2016 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the
Environment Act 1995
Local Air Quality Management

July 2016

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Executive Summary: Air Pollution in Our Area

What is Air Pollution?

Air pollution is defined as a mixture of gases and particles that have been emitted into the atmosphere by man-made processes. The combustion of fuels such as:

- coal,
- oil,
- gas,
- petrol or diesel
- wood burning

are the most significant sources of the key pollutants of concern to local authorities.

What are Particles?

Particle pollution (also called particulate matter or PM) is the term for a mixture of solid particles and liquid droplets found in the air. Some particles, such as dust, dirt, soot, or smoke, are large or dark enough to be seen with the naked eye. Others are so small they can only be detected using an electron microscope.

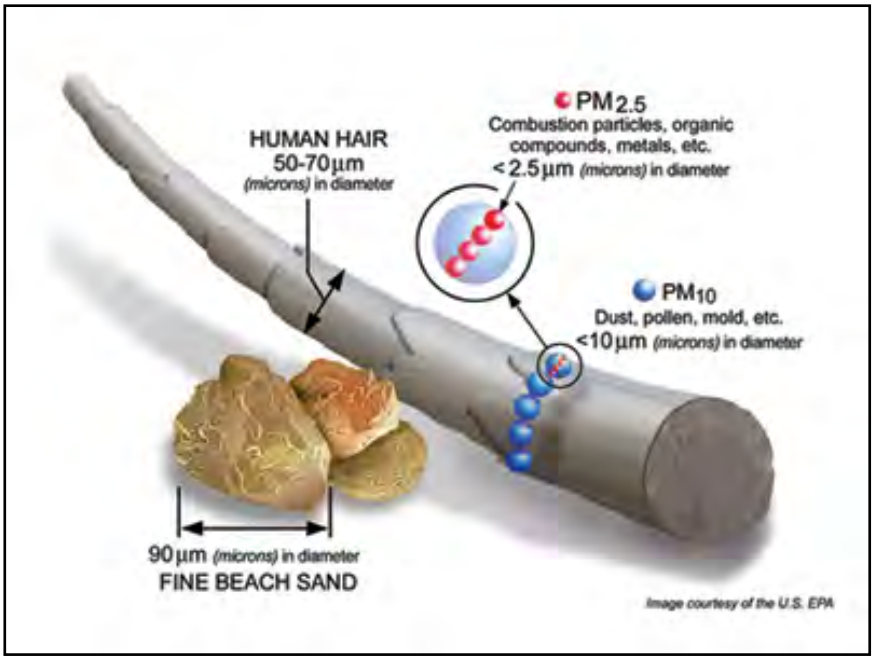
Particulate matter is made of lots of different sorts of things including: vehicle exhausts; poorly combusted fuel; particles of metal from engine chambers; bits worn from brake pads; bitumen asphalt or concrete dust work from the road; biological and other waste ground up on the road; and it's formed by reactions between other pollution in the air too.

How big is Particle Pollution?

Particle pollution includes "inhalable coarse particles," with diameters larger than 2.5 micron (μm) and smaller than 10μm and "fine particles," with diameters that are 2.5μm and smaller.

How small is 2.5μm? Think about a single hair from your head. The average human hair is about 70μm in diameter; making it 30 times larger than the largest fine particle.

(See diagram below)



Source: USEPA - https://www3.epa.gov/pm/basic.html

These particles come in many sizes and shapes and can be made up of hundreds of different chemicals. Some particles, known as ***primary particles*** are emitted directly from vehicles and road surfaces, chimney stacks, dust from storage areas, spoil heaps, emissions from buildings (ventilation, boilers and solid fuel combustion), materials handling and construction sites.

Particles may form when substances react in the atmosphere. These are often from the oxidation of sulphur and nitrogen oxides, which form nitrates and ammonium salts. These are usually less than 10µm diameter, and originate from combustion and natural sources; these particles, known as ***secondary particles***.

What is Nitrogen Dioxide?

Nitrogen dioxide is a brown gas, with the chemical formula NO_2. It is chemically related to nitric oxide, a colourless gas with the chemical formula NO. These abbreviations are often used instead of writing the names of the chemicals in full.

Together, NO and NO_2 are known as Nitrogen Oxides or NOx. NOx is released into the atmosphere when fuels are burned (for example, petrol or diesel in a car engine or natural gas in a domestic central heating boiler).

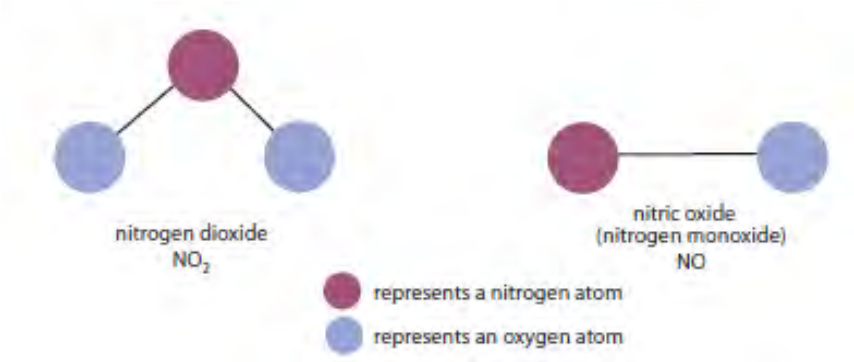


Diagram of the structures of NO_2 and NO

NOx emissions from burning fossil fuels are mainly as NO, but some sources can release a lot of NOx as NO_2. These **primary** NO_2 emissions are particularly important from diesel vehicles (especially when moving slowly), and can make up as much as 25% of the total NOx emissions from this source.

One reason for this is as a side-effect of measures that have been developed to reduce emissions of particulate matter (PM) from diesel vehicles by treating the exhaust using diesel particulate filters.

These primary NO_2 emissions can lead to high concentrations of NO_2 at the roadside, especially where there are many diesel vehicles.

NO_2 is also formed in the atmosphere in a chemical reaction between NO and ozone (O_3). Because this NO_2 is not released straight into the atmosphere, but is formed there by a chemical reaction, it is known as **secondary** NO_2.

Sometimes this reaction cannot take place because there is not enough O_3 for the NO to react with. This is most common close to where NO is released, for example, nearby busy roads.

Why should I be Concerned?

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas[1,2].

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion[3].

Health effects of Particles

One of the best characterized and most important health impacts of air pollution is the increase in mortality risk associated with long-term exposure to particulate air pollution.[4] Public Health England (PHE) has produced estimates of this risk for all local authorities in the United Kingdom. These estimates are based on the research evidence of mortality risk, combined with modelled levels of the background air pollution to which populations are exposed at local authority level. Local estimates are given in **Table i**.

Table i: Estimated effects on annual mortality in 2010 of human-made $PM_{2.5}$ air pollution.

Area	Attributable Fraction	Attributable* deaths aged 25+	Associated Life-years Lost
EAST MIDLANDS	5.7	2,314	24,016
Nottingham City	6.4	150	1,559
Nottinghamshire CC	5.7	430	4,270
Gedling Borough	**5.8**	**63**	**628**

Source: Estimating Local Mortality Burdens associated with particulate air pollution, PHE, 2014

* in reality, air pollution is likely to contribute a small amount to the deaths of a larger number of exposed individuals rather than being solely responsible for the number of deaths equivalent to the calculated figure of attributable deaths

1 Environmental equity, air quality, socioeconomic status and respiratory health, 2010
2 Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006
3 Defra. Abatement cost guidance for valuing changes in air quality, May 2013
4 Gowers, A.M. et al. Estimating Local Mortality Burdens associated with Particulate Air Pollution, Public Health England, 2014

To place these figures in context, **Table ii** presents a comparison of deaths attributable to some other key risk factors in Nottinghamshire County and Nottingham City.

Table ii*: Comparison of deaths attributable to human-made air pollution, smoking and deaths related to alcohol consumption, Nottinghamshire County and Nottingham City.*

Area	Deaths attributable to human-made air pollution	Deaths attributable to smoking	Deaths related to alcohol consumption
Nottinghamshire County	430	1,282*	326¥
Nottingham City	150	420	115

*Estimate based on 1/3 of deaths attributable for 2011-2013, Tobacco Control Profiles, PHE, http://www.tobaccoprofiles.info/profile/tobacco-control

¥ Estimates for 2010, Local Alcohol Profiles for England, http://www.lape.org.uk/data.html

Health effects of Nitrogen Dioxide

Studies have shown associations of nitrogen dioxide (NO_2) in outdoor air with adverse effects on health, including reduced life expectancy. It has been unclear whether these effects are caused by NO_2 itself or by other pollutants emitted by the same sources (such as traffic). Evidence associating NO_2 with health effects has strengthened substantially in recent years and we now think that, on the balance of probability, NO_2 itself is responsible for some of the health impact found to be associated with it in epidemiological studies.[5]

It is hoped that PHE will produce similar estimates of increase in mortality risk associated with long-term exposure to nitrogen dioxide air pollution in the near future.

[5] Statement on the evidence for the effects of nitrogen dioxide on health - https://www.gov.uk/government/publications/nitrogen-dioxide-health-effects-of-exposure

Air Quality Issues in Gedling Borough

The main pollutants of concern in the Borough relate to the tail pipe emissions from motor vehicles. As such the main commuter routes into Nottingham, through the Borough, are the main areas of concern: the A60 Mansfield Road, A612 Colwick Loop Road and B684 Mapperley Plains/Woodborough Road. Ambient background levels are affected by emissions from domestic heating: NOx from domestic gas boilers and PM from wood/coal burners.

Nitrogen Dioxide is the primary pollutant of concern in the Borough; Gedling Borough has an Air Quality Management Area (AQMA) along the A60 Mansfield Road. Nitrogen Dioxide monitoring results for the last year (2015) are below the air quality objective, but continue to be of concern in the AQMA and along the Colwick Loop Road.

Background levels of $PM_{2.5}$ across the Borough are modelled to be over the World Health Organisation guideline level.

Due to the traffic related issues of our AQMA and more widely across the Borough the Council works with colleagues from the County Council Highways Department to implement actions to help:

- Ease congestion thereby maintaining a flow of traffic (reducing the stop/start)
- Promote Public Transport use.
- Promote cycling/walking as an alternative.

More generally the Public Protection Service works with colleagues in the Planning Service to ensure air quality issues are considered in the forward planning process and during consultation for new developments.

Actions to Improve Air Quality

Below is a brief summary of core actions to target sources of pollution in Gedling over the past year.

ECO Stars Fleet Recognition Scheme

The ECO Stars Fleet Recognition Scheme (http://ecostar.web10.indzine.net/) encourages and helps operators of HGVs, buses, coaches, vans and taxis to run fleets in the most efficient and green way.

The scheme provides recognition for best operational practices, and guidance for making improvements. The ultimate aim is to reduce fuel consumption which naturally leads to fewer vehicle emissions and has the added benefit of saving money.

The Nottingham ECO Stars scheme began as a scheme in Gedling Borough in 2012 and then expanded the following year to cover the whole of the Nottingham conurbation. Membership stands at 82 members operating over 5200 vehicles around the Nottingham Conurbation.

Is the scheme having any benefit?

The South Yorkshire ECO Stars group have recently developed a Scheme Assessment Toolkit, developed by the University of the West of England, whereby emissions output as well as fuel consumption have been modelled for eight ECO Stars members of the South Yorkshire Scheme.

All of the companies showed an improvement in NOx emissions, 6 companies showed improvement in PM and CO2 emissions; for, example:

- **Company A** had a 46% reduction in PM, 8% reduction in NOx, and a 24% reduction in CO_2.
- **Company B** had a 73% reduction in PM, a 9% reduction in NOx, and a 15% reduction in CO_2.

Planning Guidance on Air Quality and Emissions Mitigation

Informal guidance on Air Quality has been prepared to set out the measures, which will be taken to help reduce vehicle emissions that occur as a result of development proposals. (LINK) The guidance applies across the whole Borough in order to improve air quality and avoid other areas having to be designated as AQMAs. At the present time the guidance carries some weight as a material consideration in determining planning applications; the Council seeks agreement with developers to include many of the mitigation measures on a voluntary basis.

In the longer term, it is proposed to incorporate the guidance into the Local Planning Document. This will bring the requirements of the guidance into the statutory development plan giving it more weight. Currently a draft Air Quality policy has been included in the emerging Local Plan.

Local Priorities and Challenges

Below is a brief summary of the priorities for the local authority in addressing air quality for the coming year:

- The Borough Council is, as a member of the Nottinghamshire Environmental Protection Working Group (NEPWG), currently establishing links with colleagues in Public Health. Engagement with Health and Well Being Boards (Nottingham City and Nottinghamshire County) has led to Air Quality being included within the Joint Strategic Needs Assessment (JSNA) for the County and City in 2015 (JSNA Air Quality). The Council will continue to promote air quality issues via the NEPWG with health colleagues to promote air quality issues in emerging work, such as the Sustainable Transformation Plan.

- Linked to the above the NEPWG have started to consider the re-writing of the Nottinghamshire Air Quality Strategy 2008. With the assistance of Public Health England and local Public Health officers the NEPWG are in the process of engaging with stakeholders, in particular Transport and Land-use Planners to re-draft a new strategy.

- The suburban areas of the Borough fall within the Nottingham Urban Area Agglomeration; which is one of the 5 agglomerations DEFRA has mandated to introduce a Clean Air Zone (CAZ) by 2020 due to breaches of EU limit values. The Borough Council will continue to liaise with Nottingham City Council over the CAZ development; and the development of a 'Greater Nottingham Air Quality Strategy.'

