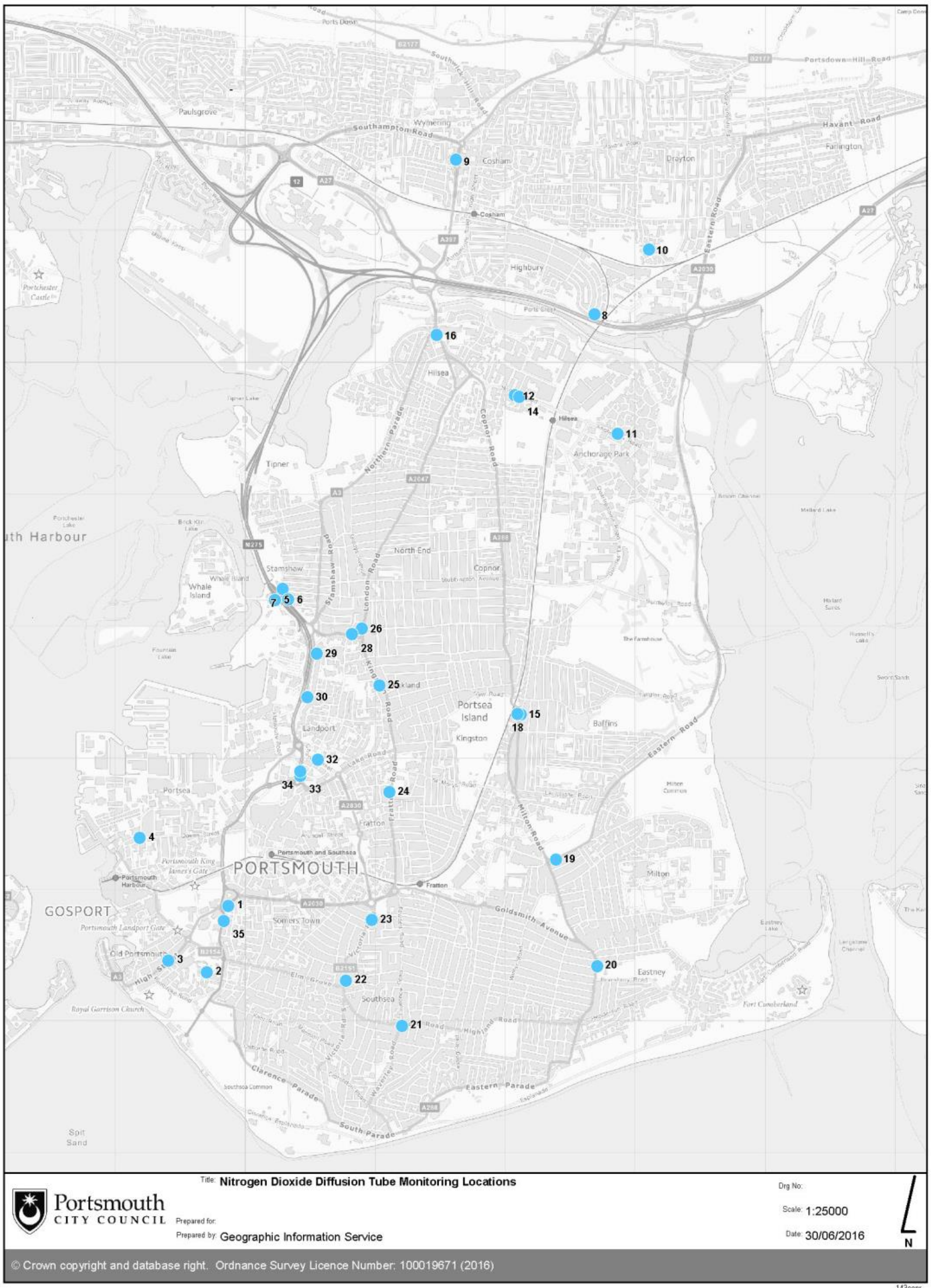


Map 5 – PCC's Roadside CAQMS

Location (C7) Along Mile End Road, Buckland



Map 6 – PCC's Nitrogen Dioxide Diffusion Tube Monitoring Locations



Appendix E: Summary of national air quality objectives

Table E1– Air Quality Objectives in England

Pollutant	Air Quality Objective[2]	
	Concentration	Measured as
Nitrogen Dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m^3	Annual mean
Particulate Matter (PM_{10})	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

[2] The units are in micrograms of pollutant per cubic metre of air (µg/m^3).

Appendix F: Figures exhibiting last five years trend at each of the monitored location.

