Worcestershire
Regulatory Services
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Detailed Assessment: Air Quality in Stourport on Severn for Wyre Forest District Council

March 2015

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Executive Summary

Previous rounds of Local Authority review and assessment highlighted the need for a detailed assessment for Nitrogen Dioxide (NO_2) at High Street, Bridge Street, New Street and York Street in Stourport-on-Severn. This was undertaken in 2012 however too many uncertainties were contained in the report to enable a defined area for declaration of an Air Quality Management Area (AQMA). Wyre Forest District Council took the decision to extend the diffusion tube network and gain a full year's automatic monitoring data in order to have confidence in and fully define the area of concern.

This detailed assessment using both modelled and monitored concentrations determines whether an exceedence of an air quality objective is likely and the geographic extent of that exceedence based on a more complete data set.

Monitoring in Stourport on Severn takes place for nitrogen dioxide only and consists of a network of 15 NO_2 diffusion tubes of which 9 locations are relevant to this assessment and a single automatic monitor.

Modelling was undertaken using ADMS roads dispersion model and verified against 10 diffusion tube locations along High Street, Bridge Street, New Street and York Street together with the automatic analyser located in High Street.

Uncertainty is inherent in all measured and modelled data and all of the measured concentrations presented have an intrinsic margin of error. The model results are compared with measurements and in this case corrected for the apparent under-prediction of the model so the uncertainties are reduced. The results of the final adjusted NO_2 concentrations at 4.5m first floor height, the relevant receptors, are all below 32 µg/m3, even allowing for error and uncertainty these concentrations are well below the guideline values for NO_2 and there is no requirement to declare an AQMA

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1 Introduction

Wyre Forest District Council (WFDC) lies within the county of Worcestershire. It is surrounded by Bromsgrove DC, Wychavon DC, Malvern Hills DC, South Staffordshire DC, and Shropshire Council areas. It has a population of approximately 98,000 (2011 census data). It includes three main towns Kidderminster, Stourport-on-Severn and Bewdley.

The District is traversed by several A-roads including the A451, A456 and A442 and is served by a national rail services at Kidderminster station providing services to London and Birmingham.

The subject of this assessment, Stourport-on-Severn (population 20,112) is a popular inland tourist attraction and boating centre and lies at the junction of the River Severn and the Staffordshire and Worcestershire Canal, approximately 5 miles south of Kidderminster.

The aim of this detailed assessment is to determine if the annual mean nitrogen dioxide objective is exceeded at relevant locations and the extent of the exceedence and thus the boundary of an Air Quality Management Area (AQMA).

Background

The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Defra, 2007) sets out a framework for air quality management, which includes a number of air quality objectives. National and international measures are expected to achieve these objectives in most locations, but where areas of poor air quality remain, air quality management at a local scale has a particularly important role to play. Part IV of the Environment Act 1995 requires local authorities to periodically review and assess air quality in their areas. The role of this process is to identify areas where it is unlikely that the air quality objectives will be achieved. These locations must be designated as AQMAs and a subsequent Air Quality Action Plan (AQAP) developed in order to reduce pollutant emissions in pursuit of the objectives. Review and Assessment is a long-term, ongoing process, structured as a series of ‘rounds’. Local Authorities in England, Scotland and Wales have now largely completed the first, second, third, fourth and fifth rounds of Review and Assessment.

Technical Guidance for Local Air Quality Management (LAQM.TG (09)) (Defra, 2009) sets out a phased approach to the Review and Assessment process. This prescribes an initial Updating and Screening Assessment (USA), which all local authorities must undertake. It is based on a checklist, to identify any matters that have changed since the previous round. If the USA identifies any areas where there is a risk that the objectives may be exceeded, which were not identified in the previous round, then the Local Authority should progress to a Detailed Assessment

The purpose of the Detailed Assessment is to determine whether an exceedence of an air quality objective is likely and the geographical extent of that exceedence. If the outcome of the Detailed Assessment is that one or more of the air quality objectives are likely to be exceeded, then an AQMA must be declared. Subsequent to the declaration of an AQMA, confirmation that the AQMA declaration is justified; and that the appropriate area has been declared; the sources contributing to the exceedence identified; the magnitude of reduction in emissions required to achieve the objective, are required, to inform an Air Quality Action Plan (AQAP), which will identify measures to improve local air quality.

This report represents a Detailed Assessment in the fifth round of Review and Assessment.

Air Quality Objectives

The air quality objectives applicable to LAQM in England are set out in the Air Quality (England) Regulations 2000 (SI 928), The Air Quality (England) (Amendment) Regulations 2002 (SI 3043), and are shown in Table 1.1. This table shows the objectives in units of micrograms per cubic metre µg/m^3 (milligrammes per cubic metre, mg/m^3 for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).

Table 1.1 Air quality objectives for the purposes of LAQM in England

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 µg/m^3	Running annual mean	31.12.2003
	5.00 µg/m^3	Annual mean	31.12.2010
1,3-Butadiene	2.25 µg/m^3	Running annual mean	31.12.2003
Carbon monoxide	10 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.50 µg/m^3	Annual mean	31.12.2004
	0.25 µg/m^3	Annual mean	31.12.2008
Nitrogen dioxide	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µg/m^3	Annual mean	31.12.2005
Particulate Matter (PM_{10}) (gravimetric)	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 µg/m^3	Annual mean	31.12.2004
Sulphur dioxide	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

2 Assessment Methodology

Monitoring

For the purposes of this assessment monitoring for nitrogen dioxide in the study area of Stourport-on-Severn has been carried out by Wyre Forest District Council using a real time analyser and 10 passive diffusion tube sites (one site co-located with the automatic monitoring site). The monitoring sites and study area are shown in Figure 1.

The diffusion tubes were prepared and analysed by ESG, Didcot using the 20% TEA in water preparation method. It is necessary to adjust diffusion tube data to account for laboratory bias. The ESG bias-adjustment factor for 2013 is 0.85 and is based on three studies (National Diffusion Tube Bias-Adjustment Spreadsheet version 09/14) however a single local co-location study has been undertaken in Worcestershire to determine a local bias-adjustment factor. Triplicate NO_2 diffusion tubes were exposed alongside an automatic (chemiluminescent) NO_2 analyser at High Street, Stourport-on-Severn, Worcestershire. Overall data capture at the automatic analyser was good (99-100% for 11 months of the 12 month study) Overall good precision between the automatic analyser and the co-located diffusion tubes was observed. The local bias-adjustment factor has been calculated using AEA Energy and Environment precision and accuracy spreadsheet (v.04). The calculated local bias-adjustment factor for 2013 was 0.98

Diffusion tube results for 2013 have been adjusted using the bias-adjustment factor derived from the local co-location study at Stourport-on-Severn as the National Diffusion Tube Bias-Adjustment Spreadsheet (v.09/14) contains data from fewer than five studies using ESG and the 20% TEA in water preparation methodology and lack of confidence in the ESG national bias-adjustment factor as it's accuracy remains low.