- Continue to monitor for Nitrogen Dioxide in the areas of concern.

- The Air Quality Action Plan has been in place for 4 years and many of the actions have been completed and/or on-going for some time. Additionally, it is understood that the assumptions made, at the time of writing the Action Plan, (about the main contributing sources of pollution, which parts of the vehicle fleet contribute the most to the pollution problem) may need revising.

The Action Plan is based on old emissions information, which has been updated to better reflect the effect diesel passenger vehicles may have.

This update of the Action Plan will inevitably raise some difficulties:

a) Have we done the easy things…what's left is the difficult?

b) Dealing with commuters in diesel passenger vehicles.

- Promotion of Air Quality Planning Guidance Document – with regard to the planning guidance document mentioned above, at the current time the document is informal. Therefore, the Council are encouraging developers to install mitigation as standard (for example electric vehicle charging points), but ultimately there is no formal trigger for them to do so.

The location of the AQMA and the site constraints makes it difficult to remedy the problems with small-scale infrastructure improvements and therefore smarter choices measures (such as travel planning, and marketing and promotion of alternatives to the car) are more likely to provide improvements. Measures that facilitate and encourage walking, cycling and bus use will therefore be the priority actions in the foreseeable future.

The top-slicing of 43% of the integrated transport block from 2015/16 onwards by the government and allocating it to the Local Growth Fund means that from 2015/16 the integrated transport funding allocated to Nottinghamshire County Council reduced by approximately £3.5m; significantly reducing the funding available for transport improvements that will deliver air quality improvements.

The cessation of the Local Transport Fund funding in March 2016 and the Department for Transport's decision to not award Sustainable Transport Transition Year Funding 2016/17 to the D2N2 area bid also means that several of the proposed actions in the action plan will be delayed further until such time as funding becomes available from Central Government.

How to Get Involved

As a resident of Gedling Borough you can help to make a difference:

- trying alternatives to car travel or preferably taking the active option - bus, train, walking and cycling.
- when buying a new or used car consider the alternatives to diesel – electric/hybrid/petrol.
- when buying a new boiler for your home consider the NOx emissions – go for a low NOx model.
- if you are thinking of installing a solid fuel burner make sure you are not in a smoke control area. If you are, make sure the appliance is certified for use in a smoke control area.
- keeping gas appliances and solid fuel burners in good repair.

Changing your behaviour can reduce your exposure to pollution:

Pollution levels vary over very short distances: in general, the closer you are to the sources, the more you breathe in.

- If you're walking or cycling, you can easily avoid the worst pollution by travelling along quieter streets. Even walking on the side of the pavement furthest from the road can help.
- One of the worst places for pollution is inside vehicles on busy roads where levels inside the car are typically as high as just outside.
- The health benefits of physical activity (walking or cycling) outweigh the risks from air pollution. If you're in a vehicle, you just get the risks with none of the benefits.

Air pollution is a local problem. It comes from local sources, it has local health impacts, and it can be tackled by local action.

The collective effect of actions by individuals, together with action by local councils and governments, can make a significant difference to pollutant exposure.

Royal College of Physicians. Every breath we take: the lifelong impact of air pollution. Report of a working party. London: RCP. 2016

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1 Local Air Quality Management

This report provides an overview of air quality in Gedling Borough during 2016. It fulfils the requirements of Local Air Quality Management (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 to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Gedling Borough to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England can be found in Table E.1 in Appendix E.

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

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 Air Quality Action Plan (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 Gedling Borough can be found in Table 2.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at the Councils Air Quality webpages.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Pollutants and Air Quality Objectives	City / Town	One Line Description	Action Plan
Gedling No:2	NO_2 annual mean	Gedling	A60 Mansfield Road (Oxclose Lane to Egerton Road)	Action Plan Nov 2012

2.2 Progress and Impact of Measures to address Air Quality in Gedling Borough

Gedling Borough has taken forward a number of measures during the current reporting year of 2016 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.3a and Table 2.2b. More detail on these measures can be found in the Action Plan. Key completed measures are:

1. Continuation of the ECO Stars Fleet Recognition Scheme in the Nottingham Urban Area. Membership stands at 82 members operating over 5200 vehicles.

2. Introduction of the Robin Hood Card; a smart travel card allowing public transport passengers to use multiple public transport operators.

3. Personalised travel planning was undertaken with 4,000 households within and close to the AQMA during 2014/15. The travel planning included before and after surveys and the analysis of these show that for a matched panel there has been:

- 14% reduction in car journeys to work
- 11% increase in walking journeys to work
- 8% reduction in car use for shopping journeys
- 9% increase in bus use for shopping journeys

4. The County Council also undertook targeted workplace travel planning with 44 businesses in the AQMA during 2014/15. Detailed travel clinics to give advice to staff on travel options were also held at 5 sites within the AQMA, including the County Council workplace site and two Gedling Borough workplace sites.

Progress on the following measures has been slower than expected due to:

- Park and ride sites due to the lack of revenue funding available for undertaking the feasibility studies (and revenue running costs) for such measures; as well as the lack of major scheme funding available for the delivery of such measures
- Introduction of a car club in the county as this will only be introduced once the club in the City proves consistently successful over a period of time (the Nottingham City car club was only introduced in April 2014)
- Expansion of the cycle hire scheme due to the cessation of Local Sustainable Transport funding and the DfT decision not to allocate Sustainable Transport Transition Year 2016/17 funding to the D2N2 area-wide bid.

Nottinghamshire County Council's priorities for the coming year are predominantly through measures to make the best use of the transport networks and through smarter travel measures that will encourage people to travel more sustainably. These include:

- Traffic control and information provision to minimise disruption and delay on County Council managed roads such as contingency planning, the effective co-ordination of works and the provision of real-time travel information.
- Parking enforcement on County Council managed roads to ensure that the traffic keeps moving.
- Travel planning such as personalised travel planning undertaken at major workplaces within the AQMA, travel planning at the County Council, and the development of new travel plans at businesses across the Borough through planning conditions.
- Measures to reduce the need to travel at peak times such as the provision and encouragement of flexible working arrangements.
- The facilitation of smarter travel behaviour such as the provision of a car sharing scheme, small scale sustainable transport improvements (e.g. cycle parking facilities, and cycling network enhancements) on County Council managed roads, and integrated and concessionary ticketing schemes.
- The encouragement of smarter travel behaviour such as the marketing and promotion of passenger transport, walking and cycling, provision of cycling and walking route maps, cycle training programmes, and web-based journey planners.
- The encouragement of the uptake of low-emission vehicles through the delivery of the Nottingham Go Ultra Low City bid funding.

Gedling Borough's priorities for the coming year are to re-examine and begin the process of re-writing the air quality action plan in conjunction with stakeholders.

The AQAP has been in place for 4 years and many of the actions have been completed and/or on-going for some time. Additionally, it is understood that the assumptions made, at the time of writing the action plan, (about the main contributing sources of pollution, which parts of the vehicle fleet contribute the most to the pollution problem) may need revising. The action plan is based on old emissions information, which has been updated to better reflect the effect diesel passenger vehicles may have.

Table 2.2 – Action Plan Measures- Key Dates and Classifications

Measure No.	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Estimated Completion Date
1a	Alternatives to private vehicle use	Bus based park & ride; rail based park and ride	NCC	2016-2021	2015 (review)	On-going
2a	Freight and delivery management	Route Management Plans/ Strategic routing strategy for HGV's	NCC	2013	2014	**Complete**
2b	Freight and delivery management	Route Management Plans/ Strategic routing strategy for HGV's	NCC	2013	2014	**Complete**
2c	Freight and delivery management	Route Management Plans/ Strategic routing strategy for HGV's	NCC	2013	2014	**Complete**
3a	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, inc. Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	NCC	2012	2013/14	**Complete**
3b	Public Information	UTC, Congestion management, traffic reduction	NCC	2012	2012-16	On-going
3c	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, inc. Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	NCC	2012	2012-16	On-going
3d	Traffic Management	UTC, Congestion management, traffic reduction	NCC	2012	2013-14	**Complete**
3e	Traffic Management	UTC, Congestion management, traffic reduction	NCC	2012	2012-16	On-going
3f	Traffic Management	UTC, Congestion management, traffic reduction	NCC	2012	2012-16	On-going
3g	Traffic Management	UTC, Congestion management, traffic reduction	NCC	2012	2012-16	On-going
4	Freight and Delivery Management	Route Management Plans/ Strategic routing strategy for HGV's	GBC	2012	2012-16	On-going
5a	Traffic Management	Workplace Parking Levy, Parking Enforcement on highway	NCC	2012	2012-16	On-going
5b	Traffic Management	Other	GBC	2012	n/a	**Complete**
6a	Promoting Low Emission Transport	Low Emission Zone (LEZ)	NCC	2013	2014	**Complete**
7a	Policy Guidance and Development Control	Other policy	GBC	2012	2012-16	On-going
7b	Policy Guidance and Development Control	Other policy	GBC/NCC	2012	2012-16	On-going
7c	Policy Guidance and Development Control	Other policy	GBC/NCC	2012	2012-16	On-going
7d	Policy Guidance and Development Control	Other policy	GBC/NCC	2012	2012-16	On-going
7e	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	GBC	2013	2012-15	**Complete**
7f	Policy Guidance and Development Control	Other policy	NCC	2012	2012-16	On-going
8	Transport Planning and Infrastructure	Other	NCC	2012	2012-16	On-going
9a	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	GBC	2012	2012-16	On-going

Measure No.	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Estimated Completion Date
9b	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	GBC	2012	2012-15	**Complete**
9c	Vehicle fleet efficiency	Promoting low emission public transport	NCC	2012	2012-16	On-going
9d	Promoting Low Emission Transport	Other	NCC	2012	2012-16	On-going
10a	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	GBC	2012	2012-16	On-going
10b	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	GBC	2012	2012-15	**Complete**
11	Promoting Low Emission Transport	Taxi Emissions incentives	GBC	2013	none	Not known
12a	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	GBC	2012	2012-16	On-going
12b	Vehicle Fleet Efficiency	Other	GBC	2012	2012-16	On-going
12c	Vehicle Fleet Efficiency	Driver training and ECO driving aids	GBC	2012	2012-13	On-going
12d	Vehicle Fleet Efficiency	Other	GBC	2012	2012-16	On-going
12e	Vehicle Fleet Efficiency	Other	GBC	2013	none	Not known
13a	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging.	GBC	2012	2013	**Complete**
13b	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging.	GBC	2012	2014-15	2014/ on-going
14a	Public Information	Other	GBC	2013	none	Not known
14b	Vehicle Fleet Efficiency	Testing Vehicle Emissions	GBC	2012	none	Not known
14c	Public Information	via other mechanisms	NCC/GBC	2012	2012-16	On-going
14d	Public Information	via other mechanisms	GBC	2013	2012-16	On-going
15a	Promoting Travel Alternatives	Workplace Travel Planning	GBC	2013	2013-14	**Complete**
15b	Promoting travel alternatives	Workplace travel planning	NCC	2012	2012-16	On-going
15c	Promoting travel alternatives	School travel planning	NCC	2012	2012-16	On-going
15d	Promoting travel alternatives	Workplace travel planning	NCC	2013	2014-15	**Complete**
16a	Promoting travel alternatives	Personalised travel planning; Intensive active travel campaign & infrastructure	NCC	2014-2015	2015	**Complete**
16b	Alternatives to private vehicle use	Car clubs	NCC	2014-2017	none	Not known
16c	Alternatives to private vehicle use	Car & lift sharing schemes	NCC	2012	2012-16	On-going
16d	Promoting Travel Alternatives	Other	NCC	2012	none	Not known
17a	Transport Planning and Infrastructure	Public transport improvements - interchanges stations and services	NCC	2012	2012-16	On-going

Measure No.	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Estimated Completion Date
17b	Transport Planning and Infrastructure	Public transport improvements - interchanges stations and services	NCC	2012	2012-16	On-going
17c	Public Information	Via leaflets /via other mechanisms /via radio /via television /via the internet / other	NCC	2012	2012-16	On-going
17d	Transport Planning and Infrastructure	Bus route improvements	NCC	2012	2012-16	On-going
17e	Transport Planning and Infrastructure	Public transport improvements - interchanges stations and services	NCC	2012	2012-16	On-going
17f	Transport Planning and Infrastructure	Bus route improvements	NCC	2012	2014-15	**Complete**
17g	Transport Planning and Infrastructure	Other	NCC	2012	2012-16	On-going
18a	Promoting Travel Alternatives	Promotion of cycling	NCC	2012	2012-16	On-going
18b	Promoting Travel Alternatives	Promotion of cycling	NCC	2012	2012-16	On-going
18c	Promoting Travel Alternatives	Promotion of cycling	NCC	2012	2012-15	**Complete**
18d	Promoting Travel Alternatives	Other	GBC	2013	2012-16	On-going
18e	Promoting Travel Alternatives	Promotion of walking	NCC	2012	2012-16	On-going
18f	Transport planning and infrastructure	Cycle network	NCC	2012	2012-16	On-going

2.2.1 Target Pollution Reduction(s) in the AQMA

The reduction in NO_2 emissions required, based on 2010 worse case adjusted diffusion tubes results, expressed as a concentration, would be a 5µg/m^3 reduction in NO_2 from 45 to 40µg/m^3.

