Transport Interchange South Shields

AIR QUALITY ASSESSMENT

Report

Bus Interchange, South Shields, South Tyneside

AIR QUALITY ASSESSMENT

Report

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Tables and Figures

Appendices

1 Introduction

GENERAL

1.1 JMP Consultants Limited (JMP) has been commissioned by Muse Developments, South Tyneside Council and Nexus to produce an Air Quality Assessment (AQA) for a Transport Interchange development that forms part of a wider Masterplan development for the South Shields 365 Town Centre Vision.

1.2 The South Shields 365 Town Centre Vision project is an ongoing initiative intent on the regeneration and revitalisation of South Shields town centre. The initiative sets out a sustainable economic vision for the town centre, which will help create new opportunities for residents, visitors and businesses. This will include the creation of new commercial, residential, cultural and retail developments.

1.3 South Shields is a coastal town located at the mouth of the River Tyne and is a part of the metropolitan borough of South Tyneside. It is situated approximately 5 miles to the east of Newcastle upon Tyne, 5.2 miles to the north of Sunderland and 1.8 miles to the northeast of Jarrow.

DEVELOPMENT PROPOSALS

1.4 The Transport Interchange development will incorporate improved facilities for bus, metro passengers and will consist of:

- New interchange building
- Metro station
- Bus station
- A pickup/drop off area for short term parking and taxis
- Two retail units of up to 5,020 sq ft
- Office accommodation of up to 6,662 sq ft at first and second floors
- A travel shop and staff/customer amenities;

REPORT SCOPE

1.5 JMP has liaised with the Environmental Health Officer (Ian Rutherford) responsible for air quality at South Tyneside Council (the Council) during January 2015 to confirm the scope of this AQA.

1.6 As such, the scope of work has been agreed and a copy of the scoping discussion is included at **Appendix A** for information.

1.7 The associated Transport Assessment for the site has determined that the traffic levels from the proposed development will have impact on the surrounding highway network, hence an assessment of the traffic – related development impact on air quality is required.

1.8 The proposed development interchange and wider Masterplan will increase traffic flows in the local area and may potentially change traffic level composition. Therefore the purpose of this report is to consider the impact of the development on the local air quality.

REPORT STRUCTURE

1.9 Following this introductory section the structure of this report is as follows:

- Section 2 – Policy Context
- Section 3 – Baseline Conditions
- Section 4 – Assessment Methodology
- Section 5 – Assessment Results
- Section 6 – Assessment Discussion
- Section 7 – Construction Impacts
- Section 8 – Mitigation
- Section 9 – Conclusion

2 Policy Context

GENERAL

2.1 This section of the report outlines the policy and legislative context of the proposed development with respect to local air quality.

2.2 Relevant national and local policies are described with respective legislation summarised at the end of each section together with a review of the air quality situation in the Council area and, specifically, within the locality of the proposed development.

NATIONAL POLICY

Environmental Act 1995

2.3 Part IV of the Environment Act 1995 (the Act) requires UK government and devolved administrations to produce a national air quality strategy containing standards, objectives and measures for ameliorating poor ambient air quality and to continually review these policies.

2.4 The Act also provides a legislative framework for a system of Local Air Quality Management (LAQM). This system is an integral part of delivering the UK's air quality obligations.

2.5 Under the LAQM regime, 'responsible' authorities are required to carry out a regular review and assessment (R&A) of air quality in their area against defined national objectives, which have been prescribed in regulations for the purposes of LAQM. Where it is found these objectives are unlikely to be met, responsible authorities must designate Air Quality Management Areas (AQMA's) and implement Air Quality Action Plans (AQAP's) to tackle the problems.

2.6 Provisions in the Act are largely enabling and give responsible authorities the power to take forward local policies to suit their own needs. Local circumstance will also determine the content of the local air quality policy, designation of AQMA's and the content of AQAP's.

The National Air Quality Strategy

2.7 Due to the trans-boundary nature of air pollution, it is appropriate to have an overarching strategy with common aims covering all parts of the UK. For this reason, the National Air Quality Strategy (NAQS) is presented as a joint UK Government and devolved administrations document.

2.8 Air quality in the UK has generally continued to improve since the first NAQS, entitled 'The United Kingdom Air Quality Strategy', was adopted in 1997. This was later superseded by 'The Air Quality Strategy for England, Scotland, Wales and Northern Ireland' published in 2000.

2.9 The 2000 NAQS established a framework for further improvements in ambient air quality in the UK to 2003 and beyond. It identified actions at local, national and international levels to improve air quality. It was followed by an Addendum in February, 2003.

2.10 There are a wide range of terms and concepts used in international, national and local air quality policy and legislation and the NAQS discusses air quality in terms of Standards and Objectives. These terms are defined below:

- Standards are the concentrations of pollutants in the atmosphere which can be broadly taken to achieve a certain level of environmental quality. The standards are based on assessment of the effects of each pollutant on human health including the effects on sensitive sub groups and ecosystems.

- Objectives are policy targets often expressed as a maximum ambient concentration not to be exceeded either without exception or with a permitted number of exceedences within a given timescale.

2.11 The main pollutants of concern in the UK and addressed in the NAQS are:

- Particulate Matter (PM_{10} and $PM_{2.5}$);
- Nitrogen Dioxide (NO_2);
- Ozone (O_3);
- Sulphur Dioxide (SO_2);
- Polycyclic Aromatic Hydrocarbons (PAH's);
- Benzene;
- 1,3-Butadiene;
- Carbon Monoxide;
- Lead (Pb); and
- Ammonia.

The National Air Quality Strategy 2007

2.12 The most recent National Air Quality Strategy (NAQS) was published in July, 2007 and established a framework for further air quality improvements across the UK. The NAQS sets out Standards and Objectives to help quantify the improvement in air quality.

2.13 The NAQS is a statement of Policy targets and as such there is no legal requirement to meet these Objectives except in so far as these mirror an equivalent legally binding 'limit value' in EU legislation.

2.14 This latest Strategy does not remove any of the Objectives set out in previous versions, apart from replacing the provisional 2010 PM_{10} Objective in England, Wales and Northern Ireland with the exposure reduction approach for $PM_{2.5}$. In Scotland, the $PM_{2.5}$ Objective is an addition to the retained 2010 PM_{10} Objective.

2.15 The NAQS Objectives have generally been met across the UK for all pollutants except Particulate Matter (PM_{10}) and Nitrogen Dioxide (NO_2). These pollutants are directly related to road traffic pollution and many of the areas that breach the NAQS Objectives - designated Air Quality Management Areas (AQMA's) - are located close to major roads.

Air Quality (England) (Standards) Regulations 2010

2.16 The UK has a legislative requirement to meet air quality 'Limit Values' for key pollutants defined at a European level by European Council Directives:

- Directive 2008/50/EC on ambient air quality and cleaner air for Europe; and
- Directive 2004/107/EC relating to arsenic, cadmium, mercury, nickel and PAH.