Details of the monitoring locations are included in Table 1.2.

Figure 1 Automatic analyser location and non-automatic monitoring locations

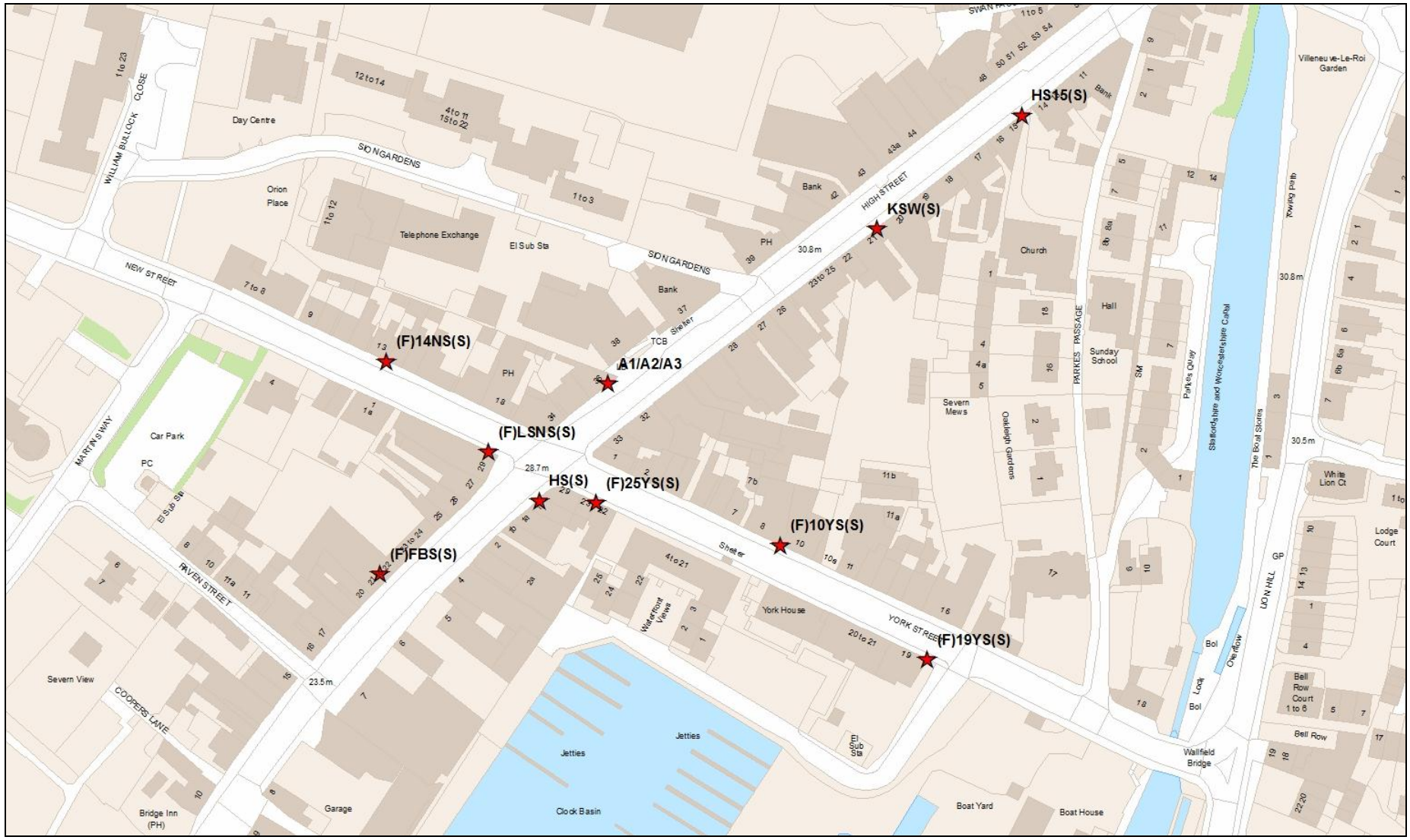


Table 1.2 Automatic analyser location and non automatic monitoring locations

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
HS(S)	High Street corner of York Street lamppost o/s sweet shop	Roadside (façade)	380974	271268	2.82m	NO_2	N	N	Y (< 1m)	4m	Y
KSW(S)	Kodak Spectacles Warehouse, High Street (façade)	Roadside (façade)	381072	271347	2.25m	NO_2	N	N	Y (< 1m)	4m	Y
HS15(S)	15 High Street (façade)	Roadside (façade)	381114	271380	2.34m	NO_2	N	N	Y (< 1m)	2.3m	Y
A1/A2/A3	Automatic Analyser outside Bentleys, 36 High Street	Analyser + Triple tubes	380994	271302	1.4m	NO_2	N	Y	Y (< 1m)	3.6m	Y
(F)19YS(S)	19 York Street, Stourport	Roadside (façade)	380931	271307	2.34m	NO_2	N	N	Y (< 1m)	1.66m	Y
(F)10YS(S)	Allcocks, 10 York Street, Stourport	Roadside (façade)	380957	271284	2.3m	NO_2	N	N	Y (< 1m)	1.9m	Y
(F)25YS(S)	Chutimas Thai Massage Centre, 22 York Street, Stourport	Roadside (façade)	380933	271247	2.45m	NO2	N	N	Y (< 1m)	1.46m	Y
(F)14NS(S)	14 New Street, Stourport	Roadside (façade)	383350	277193	2.4m	NO2	N	N	Y (< 1m)	2.00m	Y
(F)LSNS(S)	Lumsdons Solicitors, New Street, Stourport	Roadside (façade)	383311	277087	2.32m	NO2	N	N	Y (< 1m)	1.47m	Y
(F)FBS(S)	Flamingo's 21 Bridge Street, Stourport	Roadside (façade)	383304	277071	2.4m	NO2	N	N	Y (< 1m)	1.86m	Y

Uncertainty

Uncertainty is inherent in all measured and modelled data. All values presented in this report are the best possible estimates, but uncertainties in the results might cause over- or under-predictions. All of the measured concentrations presented have an intrinsic margin of error. Defra (2012) suggests that this is of the order of plus or minus 20% for diffusion tube data and plus or minus 10% for automatic measurements. The model results rely on traffic data provided by Worcestershire County Council and any uncertainties inherent in these data will carry into this assessment.