The reduction in road NOx emissions required to meet the 40µg/m^3 objective has been calculated as 16µg/m^3 which represents a 24% reduction in roadside NOx.

The Council has not set individual pollution reduction targets for each of the measures in the Action Plan. This is largely due to the challenges in trying to establish the affect any particular measure is having on emissions and concentrations within the AQMA.

Table 2.3 – Action Plan Measures - Progress

No.	Measure	Measure Focus	Indicator	Progress to Date	Comments
1	**Park and Ride**				
a)	The creation of a park and ride scheme.	An alternative public transport solution to commuting into Nottingham from the north of the city.	Review	The development of the third LTP in 2010 included a review of transport schemes that currently have land safeguarded along their proposed route, or would require NCC to safeguard a route. The review recognised the aspiration for a park & ride site to the north of Nottingham and therefore further investigations will be undertaken to identify potential sites (potentially linked to new housing/employment development). The creation of a park and ride scheme along the A60 was included in the LTP Implementation Plan as a potential major transport scheme to be funded during 2015-2026. An assessment of all the potential schemes was undertaken by the D2N2 Local Transport Body during 2013 to determine the deliverability and priority of schemes for implementation during 2015-2019. A park & ride scheme along the A60 was not one of the schemes prioritised by the D2N2 Local Transport Body for delivery during the 2015-2019 funding period, although a scheme may be considered for delivery beyond this period.	A review of the potential future major transport schemes in Nottinghamshire will be undertaken during 2016. Following this review a programme of work will be established to further develop the feasibility and design of the prioritised schemes.
2	**Re-routing of freight operators**				
a)	Restriction of vehicle types using the road at certain times	Removing HGV and commercial vehicles from the AQMA	Review/ Feasibility Assessment	A feasibility study to consider potential impacts and benefits of HGV restrictions and re-routing HGVs and buses was undertaken during 2013/14. The study considered a number of alternative routes for HGVs that normally travel along the A60. Each of the routes was, however, found to be unsuitable for a number of reasons, including: • the alternative routes were found to be longer, thereby increasing traffic mileage, emissions and significantly increase both fuel and time costs for businesses. • the alternative routes would encompass more residential properties as well as school 20mph zones or a hospital. • using the alternative routes would create significant delays at junctions which already operate at capacity, increasing congestion on the network. • turning movements required on the alternative routes would increase idling time for HGVs and the resultant increase in emissions. *Contd.*	**Complete**

No.	Measure	Measure Focus	Indicator	Progress to Date	Comments
a)	Contd.	Removing HGV and commercial vehicles from the AQMA	Review/ Feasibility Assessment	• large sections of existing on-street parking would likely be required to be removed to enable HGVs to use the routes. Buses use the A60 as it is a key public transport corridor serving large communities and therefore it is not practical to restrict their access. Doing so would also potentially negatively impact on the AQMA as more people would select to use private vehicles to make journeys (thereby increasing emissions within the AQMA) as using the bus would become less convenient..	
b)	Restricting the road as appears on route finders and Satellite Navigation Systems			Given the unsuitability of alternative routes (and the A60 being a strategic route) it is not considered appropriate to investigate the removal of the A60 from route finders and satellite navigation systems.	**Complete**
c)	Consider diverting HGVs			This measure was considered as part of the feasibility undertaken to consider freight movements along A60 as detailed above.	**Complete**
3	**Traffic control and management**				
a)	Consideration and installation of SCOOT/MOVA and other traffic signal efficiency improvements, including CCTV at appropriate junctions within the AQMA	Looking at keeping traffic congestion to a minimum. Allowing Public Transport to flow unhindered.	Restrain average journey times in the morning peak to a 1% increase per year	There are 10 sets of traffic signals along the A60 between Redhill Road and Woodthorpe Drive, only one of which has not been equipped with SCOOT or MOVA to help ensure the efficient movement of traffic along A60. The signals at Oxclose Lane do not have SCOOT as it is not currently considered that the benefits of doing so would merit the costs (in excess of £250k). During 2012/13 improvements to the signals were undertaken at the High Street/Cross Street, Arnold junction to improve the capacity for all traffic travelling through the junction; as well as at nine other sites along A60 to provide bus priority.	**Complete**

<table>
<tr><th>No.</th><th>Measure</th><th>Measure Focus</th><th>Indicator</th><th>Progress to Date</th><th>Comments</th></tr>
<tr><td>b)</td><td>Nottinghamshire County and City Councils jointly fund the traffic control centre that monitors traffic movement and provides real time traffic control over many traffic signal installations</td><td></td><td>Restrain average journey times in the morning peak to a 1% increase per year</td><td>NCC and Nottingham City Council jointly fund the Traffic Control Centre that monitors traffic movement and provides real time traffic control over many traffic signal installations. Real time information is conveyed onto the local media and disseminated via NCC's web site.

The Travelwise centre remains in operation 24hrs a day, every day as the central real time information hub for reporting road conditions, congestion, road works, events, incidents, travel information and useful advice to the travelling public.</td><td>Detailed journey time monitoring is undertaken to determine the impacts of highways work programmes on the highway network. This monitoring shows that between 2009/10 and 2014/15 journey times on the main routes in the AQMA have been restrained despite the significant increases in traffic volumes in the county in 2013/14 and 2014/15. The table below shows the journey time per mile in the morning peak on the A60, the main route through the AQMA.
<table><tr><td>2009 / 10</td><td>2010 / 11</td><td>2012 / 13</td><td>2013 / 14</td><td>2014 /15</td></tr><tr><td>4.2 mins</td><td>3.6 mins</td><td>3.6 mins</td><td>3.9 mins</td><td>4.2 mins</td></tr></table></td></tr>
<tr><td>c)</td><td>Consideration of bus priority measures at traffic signal junctions</td><td rowspan="2">Looking at keeping traffic congestion to a minimum. Allowing Public Transport to flow unhindered.</td><td>Implementation of systems to allow public transport flow.</td><td>During 2012/13 bus detection (AVL TLP - automatic vehicle location traffic light priority) was installed at nine signals along the A60 corridor within and on the approach to the AQMA. It is not currently proposed to install these features at the remaining site but this may change should proposed development go ahead.

The bus detection enables the signals to detect when a bus approaches and extend the green phase so the bus passes through without delay, reducing delays for buses, reducing the idling time for buses at traffic signals, making bus journey times more reliable and thereby making bus travel more attractive.</td><td>Complete</td></tr>
<tr><td>d)</td><td>Review of 24hr bus lane restrictions</td><td>Review</td><td>A review of the 24 hour bus lane to consider potential impacts and benefits of changing existing restrictions was undertaken during 2013/14. It was considered that the bus lane would still be required during the peak periods to ensure that buses retain adequate priority in order to make bus travel attractive to existing and potential users, thereby reducing the volume of private cars on the road at peak time. The bus lane could not therefore be removed. Reducing the hours of the bus lane's operation was also considered but it was determined that doing so would have little/no impact on the AQMA as traffic rarely queues adjacent to the bus lane back into the AQMA outside the morning peak.</td><td>Complete</td></tr>
</table>

No.	Measure	Measure Focus	Indicator	Progress to Date	Comments
e)	Effective co-ordination of street works to minimise traffic disruption and unnecessary congestion as part of the County Council's network management duty		Restrain average journey times in the morning peak to a 1% increase per year	• Systems for notice management and coordination have been upgraded to enhance noticing handling, monitoring of works proposals, coordination of works and directing timing of works • Staff awareness and training undertaken to ensure that powers are used effectively • Street designations/network hierarchy review is ongoing to improve data quality for works promoters and network managers and to prioritise works management • Regular coordination meetings held between all works promoters and regional partners in additional to regular meetings between HE and regional partners to create a framework programme of planned works affecting strategic and local routes • Workshops held with major works promoters incl. utility companies to raise awareness of their requirements to reduce traffic disruption, to promote good practice and encourage alternative working methods that reduce peak period working/disruption • Detailed journey time monitoring undertaken annually since 2005/06.	On-going **Complete** On-going On-going **Complete** On-going
f)	Effective management of incidents to minimise traffic disruption and unnecessary congestion as part of the County Council's network management duty	Looking at keeping traffic congestion to a minimum. Allowing Public Transport to flow unhindered.	Restrain average journey times in the morning peak to a 1% increase per year	• The local operating agreement between the authority and HE has been comprehensively reviewed to identify the relevant parts of the network which have interaction on each authority and to put in place appropriate communication channels for management of incidents and dissemination of information • Key locations on the local network have been identified and associated diversion routes investigated in line with the developing network hierarchy • Incidents dealt with through agreed procedures and regular partnership meetings held. Working in close collaboration with the City and HE, tactical diversion routes have been developed for the emergency diversion of traffic from any part of the strategic road network, to reduce the delay in rerouting traffic to ease congestion at the time of incidents.	On-going On-going On-going
g)	Effective contingency planning to minimise traffic disruption and unnecessary congestion as part of the County Council's network management duty				

No.	Measure	Measure Focus	Indicator	Progress to Date	Comments
4	**Gedling waste collection**				
a)	Ensure that collections around the AQMA occur outside of the rush hour.	Reduce traffic congestion along the AQMA.	Review of collection timetables	On-going discussions with waste collection service	On-going
5	**Parking management and control**				
a)	Ensure that car parking in and around the AQMA is managed and reviewed via: Civil parking enforcement	Looking at keeping traffic congestion to a minimum.	Improved journey times and bus patronage	Civil Parking Enforcement was introduced on 12 May 2008 and is ongoing. Locations where illegal parking hinders the free flow of traffic (and particularly buses) are prioritised for regular enforcement. Residents' parking schemes were also introduced on Bond Street and Redhill Road, Arnold to deter commuter parking.	On-going
b)	Continual review of car parking charging, to promote public transport options	Promote public transport through review of car parking arrangements.	Improved journey times and bus patronage	Promotion of economy and town centres means that review is unlikely to be considered for the foreseeable future.	none
6	**Low emission zone**				
a)	Consider feasibility of a low emission zone	Restricting vehicle access to AQMA to low emission vehicles.	Review	Given the lack of an alternative HGV route it is not currently considered feasible to introduce a low emission zone on A60. Nottingham City Council are currently investigating the introduction of a Clean Air Zone (CAZ) to help meet its 2020 air quality targets. The scheme would initially be applicable to HGVs buses and taxis; and may extend into the wider Nottingham Agglomeration.	**Complete** Dependant on feasibility and extent studies.
7	**Improve links with local planning and Local Development Framework**				
a)	Ensure sustainable development on vacant sites within and in the vicinity of the AQMA.		No. of AQ impact assessments related to AQMA	1 assessment for redevelopment of Grove Public House – mitigation measures incorporated into building design. Assessment not carried out for Lidl supermarket for planning reasons. Lidl installed one EV charging point on request of LA.	1 assessment

No.	Measure	Measure Focus	Indicator	Progress to Date	Comments
b)	Ensure AQAP and AQMA are considered in future planning policy frameworks (Local Plans).	Local planning considerations aim to mitigate the cumulative negative air quality impacts of new development.	On-going consultation with Core Strategy/ Local Plan development	Work continues on the development of the Local Plan, which is at draft stage (out for consultation). Currently there is a new policy LPD 11 - Air Quality.	Involvement in drafting of Local Plan Air Quality Policy
c)	Co-ordination of land-use planning and transport infrastructure (including through the Local Plan). Development of car parking standards that encourage cycling, walking and public transport use.		n/a	The County Council provides comments to Gedling BC on the impact of development on the transport networks, as well as suggested transport improvements to mitigate against these impacts, when requested as part of the planning application process.	On-going co-operation with County Council
d)	Secure appropriate levels of developer contributions (Section 106 and/or CIL) for use on air quality improvement projects. Use of collected development control contributions to provide cycling, walking and public transport improvements within the AQMA.		Sums collected for air quality projects	Approximately £80,000 s106 funding has been spent on infrastructure improvements in the vicinity of the AQMA in the last three years (up to 2013/14) including improvements to traffic signal phasing and accessibility improvements in Arnold town centre. £67,000 of s106 funding was allocated during 2013/14 and 2014/15 to fund a smarter travel coordinator post in the Gedling area. The post led on smarter travel activities within targeted communities with the aim of reducing car journeys, particularly at peak times.	Development control contributions are collected by Gedling Borough Council and used to provide cycling, walking and public transport improvements within the AQMA. During 2015/16 this funding has been used to make improvements at bus stops (such as real time information displays) at locations in Arnold and Carlton to encourage greater bus use.
e)	Development of an Air Quality Supplementary Planning Document(SPD)		Development of SPD	Guidance produced available as informal planning guidance	**Complete**
f)	Use of planning conditions for delivery times, travel plans etc.; including enforcement to ensure compliance			• Workplace travel plans are developed with businesses as part of planning conditions and through voluntary arrangements • Targeted travel planning (funded by the County Council) was held at workplaces within the AQMA during 204/15.	During 2015/16 a further 1 travel plans has been developed in Gedling borough although this has not been approved by the County Council.
8	**Improving links with local transport strategy**				
a)	Continue links with both County and City transport planners to ensure AQAP is considered in future transport planning			Regular meetings have been undertaken and are scheduled to take place between GBC and NCC.	Meetings are held twice a year to discuss the results of monitoring undertaken by both parties and where appropriate progress of measures to improve air quality within the district.