2.17 These Directives are transposed into UK legislation by the Air Quality (Standards) Regulations 2010.

2.18 Table 2.1 overleaf summarises the NAQS Objectives and European 'limit value' obligations for PM_{10} and NO_2, the key transport-related pollutants of concern at the majority of UK AQMA's.

Table 2.1 Summary of NAQS and EU Obligations Applicable in England

Pollutant	Measured as	NAQS Objectives	Achieved by	European Obligations	Achieved by
Nitrogen Dioxide (NO2)	Annual Mean	40µgm^{-3}	31 December 2005	40µgm^{-3}	1 January 2010
	1 Hour Mean	200µgm-3 not to be exceeded more than 18 times a year	31 December 2005	200µgm^{-3} not to be exceeded more than 18 times a year	1 January 2010
Particles (PM10)	24 Hour Mean	50µgm^{-3} not to be exceeded more than 35 times a year	31 December 2004	50µgm^{-3} not to be exceeded more than 35 times a year	1 January 2005
	Annual Mean	40µgm^{-3}	31 December 2005	40µgm^{-3}	1 January 2005

National Planning Policy Framework (NPPF)

2.19 The NPPF is the 2012 Spatial Planning Policy guidance document which covers all areas of strategic and spatial planning. It states:

2.20 'The planning system should contribute to and enhance the natural and local environment by, 'preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability'

2.21 With regard to the development of planning policies, the NPPF suggests that polices should sustain compliance with and contribute towards EU limit values or National Objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions need to ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan.

Planning Policy Guidance 13 (PPG 13) – Transport (Superseded)

2.22 The former PPG 13 dealt with air quality indirectly by advising that developments should be sustainable. For example, development that is likely to have significant transport implications should be accompanied by a Travel Plan, the typical measures of which should minimise the impact of a development upon air quality.

LOCAL POLICY

Local Air Quality Management Guidance

2.23 LAQM guidance requires Local Authorities to undertake a regular Review and Assessment (R&A) of air quality. Current guidance dictates that there are three types of assessment that a Local Authority can undertake.

2.24 The first is an Updating and Screening Assessment (U&SA), which is undertaken every three years. The U&SA considers the changes that have occurred in pollutant emissions and sources since the last round of R&A that may affect air quality. The U&SA is then followed by either a Detailed Assessment (DA) or a Progress Report (PR).

2.25 A Detailed Assessment is required when the U&SA identifies a risk of exceeding an air quality objective at a location of relevant public exposure and the objective is to determine whether it is necessary to

declare an AQMA. If the U&SA does not identify any risk, then a Progress Report is prepared annually in the intervening years between U&SA's.

LOCAL AIR QUALITY

2.26 Local authorities have a duty under the Environment Act 1995 to review and assess local air quality within their areas, against a set of health-based objectives for a number of specific air pollutants. Where exceedences of the objectives are identified, authorities are then required to declare an Air Quality Management Area (AQMA) and to prepare an Air Quality Action Plan (AQAP).

Air Quality Updating & Screening Assessment for South Tyneside, 2011

2.27 The 2011 U&SA considers both the current and likely future air quality within the Borough against prescribed objective values set out in the Air Quality Strategy 2007, based on The Air Quality (England) Regulations 2000 and The Air Quality (England) (Amendment) Regulations 2002.

2.28 The Updating and Screening Assessment carried out in 2010 identified the need to proceed to a detailed assessment for nitrogen dioxide at Western Approach, South Shields due to traffic associated with the Port of Tyne.

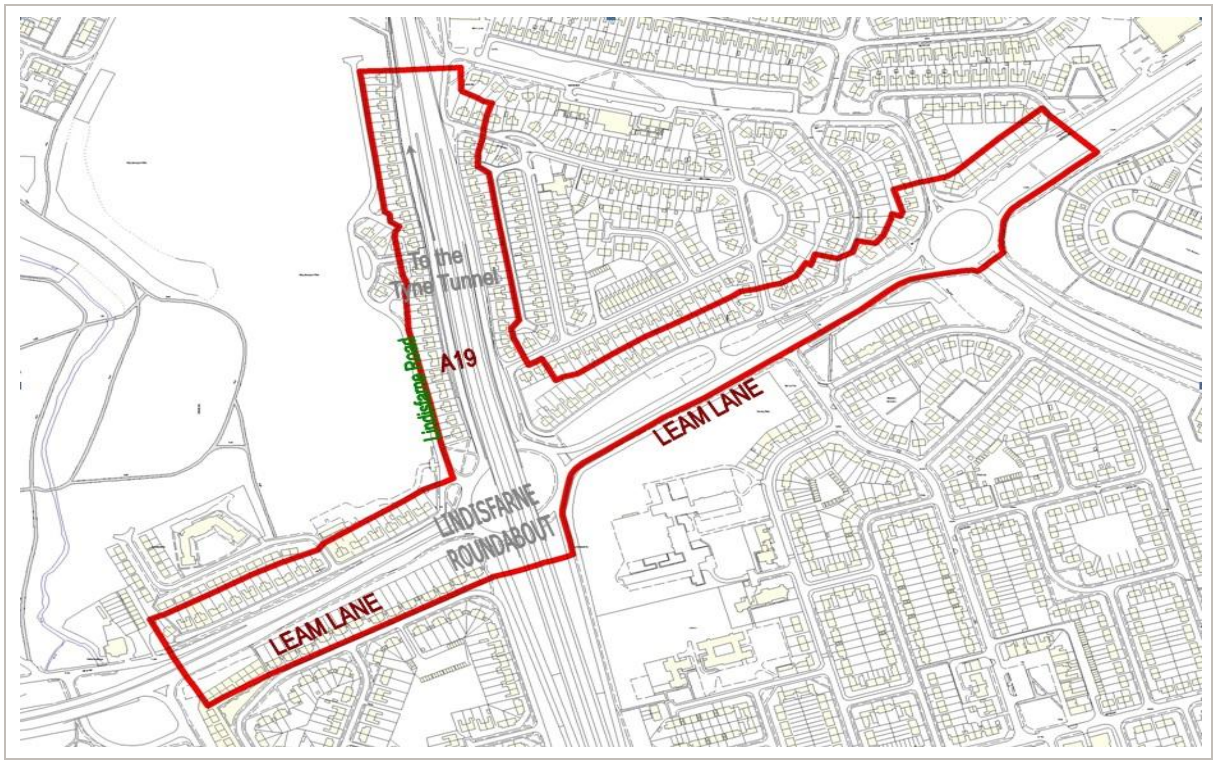
2.29 There were two Air Quality Management Areas (AQMA) declared in South Tyneside in 2006 after the completion of an extensive detailed assessment of the area in 2004. The first AQMA is situated on Bold Lane as illustrated in the **Figure 2.1**. This AQMA is located approximately 1.7 miles to the south of the site and extends along Bold Lane and a short distance up Stanhope Road. The second AQMA is situated 3.9 miles southwest of the site and covers receptor locations around Lindisfarne Roundabout, extending along Leam Lame and the A19, as illustrated in the **Figure 2.2**.