Figure F.1 – Lord Montgomery Way NDDT Data Exhibits Upward Trend

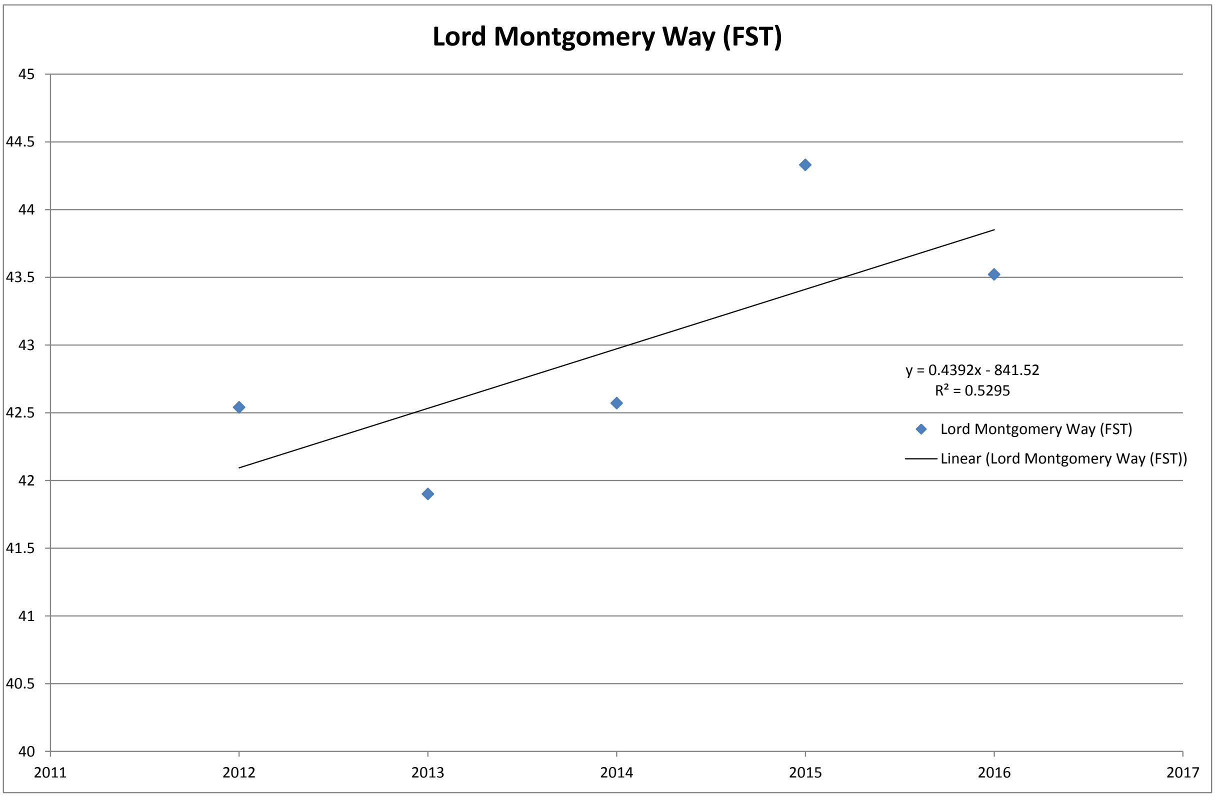


Figure F.2 – Chadderton Gardens NDDT data Exhibits Downward Trend

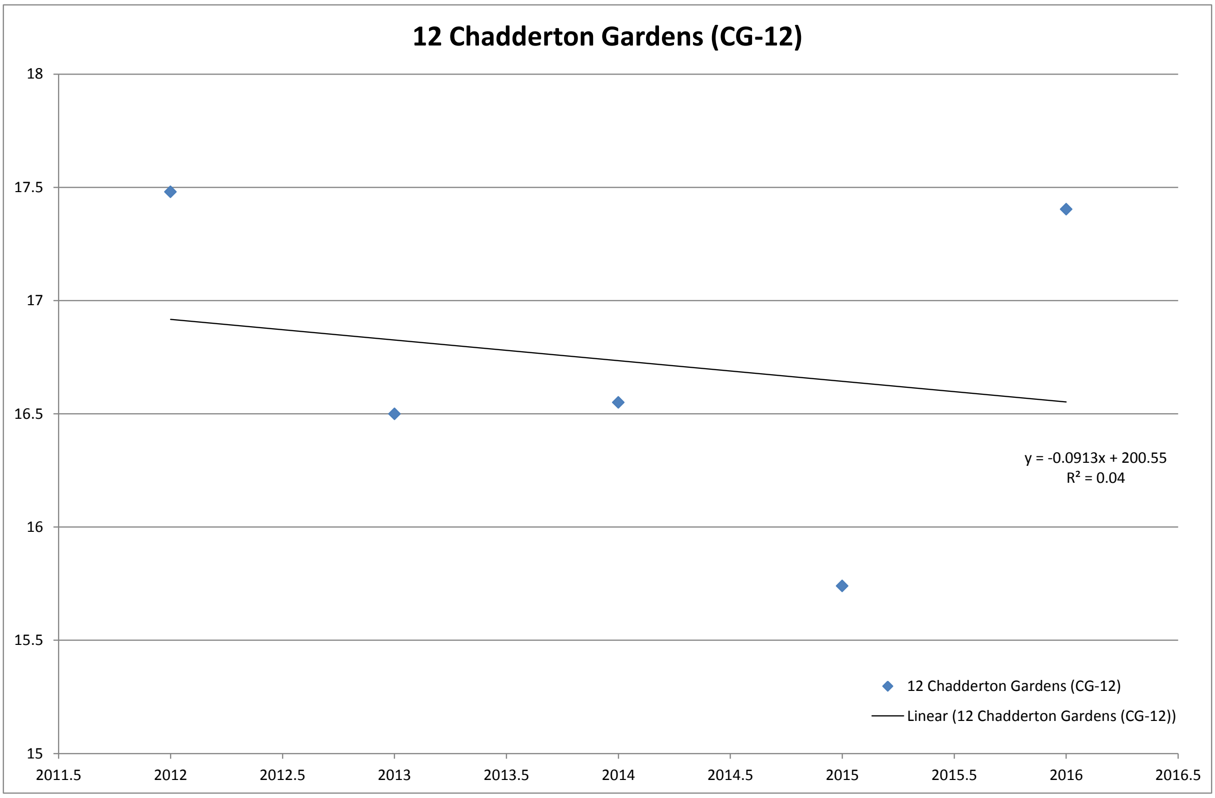


Figure F.3 – High Street NDDT Data Exhibits Downward Trend

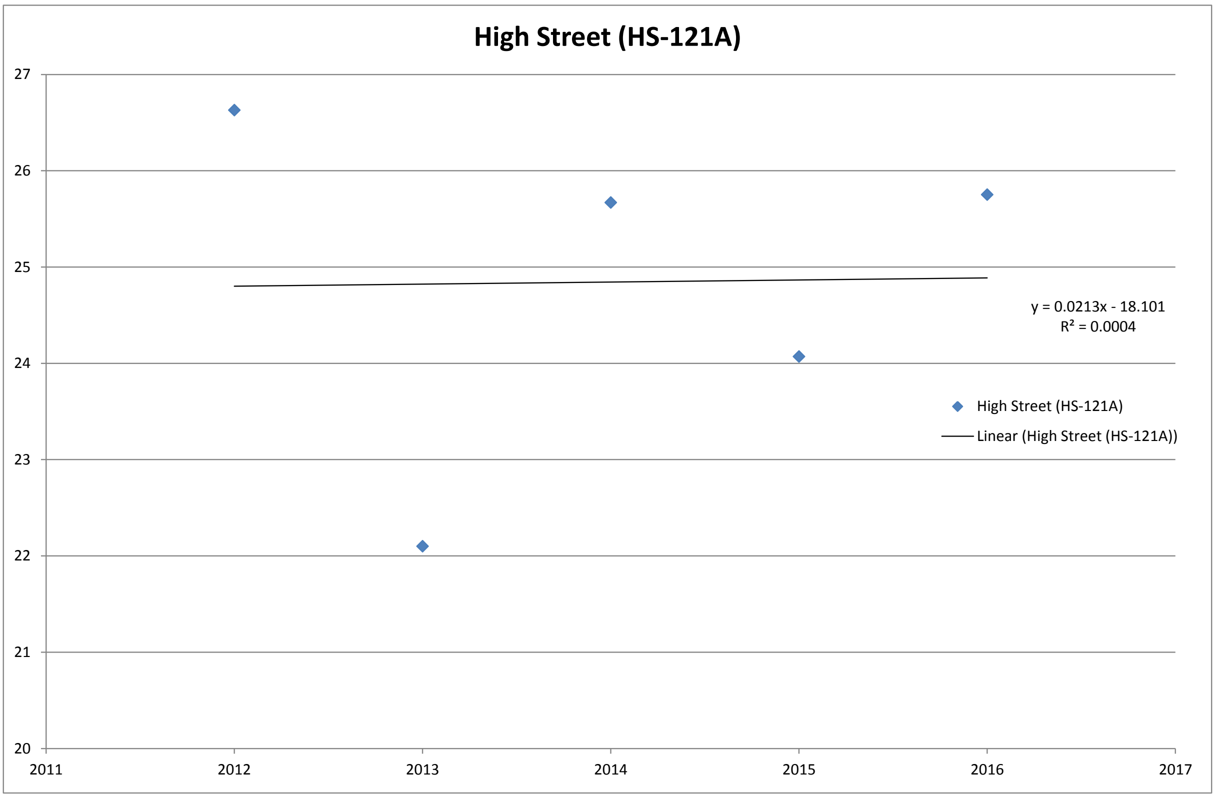


Figure F.4 – Queen Street NDDT Data Exhibits Downward Trend

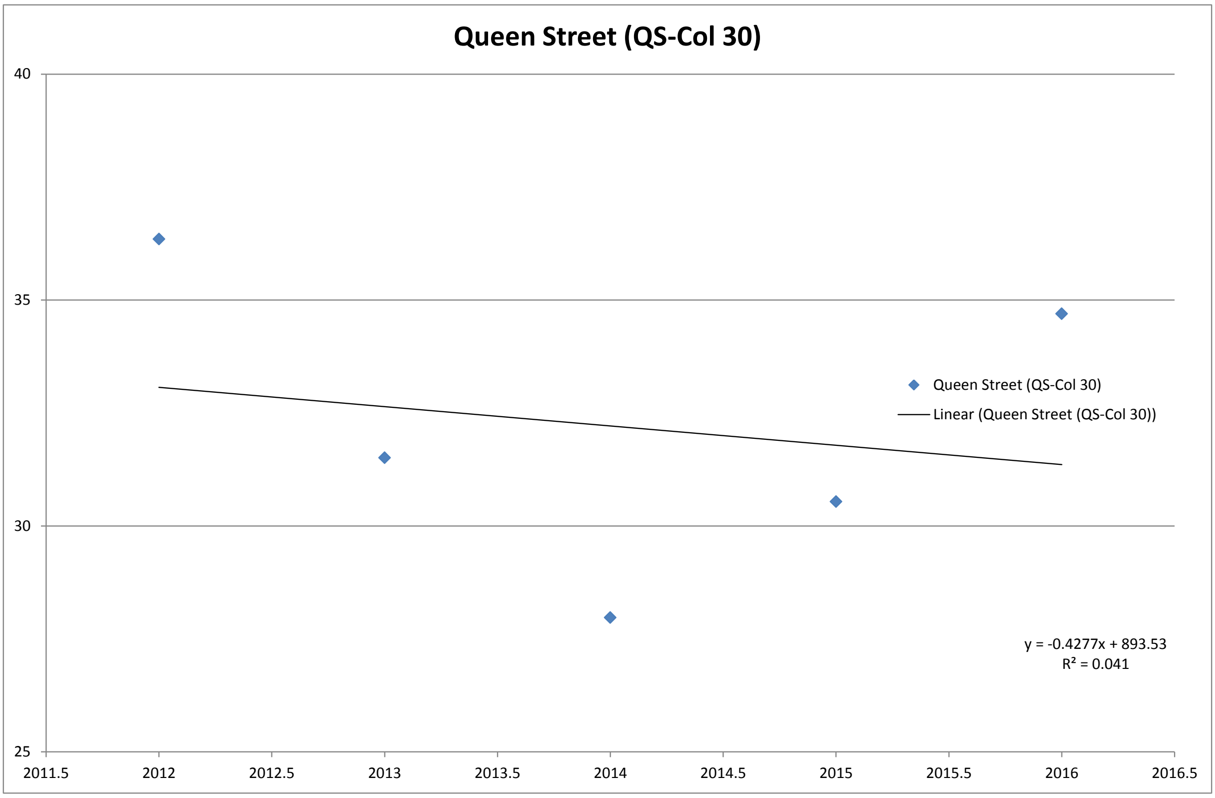


Figure F.5 – Whale Island Way NDDT Data Exhibits Downward Trend

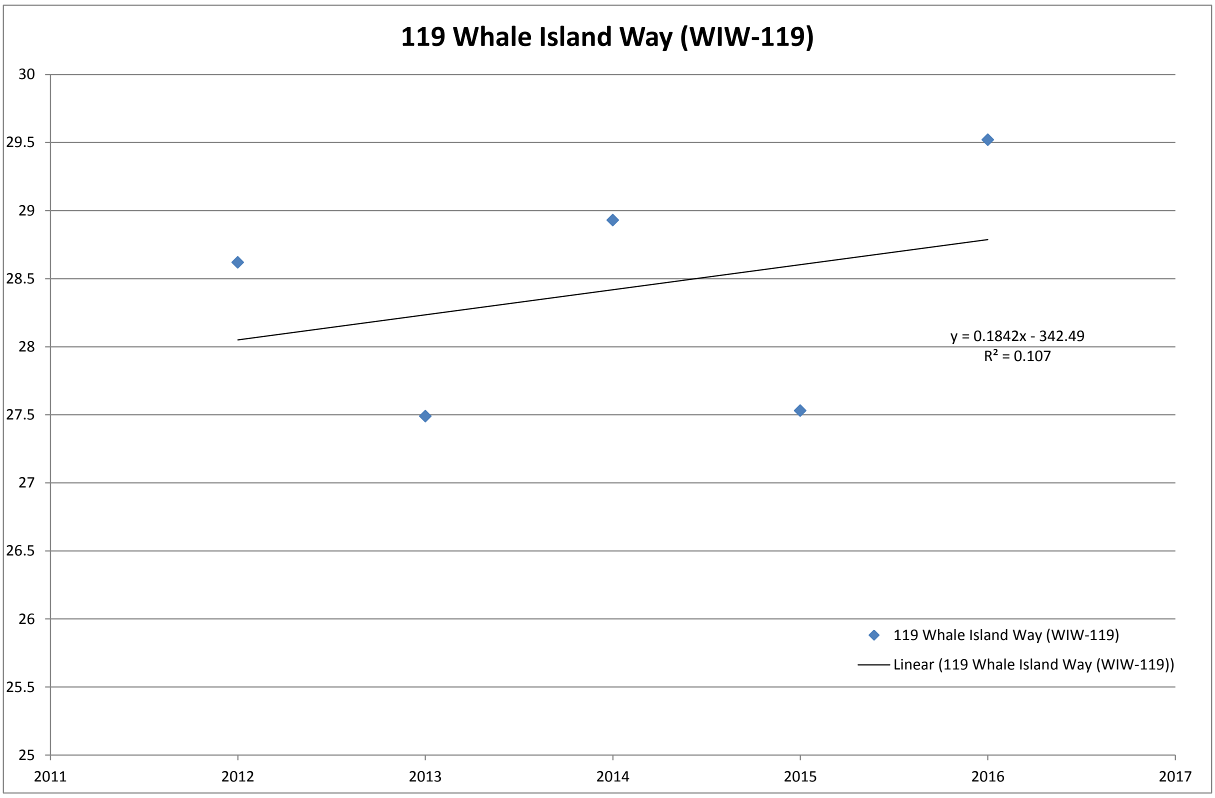


Figure F.6 – Stanley Road NDDT Data Exhibits Upward Trend

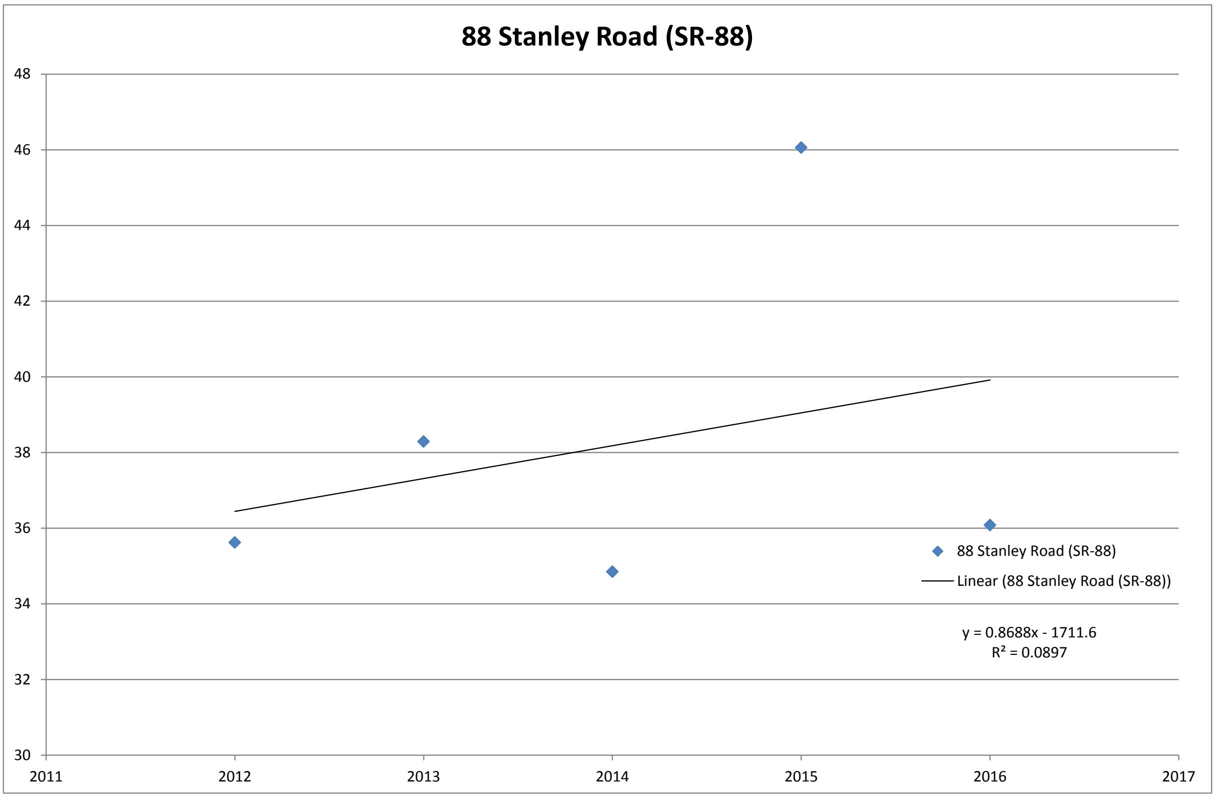