No.	Measure	Measure Focus	Indicator	Progress to Date	Comments
9	**Target reductions in emissions from buses**				
a), b),	ECOStars Fleet Recognition Scheme. Promotion of the benefits of Eco-driving training for drivers.	Target reduced emissions from buses operating within the AQMA.	Scheme membership	4 members (2 bus, 2 coach operators). SAFED training ceased with closing of LSTF.	No new members from this sector. On-going engagement with existing members
c)	On-going delivery of Quality Bus Partnerships through Gedling Borough. (Mansfield and Nottingham City)		On-going take-up of cleaner vehicles	• Operators are encouraged to take-up cleaner vehicles through partnership working. Due to the sustained high level of investment by the two main operators the average age of the bus fleet operating in the AQMA was already less than six years old and by the end of 2007 all of the two main operators' fleet were low-emission Euro2, 3 or 4 standards.	On-going
				• Partnerships with all of the major bus operators are on-going including the transport development group, which is held every two months; and the Greater Nottingham Bus Quality Partnership, which meets quarterly. The groups help determine future service and public transport scheme improvements	On-going
				• Vehicle emissions standards included in procurement of contracted services operating within AQMAs	On-going
				• The Statutory Quality Partnership Scheme (SQPS) – the vast majority of buses travelling through the AQMA go into the SQPS area – ensures that services operating into the city centre (including those travelling through the AQMA) meet a minimum standard for emissions with many vehicles operating at higher standards. Monitoring of operator standards and operation of the SQPS is on-going	On-going
				• A Green Bus Fund bid, made to fit equipment on services running through AQMA to reduce emissions, was rejected by DfT	Will not proceed
				• NCC plan to continually improve the emission standards of their fleet vehicles. The majority of the Council's bus fleet is now Euro V standard	
				• NCC has submitted an OLEV bid to accelerate bringing in low emission vehicles.	Dependent on outcome of OLEV bid

No.	Measure	Measure Focus	Indicator	Progress to Date	Comments
d)	Encouraging the use of emissions standards when procuring school bus contracts and supported bus services that operate within the AQMA			The Integrated Passenger Transport Strategy, which does include a statement regarding this issue, was completed and approved in 2015.	On-going application during tendering of contracts.
10	**Target reductions in emissions from heavy and light goods vehicles**				
a) b)	ECOStars Fleet Recognition Scheme. Promotion of the benefits of Eco-driving training for drivers.	Target reduced emissions from HGV's and LGV's operating within the AQMA	Scheme membership	Following the introduction of the scheme in Gedling Eco-Stars was expanded to include the whole of the Greater Nottingham area in March 2013 as part of the LSTF programme. – SAFED driver training is included as part of the scheme. 82 members operating around Nottingham. 5274 vehicles	11 new members SAFED Training ended with LSTF programme
11	**Target reductions in emissions from Taxis**				
a)	Promotion of low emission vehicles through taxi licensing.	Target reduced emissions from Taxi's operating within the AQMA	Review of Taxi Licence criteria	Review of taxi licencing vehicle criteria undertaken April 2016. Policy remains an age related policy; no vehicles over 6 years of age.	The implementation of the Clean Air Zone in Nottingham will have implications on the taxi fleet operating in Gedling. It is proposed to re-visit the vehicle policy in 2016/2017 informed by a clearer understanding of the implications of the CAZ.
12	**Target reductions in emissions from the council fleet and contract vehicles**				
a)	Gedling Borough membership of ECOStars scheme.	Target reduced emissions from Council fleet vehicles and Council contract fleet vehicles operating within AQMA.	membership	Upgrade to 4* Member	Continued membership
b)	Ensuring new vehicles procured are cleanest possible.		Indictors linked to the GBC Sustainability Strategy and Action Plan	Electric van purchased	none
c)	Run Eco-driving training course for officers using own and GBC vehicles for work.			56 staff received training	none
d)	Consider alternative fuelled 'pool vehicles'			See 12b, bicycles available for staff use	none
e)	GBC Green Procurement (emission standards for vehicles making deliveries to the Council).			none	none

No.	Measure	Measure Focus	Indicator	Progress to Date	Comments
13	**Encourage the uptake of alternative fuels**				
a)	GBC consider installing electric charging points for visitors and staff.	Encourage the uptake of alternative fuels with infrastructure improvements.	Indictors linked to the GBC Sustainability Strategy and Action Plan	One Charging point part of Plugged in Midlands	none
b)	Consider a wider network of charging points.			One charging point at a GBC car park in Arnold. Part of Plugged in Midlands.	Use of planning guidance document to encourage the introduction of EV charging
14	**Communication and education – awareness raising of local air quality issues**				
a)	Design and erect AQMA signs at various locations	To increase awareness of local air quality issues and encourage change in behaviour that will contribute to improving local air quality.	Feasibility assessment	none	none
b)	Roadside Vehicle Emissions Testing (RVET)		Carry out RVET day.	Twice submitted Defra grant application. Unsuccessful.	None, funding not available
c)	Tackling the school run – communication with schools and parents			School travel plans have been developed with 43 of the 45 schools in Gedling Borough; with one of the schools without a travel plan falling within the AQMA. In 2009/10 academic year 25% of school pupils travelled to school by car; a 9% reduction when compared to 2004/05. These figures were provided by DfES and are not available for a smaller geographical area. DfES no longer collects and/or publishes this data so it can no longer be reported.	Advisory 20mph speed limits have been introduced outside all schools in the county where feasible to improve safety around schools and to encourage more pupils to walk and cycle to school (completion 2016/17)
d)	Undertake a publicity campaign to raise awareness of the A60 AQMA.		Publication of relevant promotional material	Articles in Contacts magazine regarding Action Plan and ECOStars.	none

No.	Measure	Measure Focus	Indicator	Progress to Date	Comments
15	**Travel plans**				
a)	Review/refresh Gedling Borough Council Travel Plan;	To encourage a shift to more sustainable forms of travel, or reducing the need for travel.	Review GBC travel plan; improved journey times; increased bus patronage; increased active travel	Carried out employee travel to work survey. Draft copy of new Plan completed	none
b)	Nottinghamshire County Council to review travel plan for its sites within or close to the AQMA		No. of people travelling by sustainable transport / Restrain average journey times in the morning peak to a 1% increase per year	• Operational for over 15 years and has been incorporated into the climate change action plan for the County Council • NCC staff at work locations in the AQMA are surveyed annually to determine how people travel to work • A variety of measures have been undertaken to promote alternatives to the car, including involvement in 'walk week', 'bike week', car sharing, and personalised travel planning etc. • Travel surgeries were undertaken at the County Council site within the AQMA during 2014/15. This offered all County Council staff at the site the opportunity to receive one to one travel advice to encourage people to travel to work by bus, cycle, on foot, or by car sharing. The surveys undertaken during the 2015/16 financial year indicated that of the staff working at the Daybrook campus 3% cycled (same as the county average); 6% walked (county average 8%); 4% travelled by public transport (half the county average); and 4% car share (county average 5%). These figures are due to the nature of the employees based at the Daybrook campus who are required to drive during the day as part of their job.	On-going On-going On-going **Completed**

No.	Measure	Measure Focus	Indicator	Progress to Date	Comments
c)	Continue to support the implementation of school travel plans			School travel plans have been developed with 43 of the 45 schools in Gedling Borough; with one of the schools without a travel plan falling within the AQMA. In 2009/10 academic year 25% of school pupils travelled to school by car; a 9% reduction when compared to 2004/05. These figures were provided by DfES and are not available for a smaller geographical area. DfES no longer collects and/or publishes this data so it can no longer be reported. Activities in schools include the junior road safety officer scheme and promotion of walk to school week.	Central Government grant funding for the development of school travel plans is no longer available. All schools are, however, offered free road safety training to enable pupils to travel on foot or bicycle safely. This training includes a range of both classroom based and practical education.
d)	Work with local businesses/ organisations to encourage the development and implementation of travel plans		No. of travel plans developed / Restrain average journey times in the morning peak to a 1% increase per year	• Workplace travel plans are developed with businesses as part of planning conditions and through voluntary arrangements • Targeted travel planning (funded by the County Council) was held at workplaces within the AQMA during 204/15. During 2015/16 a further 1 travel plans has been developed in Gedling borough although this has not been approved by the County Council.	On-going 2015 On-going
16	**Promoting travel choices**				
a)	Undertake personalised travel planning within Gedling borough		No. of people travelling by sustainable transport / Restrain average journey times in the morning peak to a 1% increase per year	• Personalised travel planning was undertaken with 4,000 households within and close to the AQMA during 2014/15. The travel planning included before and after surveys and the analysis of these show that for a matched panel there has been: - 14% reduction in car journeys to work - 11% increase in walking journeys to work - 8% reduction in car use for shopping journeys - 9% increase in bus use for shopping journeys • Future PTP will be dependent on the outcome of funding bids such as the 2016/17 Sustainable Transport Transition Year Funding which was unsuccessful • Requests for funding from developers for travel planning at new residential developments are made to the planning authority by the County Council through the planning process where necessary.	**Completed** Dependent on availability of Central Govt funding On-going

No.	Measure	Measure Focus	Indicator	Progress to Date	Comments
b)	Establishment of a City Car Club and consideration of extending this into the county		Restrain average journey times in the morning peak to a 1% increase per year	• Feasibility study undertaken by consultants on the merits of introducing such a scheme in the wider Nottingham area concluded that the greatest benefits would be seen by a scheme evolving out of a car share club introduced in the City. • A car club was introduced in Nottingham City in April 2014. The scheme was funded through the Local Sustainable Transport Fund and the Nottingham City workplace parking levy. The contract for the scheme allows for the expansion of the car club in to the county at a later date if the club proves consistently successful over a period of time. The possibility of expanding the existing scheme with electric vehicles into the county is also being considered for inclusion in a future OLEV funding bid.	Dependant on monitoring of Nottingham scheme
c)	The promotion and facilitation of car sharing schemes.		Increase the no. of people car sharing / Restrain average journey times in the morning peak to a 1% increase per year	• A car-sharing scheme at NCC and throughout the county (nottinghamshare.com) was launched in April 2006 and continues to be promoted across the county. • Whilst nottinghamshare is promoted throughout the year additional activities and promotion was held during lift share week including features in the local press and other publications. The number of current registered users on the website has increased to 2,788 in 2016 (an increase of 484 from 2015). The number of NCC staff registered on the website is 368. NCC staff are estimated to save 41,913 miles making emission savings of 13.8tonnes of CO2; and approximately 125kg nitrogen oxides over the next 12 months as a result of car sharing through the website.	On-going
d)	Residential Travel Packs, to be issued to all new built homes identified through planning process; promotion of walking, cycling and public transport			Residential travel packs were considered for development but have not been progressed due to available funding and potential ongoing costs of producing the materials.	none

No.	Measure	Measure Focus	Indicator	Progress to Date	Comments
17	**Public transport**				
a)	Development of ITSO smartcard ticketing		Increased public transport patronage / Restrain average journey times in the morning peak to a 1% increase per year	• An integrated ticketing strategy for the county was developed during 2014/15 and will inform the future development of ITSO smartcard ticketing options as well as the use of contactless ticketing etc. • A new smartcard platform was introduced in April 2014 allowing passengers to have a more robust ticket than the paper alternative. In 2013/14 over 600,000 day tickets were sold and over 10,000 smartcards were issued. MANGO smartcards were also expanded in April 2014 to include use on NET tram network • The long-running kangaroo integrated ticket scheme was replaced by the Robin Hood card scheme in 2015. The Robin Hood card scheme offers customers an all-operator ticket through the AQMA corridors	On-going
b)	Deliver the free countywide off-peak concessionary fare scheme for the over 60s and disabled. Consideration of introduction of concessionary fares for young people		Increased public transport patronage / Restrain average journey times in the morning peak to a 1% increase per year	• A countywide off-peak concessionary fare scheme for elderly and disabled residents has been in place since 1985. This has undergone significant changes in subsequent years and is now part of the English National Concessionary Travel Scheme. Nottinghamshire offers additional discretionary travel entitlements for pass holders, which allows travel on the Nottingham tram network. 2014 saw the enhancement of travel entitlement of tram travel with the removal of the evening peak restriction and the extension of the scheme to cover new NET lines. A further facility is offered which allows a companion to travel without charge for residents with severe mobility issues. • Concessionary fares for young people continue through the under 16 Travel Assistance scheme for school pupils which offers free bus passes to eligible children, and season passes to those who are not eligible. Nottinghamshire County Council refers pupils to all available bus operators for their route to promote the use of public transport. A continued Post 16 Travel Assistance scheme for further education pupils, which offers either a half-fare pass or season pass.	On-going