2.30 The 2006 AQMAs remain, with no new AQMAs designated since that time. The proposed Transport Interchange site is not located within a designated AQMA.

Figure 2.1 Bold Lane/Stanhope Road Air Quality Management Area

Source: South Tyneside Council Website

Figure 2.2 Lindisfarne Roundabout/Leam Lane Air Quality Management Area



Source: South Tyneside Council Website

3 Baseline Conditions

LOCAL HIGHWAY NETWORK

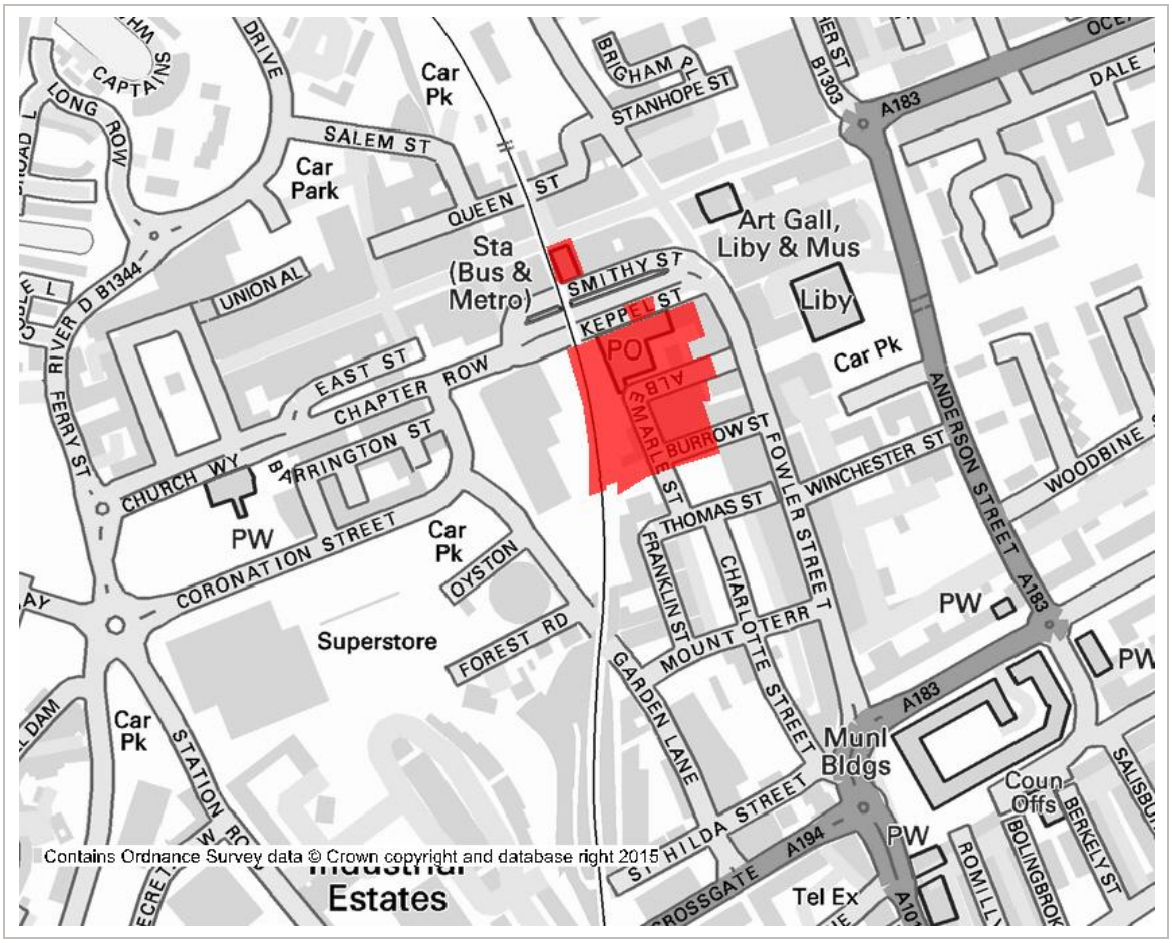
3.1 The development site is located within South Tyneside Council in South Shields and is bounded by King Street to the north, Waterloo Square to the west, Burrow Street to the south and Fowler Street to the east, as shown in **Figure 3.1**.

3.2 The Council has identified that much of the pollution within the South Shields area arises from road traffic. In scoping discussions, taking into account the location of the site, the Council has agreed that the following roads will be taken into account in the Air Quality Assessment:

- Waterloo Square;
- Garden Lane;
- Fowler Street;
- Winchester Street;
- Crossgate.

3.3 The location of these roads in relation to the site is shown in **Figure 3.1**.

Figure 3.1 Study Area



AIR QUALITY IN THE VICINITY OF THE SITE

3.4 There are five automatic monitoring stations within South Tyneside Council. The three nearest monitoring sites are located as follows:

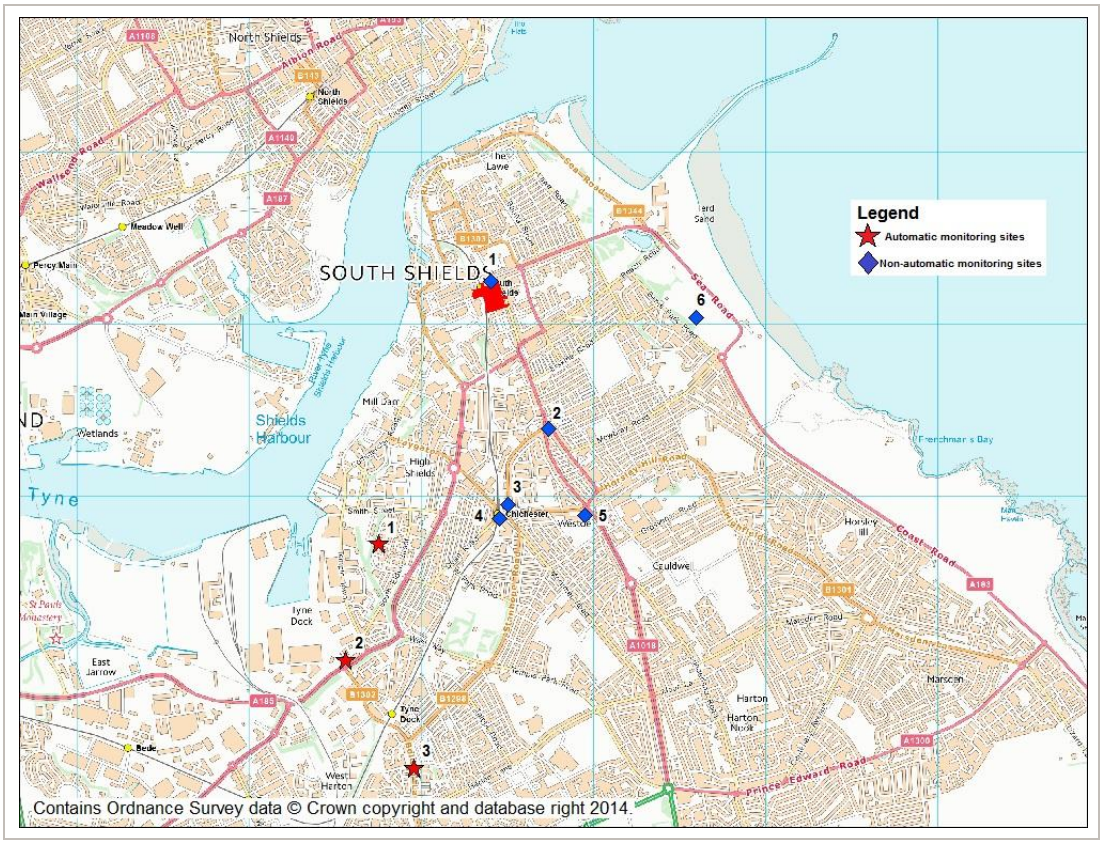
- 1 – The Captains Row, South Shields – located approximately 0.9 miles south of the development site;
- 2 – Tyne Dock, South Shields - located approximately 1.2 miles south of the development site;
- 3 – Bold Lane, South Shields - located approximately 1.9 miles south of the development site.