Figure F.7 – Lower Derby Road NDDT Data Exhibits Downward Trend

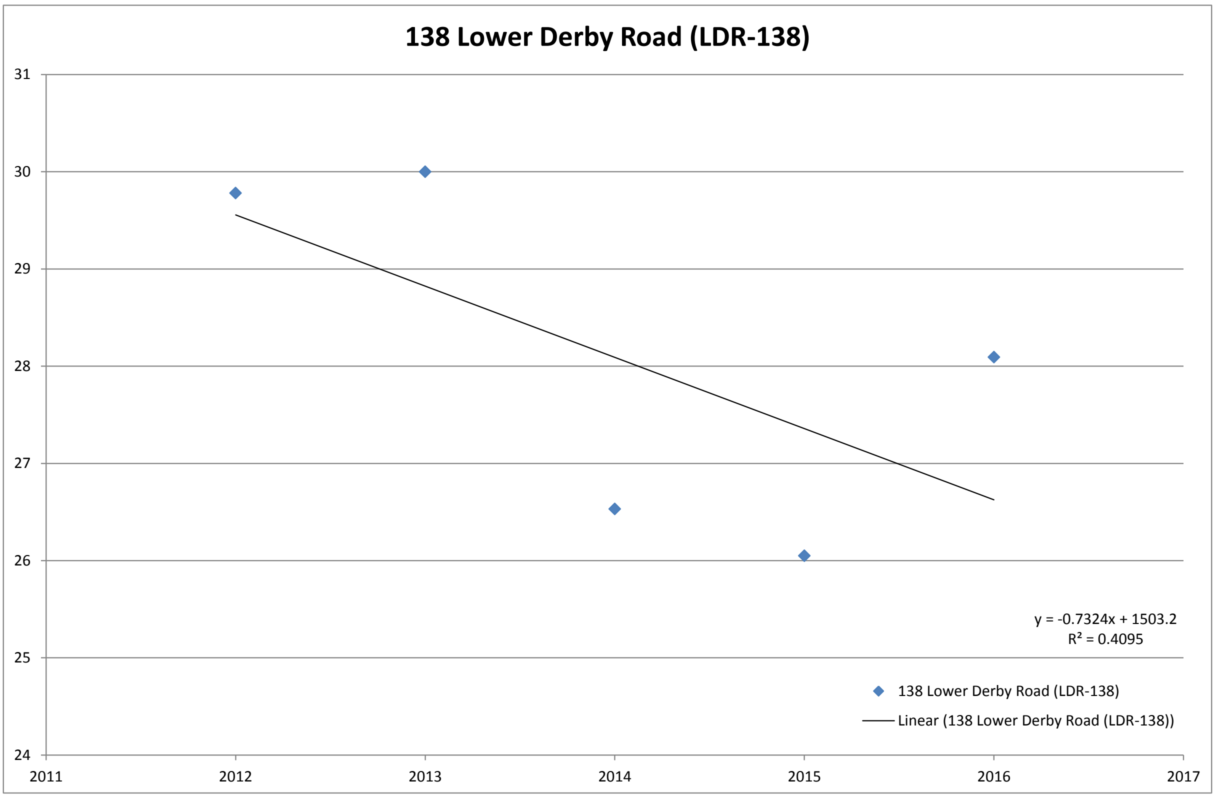


Figure F.8 – Hawthorn Crescent NDDT Data Exhibits Downward Trend

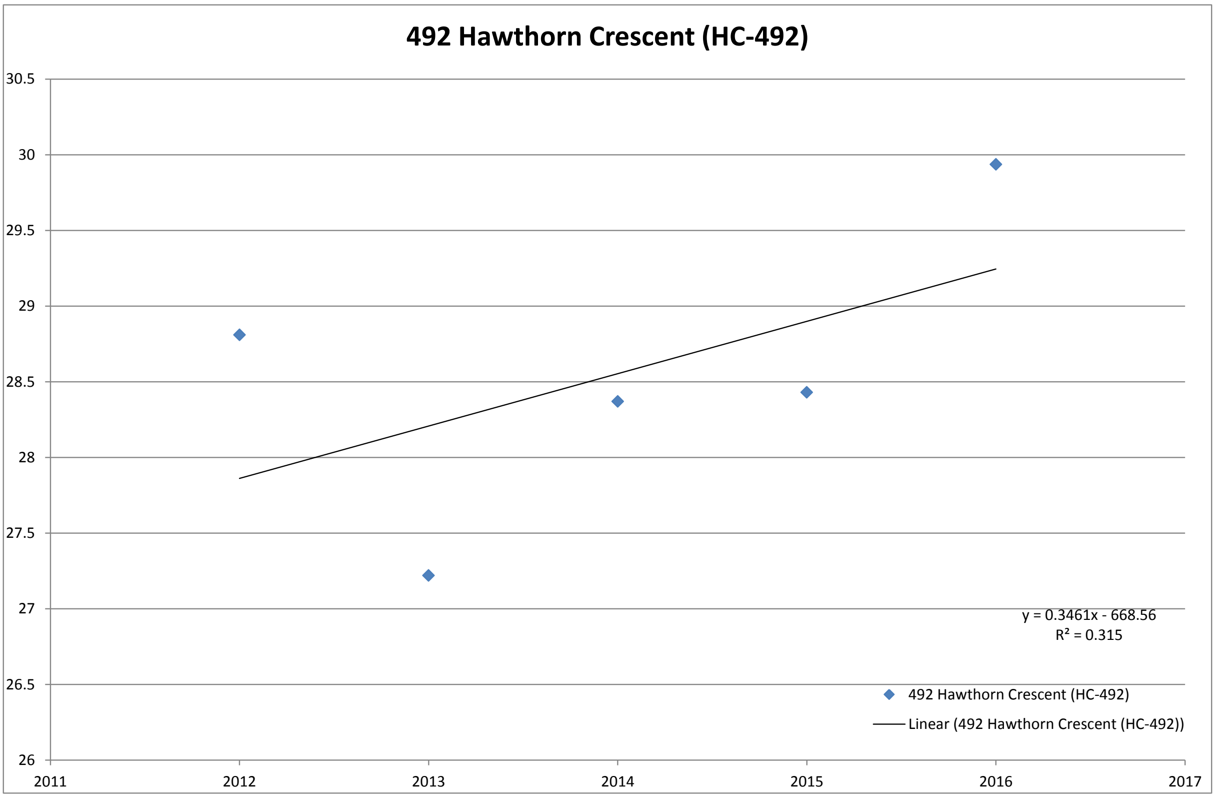


Figure F.9 – Northern Road NDDT Data Exhibits Downward Trend

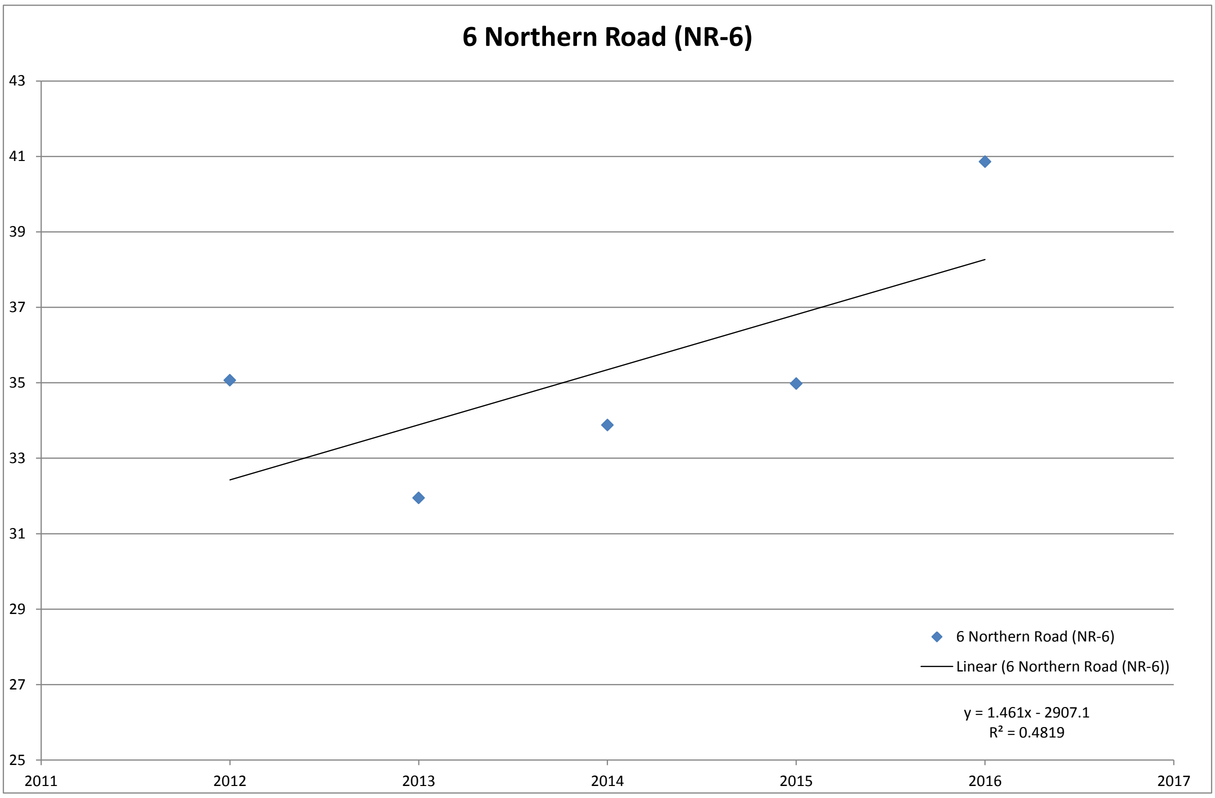


Figure F.10 – Stroudley Avenue NDDT Data Exhibits Downward Trend

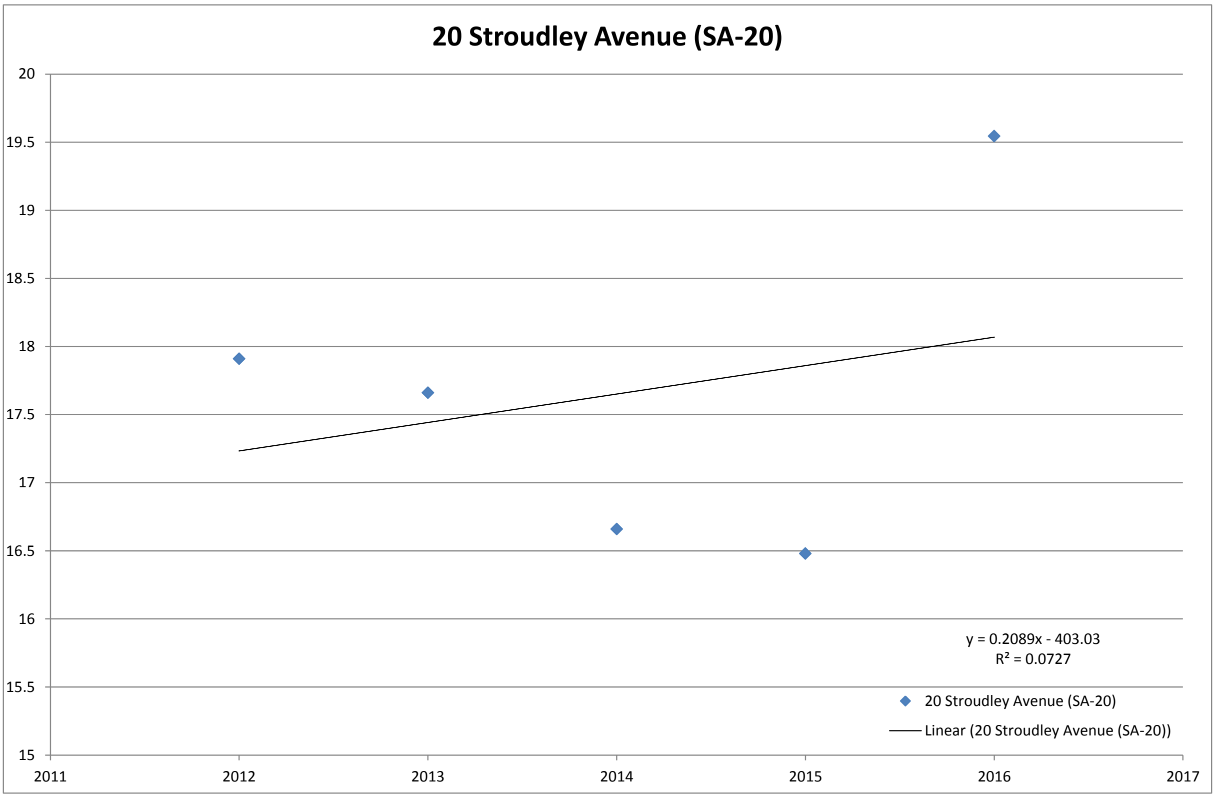


Figure F.11 – Anchorage Road NDDT Data Exhibits Downward Trend

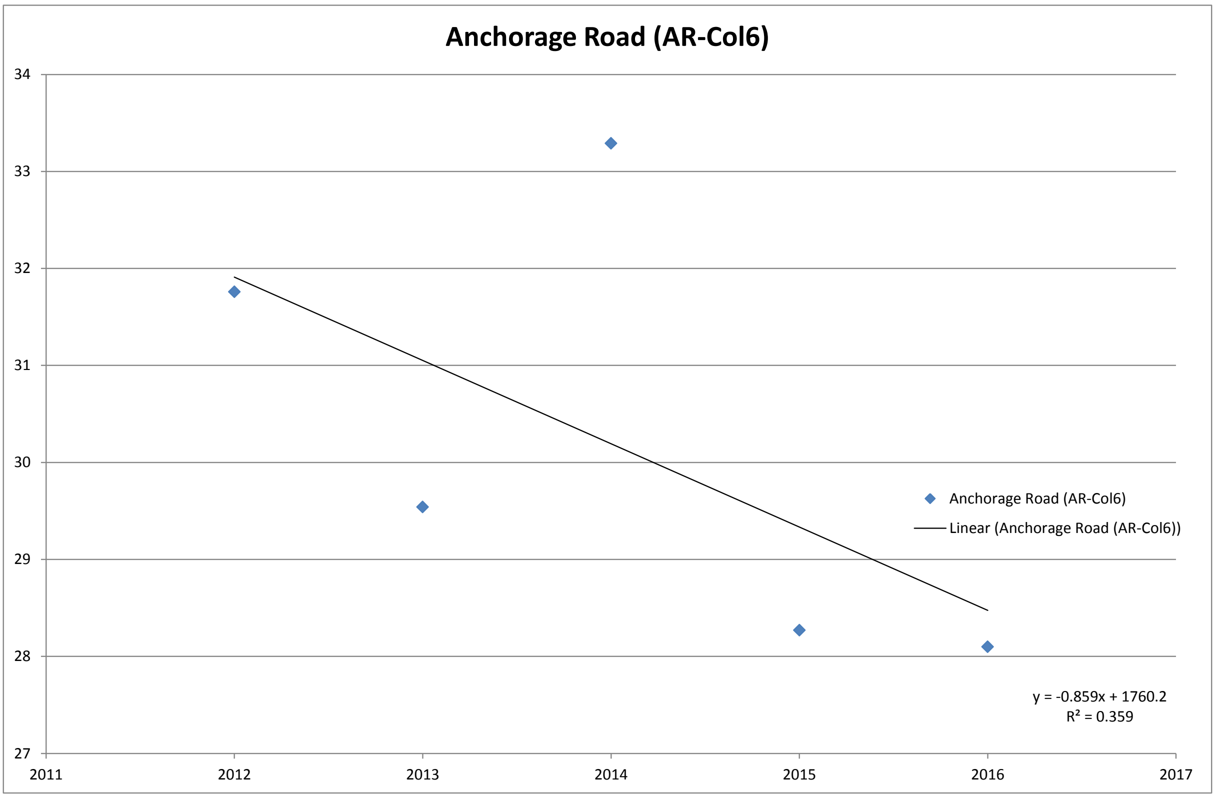


Figure F.12 – Merlyn Drive NDDT Data Exhibits Upward Trend

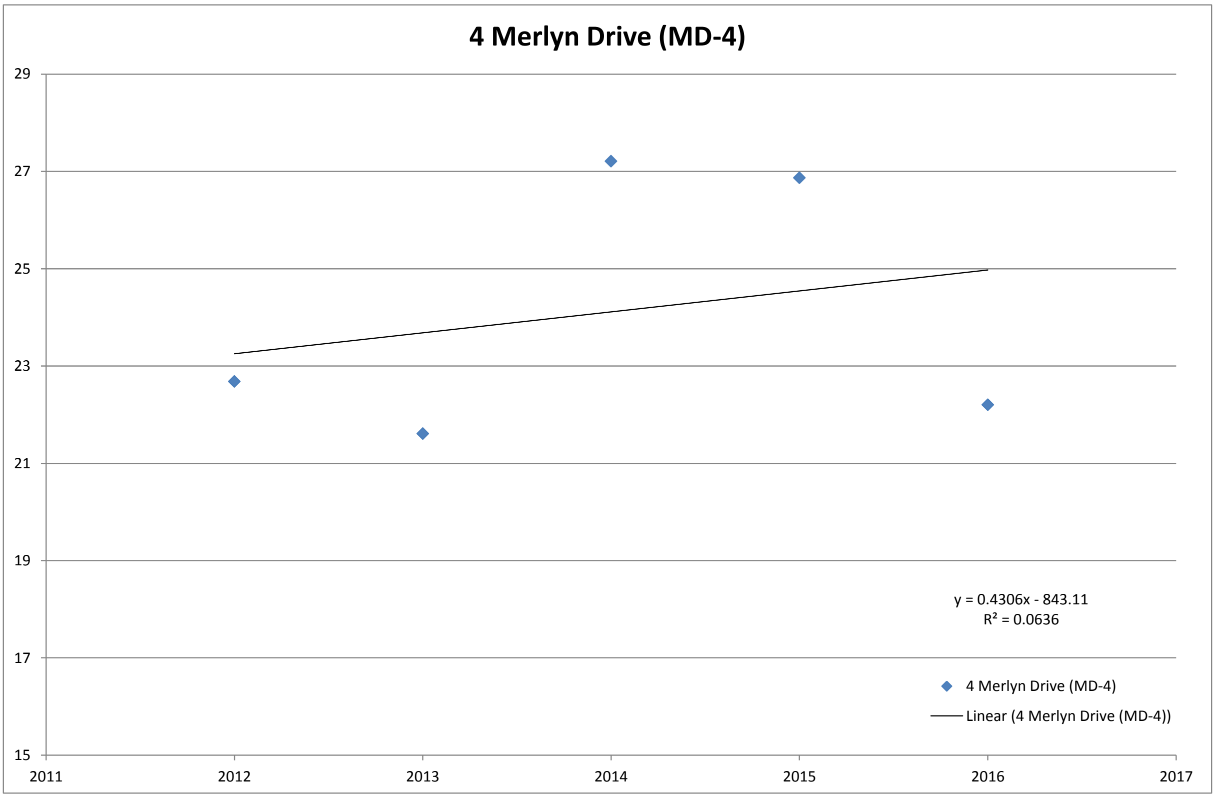