There will be additional uncertainties introduced because the modelling has simplified real-world processes into a series of algorithms. For example: it has been assumed that wind conditions measured at Pershore during 2013 will have occurred throughout the study area during 2013; and it has been assumed that the dispersion of emitted pollutants will conform to a Gaussian distribution over flat terrain.

An important step in the assessment is verifying the dispersion model against the measured data. By comparing the model results with measurements, and correcting for the apparent under-prediction of the model, the uncertainties can be reduced.

The limitations to the assessment should be borne in mind when considering the results set out in the following sections.

3 Relevant Exposure

Local knowledge and measured study area data have been used to obtain accurate heights of the monitoring sites as detailed in Table 1.2 these were subsequently used for the purpose of verifying the model (see Appendix A1).

It was noted that there was no relevant ground-floor exposure to the annual mean objective in the study area as a whole as the area was mainly commercial shop frontages however first-floor relevant exposure was identified at several locations on High Street, Bridge Street, New Road and York Street in the study area.

For modelling purposes the height of the first floor receptors has been modelled at 4.5m high and the ground-floor exposure at 1.5m high.

4 Monitoring

Monitoring data for the sites within the study area (Figure 1and Table 1.2) are summarised in Table 2.1 and Table 2.2. The 2013 diffusion tube data have been adjusted using a locally calculated adjustment factor.

Automatic Monitoring Data

The Stourport-on-Severn automatic analyser became operational in October 2010. Data capture for the 12 month monitoring period 1st January 2013 to 31st December 2013 was 95.8%.

The analyser data has been ratified and rescaled by Bureau Veritas in accordance with their in-house Data Ratification Procedures by an appropriately qualified professional. A copy of the Certificate of Ratified and Rescaled Data can be found in Appendix A1.

Table 2.1 Annual mean automatic monitoring site.

Bentleys, 36 High Street	NO_x	NO	NO_2
Min hourly av.	0.86 µg/m^3	0 µg/m^3	0.53µg/m^3
Max hourly av.	922 µg/m^3	534.2 µg/m^3	198.2 µg/m^3
Period av.	137.5 µg/m^3	60.5 µg/m^3	**44.86 µg/m^3**
% Data Capture	95.8 %	95.8%	95.8%

The data for 2013 confirms that the measured annual mean for nitrogen dioxide for the monitoring period 1st January 2013 to 31st December 2013 was 44.86ug/m3. The data for 2013 confirmed that there were no measured exceedences of the hourly mean objective for nitrogen dioxide for the monitoring period 1st January 2013 to 31st December 2013.

Diffusion Tube Monitoring Data

Measured concentrations at the 10 diffusion tube monitoring sites relevant to this study in 2013 are presented in Table 2.2. this includes concentrations since 2009, at all sites where monitoring data is available.

In 2013 measured exceedences of the annual mean objective for nitrogen dioxide were observed at HS(S) (45ug/m3), A1/A2/A3 (46ug/m3) and (F)FBS(S) (47ug/m3). In January 2013 six additional diffusion tube location had been deployed to provide additional data for this Detailed Assessment, tube (F)FBS(S) is one of those new locations. In 2013 the further additional five locations did not measure exceedences of the annual mean objective.

Table 2.2 Annual mean non-automatic monitoring sites

Site ID	Site Type	Within AQMA?	Annual Mean Concentration (µg/m^3) - Adjusted for Bias [a]				
			2009 (Bias Adjustment Factor = 0.90)	2010 (Bias Adjustment Factor = 0.95)	2011 (Bias Adjustment Factor = 0.89)	2012 (Bias Adjustment Factor = 0.69)	2013 (Bias Adjustment Factor = 0.98)
HS(S)	Roadside (façade)	N	**40.3**	**41.1**	38.6	33.2	**45**
KSW(S)	Roadside (façade)	N	32.1	38.1	32.6	28.8	38
HS15(S)	Roadside (façade)	N	-	**40.1**	32.4	29.9	39
A1/A2/A3	Analyser	N	-	**47.9**	37.1	33.7	**46**
(F)19YS(S)	Roadside (façade)	N	-	-	-	-	33
(F)10YS(S)	Roadside (façade)	N	-	-	-	-	32
(F)25YS(S)	Roadside (façade)	N	-	-	-	-	39
(F)14NS(S)	Roadside (façade)	N	-	-	-	-	26
(F)LSNS(S)	Roadside (façade)	N	-	-	-	-	34
(F)FBS(S)	Roadside (façade)	N	-	-	-	-	**47**

5 Modelling

Annual mean nitrogen dioxide concentrations have been predicted using detailed dispersion modelling (ADMS-Roads v3.4) at each of the receptor locations shown in Figure 2. The input data used are described in Appendix A1. The model outputs have been verified against the diffusion tube data described in the monitoring section above, with the diffusion tubes adjusted using the local bias adjustment factor. The data from the automatic monitor has also been included in the verification process. Further details of model verification are also supplied in Appendix A1.

Concentrations have been predicted for a grid of receptors across the study area to allow concentration isopleths to be plotted. The receptors have been modelled at both 1.5 m and 4.5 m to represent exposure at ground-floor and first-floor. The results for all the receptor locations are shown at Appendix 2, Table A.2.

Isopleth maps of the modelled annual mean nitrogen dioxide concentrations at ground floor, 1.5m high and first floor, 4.5m high are shown at Figures 3 and 4.

Ground floor modelling predicts an exceedance of the annual mean objective at receptors 1HS, 2HS, 12HS, 14HS, 15HS, 16 HS and 1BS -7BS, 10YS and 11YS; this is consistent with the results from the diffusion tubes and automatic monitor located in the same area. There are no relevant exposure receptors at ground floor level.

First floor modelling indicates no exceedance of the annual mean objective at any of the relevant receptors.

No exceedances of 60µg/m3 as an annual mean nitrogen dioxide concentration have been identified at any locations therefore exceedances of the 1 hour objective are unlikely.