3.5 The Council also monitor pollution concentrations using passive diffusion tubes (non-automatic monitoring). There are sixty diffusion tubes in South Tyneside, with six of these located in close proximity to the development site:

- 1 – South Shields bus stop behind McDonalds – located on the south in immediate vicinity to the site, approximately 40m away.
- 2 – The Glebe – near flats on Westoe Road – located approximately 0.2 miles to the south of the site;
- 3 – Dean Road – Near Metro – located approximately 0.4 miles to the south of the site;
- 4 – South Shields Bus Station - located approximately 0.4 miles to the south of the site;
- 5 – Westoe Road – near The County pub – 0.6 miles to the southeast of the site;
- 6 – Anderson Street near Town Hall – 0.7 miles to the east of the site;

3.6 The nearest monitoring stations are illustrated in **Figure 3.2**.

Figure 3.2 Monitoring Stations



3.7 It has been agreed with the Environmental Health Officer at Tyneside Council that the most appropriate Nitrogen Dioxide diffusion tube sites in relation to the proposed development site is the Tyne Dock automatic monitoring site.

3.8 **Table 3.1** below sets out the local air quality monitoring data for the nearest monitoring locations.

Table 3.1 Monitored Annual Mean NO_2 Concentrations at relevant South Tyneside Monitoring Sites (µgm-^{3})

Site Name	2011	2012	2013
Tyne Dock (Automatic)	-	-	34.00
Bold Lane (Automatic)	-	-	27.2
South Shields bus stop behind McDonalds (58)	37.08	-	36.07
The Glebe – nr flats on Westoe Road (59)	22.96	-	27.90
Dean Road – Near Metro (55)	7.91	-	29.83
South Shields Bus Station (56)	-	-	-
Westoe Road – near The County pub (60)	23.53	-	-

Anderson Street near Town Hall (57)	11.84	-	24.80

Source: South Tyneside Council Updating and Screening Assessment 2011 and Email from EHO sent in January 2015

3.9 As **Table 3.1** indicates the air quality, with regard to the NAQS for NO_2 has not been exceeded at the monitoring sites.

3.10 The monitoring station at South Shields bus stop behind McDonalds showed the highest recorded concentration of NO_2 obtaining a value of 36.07µgm^{-3} for 2013.

4 Assessment Methodology

GENERAL

4.1 This section of the report describes, in detail, the methodology adopted to evaluate the air quality environment at the proposed Transport Interchange development. The methodology has been agreed with the Environmental Health Officer at South Tyneside Council.

THE DMRB MODEL

4.2 The assessment methodology is based on the Local Screening Method set out in Design Manual for Roads and Bridges (DMRB) Section 11.3.1, published in May, 2007 and guidance given in the Department for Environment, Food and Rural Affairs (DEFRA) Local Air Quality Management Technical Guidance, 2009 (LAQM.TG(09)).

4.3 For the modelling, the DMRB Local Screening Method spreadsheet, version 1.03c, published in July, 2007 (hereinafter referred to as 'the DMRB model') has been used. The DMRB model assesses the contribution of individual roads to the long-term (daily or annual average) pollutant concentrations at specified Receptor locations from the roadside.

4.4 The DMRB model requires the following input data:

- Background pollutant concentration data;
- Annual Average Daily Traffic (AADT) flows;
- Average vehicle speed;
- Vehicle classification by light and heavy duty vehicles (LDV/HDV);
- Type of road;
- Distance from the centre of the road to the Receptor being assessed.

4.5 However, recent LAQM.TG(09) guidance has led to some changes in the way the DMRB model should be used from those set out in DMRB 11.3.1. Specifically, LAQM.TG(09) and the 'Guidance on Running the DMRB Screening Model' published in April, 2009 notes that the DMRB model is now known to underestimate the conversion of NO_x to NO_2.

4.6 In order to correct for this, current guidance requires that the DMRB model to be run without background concentrations of NO_x or $_{NO2,}$ so that it is used solely to derive road-based concentrations of NO_x. These are then input into the 'NO_x to NO_2 Calculator' (version 3.2, released September, 2012), to convert the modelled, road-based NO_x to road-based NO_2. When added to the background concentrations, total NO_x and NO_2 concentrations can then be established.

4.7 This conversion calculator has therefore been applied to all the modelled results included in this assessment and a detailed explanation of the methodology follows.

DFT UPDTED AIR QUALITY ADVICE ON ASSESSMENT OF FURTHER NO_X AND NO_2 PROJECTS USING DMRB METHOD (INTERIM ADVICE NOTE 170/12)

4.8 Recent DfT advice for users of the DMRB 11.3.1 air quality assessment method enables highway scheme assessments to take into account the impact of future alternative Nitrogen Dioxide projections. The advice is in relation to the report on long term NO_x and NO_2 trends issued by DEFRA in July, 2011 and their subsequent note dated April, 2012. A spreadsheet is provided to support the implementation of the guidance. The guidance is intended for relevant projects in England, where air quality assessments

are undertaken and where such projects are yet to be submitted for statutory process, including Determination of the need for a statutory Environmental Impact Assessment.

4.9 The guidance has come about in relation to DEFRA's 2011 report assessing the long term trends in NO_x and NO_2 at roadside monitoring sites which clearly decreased between 1996 and 2002 and then stabilised, with minimal reduction from 2004 to 2010. The conclusion of the analysis of long term trends is that there is now a gap between current projected vehicle emission reductions and projections on the annual rate of improvements in ambient air quality (as previously published in DEFRA's technical guidance) and observed trends. Highways Agency (HA) analysis of long term monitored NO_2, between 2006 and 2010, investigated whether trends published in DEFRA's report were observed at monitoring sites in close proximity to HA schemes. The analysis indicates that the observed trends from monitoring data closely aligns with long term trends indicated in DEFRA's recent 2011 report.