Figure F.13 – 29 Milton Road NDDT Data Exhibits Downward Trend

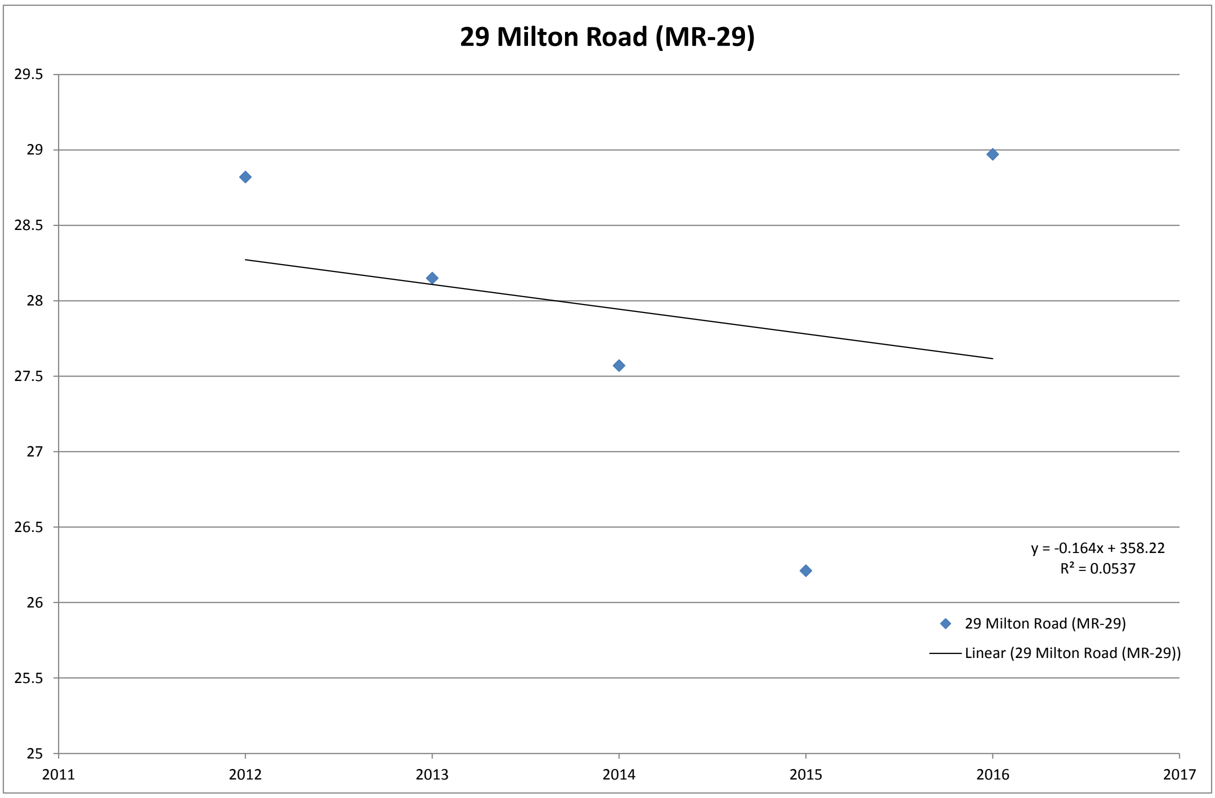


Figure F.14 – 4 Milton Road NDDT Data Exhibits Downward Trend

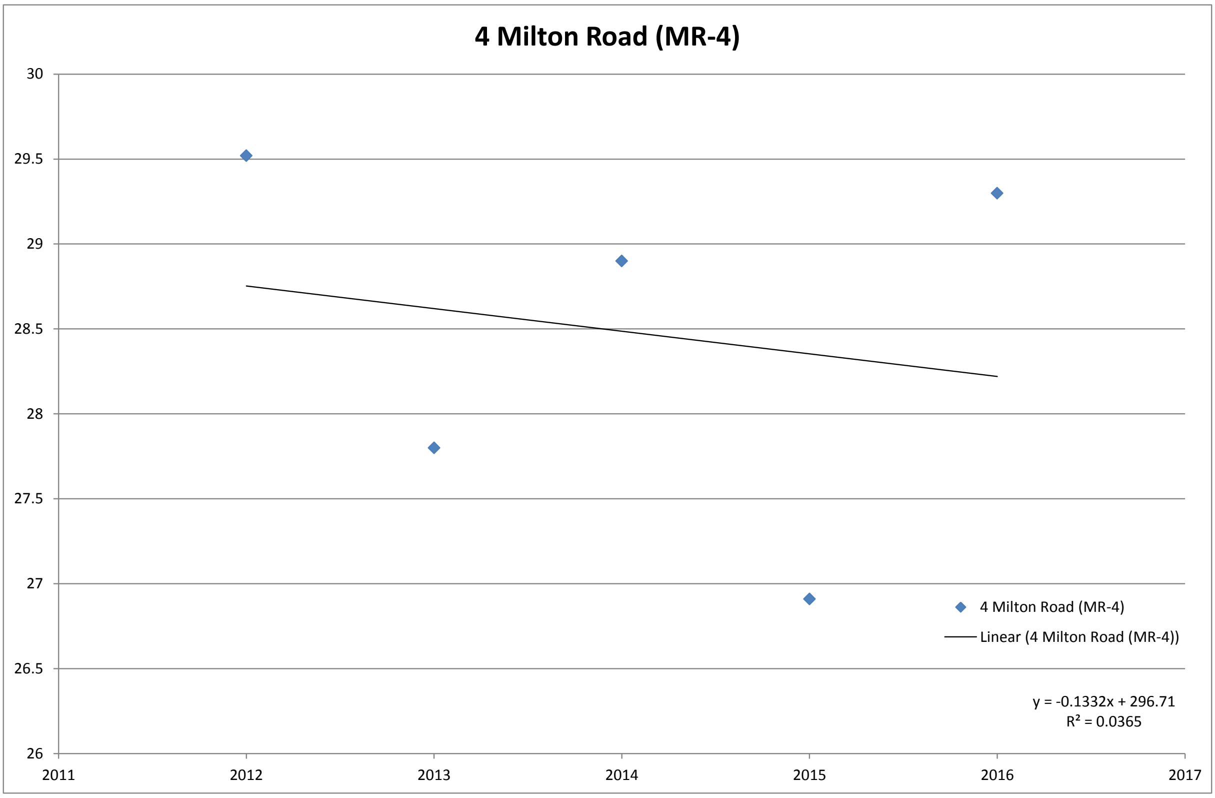


Figure F.15 – "The Tap" Public House NDDT Data Exhibits Downward Trend

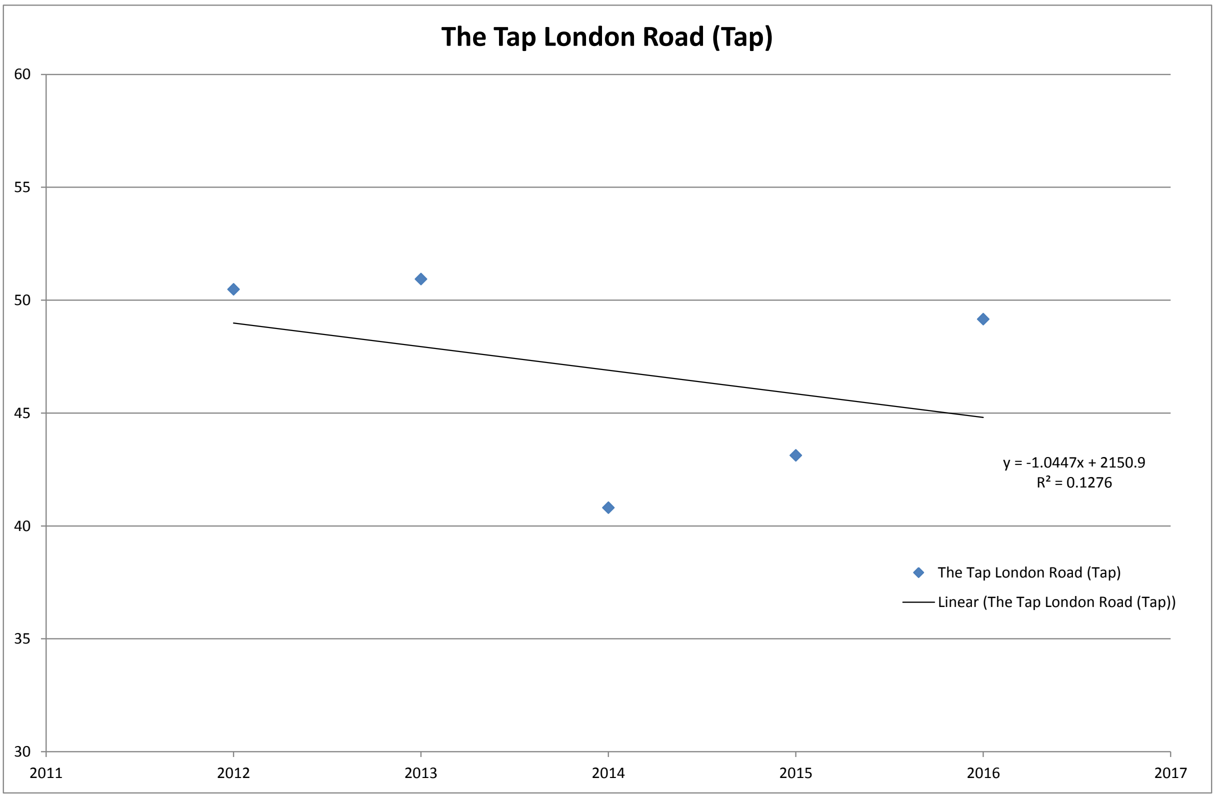


Figure F.16 – Fratton Road NDDT Data Exhibits Downward Trend

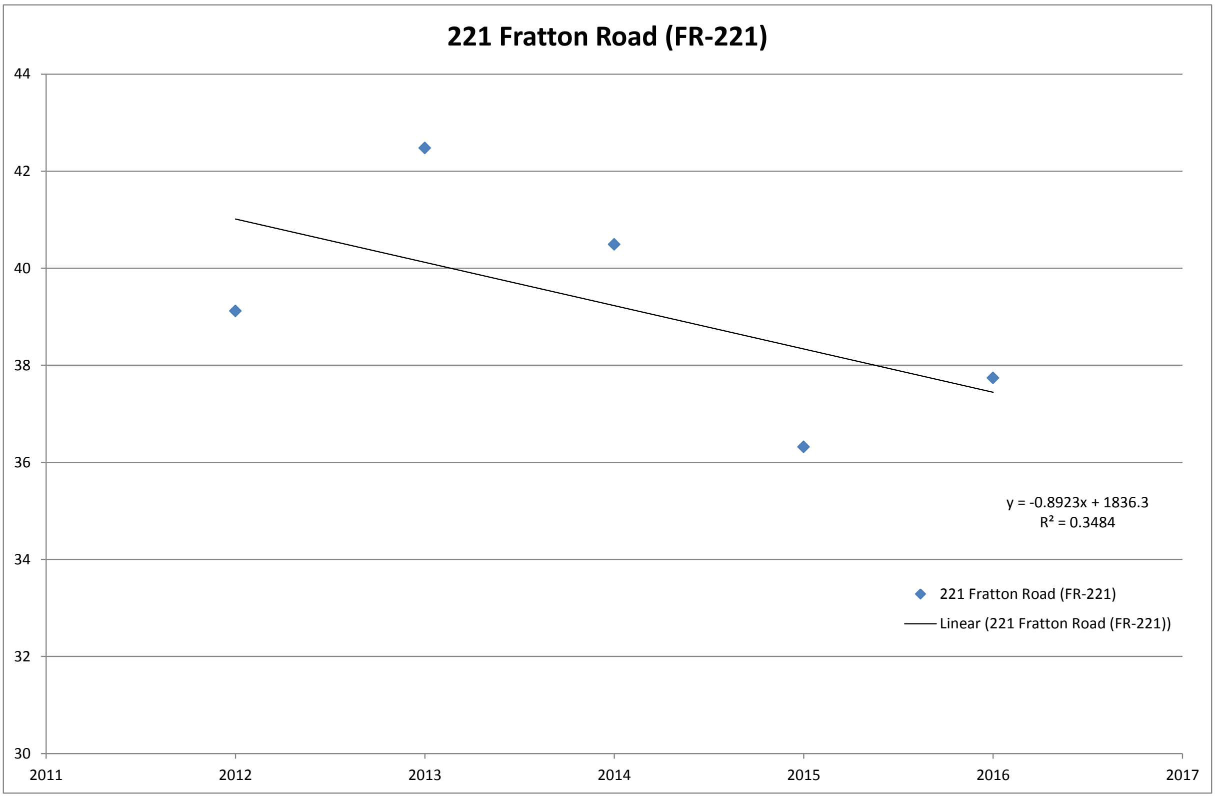


Figure F.17 – Kingston Road NDDT Data Exhibits Upward Trend

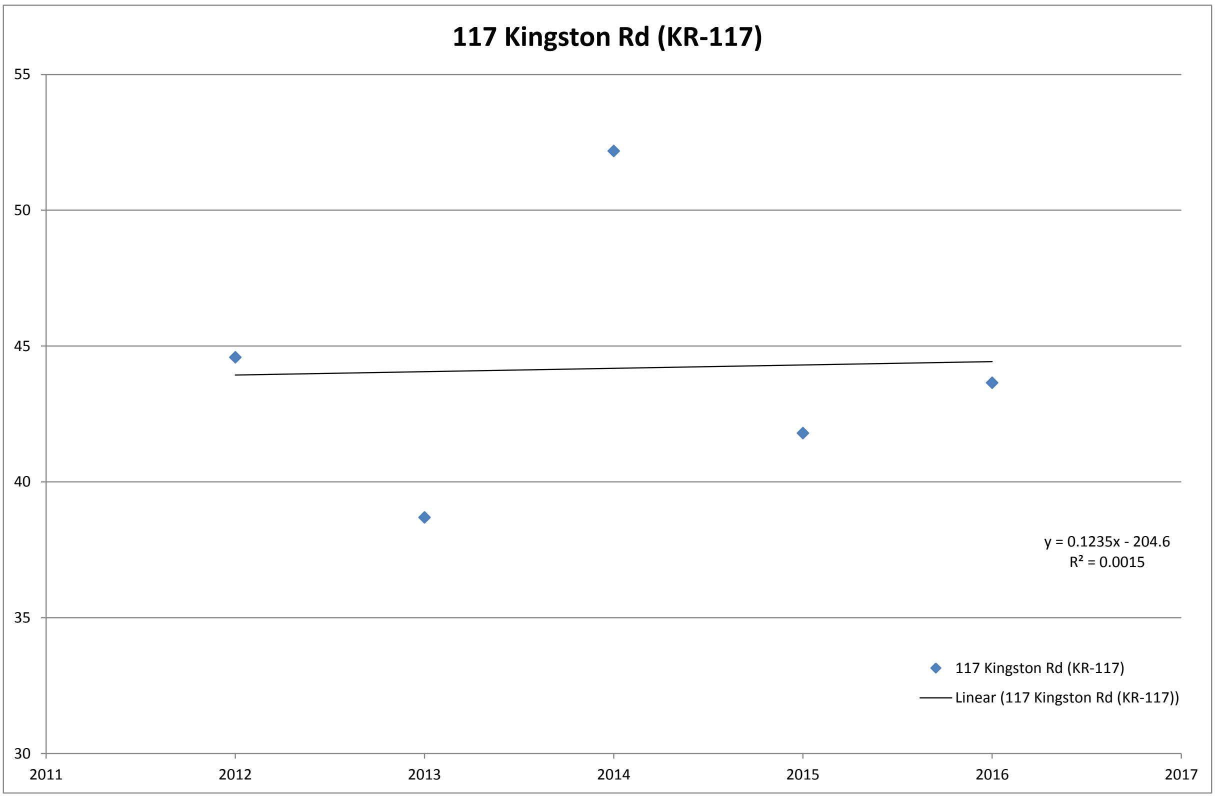


Figure F.18 – "Market Tavern" Public House Road NDDT Data Exhibits Downward Trend