Figure 2 Specific receptor locations

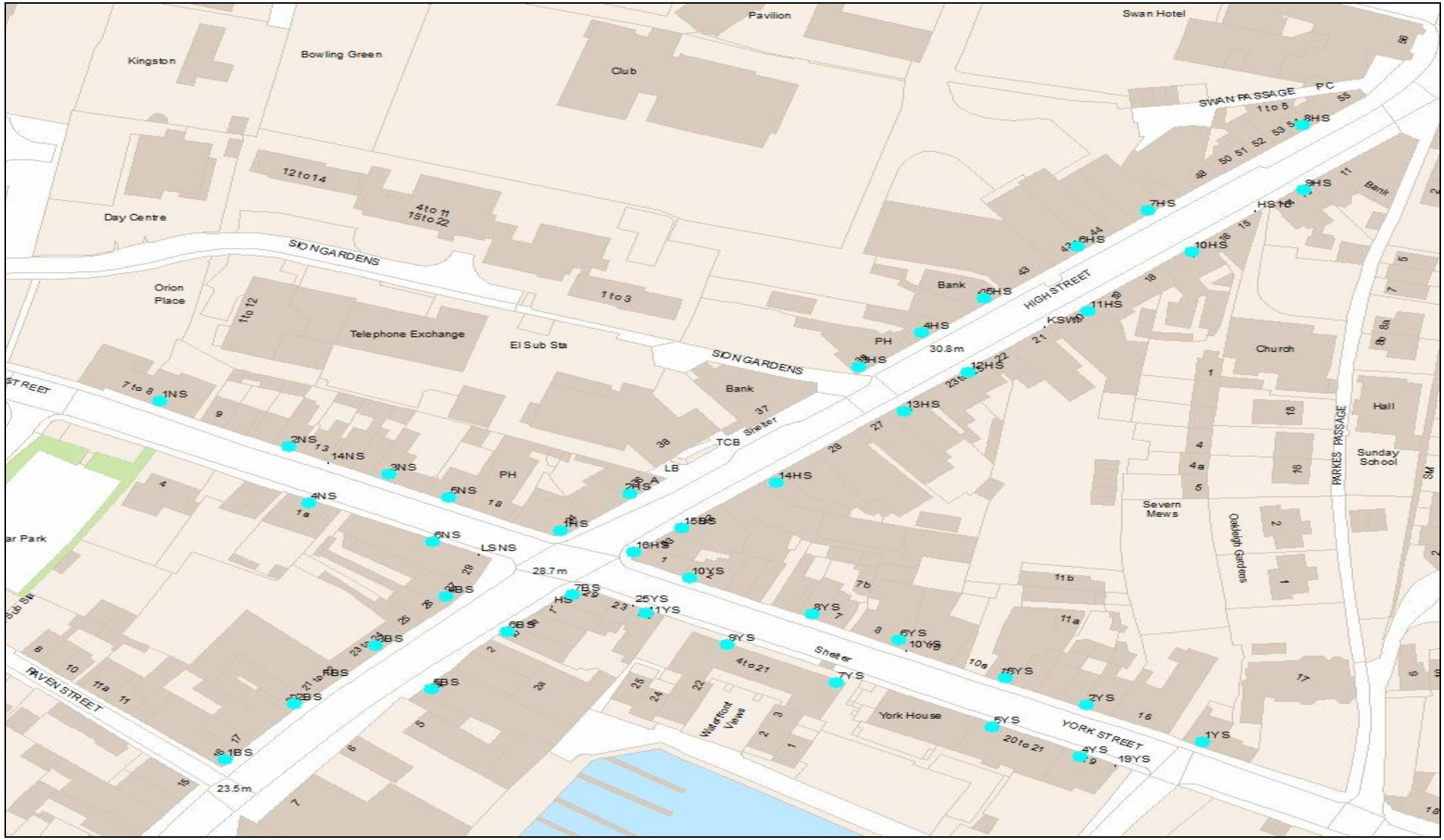
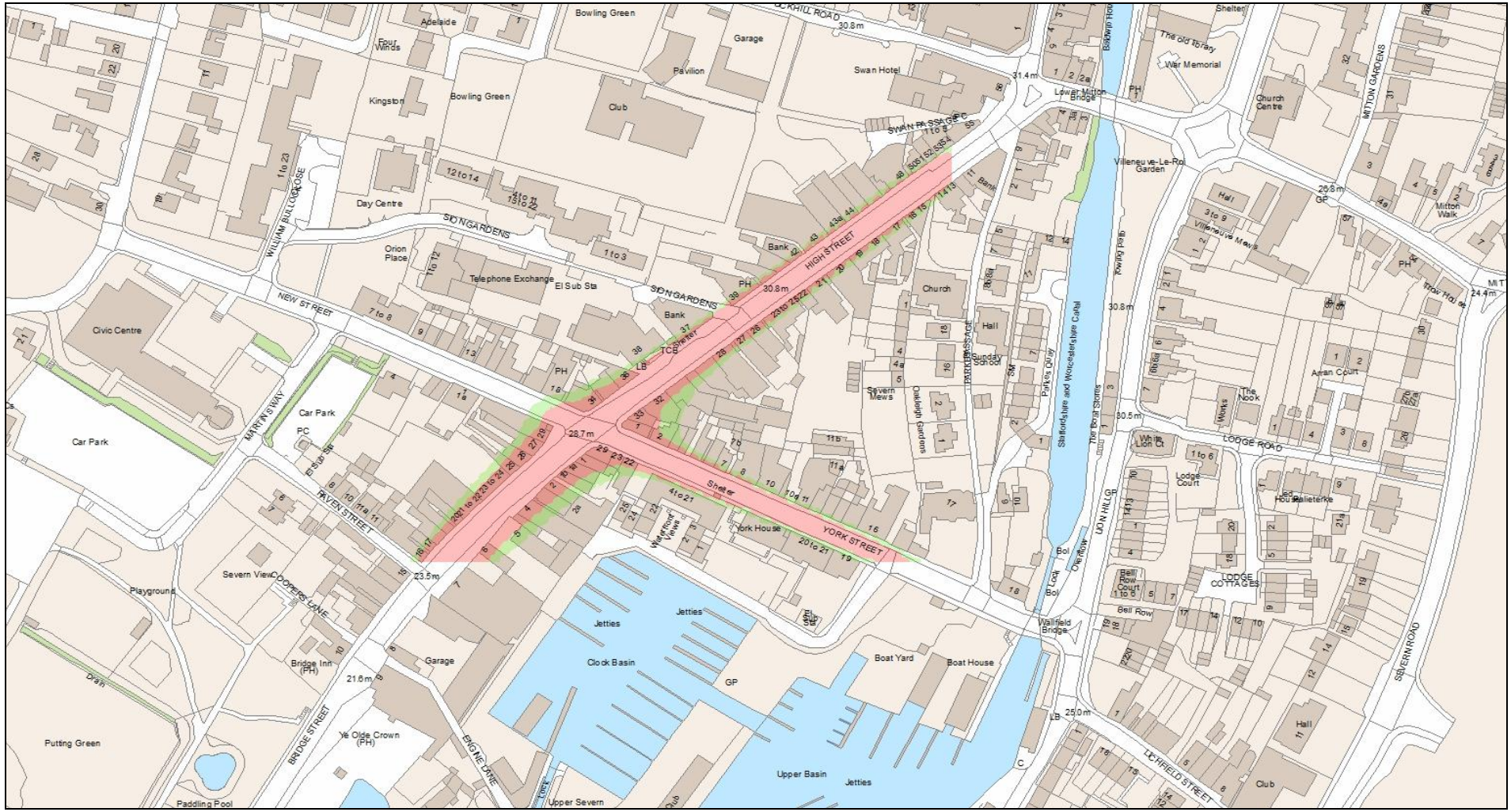
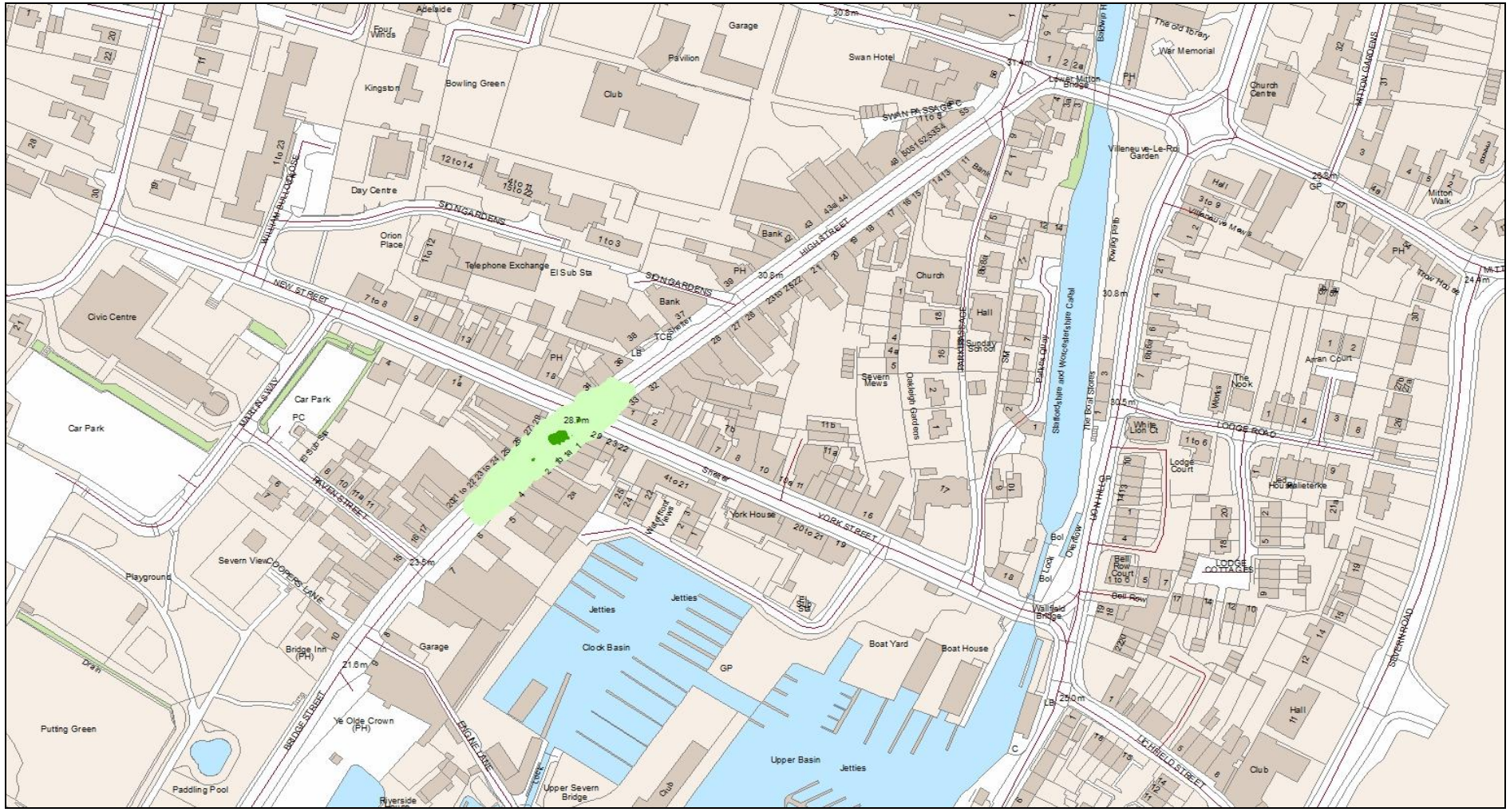