4.10 The guidance stipulates that air quality modelling should continue to be completed in accordance with existing guidance but some additional steps should be undertaken to adjust the verified modelled NO2 concentrations to account for the long term profiles through use of the DfT spreadsheet. An additional scenario (called the 'Projected Base Year) is required to enable the Gap Analysis to be completed.

4.11 In order to provide a robust assessment for the Tamworth Phase One residential development proposals, the additional Projected Base Year Scenario has been assessed in line with the new guidance within this report.

MODEL INPUTS

Assessment Scenarios

4.12 The following assessment scenarios have been agreed with the Council and considered in this AQA:

- Baseline 2013 (existing air quality baseline)
- Opening Year 2018

Receptors

4.13 DMRB 11.3.1 notes that, for the purpose of an AQA, sensitive receptors can be thought of as areas within 200m of the roadside where people may be subject to change in air quality. Beyond 200m from the roadside, atmospheric dispersion and chemistry render emissions from road traffic are negligible.

4.14 Four receptors have been identified to take into account the impact of air pollution. The receptors are considered to represent a robust assessment of air quality within and around the development site area.

4.15 The receptor locations are shown in **Figure 4.1. Table 4.1** details the receptor location together with the relative distances to the centre of the relevant highway link.

Figure 4.1 Receptor Locations

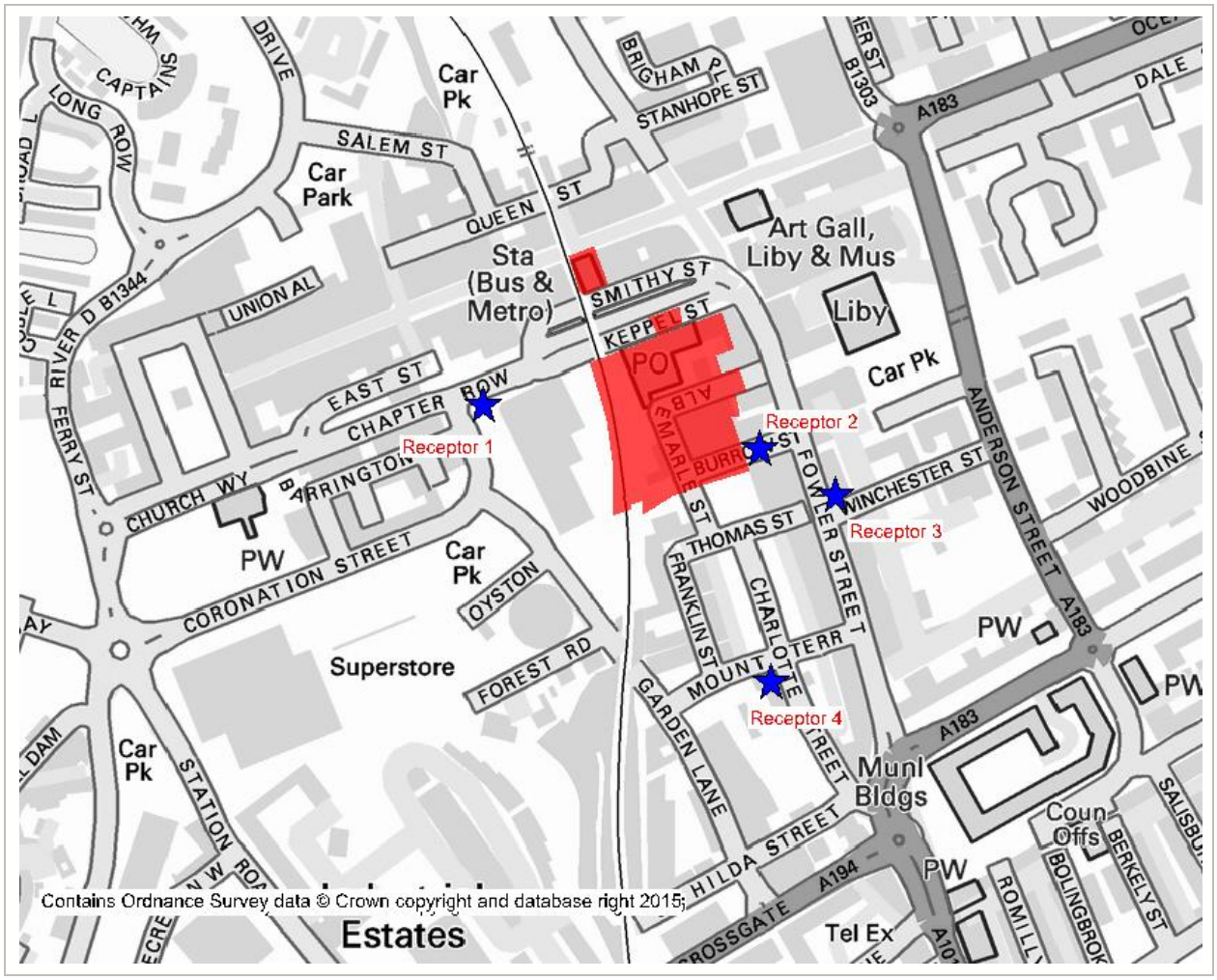


Table 4.1 Distances between Receptors and Highway Links (in metres)

Link	Road Name	Receptor 1	Receptor 2	Receptor 3	Receptor 4
1	Waterloo Square	5	-	-	-
2	Garden Lane	80	190	-	50
3	Fowler Street	-	10	5	60
4	Winchester Street	-	-	5	-
5	Crossgate	-	-	-	110

Background Pollutants

4.16 Local background pollutant concentration data has been obtained from the DEFRA Background Air Quality Maps. The maps show estimated UK background concentrations of NO_x, NO_2, and PM_{10} for each year from 2010 to 2030. However, due to recent guidance which requires the DMRB model to be run without background concentrations of NO_x or NO_2, so that it is used solely to derive road-based concentrations of NO_x, there is no longer a requirement to include NO_x background concentrations. The

road-based NO_x is used in the 'NO_x to NO_2 Calculator' (version 3.2, released September, 2012), with the background NO_2, to convert the modelled, road-based NO_x to road based NO_2 and Total NO_2.

4.17 Data are available for each 1 km by 1 km grid square in each Local Authority area. The grid square with a centre point nearest to each receptor has been used to obtain the background pollutant concentrations.

4.18 The maps for PM_{10} provide the total background pollutant concentration as well as the contribution from individual emission sectors. This information enables the pollutant concentrations attributable to individual sectors to be subtracted from the total when detailed local modelling of that sector has been carried out. Therefore, as this assessment involves the assessment of pollution from road sources using the DMRB screening model, the road emissions sectors within the background pollutant concentrations have been removed to avoid double counting.

4.19 For NO_2, total background concentrations are provided. However, the NO_2 levels must be calculated using the specific background NO_x to NO_2 calculator (version 3.2), which uses the modelled road-based NO_x concentration predicted by the DMRB model (run without any background concentrations) and the background NO_2 values to determine the total NO_2.