No.	Measure	Measure Focus	Indicator	Progress to Date	Comments
b)	*Contd.*			24,111 elderly/disabled people living in the Gedling area have a concessionary travel pass. There are approximately 8,000 valid home to school transport passes currently in circulation in the county. In 2015 2,212 free under-16 home to school transport passes were issued in Nottinghamshire; 415 under-16 home to school season passes were issued in Nottinghamshire; 132 pupils received an under-16 waived season pass in Nottinghamshire; and 461 post-16 travel passes were issued in Nottinghamshire.	On-going
c)	Investigate and publicise web based journey planners. Develop and undertake annual production of marketing literature		Increases in cycle trips / Increases in passenger transport trips / Restrain average journey times in the morning peak to a 1% increase per year	• Web based journey planners are used to help people plan and make walking, cycling and passenger transport journeys • Nottinghamshire is part of the national, multi-modal Traveline journey planner • Web links to the Traveline site are publicised and available from the County Council's website • In addition to this, links to all of the area's public transport operators' journey planner information are also available from NCC's website Further enhancements to web based journey planners in the county will be developed as part of the emerging Integrated Passenger Transport Strategy, which was approved in 2015.	On-going
d)	Review, install/ replace flagpoles/ timetable cases along key AQMA corridors			• Flagpoles and timetable cases have been installed at all bus stops along the A60 AQMA corridor. • An annual programme of updates and maintenance of all stops in the AQMA including updating network maps to ensure all information is current and accurate is on-going.	**Complete** On-going
e)	Consider bus provision on the A60 and surrounding area. (Service review)			• NCC periodically undertakes a review of all of the bus services in the county, including commercial, supported and specialist services. The aim of this work is to review and design cost effective services that meet local needs • Increased capacity at peak times and introducing feeder services to high quality bus routes serving key towns in Nottinghamshire are considered when identified through the periodic service reviews and through the on-going Bus Quality Partnership work with operators	On-going

No.	Measure	Measure Focus	Indicator	Progress to Date	Comments
f)	Install 'real time' bus information along key AQMA corridors			Real time bus displays have been installed at stops along the A60 corridor to provide up to date bus arrival/departure time information.	**Complete**
g)	Consider capacity increases on the GO2 services along the A60 corridor			Capacity increases will be considered should passenger information demonstrate that there is insufficient capacity on existing services. 'Double decker' bus services already operate along some of the routes travelling through and within the AQMA where capacity had been highlighted as an issue.	On-going
18	**To encourage members of the community to adopt cycling and walking as alternatives to using private vehicles**				
a) and e)	Develop and undertake annual cycling promotional marketing campaigns/production of literature Develop and undertake annual walking promotional marketing campaigns/production of literature			• Marketing of walking and cycling is undertaken in a variety of formats. Various campaigns have been undertaken • The Big Wheel marketing organisation was established to deliver year round marketing campaigns in the Greater Nottingham area. NCC allocated a funding contribution through the Local Sustainable Transport Fund to the 'Big Wheel' to undertake various marketing campaigns throughout the year to encourage cycling, walking and passenger transport use. These campaigns included promotions through websites, social media, newsletters and newspapers/radio • Various campaigns undertaken including marketing of bike week, walk week, walk to school week. Nottinghamshire County Council, in partnership with Nottingham City Council, held a Greater Nottingham cycle forum during Bike Week and Cycle Live (including mass participation cycle rides and activities such as the Great Notts Bike Ride) was held in June to promote cycling • Guided rides delivered across the county and a booklet promoting these rides were provided by a private organisation funded through the Local Sustainable Transport Fund *Contd.*	On-going On-going On-going On-going completion Mar 2016

No.	Measure	Measure Focus	Indicator	Progress to Date	Comments
	Contd.		Increases in cycle trips / Increased footfall in town centre / Restrain average journey times in the morning peak to a 1% increase per year	• Cycle maps of Greater Nottingham area have been produced and are updated when required. Maps continue to be distributed throughout the county, and are available as a hard copy and on-line. • NCC, in partnership with Nottingham City Council, held a Greater Nottingham cycle forum during Bike Week and Cycle Live (including mass participation cycle rides and activities) was held in June to promote cycling • Nottingham City Council implemented a cycle hire scheme within the City as part of its successful LSTF bid. The intention was to extend the scheme into the county but funding did not permit this and the scheme has subsequently been reduced following the cessation of the LSTF in March 2016. • An unsuccessful Sustainable Transport Transition Year 2016/17 funding bid was submitted to DfT by the D2N2 highway authorities, which included funding for the expansion of the City cycle hire scheme into areas of the county, including potentially the AQMA area. • Involvement in Walk Week during May includes guided walks, a chance to try out activities. Media campaigns were held internally with members of staff and externally to promote walk week. Activities included organised lunchtime walks. National walk to school week was also promoted by the County Council in schools across the county. It is hoped that the events in Walk Week will encourage people to continue walking and lead healthier lifestyles. • All of the work undertaken by the officers undertaking travel planning duties (e.g., publicity campaigns, personalised travel planning etc.) aim to deliver increases in the walking and cycling mode share. The personalised and workplace travel planning undertaken in 2014/15 aimed to encourage walking, cycling and bus use. Results of personalised travel planning show that it was successful in reducing reported car driver trips amongst participants for journeys to work (15% reduction) and shopping (9% reduction). Cycling in the Gedling district has increased by 11% between 2010 and 2015. It is not possible to analyse these figures at a more local level.	On-going On-going On-going

No.	Measure	Measure Focus	Indicator	Progress to Date	Comments
b)	Deliver adult and child cycle training			Cycle training continues to be offered free of charge. The County Council continues to offer nationally accredited cycle training to people of all ages and abilities. Cycle training is offered free of charge to children in the county and adult training is also available free to members of the public; whilst training is offered at workplaces at a cost to employers In 2015/16 6,026 children received cycle training.	On-going
c)	Consider the use of advance cycle stop lines at feasible junctions within the AQMA			This action has been completed as advance cycle stop lines have been installed at all feasible major signal junctions within the AQMA.	**Complete**
d)	Gedling Borough Council to hold 'Car Free Days' to encourage staff to cycle or walk to work.	To encourage the shift away from the use of private motor vehicles for travelling to more sustainable forms of transport, or reducing the need for travel.	No. of 'car free days'	none	none
f)	Consider walking and cycling infrastructure and facility enhancements		Increases in cycle trips / Restrain average journey times in the morning peak to a 1% increase per year	An annual programme of walking and cycling improvements is delivered across the county including schemes that will encourage more walking and cycling within the AQMA. Cycle parking facilities are provided at various locations throughout the county and city to encourage cycling for short journeys • Advance cycle stop lines have been installed at all feasible major signal junctions within the AQMA • A coherent strategic cycling network for the Arnold, Mapperley, and Carlton areas is currently being developed • Development control contributions are collected by Gedling Borough Council and used to provide cycling, walking and public transport improvements within the AQMA. During 2015/16 this funding has been used to make improvements at bus stops (such as real time information displays) at locations in Arnold and Carlton to encourage greater bus use.	**Complete** Dependent upon external funding Dependent upon external funding

No.	Measure	Measure Focus	Indicator	Progress to Date	Comments
f)	*Contd.*			Additional secure cycle parking was installed in Arnold in 2014 to provide better integration for cyclists to make longer distance journeys by bus. These facilities will be accessible by bus smartcard. The Cycle Hub which is accessible by bus smartcard is located on the main bus route into Nottingham City as well as to outlying villages/towns elsewhere. To encourage walking and cycling within the AQMA schemes delivered during 2014/15 included: • new pedestrian refuge on the A60 Mansfield Road, Redhill • dropped kerbs at locations in Daybrook and Arnold • residents' parking schemes on Bond Street and Redhill Road, Arnold to deter commuter parking • pedestrian improvements on High Street, Arnold to improve safety • improvements to the zebra crossing on Worral Avenue/Front Street, Arnold	On-going

Additional measures, not in the plan

Nottinghamshire County Council, in partnership with Nottingham City and Derby City Councils has been successful in securing £6.1m OLEV funding for the period April 2016 - March 2021to accelerate the take-up of electric vehicles. The bid will include:

- Grants, loans and advice to support businesses to introduce low-emission vehicles and electric charging at workplaces
- Expansion of the Council's electric vehicle fleet (e.g. pool cars and vans and associated charging facilities at County Council sites)
- Expansion of the public electric vehicle charging infrastructure to create an area-wide network of charging infrastructure
- Expansion of the existing car club into the county

A programme of targeted promotional events in areas where data highlights the residents and/or businesses are more likely to transfer to ULEV.

2.3 $PM_{2.5}$ – Local Authority Approach to Reducing Emissions/Concentrations

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

The Borough Council does not monitor for $PM_{2.5}$ and so to understand the likely levels across the borough two points of reference have been taken.

1. The nearest relevant AURN site in Nottingham	Monitored annual mean concentration for 2015 is reported as 11.55 μm^3
2. Modelled background levels	Downloaded from Defra webpages the background map for 2015 in Gedling is presented in Appendix D. Levels are predicted to be generally between 10 - 13μm^3.

The Council has a new role in working towards reducing emissions and concentrations of $PM_{2.5}$; no Air Quality Objective has been set but the World Health Organisation guideline value is 10μm^3.

Gedling Borough is taking the following measures to address $PM_{2.5}$:

- Dust Management Strategies are routinely requested during the planning application stage of any development.
- Promotion of cleaner vehicle fleets via the ECO Stars Fleet Recognition scheme.
- Education and enforcement of Clean Air Act and Smoke Control Areas.

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 objectives.

Gedling Borough undertook automatic (continuous) monitoring at one site during 2015 Table A.2 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Appendix D. Further 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

Gedling Borough undertook non- automatic (passive) monitoring of NO_2 at 24 sites during 2015. Table A.3 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for “annualisation” and bias. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.4 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3.

For diffusion tubes, the full 2015 dataset of monthly mean values is provided in Appendix B.

Results of automatic monitoring

Table A.1 indicates the results for automatic monitoring for 2015 show no exceedences of the air quality objective for NO_2. Data capture overall for 2015 was compromised due to a failure of the data logger unit in the autumn.

The graph below shows a very slight increase in NO_2 levels over an eight-year period (2008-2015).

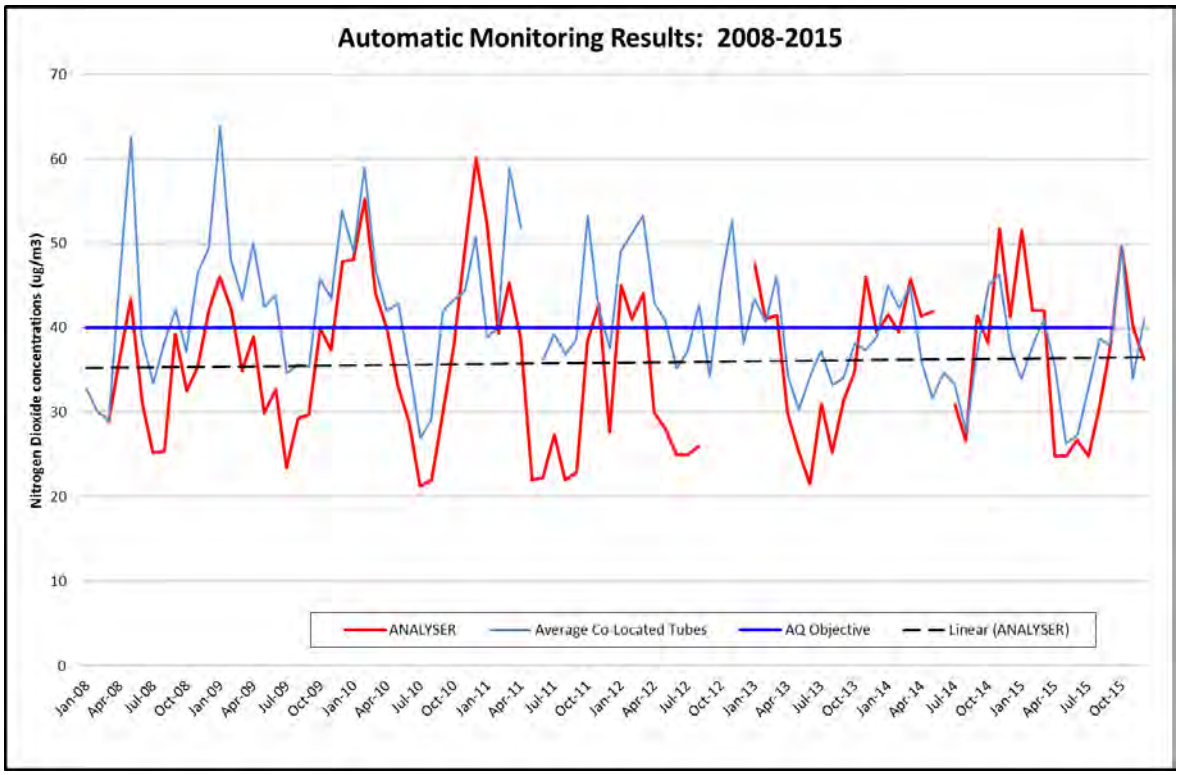


Table A.5 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

A pollution episode (over a two day period) in early January 2015 saw 22 exceedances of the hourly objective. Further analysis of this period does not seem to indicate a fault with the analyser; however, comparison with data from other stations in the Nottingham Urban Area does not show a regional episode. It may be that an instrument fault occurred at this time or some local external factors contributed to this episode; the data has been left in and reported on.

Results of non-automatic (passive) monitoring

The results of diffusion tube monitoring for 2015 (Table A3.1) show no exceedances of the air quality objectives, either inside the AQMA or at other sites around the Borough. Taking into account the 95% confidence intervals in the bias adjustment applied to the results indicates the level of uncertainty in the adjustment factor used, and the diffusion tube results. Thus, as we can see below some of the tubes results may be of concern as the objective lies within the confidence level of the results.

Site ID	Site Name	Raw Mean	Bias Adjusted	95% Confidence Interval
87407*	The Vale PH-Thackerays Ln	40.1	36	(32 - 43)
87412*	Daybrook Fish Bar	41.0	37	(33 - 44)
87413*	T&S Heating	41.7	38	(33 - 45)
87414*	Frank Keys	38.0	35	(30 - 41)
87461	Mile End Road	39.1	36	(31 - 42)

* Within the AQMA

The result for the tube 'Mile End Road' was slightly below the objective and this area continues to be an area of concern.