Figure 3 Ground floor Isopleth maps



Key - 36 µg/m3 contour, green, 40 µg/m3 contour, red

Figure 4 First floor Isopleth maps



Key - 30 µg/m3 contour, green, 32 µg/m3 contour, dark green

6 Conclusions and Recommendations

A Detailed Assessment has been carried out for nitrogen dioxide around the junction of Bridge Street/York Street/New Street/High Street in Stourport on Severn. This area was identified as being at risk of exceeding the annual mean air quality objective for nitrogen dioxide in Wyre Forest District Council's Progress Reports and USAs.

The Detailed Assessment has been carried out using a combination of monitoring data and modelled concentrations. Concentrations of nitrogen dioxide have been modelled for 2013 using the ADMS-Roads dispersion model. The model has been verified against measurements made at the nine nitrogen dioxide diffusion tube monitoring locations on High Street, Bridge Street, York Street and New Street and at the automatic monitoring site located on High Street.

The assessment has identified that the annual mean nitrogen dioxide objective is being exceeded at a number of relevant locations around the junction of Bridge Street/York Street/New Street/High Street at ground floor level however there are no exceedances at first floor level.

There are no exceedances of 60 µg/m3 as an annual mean nitrogen dioxide concentration identified at locations of relevant exposure, and thus exceedances of the 1-hour objective are unlikely.

Currently there is no requirement to declare an AQMA in the assessment area as relevant receptors are all located at first floor level and the guideline value for nitrogen dioxide is not exceeded at this level.

7 References

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

Defra (2009) Review & Assessment: Technical Guidance LAQM.TG(09), Defra.

Defra (2014) LAQM Support website.

The Air Quality (England) (Amendment) Regulations, 2002, Statutory Instrument 3043 (2002), HMSO.

The Air Quality Regulations, 2000, Statutory Instrument 928 (2000), HMSO.

Detailed Assessment, Air Quality in Stourport on Severn for Wyre Forest District Council, 2012. AQC

2014 Progress report for Wyre Forest District Council, 2014, WRS

Table TRA0307, Department for transport

8 Glossary

AADT - Annual Average Daily Traffic

ADMS-Roads - Atmospheric Dispersion Modelling System

AQMA - Air Quality Management Area

Defra - Department for Environment, Food and Rural Affairs

EFT - Emissions Factor Toolkit

Exceedance - A period of time when the concentration of a pollutant is greater than the appropriate air quality objective. This applies to specified locations with relevant exposure.