4.20 For the assessment, the 2013, and 2018 background concentration maps have been extracted. The derived background concentrations for each assessment year are shown in **Table 4.2**.

Table 4.2 Background Pollutant Concentrations at Receptors

Year Scenario	Background pollutant concentration (µgm-3)	
	NO_2	PM_{10}
Receptor 1		
2013	24.05	14.13
Opening Year 2018	21.76	13.67
Receptor 2		
2013	24.05	14.13
Opening Year 2018	21.76	13.67
Receptor 3		
2013	24.05	14.13
Opening Year 2018	21.76	13.67
Receptor 4		
2013	25.51	16.05
Opening Year 2018	22.43	15.23

Traffic Data

4.21 The DMRB model requires Annual Average Daily Traffic (AADT) flows and the proportion of Heavy Duty Vehicles (HDV's) for each road source affecting the receptors and for each assessment scenario. An explanation of the traffic data derivation is as follows:

4.22 Manual traffic counts, supplemented by queue length surveys, were undertaken by Capita Symonds on behalf of South Tyneside Council in December 2013. The surveys covered the town centre area. This data has been provided to JMP for use within the assessment process.

4.23 Analysis of the survey data by Capita identified the network peak hours as 08:30 – 09:30 and 16:45 – 17:45.

4.24 As December is not considered to be a neutral month, a sensitivity test has been undertaken against data from a neutral month to ascertain the validity of the survey data. There is also a requirement to assess the increase, if any, in background traffic grown since December 2013.

4.25 To address both of these issues, a comparison of ATC data collected at the same time as the surveys in December 2013 (see **Appendix B** for ATC flow locations) was compared with four individual weeks of ATC dated collected in October 2014 (the most recent complete set of data). The Traffic and Accident Data Unit has been contacted to acquire available ATC data for the South Shields area. Two ATC locations have been used in our assessment: C410, Station Road, south of B&Q and the A194, Crossgate, west of Claypath Lane (location provided in **Appendix B**). This exercise indicated that the 2013 December data presented a robust indication of traffic flows in the town centre, with similar or higher flows than that of neutral months.

4.26 Similarly a comparison of October 2013 and October 2014 flows taken from the same ATC sites showed similar traffic flows implying that no traffic growth had occurred in that period.

4.27 The assessment of air impacts requires the use of AADT flows. To generate these for each assessed scenario, the methodology provided in DMRB Volume 13 – Section 1 – Part 4 has been used. This uses the following principles which have been applied to the traffic flows on each road included in the assessment:

- To establish a 12-hour flow for the 2018 Opening Year Assessment, a peak hour to 12 hour growth factor was calculated from the 2013 Baseline 12 hour ATC data. A growth factor value of 3.3 was applied to the AM & PM peak traffic flows in the Opening Year to achieve 12-hour flows. An ‘E’ Factor was then applied to convert from 12-hour weekday flows to 16-hour weekday flows (default value 1.15).
- An ‘M’ Factor was derived using the formula M = a + (b x SI), whereby a and b apply to the month in which the traffic survey was undertaken and represent the regression slope between neutral and non-neutral months. The Seasonality Index (SI) enables seasonal variation to be taken into account and is “the ratio of the average August weekday flow to the average weekday flow in a neutral month (April, May, June, September and October – excluding Bank Holidays).” Based on the DMRB method, the SI value of 1.0 was used as this is the default value for Principal Roads in Built-up Areas.
- The ‘M’ Factor is used to convert flows to an AAHT (Annual Average Hourly Traffic) flow. This was achieved using the following formulae:
- AAHT = ‘M’ Factor flow / 8,760 (number of hours in a year)
- To attain an AADT traffic flow, the AAHT was multiplied by the number of hours required:
- 24 Hour = AAHT x 24 (number of hours required for the assessment of air)

4.28 Percentage HDV’s have been calculated for each flow through the analysis of the traffic data.

4.29 Traffic speeds are based on the speed limits for the roads assessed an approach consistent with DMRB methodology.

4.30 Base on forecast AADT traffic flows are included in **Table 4.3**.

Table 4.3 Traffic Flow Data

Receptor / Road name	Speed Limit (KPH)	Distance to Centre of link from receptor	AADT Base 2013	% HDV's 2013	AADT 2018	% HDV's 2018
Receptor 1						
Waterloo Square	48	5m	1324	11.91	1913	39.05
Garden Lane	48	80m	2955	0.28	2955	0.28
Receptor 2						
Garden Lane	48	190m	2955	0.28	2955	0.28
Fowler Street	48	10m	1224	89.15	1274	89.58
Receptor 3						
Fowler Street	48	5m	1494	2.78	1328	43.44
Winchester Street	48	5m	1573	23.75	1573	6.86
Receptor 4						
Garden Lane	48	50m	4183	15.48	4237	0.98
Crossgate	48	110m	8557	7.57	8910	7.36
Fowler Street	48	60m	1494	7.22	1328	43.44

Model Verification

4.31 LAQM.TG(09) identifies a clear 'local' verification process that should be applied to the DMRB model. Modelled results should be compared with monitored data at relevant locations and that, 'For the verification and adjustment of NO_x/NO_2, a combination of continuous monitoring and diffusion tubes is recommended' (Annex 3, page A3-42)'.

4.32 Table 4.4 shows the monitoring data used for the verification of modelled results.

Table 4.4 Council Monitoring Data Used in Verification (2013)

Monitoring Site	Type	Distance from Kerb (m)	Grid Reference	Annual Mean NO_2 μgm-3
Tyne Dock	Roadside	14.0	435565; 565040	34.00
Bold Lane	Roadside	3.0	435949; 564456	27.2

Source: South Tyneside Council – Information provided from Environmental Health Officer, January 2015

4.33 As these are the most representative locations (in terms of distance and monitor type) to the site for which air quality data is available, they have been used to verify the modelled results. The NO_2 concentrations at the verification sites are similar to that in the modelled calculated assessment results (baseline 2013 results range from 25 to 28µgm-^{3}). The available existing monitoring data therefore verifies that the air quality assessment provides a representative assessment of local air quality at the receptor points located around the development site.

5 Assessment Results

MODELLED IMPACT

5.1 The findings of the assessment of pollutant concentrations at the Receptor locations for the assessment scenarios are discussed below. These results should be compared with the NAQS Objectives listed in **Table 2.1** and summarised as follows:

- NO_2 average Annual Mean not to exceed 40µgm^{-3} by 31st December, 2005;
- PM_{10} average annual concentrations not to exceed 40µgm^{-3} by 31st December, 2004; and
- PM_{10} average daily concentrations not to exceed 50µgm^{-3} more than 35 times per year by 31st December, 2004.