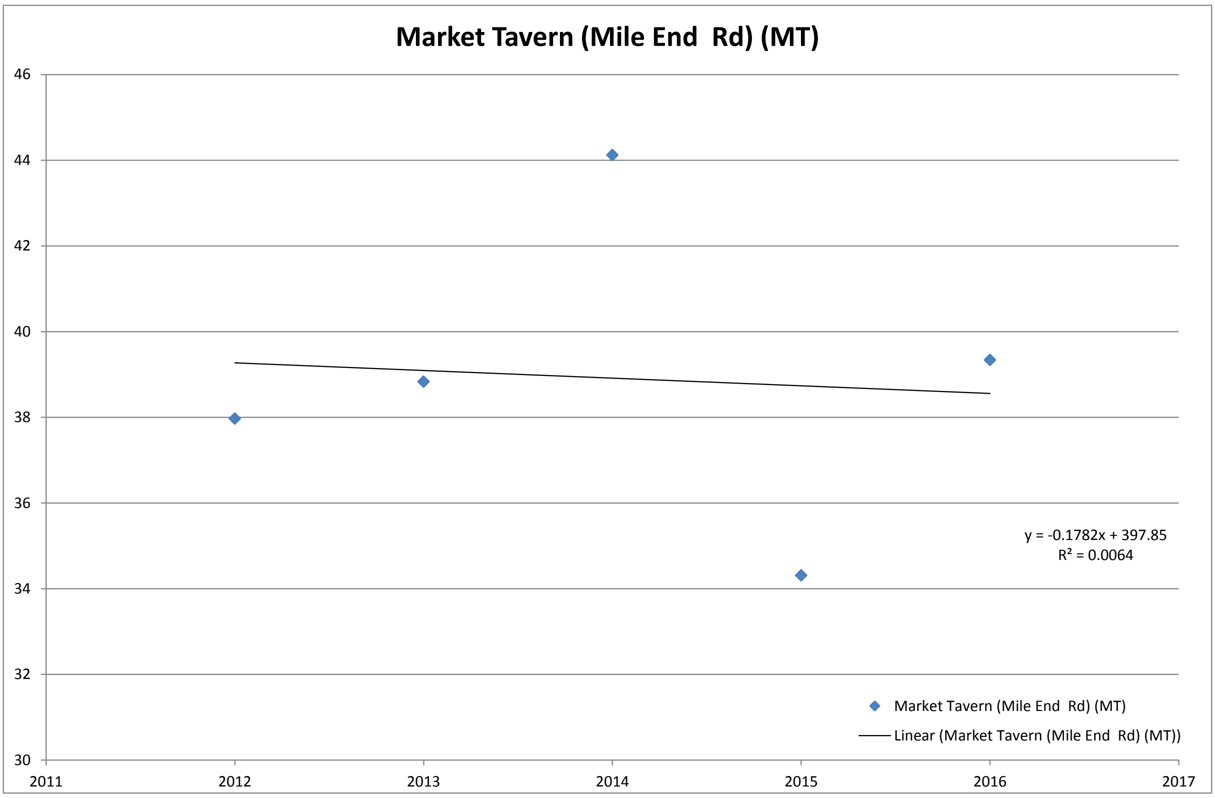


Figure F.19 – Elm Grove NDDT Data Exhibits Downward Trend

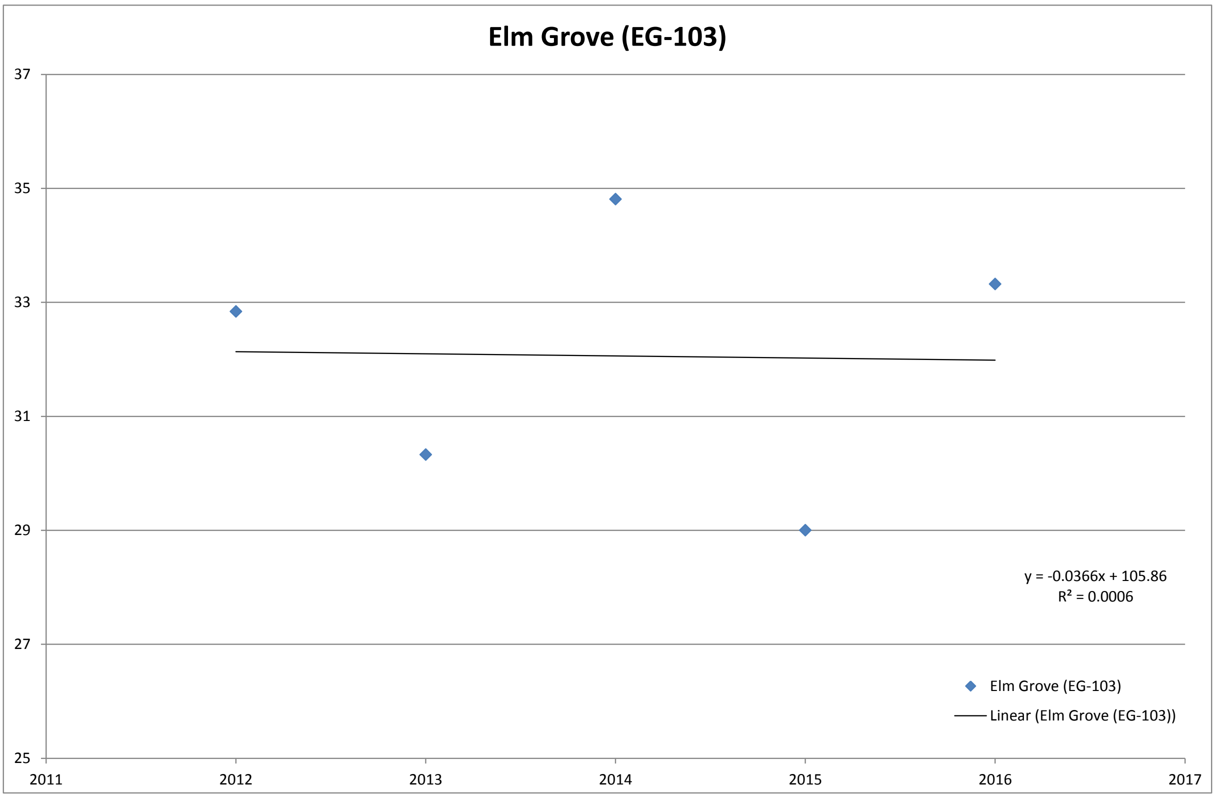


Figure F.20 – 106 Victoria Road North NDDT Data Exhibits Downward Trend

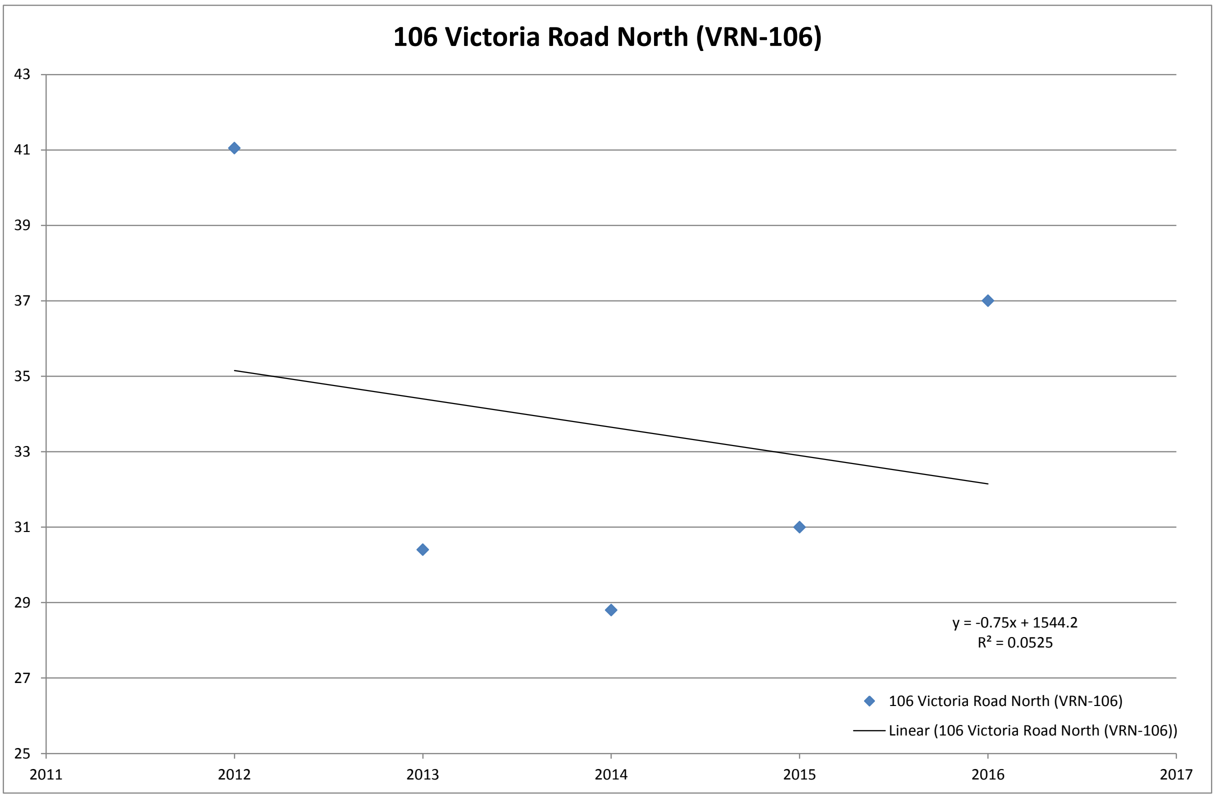


Figure F.21 – Albert Road NDDT Data Exhibits Downward Trend

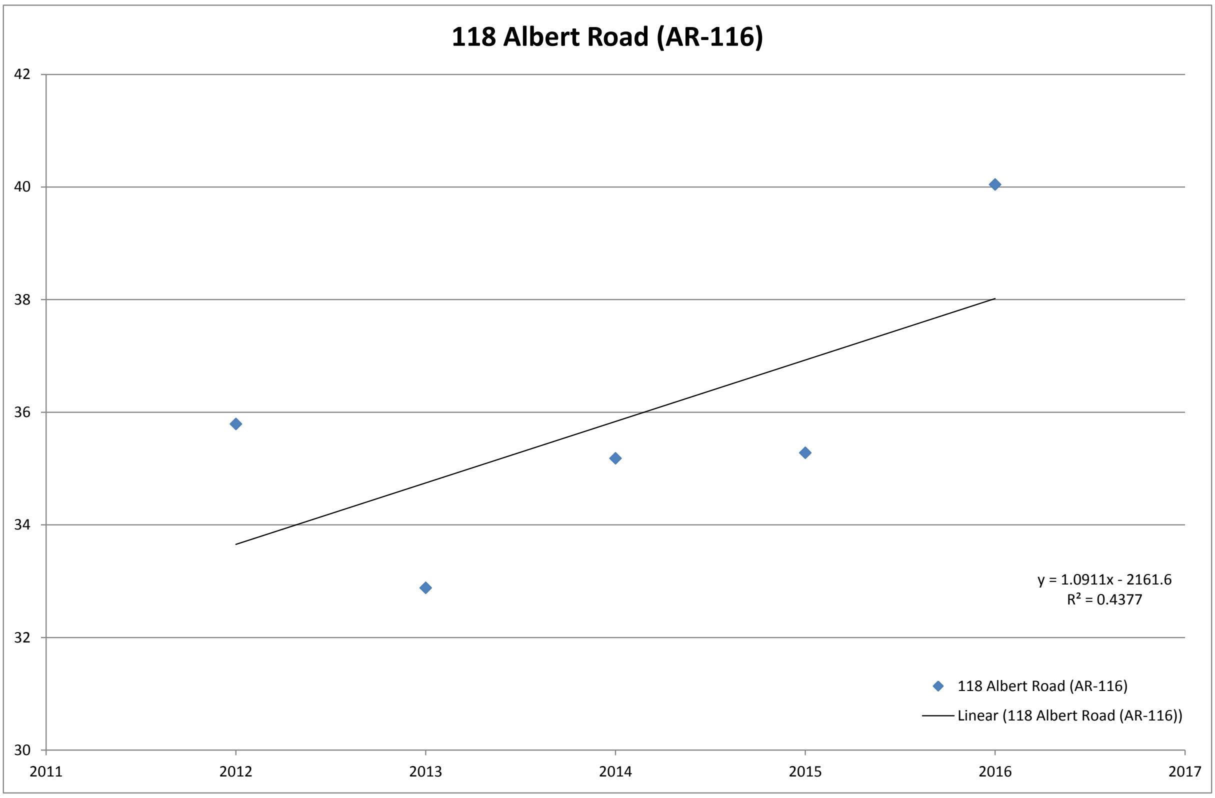


Figure F.22 – Victoria Road North NDDT Data Exhibits Downward Trend

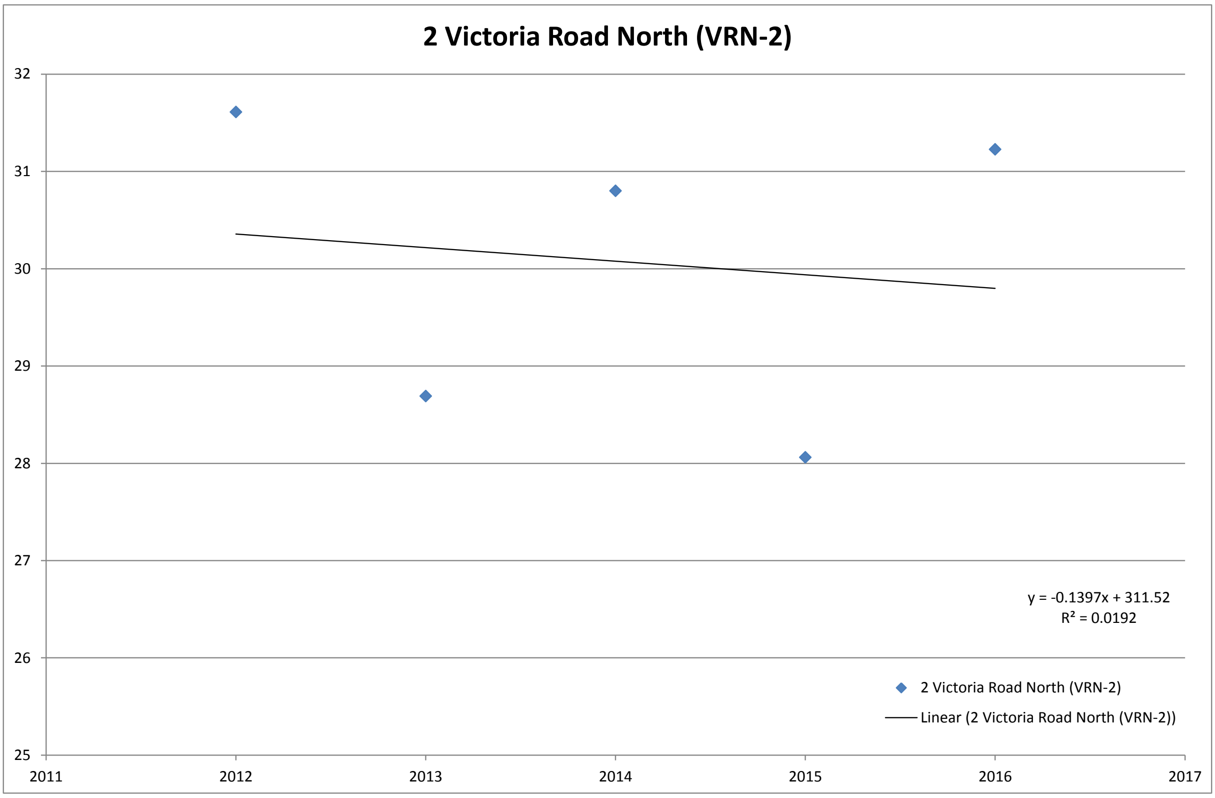


Figure F.23 – Velder Avenue NDDT Data Exhibits Downward Trend

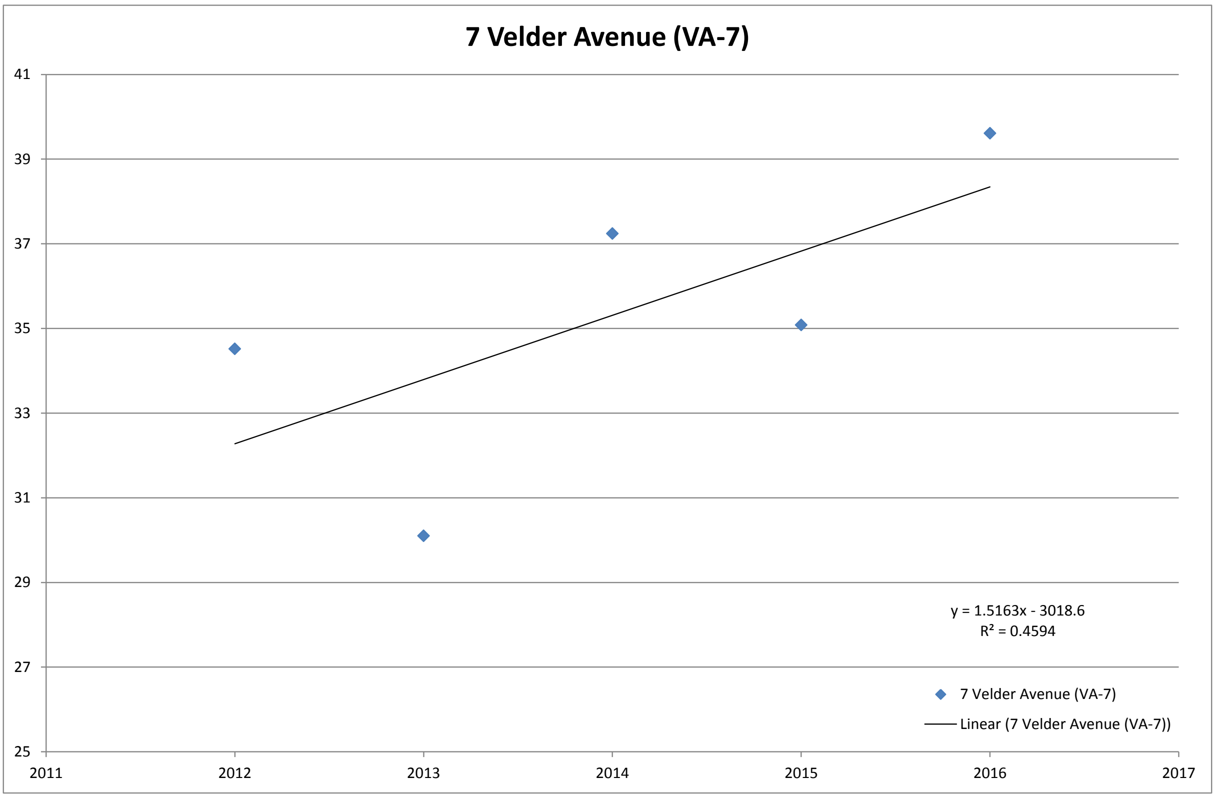