HDV - Heavy Duty Vehicles (> 3.5 tonnes)

LDV - Light Duty Vehicles (<3.5 tonnes)

µg/m3 - Microgrammes per cubic metre

NO - Nitric oxide

NO_2 - Nitrogen dioxide

NOx - Nitrogen oxides (taken to be NO_2 + NO)

Objectives - A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date.

Standards - A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal

TEA - Triethanolamine – used to absorb nitrogen dioxide

Appendices

A1

Meteorological Data

The model has been run using a full year of meteorological data for 2013 from the meteorological station at Pershore.

Background Concentrations

The background concentrations across the study area have been defined using the national pollution maps published by Defra. The background pollutant concentration maps are presented in 1km x 1km grid squares across England, Wales, Scotland and Northern Ireland. The current version of the background maps (reference year 2011) contains estimates for NOx, NO_2, PM10 and PM2.5 for the period 2011 through to 2030.

The background maps are based on all the assumptions underlying the latest (Base 2013) NOx emission projections for road transport. The projections use new NOx emission factor assumptions for Euro 5 and 6 diesel cars and LGVs based on COPERT 4v10.0 published in November 2012. The new NOx factors for Euro 5 and 6 diesel cars are higher than previously assumed in COPERT 4 v8. These emissions projections include an assessment of the likely impact of Euro 6 emission standards for cars and LGVs (and Euro VI for HGVs and buses) but do not include the impact of any further reduction in emissions resulting from a second stage of Euro 6.

Model Inputs

Predictions have been carried out using the ADMS-Roads dispersion model (v3.4). The model requires the user to provide various input data, including the AADT flows for each of the vehicle class, road characteristics and the vehicle speed. Vehicle emissions are calculated within ADMS-roads (v3.4) based on vehicle flow, composition and speed using the same emission factors as published within the EFT, version 6.02 (Defra, 2014).

Traffic Data

AADT flows and vehicle fleet composition data have been provided by Worcester County Council Highways. Traffic flows were provided as 12 hour flows based on counts taken on Tuesday 9th September 2014 which are considered representative for the area and have been adjusted to AADT flows using a ratio calculated using Department for Transport hourly average statistics, (Table TRA0307)

Traffic speeds have been estimated from local speed restrictions, site visits driving along the actual roads, local knowledge and take account of the proximity to junctions and congestion.

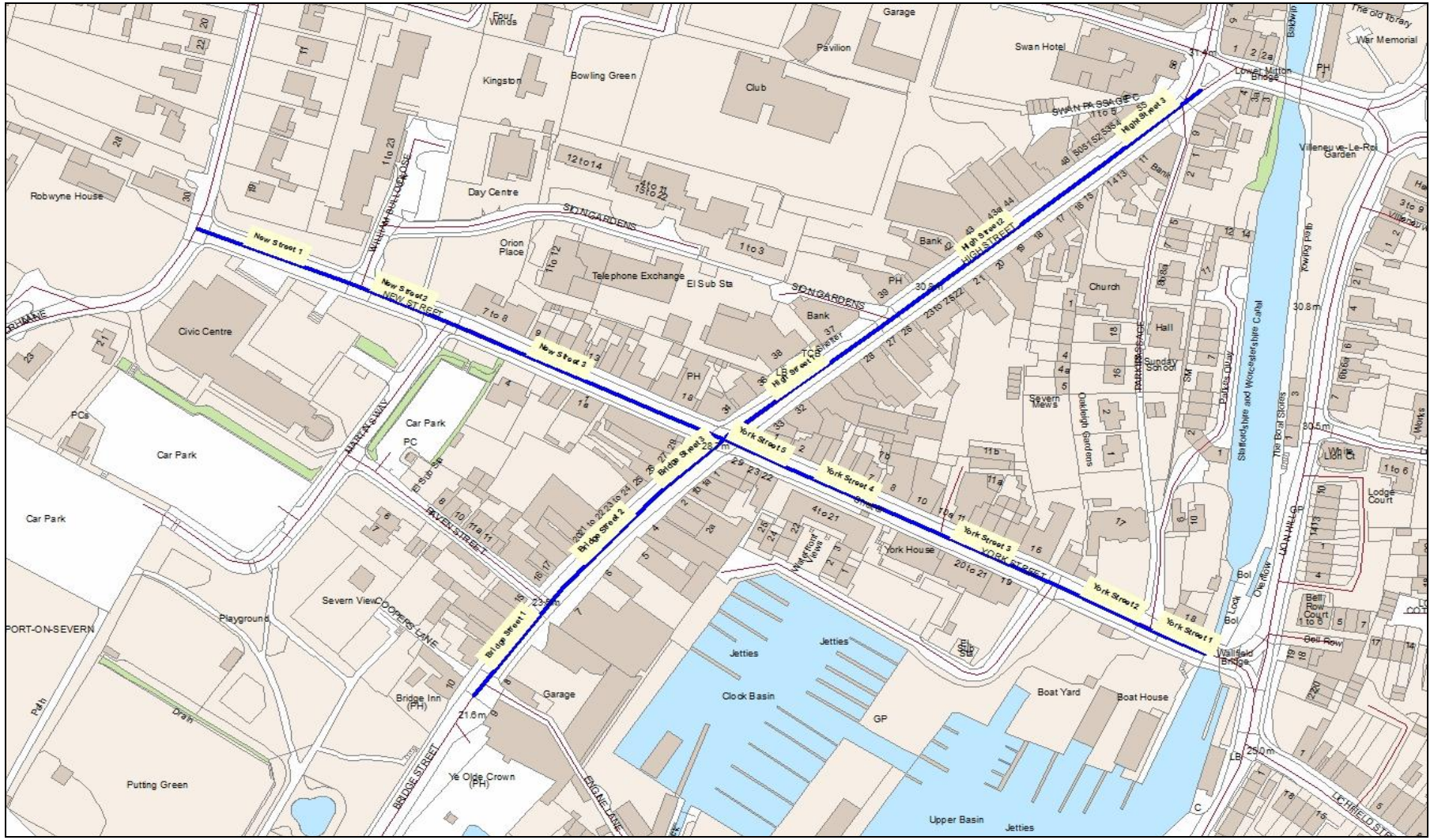
The traffic data used in this Detailed Assessment are summarised in Table A1 and the network links shown at Figure A1.1.

Table A1 Summary of traffic data used in the assessment (AADT)

Road Link	AADT	Modelled Speed
Bridge Street 1	16031	25
Bridge Street 2	16031	10
Bridge Street 3	16031	5
High Street 1	9219	10
High Street 2	9219	15
High Street 3	9219	25
New Street 1	2638	35
New Street 2	2638	30
New Street 3	2638	30
New Street 4	2638	30
York Street 1	11138	35
York Street 2	11138	35
York Street 3	11138	35
York Street 4	11138	30
York Street 5	11138	30

Note - This is just a summary of the data entered into the model, which were input as hourly average flows of motorcycles, cars, buses, Light Goods Vehicles and Heavy Goods Vehicles, as well as diurnal flow profiles for these vehicles.