Appendix A includes a series of graphs plotting diffusion tube results over an 8-year period (2008 – 2015). These graphs all indicate a declining trend in NO_2 levels over this period. Full diffusion tube monitoring dataset, including details of bias and location adjustments are available in Appendix B and C.

3.2.2 Particulate Matter (PM_{10})

Gedling Borough does not monitor for Particulate Matter (PM_{10}).

3.2.3 Particulate Matter ($PM_{2.5}$)

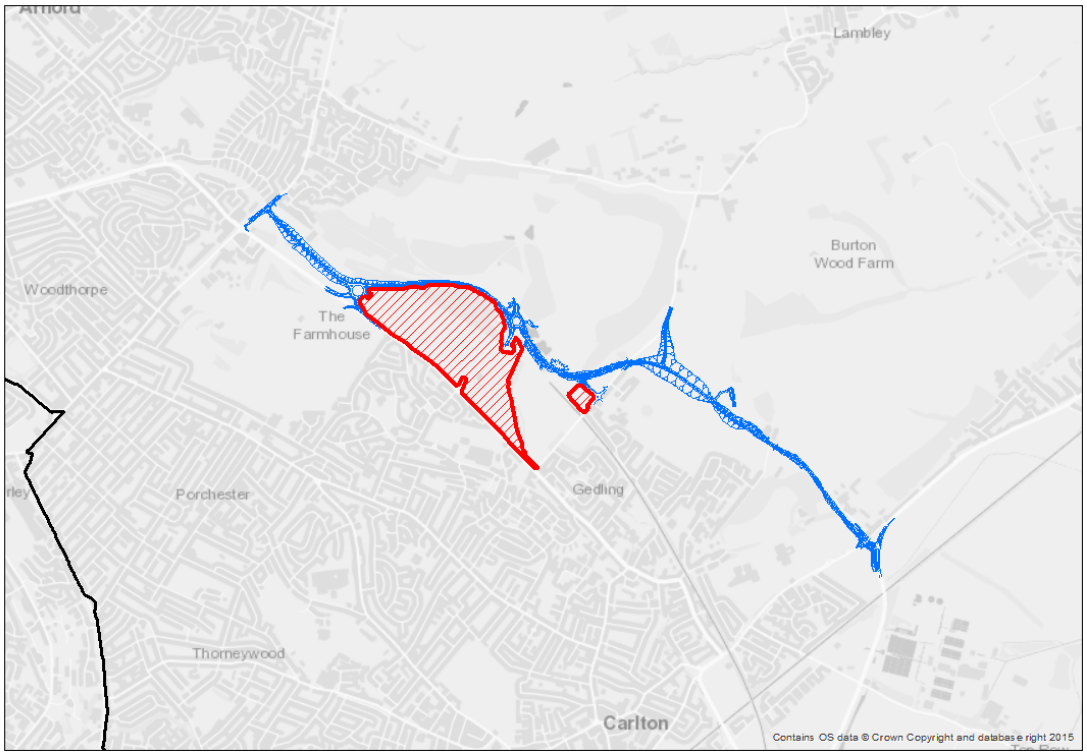
Gedling Borough does not monitor for Particulate Matter ($PM_{2.5}$).

3.2.4 Sulphur Dioxide (SO_2)

Gedling Borough does not monitor for Sulphur Dioxide.

4 Planning Applications where Air Quality was a concern

Gedling Colliery/Chase Farm development



Planning application **2015/1376** has been granted conditional permission. The application is for *'phased development of 1,050 dwellings, local centre with retail units and health centre, and new primary school',* the first phase being the erection of 506 dwellings*.*

The development is dependant in the long term on the construction of the Gedling Access Road (GAR), indicated in blue on the above plan. The first phase (506 dwellings) will access the existing road network.

The application included an Air Quality Assessment (which feed into the chapter in the Environmental Statement submitted), which looked at the situation with the finished development using the GAR and its effect on the immediate area.

The Public Protection Service supplied comments on the first assessment, which asked for consideration of the Councils AQ Guidance Document including some mitigation as standard and damage cost calculations due to the size of the development. The revised assessment was submitted and concluded:

*As the modelled results show that there will **not** be a major detrimental impact on local Air Quality as a result of the scheme, it is not deemed necessary to calculate the value of mitigation.*

Similarly the assessment of road traffic exhaust emissions has not predicted any exceedances of the AQO, However, implementing traffic management measures will result in fewer vehicle trips and therefore a reduction in associated vehicle emissions. This is likely to result in reductions of the mean roadside concentrations of traffic-related pollutant concentrations.

The following mitigation measures will be implemented to increase the number of residents travelling to and from the site on foot, by cycle and/or by public transport. As such the number of trips to and from the site made by private car, and especially the single occupancy private car, will be reduced.

- *Minimise reliance upon motor vehicle use through a Framework Travel Plan;*
- *Promote alternative transport options; and,*
- *Inclusion of pedestrian walkways into surrounding environments.*

Further comments were submitted to the Planning Department regarding the above, requesting mitigation above and beyond the basic proposed.

Appendix A: Monitoring Results

Table A.2 – 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)	Distance to kerb of nearest road (m)	Inlet Height (m)
GBC1	Daybrook Square	Roadside	457944	344596	NO_2	Y	Chemiluminescent	75	5	2

Table A.3 – 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)
82492	Grove PH Daybrook Sq	Receptor	457947	344651	NO_2	Y	16m	3.5m	N	3m
82494	Hastings street	Urban background	460391	341413	NO_2	N	N/A	N/A	N	3m
82495	Marion Murdock Court	Urban background	461294	342826	NO_2	N	N/A	N/A	N	3m
82937	47 Plains Road, Mapperley	Receptor	459209	343513	NO_2	N	0m	7m	N	3m

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)
87398	Morley Mills Building	Receptor	457969	344780	NO_2	Y	1m	3m	N	3m
87399	Mansfield Road, Redhill	Receptor	457866	345578	NO_2	Y	25m	10m	N	3m
87400	Daybrook Dental Surgery	Receptor	457867	345388	NO_2	Y	30m	2.3m	N	3m
87401	19 Victoria Road	Receptor	461995	341175	NO_2	N	1m	4m	N	3m
87402	36 Victoria Road	Receptor	462002	341097	NO_2	N	4.5m	1.5m	N	3m
87403, 87404, 87405	Daybrook Analyser	Co-located tubes	457944	344597	NO_2	Y	75m	5m	Y	2m
87406	Burton Rd/Shearing Hill	Receptor	462422	341972	NO_2	N	9m	16m	N	3m
87407	The Vale PH-Thackerays Ln	Receptor	457918	344358	NO_2	Y	14m	3.5m	N	3m
87408	Rickets Lane	Rural Background	456621	355935	NO_2	N	N/A	N/A	N	3m
87409	Wickes, Mansfield Road	Receptor	457904	345259	NO_2	Y	50m	3m	N	2m

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)
87410	Civic Centre, Arnold	Urban background	458259	344723	NO_2	N	N/A	N/A	N	3m
87411	Colwick Park Close	Receptor	461103	340086	NO_2	N	1m	10m	N	3m
87412	Daybrook Fish Bar	Receptor	457947	344713	NO_2	Y	0m	3m	N	3m
87413	T&S Heating	Receptor	457950	344748	NO_2	Y	0m	3m	N	3m
87414	Frank Keys	Receptor	457969	344827	NO_2	Y	25m	3m	N	3m
87415	856 Plains Road	Receptor	458898	343139	NO_2	N	0m	8m	N	3m
87460	Rectory Road/Vale Road	Receptor	461161	340122	NO_2	N	19m	6.5m	N	3m
87461	Mile End Road	Receptor	461196	340108	NO_2	N	1m	3m	N	3m

(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 A.4 – Annual Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
					2011	2012	2013	2014	2015
GBC1	Roadside	Automatic	81	81	33	35	35	37	36
82492	Receptor	Diffusion Tube	100	100	**40**	**41**	35	36	33
82494	Urban background	Diffusion Tube	100	100	24	28	23	22	21
82495	Urban background	Diffusion Tube	100	100	18	22	19	18	17
82937	Receptor	Diffusion Tube	100	100	32	35	29	30	27
87398	Receptor	Diffusion Tube	100	100	38	**43**	36	35	32
87399	Receptor	Diffusion Tube	100	100	29	31	27	27	25
87400	Receptor	Diffusion Tube	100	100	36	**40**	33	33	32
87401	Receptor	Diffusion Tube	83	83	31	36	29	29	26
87402	Receptor	Diffusion Tube	100	100	37	38	32	29	33
87403	Co-located tubes	Diffusion Tube	100	100	39	**42**	36	36	33
87404	Co-located tubes	Diffusion Tube	100	100	38	**42**	38	34	33
87405	Co-located tubes	Diffusion Tube	100	100	38	**43**	37	35	33

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
					2011	2012	2013	2014	2015
87406	Receptor	Diffusion Tube	75	75	25	32	27	24	24
87407	Receptor	Diffusion Tube	100	100	37	39	31	30	36
87408	Rural Background	Diffusion Tube	92	92	16	18	16	14	11
87409	Receptor	Diffusion Tube	100	100	35	39	33	31	30
87410	Urban background	Diffusion Tube	100	100	20	23	20	19	18
87411	Receptor	Diffusion Tube	100	100	26	29	28	25	23
87412	Receptor	Diffusion Tube	75	75	**45**	**50**	**44**	39	37
87413	Receptor	Diffusion Tube	92	92	**47**	**54**	**44**	**41**	38
87414	Receptor	Diffusion Tube	100	100	**41**	**46**	39	37	35
87415	Receptor	Diffusion Tube	100	100	29	34	28	27	25
87460	Receptor	Diffusion Tube	100	100	n/a	n/a	32	30	29
87461	Receptor	Diffusion Tube	100	100	n/a	n/a	**46**	39	36

Notes: Exceedances of the NO_2 annual mean objective of $40\mu g/m^3$ are shown in **bold**.

NO_2 annual means exceeding $60\mu g/m^3$, 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.

Table A.5 – 1-Hour Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
					2011	2012	2013	2014	2015
GBC1	Roadside	Automatic	81	81	0	0 (144)	0	0 (167)	**22(218)**

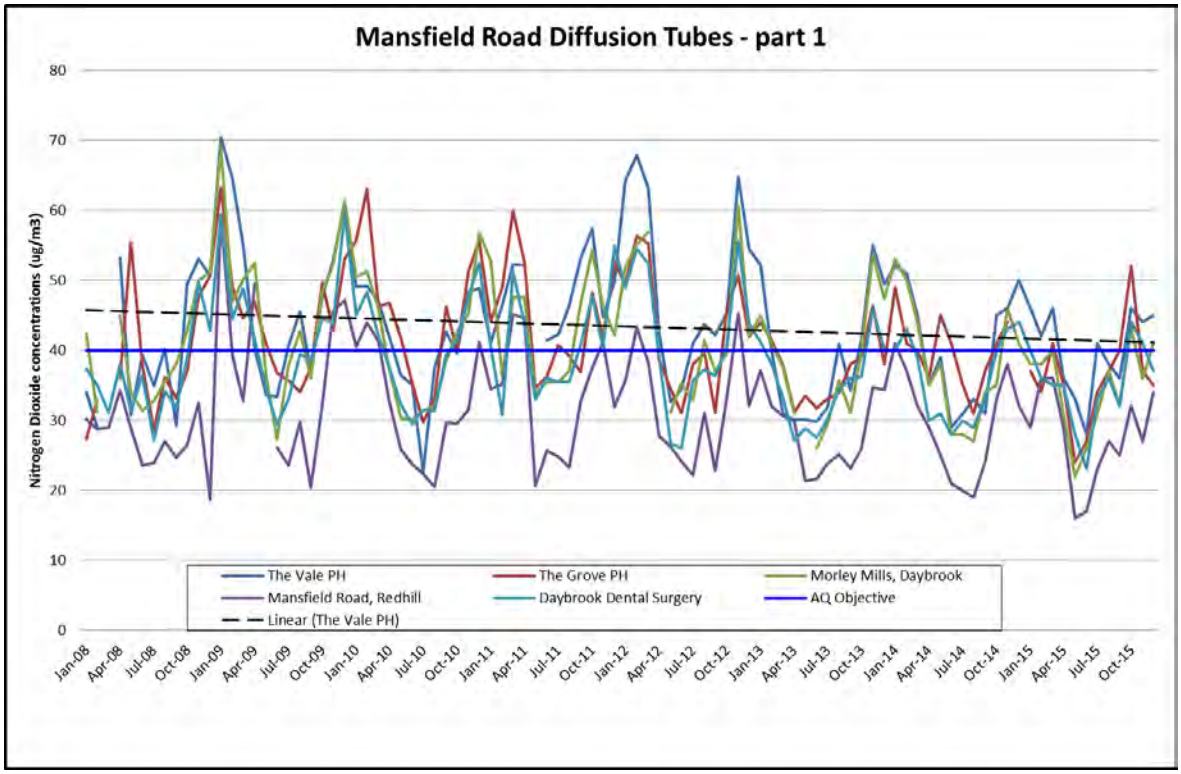
Notes: Exceedances of the NO_2 1-hour mean objective (200µg/m^3 not to be exceeded more than 18 times/year) are shown in **bold.**