Figure F.24 – Eastney Road NDDT Data Exhibits Upward Trend

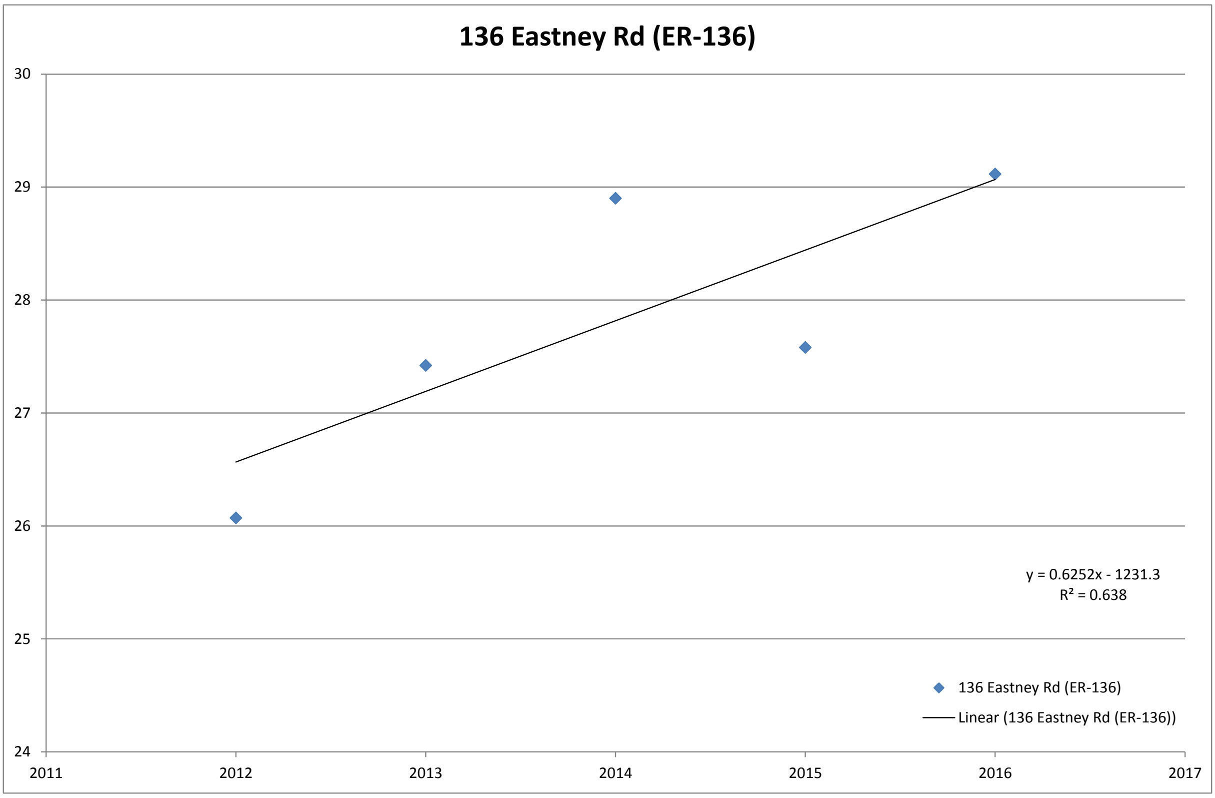


Figure F.25 – Larch Court NDDT Data Exhibits Downward Trend

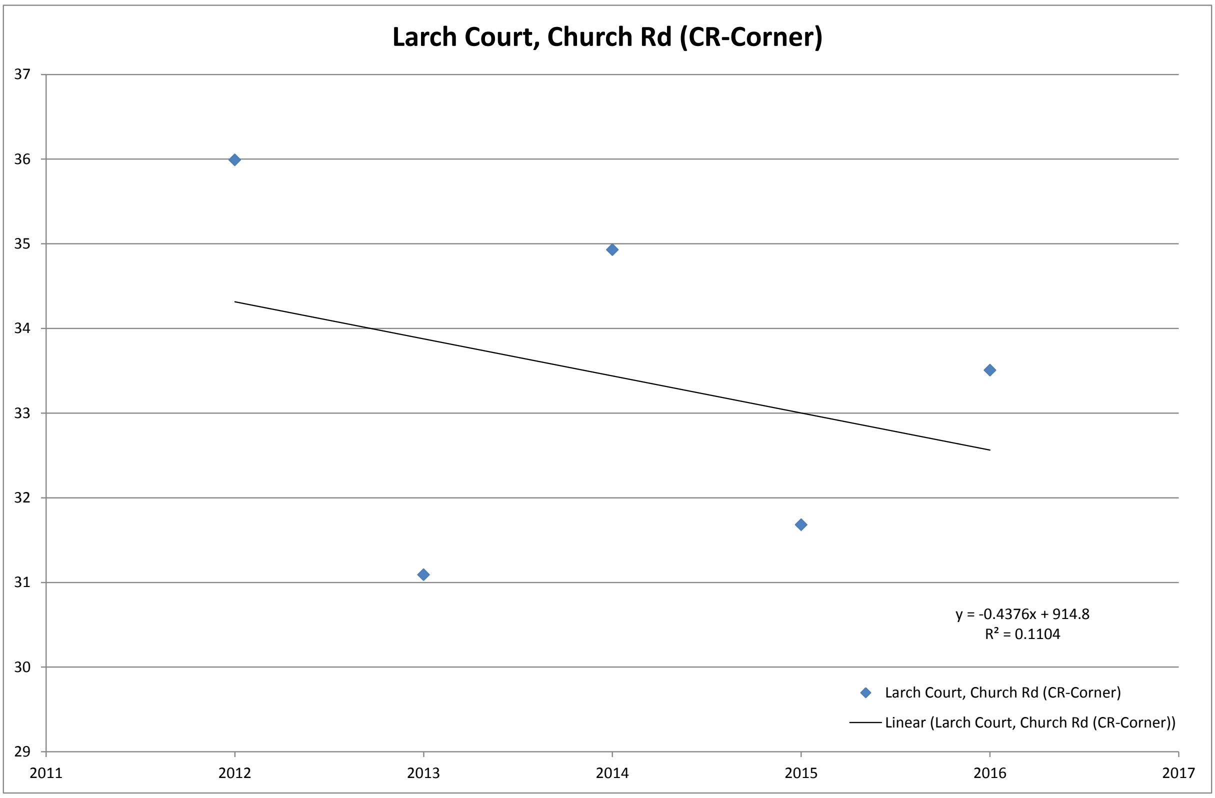


Figure F.26 – Commercial Road NDDT Data Exhibits Downward Trend

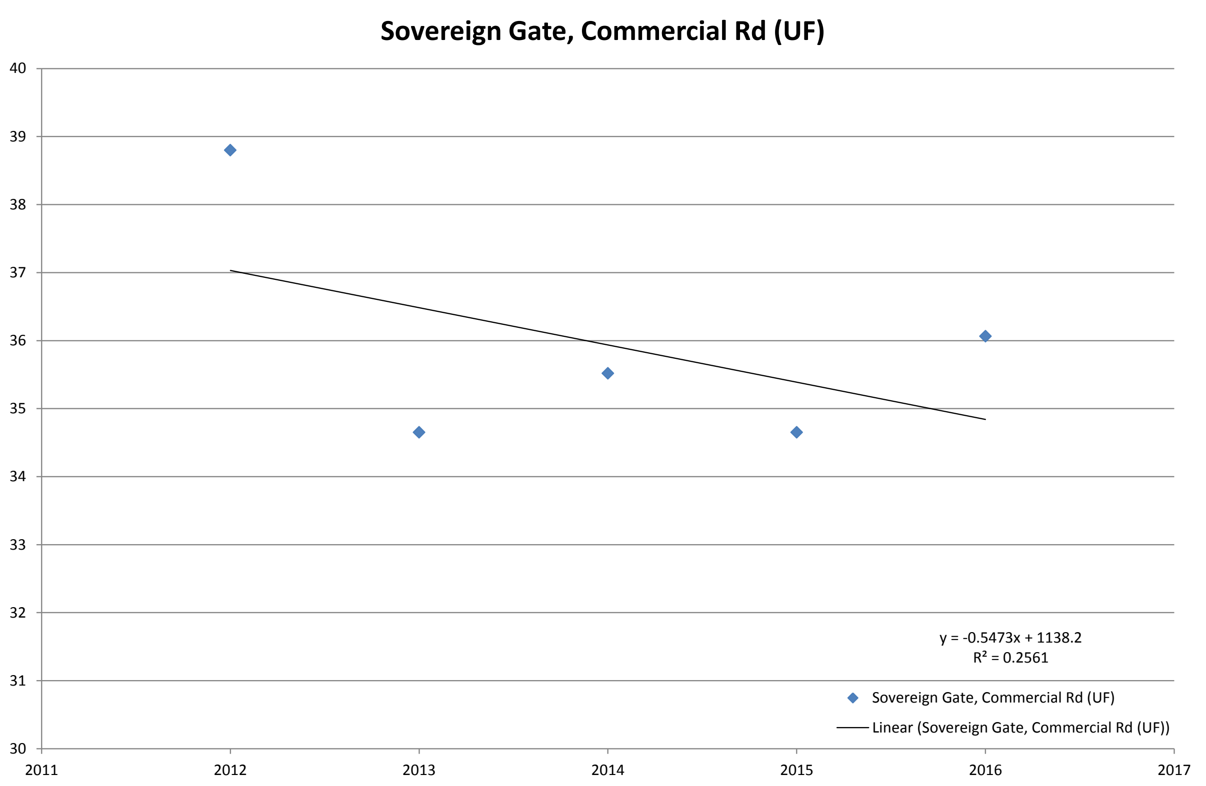


Figure F.27 – Hampshire Terrace NDDT Data Exhibits Upward Trend

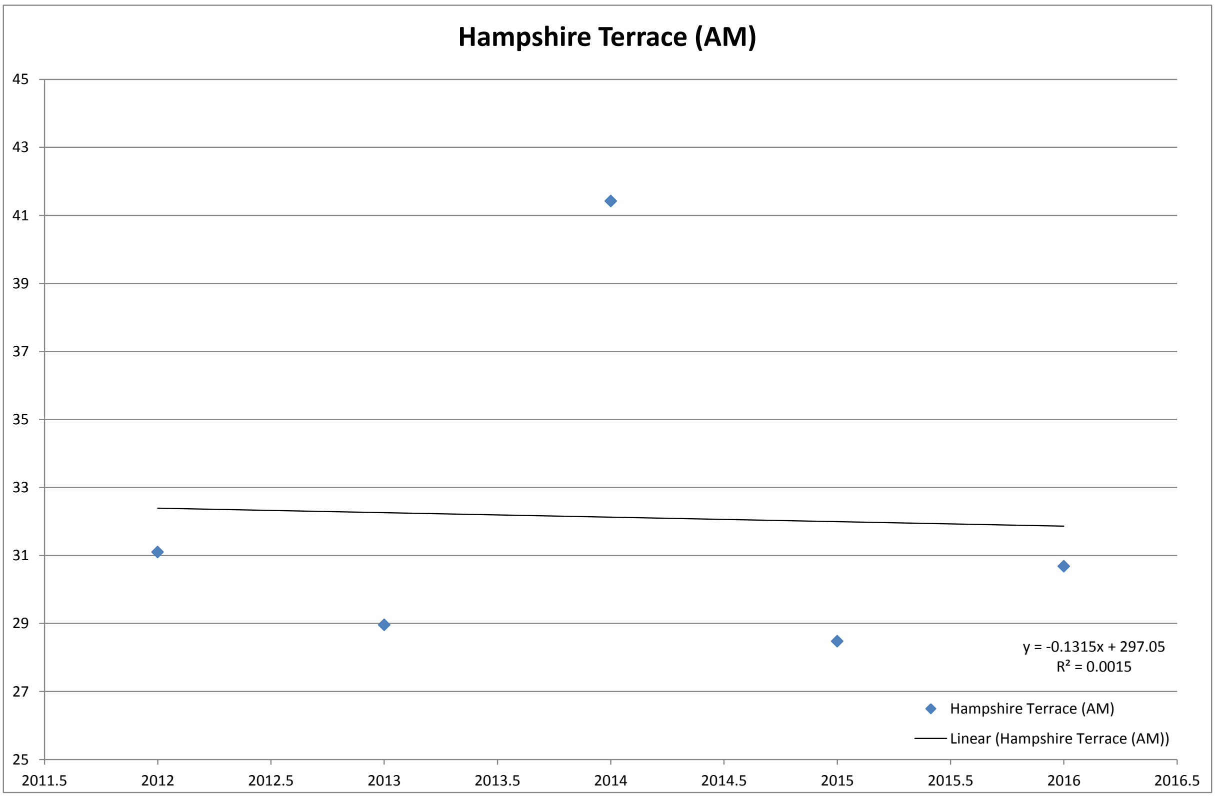


Figure F.28 – Parade Court NDDT Data Exhibits Downward

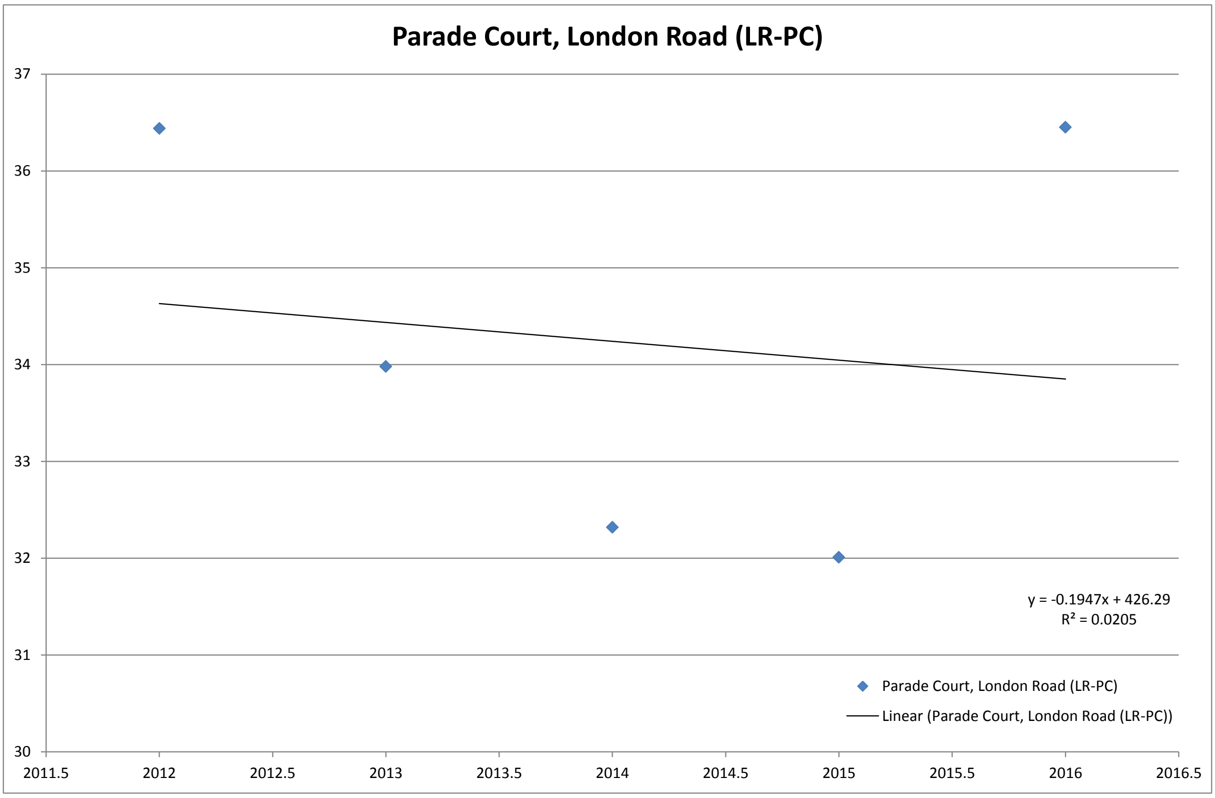


Figure F.29– London Road Continuous Monitoring Data Exhibits Downward Trend (Kerbside)