Figure A1.1 Modelled road traffic network links



Model Verification

In order to ensure that ADMS-Roads accurately predicts local concentrations, it is necessary to verify the model against local measurements. This section describes the verification that has been carried out against the annual mean nitrogen dioxide concentrations measured at the real time analyser and nine diffusion tube sites within the study area in 2013.

Most $NO_2$is produced in the atmosphere by reaction of nitric oxide (NO) with ozone. It is therefore most appropriate to verify the model in terms of primary pollutant emissions of nitrogen oxides, NOx = NO + NO_2. The model has been run to predict the annual mean NOx concentrations during 2013 at the 10 sites. The monitoring sites were modelled at the heights shown at Table 1.2, which are accurate heights measured during site visits carried out by WRS.

The model output of road-NOx, the component of total NOx coming from road traffic has been compared with the 'measured' road-NOx. Measured road-NOx was calculated from the measured NO_2 concentrations and the predicted background NO_2 concentration using the NOx from NO_2 calculator available on the Defra LAQM Support website (Defra, 2014).

The results indicate that the unadjusted model was under-predicting the road-NOx contribution, this is a common outcome with models.

A primary adjustment factor was determined as the slope of the best fit line between the 'measured' road contribution and the model derived road contribution, forced through zero and is shown at Figure A1.2. This factor was then applied to the modelled road-NOx concentration for each receptor to provide adjusted modelled road-NOx concentrations.

The total nitrogen dioxide concentrations were then determined by combining the adjusted modelled road-NOx concentrations with the predicted background NO_2 concentrations within the NOx from NO_2 calculator.

A secondary adjustment factor was finally calculated as the slope of the best fit line applied to the adjusted data NO_2 concentrations and forced through zero shown at Figure A1.3. The final NO_2 adjustment is minor

The following primary and secondary adjustment factors have been applied to all modelled nitrogen dioxide data: Primary adjustment factor: 2.6964, Secondary adjustment factor: 1.01. The adjusted, modelled results are all within 25% of the measured concentrations.

Figure A1.2 Comparison of measured road-NOX to unadjusted modelled road NOX concentrations and adjusted modelled road NOx concentrations (µg/m3).

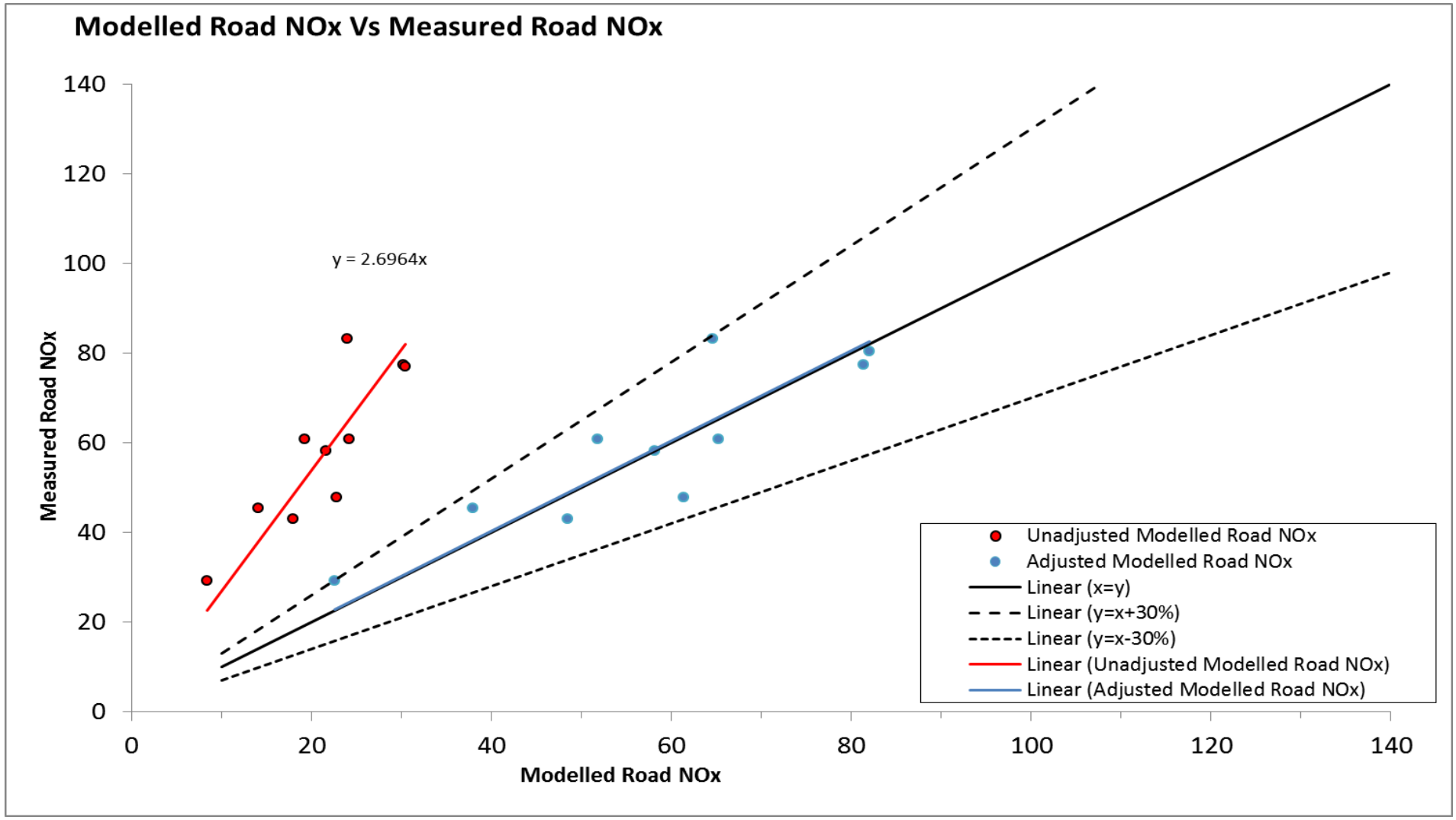
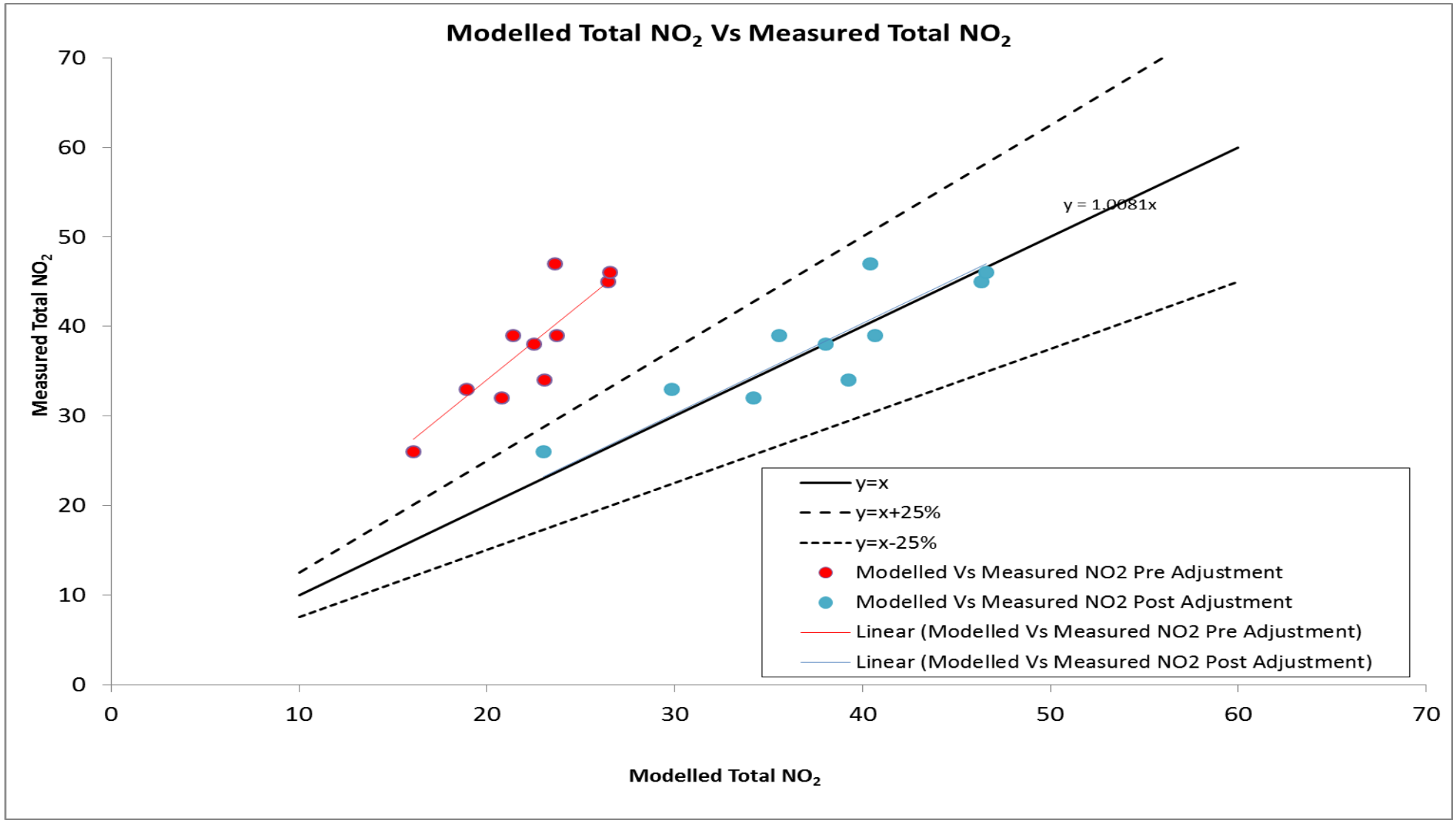