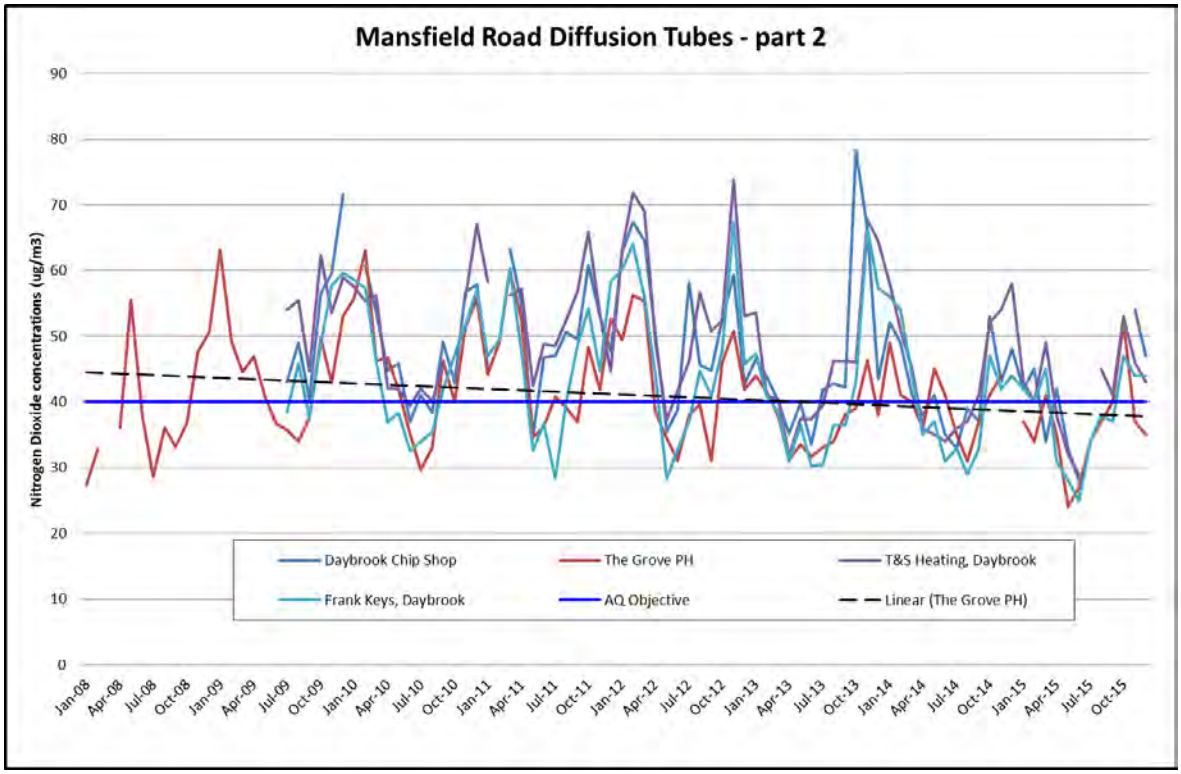
(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

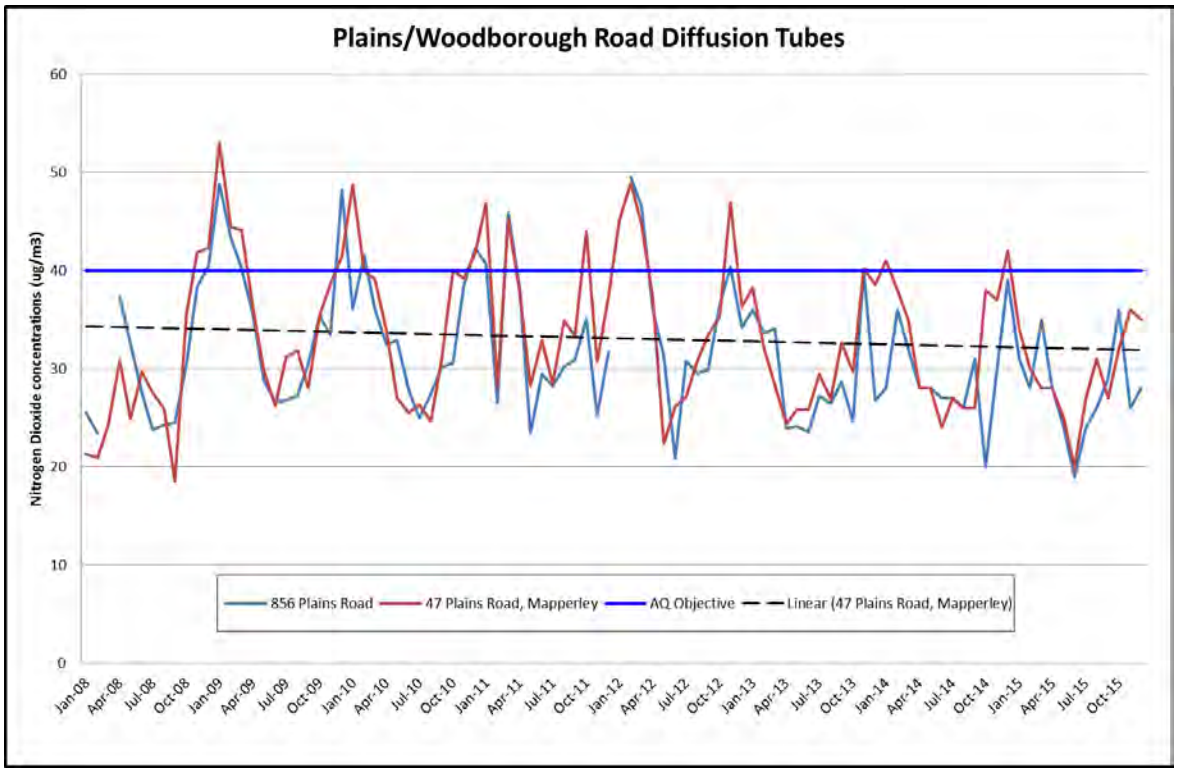
(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

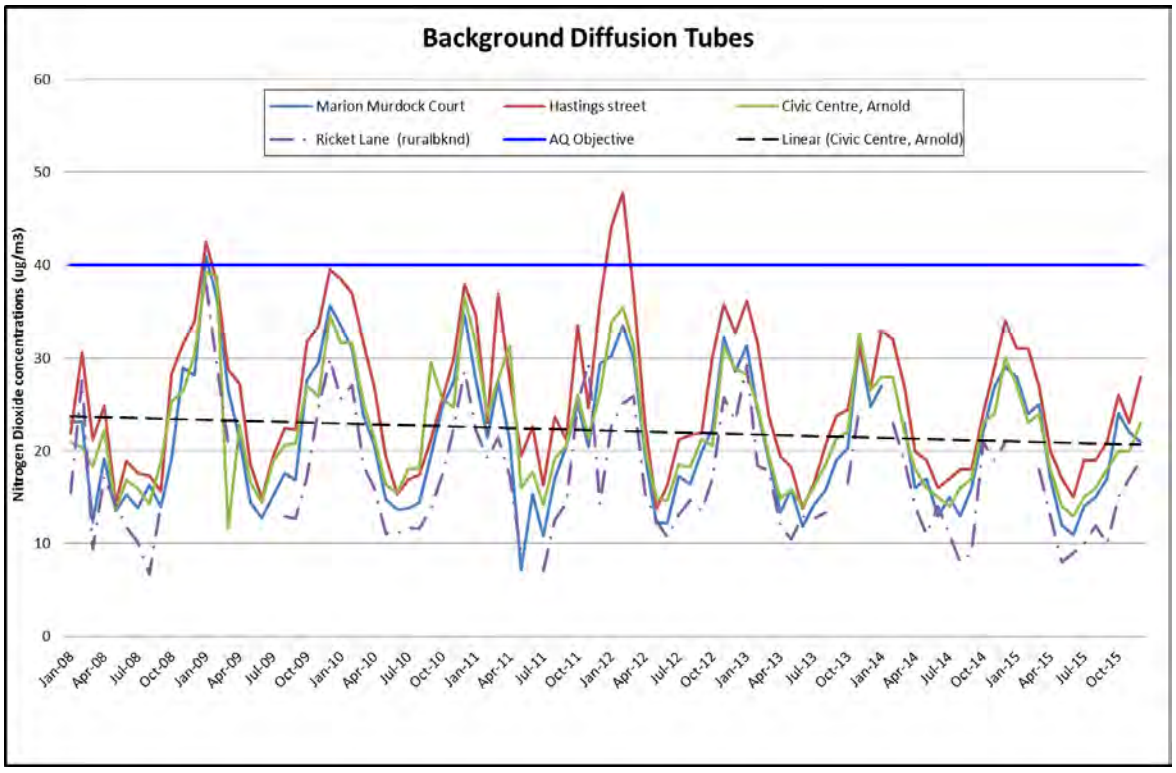
(3) If the period of valid data is less than 90%, the 99.8th percentile of 1-hour means is provided in brackets.

Nitrogen Dioxide Diffusion Tube Results 2008 - 2015






Plains/Woodborough Road Diffusion Tubes
Nitrogen Dioxide concentrations (ug/m3)
856 Plains Road
47 Plains Road, Mapperley
AQ Objective
Linear (47 Plains Road, Mapperley)


Background Diffusion Tubes
Nitrogen Dioxide concentrations (ug/m3)
Marion Murdock Court
Hastings street
Civic Centre, Arnold
Ricket Lane (ruralbknd)
AQ Objective
Linear (Civic Centre, Arnold)

Appendix B: Full Monthly Diffusion Tube Results for 2015

Table B.1 – NO_2 Monthly Diffusion Tube Results - 2015

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)
82492	37	34	41	35	24	27	34	37	40	52	37	35	36	33
82494	31	31	27	20	17	15	19	19	21	26	23	28	23	21
82495	28	24	25	17	12	11	14	15	17	24	22	21	19	17
82937	34	30	28	28	25	20	27	31	27	32	36	35	29	27
87398	38	38	40	31	22	26	31	37	32	43	36	41	35	31
87399	29	36	36	29	16	17	23	27	25	32	27	34	28	25
87400	40	36	35	35	28	23	33	36	32	44	41	37	35	32
87401	30	28	-	-	24	22	27	28	30	36	30	29	28	26
87402	42	43	41	30	31	32	37	37	35	41	39	31	37	30 (2)
87403	33	35	41	34	27	27	33	36	38	52	35	42	36	33
87404	32	46	39	35	26	29	32	41	37	45	32	41	36	33
87405	37	33	43	37	26	26	33	39	39	52	35	40	37	33
87406	32	34	32	-	-	-	22	23	29	36	28	22	29	24 (3)

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)
87407	46	42	46	36	33	28	41	38	36	46	44	45	36	29(2)
87408	-	4	18	13	8	9	10	12	10	15	17	19	12	11
87409	38	39	40	26	25	21	29	33	32	41	31	34	32	29
87410	27	23	24	18	14	13	15	16	18	20	20	23	19	18
87411	28	35	32	24	21	20	19	22	30	32	23	20	26	23
87412	42	45	34	42	33	28	-	43	-	-	54	47	**41**	37(3)
87413	43	40	49	38	32	29	-	45	41	53	46	43	**42**	38
87414	42	40	45	31	28	25	34	38	37	47	44	44	38	35
87415	31	28	35	28	24	19	24	26	29	36	26	28	28	25
87460	40	33	48	28	24	20	28	29	27	36	36	32	32	29
87461	45	38	37	39	35	28	38	41	42	45	41	40	39	36

(1) See Appendix C for details on bias adjustment

(2) Adjusted for receptor distance see Appendix C

(3) Results 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.

Appendix C: Supporting Technical Information / Monitoring Data QA/QC

Nitrogen Dioxide Diffusion Tubes

Overview

Diffusion tubes are small clear plastic tubes open at one end with a pollutant-absorbing chemical matrix or gel at the closed end. The tubes are prepared and sealed before being transported to the monitoring site. At site, the tube is exposed, by removal of the end cap, for a period of one month. After the month the tube is resealed and sent to an analytical laboratory.

The laboratory analysis measures the quantity of pollutant absorbed and then calculates an average ambient pollutant concentration over the exposure period. Diffusion tube results are for NO_2, concentrations measured in parts per billion (ppb) and micrograms per cubic metre (μgm^3).

Tubes are exposed on a monthly basis, following the timetable prescribed by the Diffusion Tube Network in which tubes are replaced generally on the first Wednesday of the month.

From April 2008 GBC entered into a Countywide contract with Gradko Ltd. for the supply and analysis of NO_2 diffusion tubes. At the same time it was agreed to use the same preparation method (20% solution of TEA in water). This harmonisation of laboratory and method for the county will allow easier comparisons of results across LA boundaries.

QA/QC Procedures

Gradko

The European Union Daughter Directive for NO_2 sets out data quality objectives for overall accuracy. Annual average NO_2 concentration results must comply with the objective of ±25% of the reference concentration therefore; average diffusion tube measurements should comply with this objective. The precision of analytical measurements is also an important consideration, as it is possible to arrive at an average bias of less than ±25% with very imprecise measurements. Following previous intercomparisons of laboratory results an arbitrary guideline figure of 3ppb for acceptable precision has been adopted.