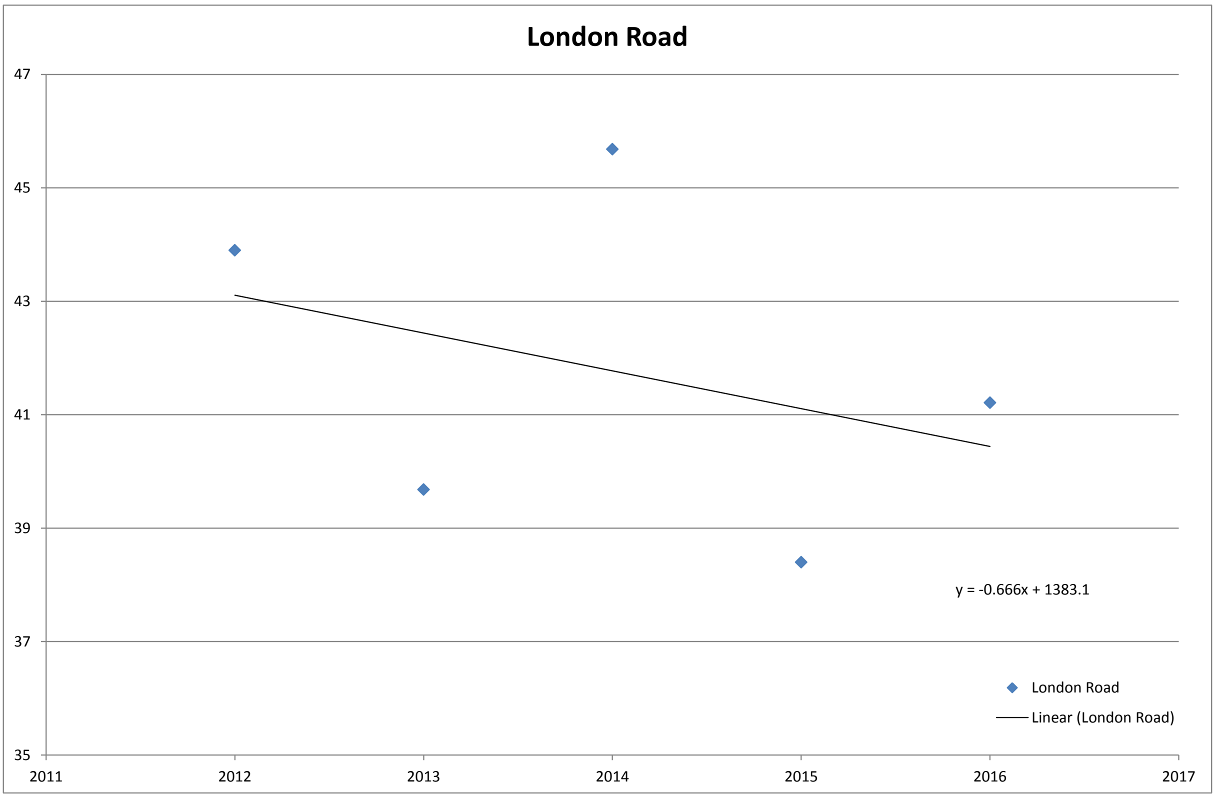


Figure F.30 – Gatcombe AURN Continuous Monitoring Data Exhibits Upward Trend (Urban Background)

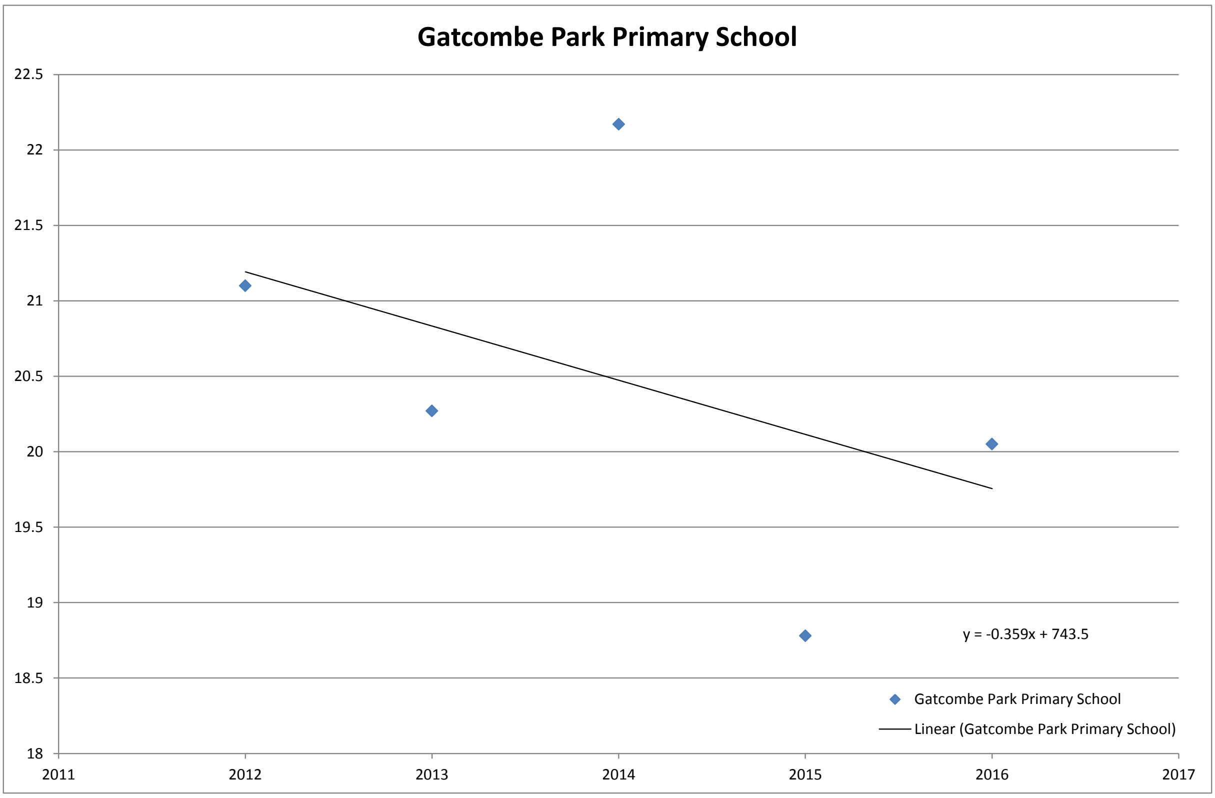


Figure F.31 – Burrfield Road Continuous Monitoring Data Exhibits Downward Trend (Roadside)

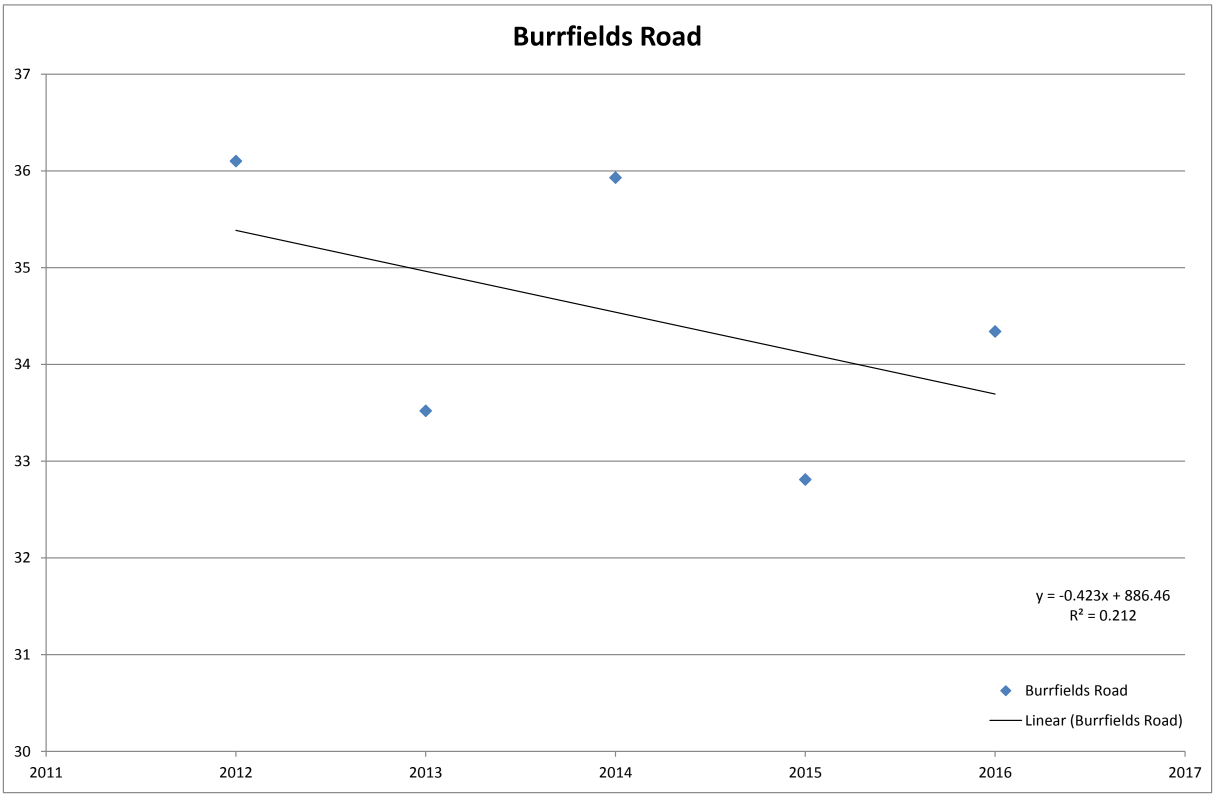


Figure F.32 – Mile End Road Continuous Monitoring Data Exhibits Downward Trend (Roadside)

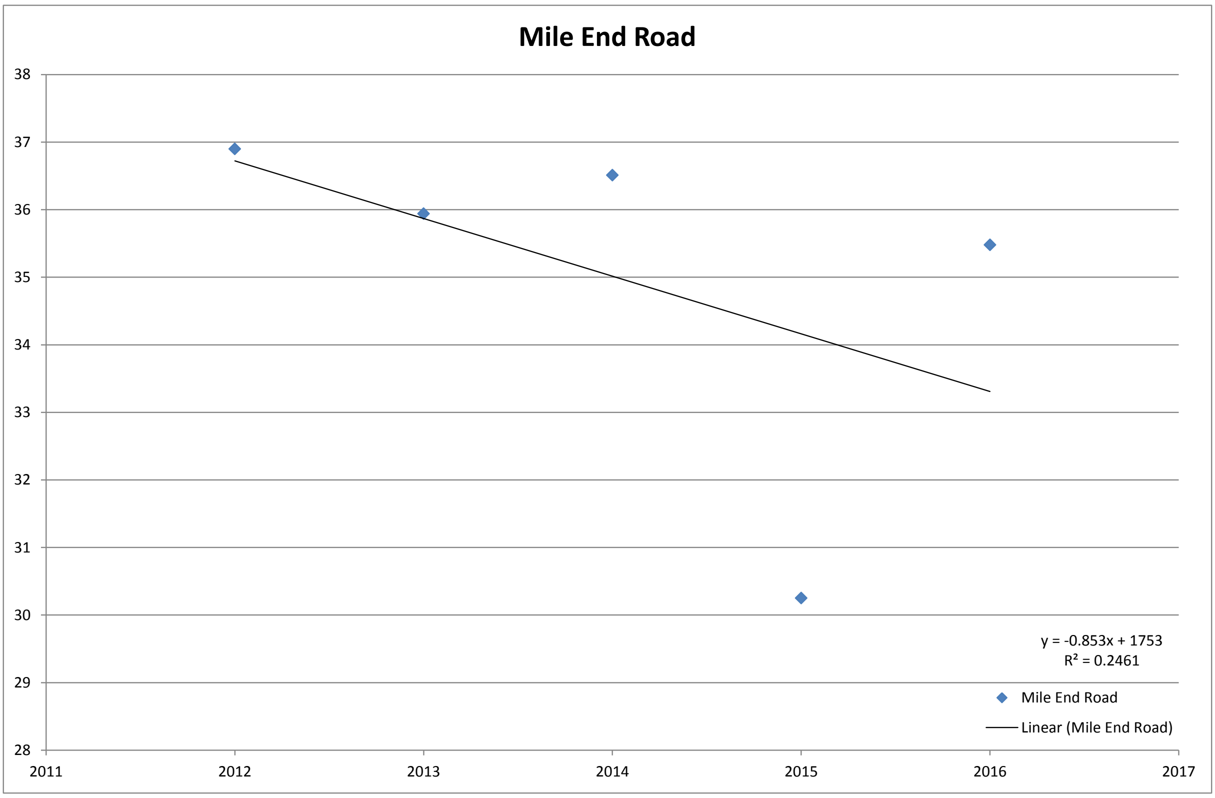


Figure F.33 – London Road PM_{10} Monitoring Data Exhibits Upward Trend (Kerbside)