NITROGEN DIOXIDE (NO_2) DMRB ASSESSMENT

5.2 The adjusted modelled NO_2 concentration at the Receptors for the assessment scenarios are shown in **Table 5.1**.

Table 5.1 Adjusted Modelled Annual Mean NO_2 Concentrations

Receptor/Road Name	2013 Baseline	Adjusted Annual Mean NO_2 Concentration (µgm-3)
		2018
Receptor 1	25.14	22.68
Receptor 2	28.18	25.14
Receptor 3	26.47	24.52
Receptor 4	27.25	23.65

NITROGEN DIOXIDE DMRB ASSESSMENT

Updated NO_2 Project Through Gap Analysis

5.3 The gap analysis adjusted, modelled NO_2 concentration at the Receptors for the assessment scenarios are shown in **Table 5.2.**

Table 5.2 Gap Analysis Adjusted Modelled Mean NO_2 Concentrations

Receptor/Road Name	2013 Baseline	Projected Base Year	Adjusted Annual Mean NO_2 Concentration (µgm-3)	
			Gap Factor	Gap Factor Adjusted Opening Year
				2018
Receptor 1	25.15	22.68	1.07	24.26
Receptor 2	28.18	25.00	1.09	27.34
Receptor 3	26.47	23.76	1.07	26.36
Receptor 4	27.25	23.88	1.10	26.04

PARTIUCULATE MATTER (PM_{10}) ASSESSMENT

5.4 The adjusted, modelled Annual Mean PM_{10} concentrations at the Receptors for the assessment scenarios are shown in Table 5.3.

Table 5.3 Adjusted Modelled Annual Mean PM_{10} Concentrations

Receptor/Road Name	2013 Baseline	Adjusted Annual Mean PM_{10} Concentration (µgm-3)
		2018
Receptor 1	14.33	13.83
Receptor 2	14.63	14.02
Receptor 3	14.53	14.04
Receptor 4	16.35	15.45

6 Assessment Discussion

NITROGEN DIOXIDE (NO_2)

6.1 The assessment results indicate that, in the base year (2013) and future year assessment (2018), the NAQS NO_2 Annual Mean Objective concentration will not be exceeded at all receptor locations. This applies to both the standard DMRB methodology and the additional gap analysis DMRB methodology.

6.2 The reductions in Annual Mean NO_2 concentrations from 2013 to 2018 are as a result of improved engine efficiency and reduced pollutant output.

PARTICULATE MATTER (PM_{10})

6.3 The assessment results show that, in the base year and future assessment year the NAQS Annual Mean Objective concentration for PM_{10} is not forecast to be exceeded at all Receptor locations.

6.4 The 2018 PM_{10} concentrations are forecast to be slightly lower than those calculated for 2013 for all Receptors.

6.5 The development will not cause PM_{10} concentrations greater than 50µgm^{-3}. The following formula (taken from the DMRB) was used to consider the scale and frequency of exceedences.

$$N = -18.5 + 0.00145a^3 + \left(\frac{206}{a}\right)$$

1 where a = Annual Mean

6.6 The maximum number of days per year where PM_{10} concentrations are forecast to exceed 50µgm^{-3} is less than one day for all assessment scenarios. As such the assessment scenarios comply with the NAQS Objective.

7 Construction Impacts

7.1 In terms of construction, the main air quality impacts that are required to be considered are the generation of dust and an increase in NO_2 and PM_{10} arising from construction plant use.

7.2 It is not possible to quantify dust emissions within the AQA as these depend on a variety of factors including the likelihood of dust being raised, the duration of works, distance of receptors from sources and the frequency of weather conditions that are likely to exacerbate dust conditions. It is also anticipated that the construction of the proposed development will be supported by a detailed Construction Management Plan (CMP) which will ensure dust is kept to a minimum.

7.3 For plant generated NO_2 and PM_{10}, paragraphs 3.12 and 3.20 of DMRB 11.3.1 advise that a change in traffic flow of 10%, or a change in Heavy Duty Vehicles (HDV) flow of at least 200 AADT, is typically required for a measurable change in local air quality. For this development, it is expected that construction traffic will increase flows by less than 10% or 200 AADT; therefore, the effect of construction vehicles and plant upon air quality is considered to be of negligible significance.

8 Mitigation

8.1 This AQA has shown that concentrations of NO_2 and PM_{10} within the vicinity of the proposed development are below the NAQS Annual Mean Objectives. The development itself will not initiate any significant increase in traffic-related emissions. Therefore, it is anticipated that no development specific mitigation will be required.

8.2 The construction phase of the proposed development has the potential to generate nuisance dust which could affect adjacent properties. A Construction Management Plan (CMP) may need to be prepared in accordance with best practice, to minimise this impact.

9 Conclusion

9.1 JMP Consultants Limited (JMP) has been commissioned by Muse Developments, South Tyneside Council and Nexus to produce an AQA for a proposed Transport Interchange development in South Shields town centre in the metropolitan borough of South Tyneside.

9.2 The AQA focuses on key transport-related pollutants NO_2 and PM_{10}.

9.3 This AQA determines the air quality associated with the 2013 base year and 2018 Opening Year scenarios.

9.4 The assessment methodology has been based on the Local Screening Method set out in the DfT DMRB Section 11.3.1 for four Receptors located in close proximity to the proposed development site, using traffic data obtained by JMP as part of the Transport Assessment for the site. In addition, following recent DfT advice for users of DMRB Section 11.3.1, a 'Gap Analysis' assessment has been undertaken to take into account the impact of future Nitrogen Dioxide projections.

9.5 Background pollutant concentrations have been obtained from DEFRA background concentration maps.

9.6 NO_2 and PM_{10} concentrations at the Receptor locations are below NAQS Objective levels for all assessment scenarios. In addition, the number of days where PM_{10} concentrations are forecast to exceed 50µgm^{-3} is also below the NAQS Objective level.

9.7 The assessment results show that, in terms of the 2013 baseline, the NO_2 concentrations are at similar levels (between 25 to 28 µgm^{-3}) to the nearest verification sites at all four receptors thus verifying the results as valid. The 2013 Baseline PM_{10} and NO_2 results are well within Objective levels for health and are forecast to decrease further in the 2018 Opening Year. Therefore the impact of development on local air quality is considered negligible and the site is deemed acceptable for the amenity of future occupants and visitors.

9.8 As there are no Objective concentration exceedences as a result of the development, specific mitigation measures are not required.

9.9 The impact of construction activities associated with the proposed development is considered negligible. A Construction Management Plan should be prepared by the Contractor outlining mitigation measures for dust to limit the impact on existing, adjacent properties at the time of construction.

Appendix A

SCOPING DISCUSSION

Scoping Email from JMP

21 January 2015

Dear Ian,

JMP has been commissioned by Muse Development to produce an Air Quality Assessment [AQA] to support the planning application for a proposed Interchange. This development is part of the Town Centre 365 Masterplan.

We are contacting you to agreeing the scope of the Air Quality Assessment required to support the planning application.

The extant of the site is bounded by King Street to the north, Waterloo Square to the west, Burrow Street to the south and Fowler Street to the east. I attach a plan at the end of this note.