Figure A1.3 Comparison of measured total NO_2 to modelled unadjusted NO_2 and final adjusted modelled total NO_2 concentrations (µg/m3)



A2

Table A2 Modelling results for specific receptors (µg/m3)

Receptor name	Location	**Ground Floor** NO_2 **(1.5m)**	**First floor** NO_2 **(4.5m)**
1HS	High Street	**48.48**	29.78
2HS	High Street	**45.07**	28.73
3HS	High Street	38.25	25.59
4HS	High Street	37.41	24.99
5HS	High Street	36.89	24.54
6HS	High Street	35.93	23.87
7HS	High Street	36.24	23.52
8HS	High Street	31.96	21.53
9HS	High Street	34.74	21.99
10HS	High Street	37.82	23.39
11HS	High Street	37.72	24.06
12HS	High Street	**40.70**	25.16
13HS	High Street	39.99	25.63
14HS	High Street	**41.89**	27.28
15BS	High Street	**47.39**	29.37
16HS	High Street	**53.27**	30.71
1NS	New Street	19.84	16.81
2NS	New Street	22.66	18.67
3NS	New Street	25.71	20.93
4NS	New Street	25.08	20.15
5NS	New Street	30.01	23.29
6NS	New Street	34.30	25.21
1BS	Bridge Street	**42.18**	26.02
2BS	Bridge Street	**45.82**	27.93
3BS	Bridge Street	**48.30**	29.34
4BS	Bridge Street	**49.20**	29.96
5BS	Bridge Street	**48.30**	29.36
6BS	Bridge Street	**52.08**	30.53
7BS	Bridge Street	**52.59**	30.73
1YS	York Street	31.85	20.84
2YS	York Street	33.09	21.60
3YS	York Street	33.86	22.26
4YS	York Street	32.07	21.09
5YS	York Street	33.20	21.73
6YS	York Street	34.63	23.48
7YS	York Street	33.31	23.14
8YS	York Street	37.41	24.87
9YS	York Street	36.78	25.03
10YS	York Street	**44.60**	28.08
11YS	York Street	**42.86**	27.56

A3

CERTIFICATE OF RATIFIED & RESCALED DATA

CERTIFICATE OF RATIFIED & RESCALED DATA

1 Worcester Regulatory Services
2 Stourport aqms
3 **1st Jan 2013 – 31st December 2013**

This is to certify that this data set has been ratified and rescaled in accordance with Bureau Veritas In House Data Ratification Procedures by Duncan Pritchard-Davies who holds the position of Senior Air Quality Consultant for Bureau Veritas on 27th January 2014. The Aforementioned data set has been emailed to York City Council on27th January 2014.

A data summary of the site is shown in the table below:

	NO_x	NO	NO_2
Min hourly av.	0.86 µg/m^3	0 µg/m^3	0.53µg/m^3
Max hourly av.	922 µg/m^3	534.2 µg/m^3	198.2 µg/m^3
Period av.	137.5 µg/m^3	60.5 µg/m^3	44.86 µg/m^3
% Data Capture	95.8 %	95.8%	95.8%

Was the annual average NO_2 objective (40 µg/m$^{3)}$ exceeded Yes

Number of exceedances of hourly objective None

This data has been approved by : Jonathan Brookes

Signed :