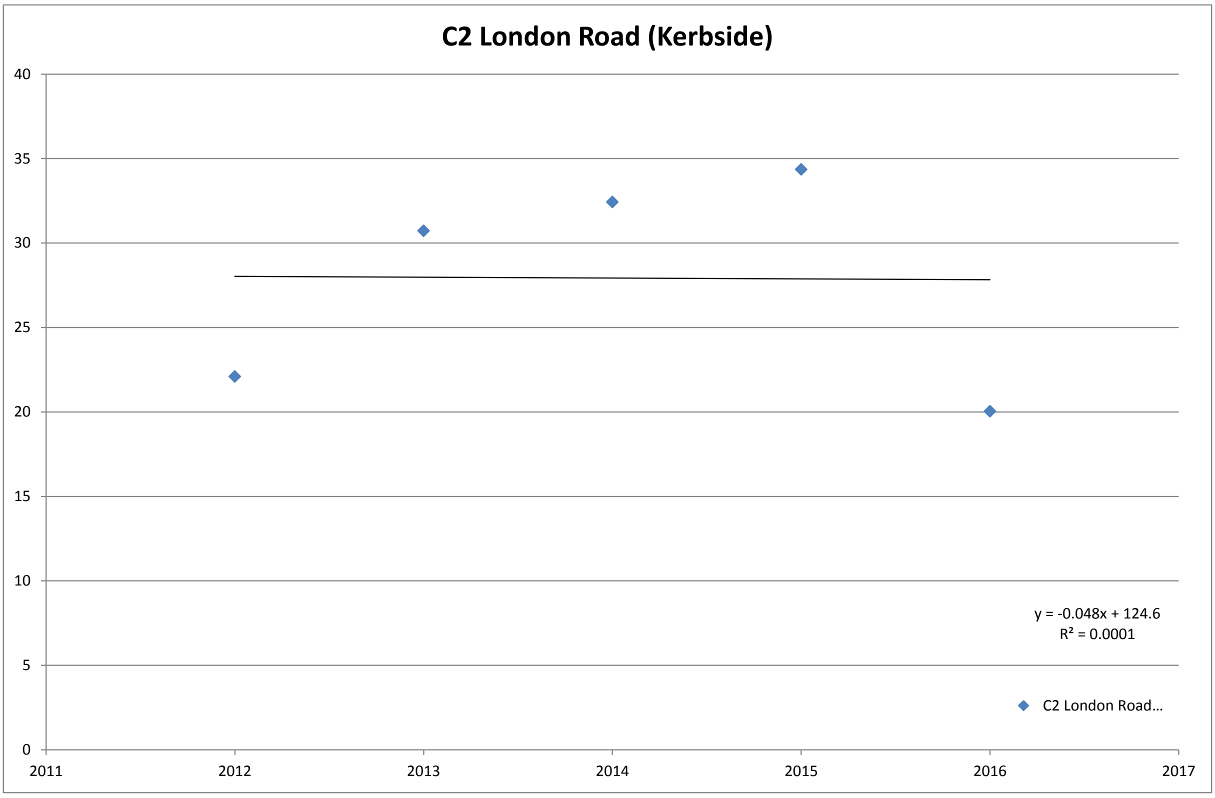


Figure F.34 – Gatcombe (AURN) PM_{10} Monitoring Data Exhibits Downward Trend (Urban Background)

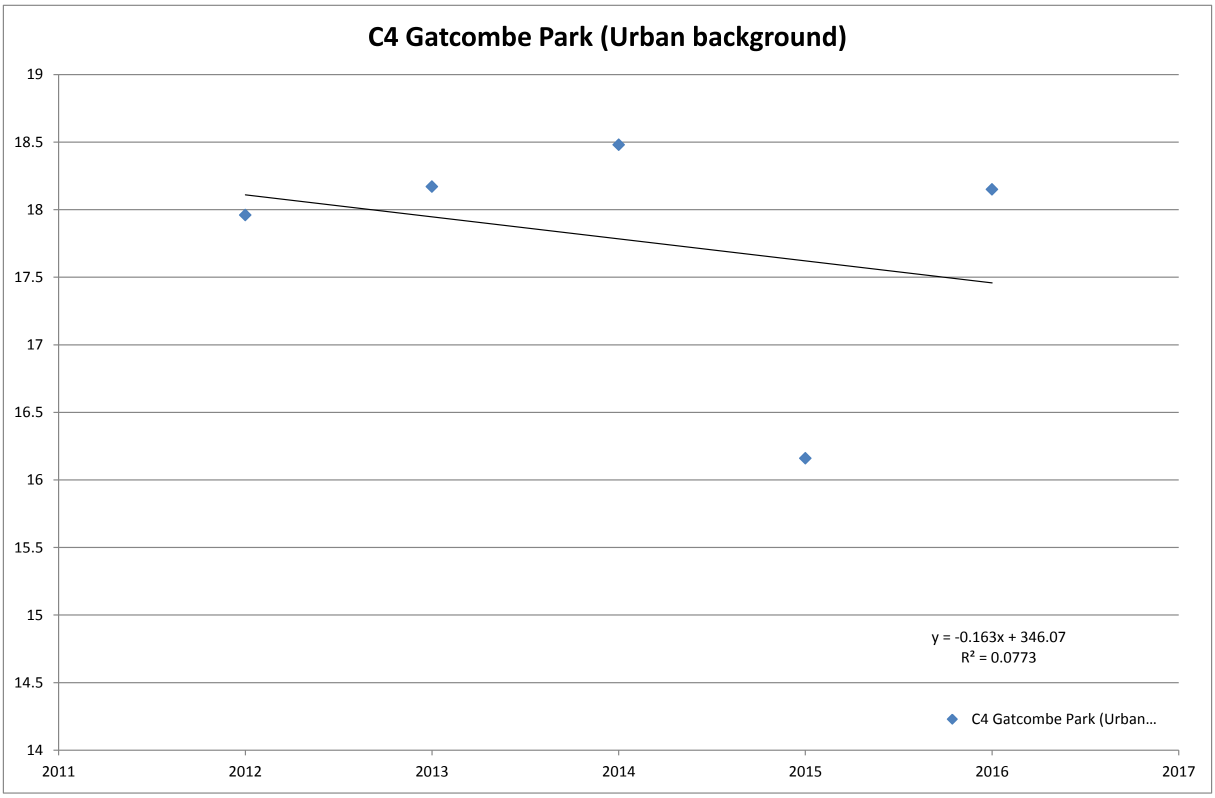


Figure F.35 – Burrfields PM_{10} Monitoring Data Exhibits Upward Trend (Roadside)

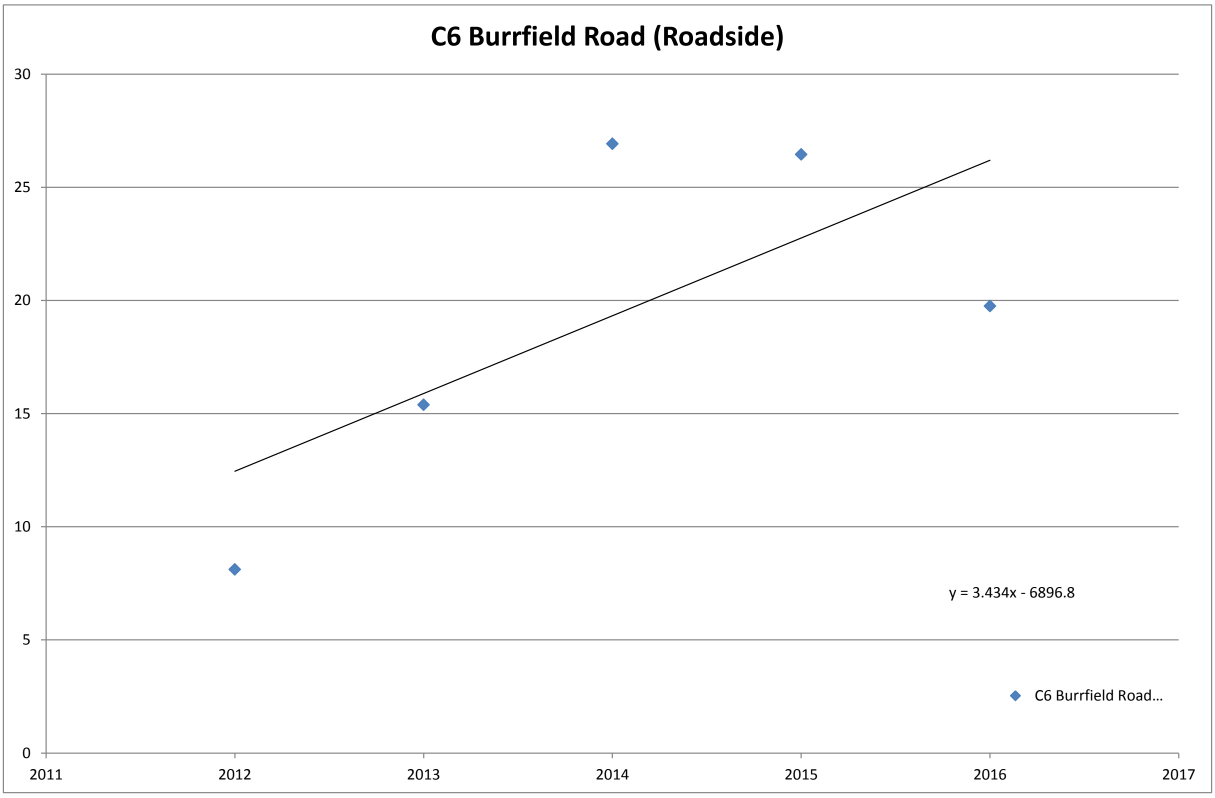


Figure F.36 – Mile End Road PM_{10} Monitoring Data Exhibits Upward Trend (Roadside)

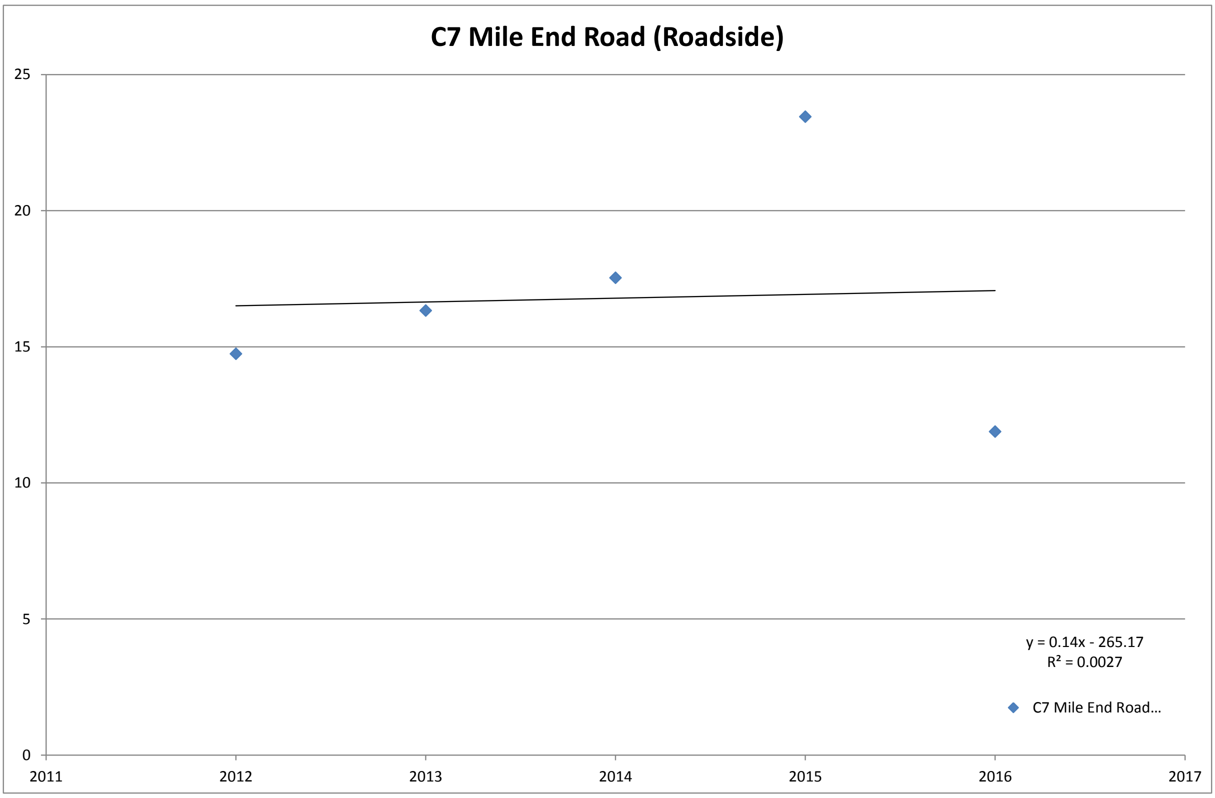
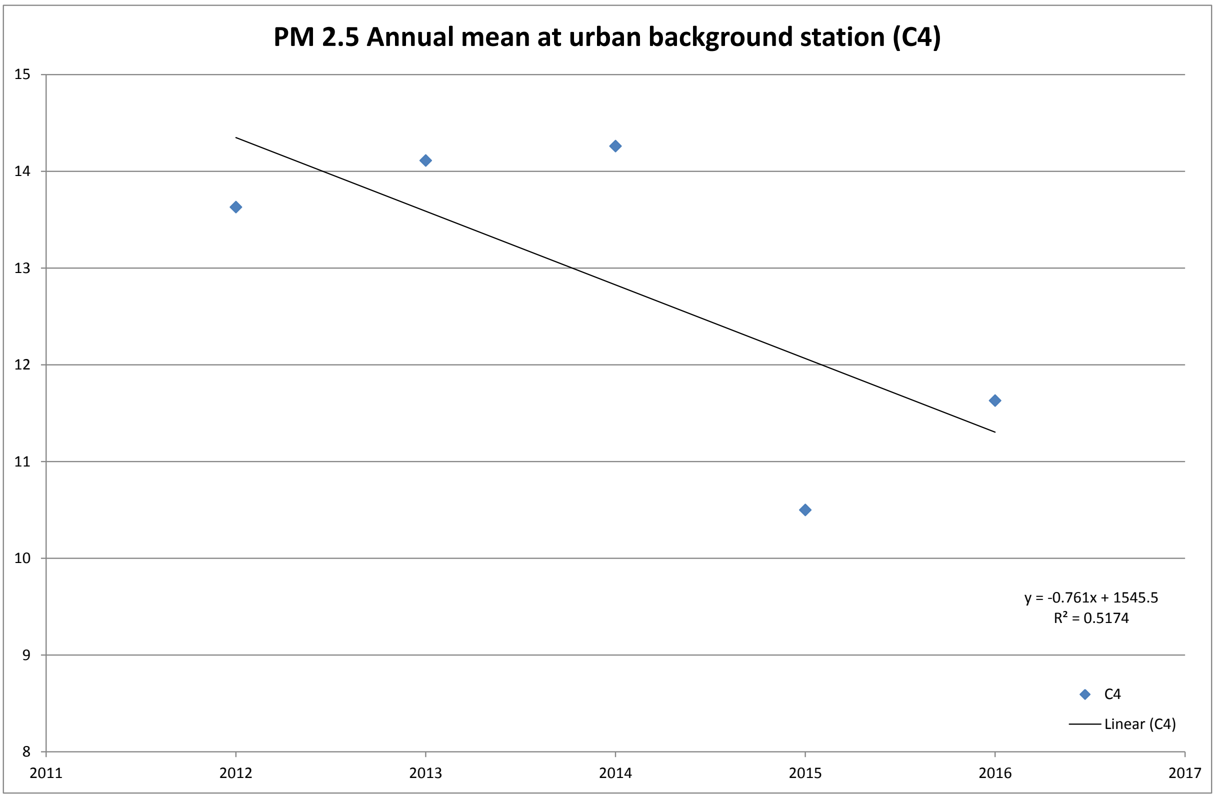


Figure F.37 – Gatcombe (AURN) $PM_{2.5}$ Continuous Monitoring Data Exhibits Downward Trend (Urban Background)



Glossary of Terms

Abbreviation	Description
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
AQS	Air Quality Strategy
DEFRA	Department for Environment Food & Rural Affairs
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
ASR	Annual Status Report
ARUN	Automatic Urban and Rural Network
CAQMS	Continuous Air Quality Monitoring Station
CAQMS	Continuous Air Quality Monitoring Station
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
FA	Further Assessment
LA	Local Authority
LAQ	Local Air Quality
LAQM	Local Air Quality Management
LAQRA	Local Air Quality Review and Assessment
LAQAP	Local Authority Air Quality Action Plan
NAQO	National Air Quality Objective
NDDT	Nitrogen Dioxide Diffusion Tubes
NDDTS	Nitrogen Dioxide Diffusion Tubes Survey
NO_x	Nitrogen Oxides
PCC	Portsmouth City Council
QA / QC	Quality Assurance and Quality Control
SAS	Source Apportionment Study
SO_2	Sulphur Dioxide