JMP in developing a scope for the work would like confirmation on the requirements of the local authority in terms of the contents of the AQA and as such I set out below our proposed air quality assessment scope for your consideration.

Based on the most up to data available on the Department for Environment, Food & Rural Affairs (DEFRA) website, two Air Quality Management Areas (AQMA) were declared in South Tyneside in 2006. Both of the sites were designated as an AQMA due to a likely breach of the Nitrogen Dioxide (NO2) Annual Mean objectives. These are located at Boldon Lane, South Shields and Leam Lane/Lindisfarne roundabout, Jarrow at least 3km from the proposed development site.

Could you please provide us with the most up to date Air Quality Progress Report/Air Quality Updating and Screening Assessment as online the latest version is 2011. We will use this information to identify appropriate monitoring sites for verification of our data.

Our intended methodology is set out below:

JMP propose to include the following roads in the assessment:

Waterloo Square;
Garden Lane;
Crossgate;
Fowler Street;
Winchester Street;

With regard to the appraisal, we normally assess the following scenarios:

Base Year - 2013
Opening Year – 2018

We will use the nearest automatic and non-automatic (Nitrogen Dioxide diffusion data) sites for verification purposes. These will be agreed with you when we receive the most up to date monitoring reports.

With regard to the background data please confirm that it will be acceptable to obtain background data from DEFRA's website.

We intend to include the following receptor locations in the assessment (attached) and your agreement to these is requested (as per enclosed flow diagram and a site plan):

Receptor 1 – Waterloo Square near BHS;
Receptor 2 – Burrow Street/BHS;
Receptor 3 – Winchester Street;
Receptor 4 – Charlotte Street;

We anticipate that the AQA will include the following sections:

Introduction - including development proposals and scope of the report;
Policy Context;
Baseline Conditions - including both local highway network and local air quality (traffic data will be derived from DfT data and through undertaking traffic counts - report will include a description of input data used, assessment years and location of receptors);
Assessment Methodology - DMRB (we will also undertake a gap analysis assessment as required by the Highways Agency for large developments);
Assessment Results - including N02 and PM10;
Assessment Discussion (including determination of significance);
Construction Impacts;
Mitigation;
Conclusions.

If you could confirm that the attached list of proposed contents satisfies the requirements of the AQA for this development I would be most grateful.

I look forward to hearing from you.

Many thanks for your anticipated assistance.

Kind regards,

Monika Jankowska

Reply from the Environmental Health Officer

Document1 [NOT PROTECTIVELY MARKED]

Ian Rutherford [Ian.Rutherford@southtyneside.gov.uk]

You replied on 28/01/2015 09:36.

Sent: Tue 27/01/2015 15:08
To: Monika Jankowska

Message | Document1.docx (16 KB)

This email has been classified as: NOT PROTECTIVELY MARKED

Monika – find attached some notes – best I can do given the time and straight off the top of my head. If you need data tell me what is preferred and I will check what we have

Ian

South Tyneside Council
Local Government Awards 2014
Public Health - winner
Every Contact a Health Improvement Contact programme

Notes on AQA submission

South Shields Transport interchange

The AQMAs were declared on the basis of modelled and monitored air quality locally by the Council, not based upon Defra data sets.

We will provide the most up to date full set of data as soon as we can but not in the form of a USA. We have a full set of data for 2014, but earlier data sets are not complete due to equipment and database problems

Your AQ assessment need only consider Crossgate/ Waterloo Sq/Garden Lane in terms of the one hour NO2 (and I doubt if there will be any issue in this regard). Sensitive receptors (residents) are only present in Winchester Street and Fowler Street hence - annual mean NO2.

Could I however suggest that given the growing emphasis on PM10/PM2.5 then it would be wise to consider those pollutants at appropriate locations.

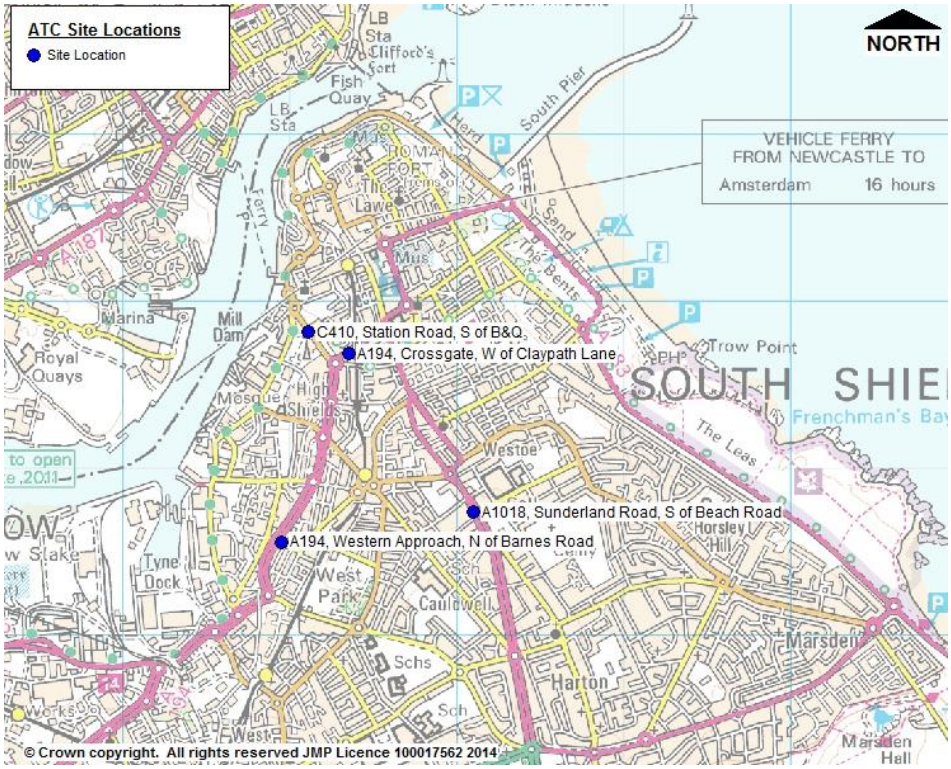
If I can provide a good set of data for 2013 then your can use that for a base year or alternatively 2014. Will you use national data sets if we cannot provide 2013 ?

Tyne Dock groundhog is the closest continuous station, located on Port of Tyne land at the junction of Western Approach and Hudson St.

Contents list is ok

Appendix B

FLOW LOCATIONS


ATC Site Locations
Site Location
NORTH
C410, Station Road, S of B&Q
A194, Crossgate, W of Claypath Lane
A1018, Sunderland Road, S of Beach Road
A194, Western Approach, N of Barnes Road
VEHICLE FERRY
FROM NEWCASTLE TO
Amsterdam 16 hours
South Pier
Fish Quay
Mill Dam
Marina
Royal Quays
Trow Point
Frenchman's Bay
The Leas
Westoe
Horsley Hill
Tyne Dock
West Park
Cauldwell
Harton
Marsden
Marsden Hall
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