Gradko's NO_2 diffusion tube procedures follow the Defra guideline document[6] related to the preparation, extraction, analysis and calculation procedures for NO_2 passive diffusion tubes. Their internal analysis procedures are assessed by U.K.A.S. on an annual basis for compliance to ISO17025. Results from the on-going Workplace Analysis Scheme for Proficiency (WASP) programme for Gradko generally show a "Satisfactory" performance classification.

Gedling Borough Council

Tubes are stored in a refrigerator until the day of exposure. On site, when the tubes are collected the date, site and time are recorded, referenced to the tube numbers assigned by the laboratory. The tubes are then forwarded to Gradko for analysis on the day of collection, along with a 'blank' trip diffusion tube.

Chemiluminescent Monitor Data

Overview

The automatic monitoring system used (Monitor Labs ML®9841B) uses gas-phase chemiluminescence detection to perform continuous analysis of nitric oxide (NO), total oxides of nitrogen (NOx), and nitrogen dioxide (NO_2).

The instrument consists of a pneumatic system, an NO_2-to-NO converter (molycon), a reaction cell, photomultiplier tube (PMT) detector, and processing electronics.

[6] Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance for Laboratories and Users

During 2001-2007 the analyser was housed in the basement of the Daybrook Baptist Chapel. In January of 2008 the analyser was moved to a Casella ROMON enclosure on the opposite side of the A60 Mansfield Road. The analyser has been operational since August 2000; data capture levels are: -

96% 2001	96% 2005	95% 2009	91% 2013
95% 2002	93% 2006	95% 2010	80% 2014**
97% 2003	83% 2007	92% 2011	81% 2015*
98% 2004	81% 2008	54% 2012*	

*data logger failure

** air conditioning unit failure in mid-May

The ML®9841B analyser has a quoted detection of ± 0.5ppb and a precision of ± 0.5ppb or 1% of reading, whichever is largest. Accuracy of the analyser is dependent on the calibration and the calibration gases used.

QA/QC Procedures

The analyser is subject to a fortnightly two point manual calibration, by a suitably trained site operative, which is conducted in accordance with the manufacturer's quality control procedures. Filters at the sample head are changed concurrently with calibration. The equipment is serviced twice a year by the manufacturer's accredited engineers.

Calibration gases (Air and NO) used during the fortnightly calibration are supplied by BOC, who have demonstrated compliance with relevant quality control procedures in the preparation of gas mixtures. Gas cylinders are replaced before use by dates or when the gas levels fall below 50 bar.

Data Validation and Ratification

A process of data validation is carried out by GBC on a fortnightly basis after application of the calibration factors; every quarter the data undergoes a process of ratification; assessing for drift, removing spurious data etc. Validation is carried out in accordance with good practise (Chapter 7, section 2 of LAQM TG16).

Diffusion Tube Bias Adjustment Factors

National Bias Adjustment Factors (BAF) have been obtaining using the co-location studies spreadsheet available at http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html

The Gradko national BAF 2015 for 20% TEA in water is given as **0.91** from 29 studies of various types. (See screen shot in this appendix)

Factor from Local Co-location Studies

A co-location study was carried out with the GBC NOx analyser.
Attached to this appendix the AEA spreadsheet for calculating bias, precision and accuracy of triplicate tubes. The bias factor calculated is also **0.91**.

Discussion of Choice of Factor to Use

Based on guidance Box7.11 in LAQM TG(16) GBC has used the **national** bias adjustment factor when adjusting diffusion tube results.

Adjustment for Receptor Distance

Two of the diffusion tube locations are not representative of the receptors concerned:

1. 36 Victoria Road
2. The Vale PH

Due to site constraints the tubes are located as close as possible to the receptors. The two results have therefore been adjusted using the 'NO_2 with distance from roads' spreadsheet; available at http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html

Background concentrations have been taken from the nearest urban background diffusion tube; The Vale PH uses the "Civic Centre" UB tube (18 g/m^3) and 36 Victoria Rd uses the average of Marion Murdock Court and Hastings Street UB tubes. (19 g/m^3). Screen shots of these spreadsheets are attached to this appendix.

Short-term to Long-term Data adjustment

As mentioned tube data from Burton Rd/Shearing and Daybrook Chip Shop (75% data capture) were incomplete for 2015. As such the annual average has been "annualised" as in Box 7.10 of LAQM TG16. Table A1 below shows details of the data used and factors produced to adjust the tube results.

Table A.1 Short-Term to Long-Term Monitoring Data Adjustment

Burton Rd/Shearing Hill Tube

Long term site	Annual Mean 2015 (Am)	Period Mean 2015 (Pm)	Ratio
Northampton Kingsthorpe	13.0	14.11	0.92
Nottingham Centre	31.0	33.56	0.92
Market Harborough	9.0	9.78	0.92
		Average ratio	**0.92**

Daybrook Chip Shop Tube

Long term site	Annual Mean 2015 (Am)	Period Mean 2015 (Pm)	Ratio
Northampton Kingsthorpe	13.0	13.33	0.98
Nottingham Centre	31.0	30.33	1.02
Market Harborough	9.0	9.22	0.98
		Average ratio	**0.99**

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 μgm^{-3}	Tube 2 μgm^{-3}	Tube 3 μgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	07/01/2015	03/02/2015	32.8	32.5	36.8	34	2.4	7	5.9
2	03/02/2015	04/03/2015	34.6	45.6	33.0	38	6.8	18	17.0
3	04/03/2015	01/04/2015	41.3	39.4	43.3	41	1.9	5	4.7
4	01/04/2015	28/04/2015	34.3	35.2	36.8	35	1.2	4	3.1
5	28/04/2015	27/05/2015	27.3	25.8	25.7	26	0.9	3	2.2
6	27/05/2015	01/07/2015	26.8	29.3	26.2	27	1.6	6	4.1
7	01/07/2015	29/07/2015	33.4	32.3	33.5	33	0.7	2	1.7
8	29/07/2015	26/08/2015	36.4	41.2	39.2	39	2.4	6	6.0
9	26/08/2015	01/10/2015	37.7	37.3	39.0	38	0.9	2	2.1
10	01/10/2015	28/10/2015	51.6	44.9	51.9	49	4.0	8	9.9
11	28/10/2015	02/12/2015	34.9	32.0	35.4	34	1.8	5	4.5
12	02/12/2015	06/01/2016	41.8	41.5	39.9	41	1.0	2	2.5
13									

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
51	74	Good	or Data Capture
42	97	Good	Good
42	88	Good	Good
25	91	Good	Good
25	92	Good	Good
27	90	Good	Good
25	80	Good	Good
31	92	Good	Good
38	99	Good	Good
50	50	Good	or Data Capture
40	61	Good	or Data Capture
36	59	Good	or Data Capture
Overall survey -->		Good precision	Poor Overall DC

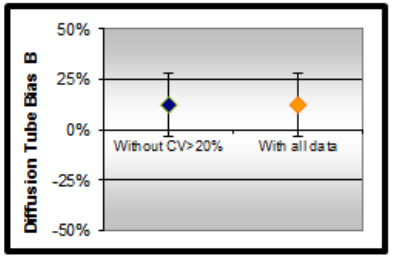
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	Daybrook Square

Precision: 12 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 8 periods of data	
Bias factor A	0.91 (0.8 - 1.07)
Bias B	9% (-6% - 25%)
Diffusion Tubes Mean:	35 μgm^{-3}
Mean CV (Precision):	6
Automatic Mean:	32 μgm^{-3}
Data Capture for periods used:	91%
Adjusted Tubes Mean:	32 (28 - 37) μgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 8 periods of data	
Bias factor A	0.91 (0.8 - 1.07)
Bias B	9% (-6% - 25%)
Diffusion Tubes Mean:	35 μgm^{-3}
Mean CV (Precision):	6
Automatic Mean:	32 μgm^{-3}
Data Capture for periods used:	91%
Adjusted Tubes Mean:	32 (28 - 37) μgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

Co-Location Spreadsheet 2015 Gradko Analysed

Adjustment of SINGLE Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tube Measurements

Site Name/ID	Periods													Raw Mean	Valid periods
	1	2	3	4	5	6	7	8	9	10	11	12	13		
The Grove PH - Daybrook Sq	37.0	34.0	41.0	35.0	24.0	27.0	34.0	37.2	40.0	52.0	36.6	35.0		36.1	12
Hastings Street	31.0	31.0	27.0	20.0	17.0	15.0	18.8	18.6	21.0	26.0	23.3	28.0		23.1	12
Marion Murdock Court	28.0	24.0	25.0	17.0	12.0	11.0	13.7	15.2	17.0	24.0	22.5	21.0		19.2	12
47 Plains Road	34.0	30.0	28.0	28.0	25.0	20.0	26.8	30.6	27.0	32.0	35.7	35.0		29.3	12
Morley Mills, Daybrook	38.0	38.0	40.0	31.0	22.0	26.0	31.1	36.9	32.0	43.0	36.4	41.0		34.6	12
Mansfield Road, Redhill	29.0	36.0	36.0	29.0	16.0	17.0	22.6	27.3	25.0	32.0	26.7	34.0		27.6	12
Daybrook Dental Surgery	40.0	36.0	35.0	35.0	28.0	23.0	32.7	36.0	32.0	44.0	41.2	37.0		35.0	12
Victoria Road, Netherfield	30.0	28.0	-	-	24.0	22.0	27.1	28.1	30.0	36.0	29.6	29.0		28.4	10
Victoria Road, Netherfield	42.0	43.0	41.0	30.0	31.0	32.0	36.8	37.0	35.0	41.0	38.6	31.0		36.5	12
Burton Rd/Shearing Hill	32.0	34.0	32.0	-	-	-	21.5	23.4	29.0	36.0	27.9	22.0		28.6	9
The Vale PH - Thackerays Lane	46.0	42.0	46.0	36.0	33.0	28.0	40.8	38.1	36.0	46.0	44.4	45.0		40.1	12
Ricket Lane (ruralbknd)	-	4.0	18.0	13.0	8.0	9.0	9.8	12.5	10.0	15.0	17.4	19.0		12.3	11
Wickes Store, Daybrook	38.0	39.0	40.0	26.0	25.0	21.0	28.7	33.4	32.0	41.0	31.0	34.0		32.4	12
Civic Centre, Arnold	27.0	23.0	24.0	18.0	14.0	13.0	15.0	15.8	18.0	20.0	20.0	23.0		19.2	12
Colwick Park Close	28.0	35.0	32.0	24.0	21.0	20.0	18.8	22.4	30.0	32.0	22.6	20.0		25.5	12
Daybrook Chip Shop	42.0	45.0	34.0	42.0	33.0	28.0	-	43.3	-	-	54.4	47.0		41.0	9
T&S Heating, Daybrook	43.0	40.0	49.0	38.0	32.0	29.0	-	44.6	41.0	53.0	46.4	43.0		41.7	11
Frank Keys, Daybrook	42.0	40.0	45.0	31.0	28.0	25.0	33.9	38.4	37.0	47.0	44.4	44.0		38.0	12
856 Plains Road	31.0	28.0	35.0	28.0	24.0	19.0	24.3	26.0	29.0	36.0	25.6	28.0		27.8	12
Rectory Road/Vale Road	40.0	33.0	48.0	28.0	24.0	20.0	28.1	29.4	27.0	36.0	35.9	32.0		31.8	12
Mile End Road	45.0	38.0	37.0	39.0	35.0	28.0	37.8	41.5	42.0	45.0	41.0	40.0		39.1	12

Adjusted measurement (95% confidence interval)
with all the data
8 periods used in this calcuations

Bias Factor A 0.91 (0.8 - 1.07)
Bias B 9% (-6% - 25%)
Tube Precision: 6 Automatic DC: 91%

Adjusted with 95% CI	33	(29 - 39)
Adjusted with 95% CI	21	(18 - 25)
Adjusted with 95% CI	17	(15 - 21)
Adjusted with 95% CI	27	(23 - 31)
Adjusted with 95% CI	32	(28 - 37)
Adjusted with 95% CI	25	(22 - 29)
Adjusted with 95% CI	32	(28 - 37)
Adjusted with 95% CI	26	(23 - 30)
Adjusted with 95% CI	33	(29 - 39)
Adjusted with 95% CI	26	(23 - 31)
Adjusted with 95% CI	36	(32 - 43)
Adjusted with 95% CI	11	(10 - 13)
Adjusted with 95% CI	30	(26 - 35)
Adjusted with 95% CI	17	(15 - 21)
Adjusted with 95% CI	23	(20 - 27)
Adjusted with 95% CI	37	(33 - 44)
Adjusted with 95% CI	38	(33 - 45)
Adjusted with 95% CI	35	(30 - 41)
Adjusted with 95% CI	25	(22 - 30)
Adjusted with 95% CI	29	(25 - 34)
Adjusted with 95% CI	36	(31 - 42)

The bias adjustment factor used in these calculations include all the data and no screening of data due to poor precision has been applied.

2015 Diffusion Gradko Analysed Tube Results

National Diffusion Tube Bias Adjustment Factor Spreadsheet

Spreadsheet Version Number: 03/16

Follow the steps below **in the correct order** to show the results of **relevant** co-location studies

Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods

Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet

This spreadhseet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.

This spreadsheet will be updated at the end of June 2016

LAQM Helpdesk Website

The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.

Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.

Step 1: Select the Laboratory that Analyses Your Tubes from the Drop-Down List

If a laboratory is not shown, we have no data for this laboratory.

Step 2: Select a Preparation Method from the Drop-Down List

If a preparation method is not shown, we have no data for this method at this laboratory.

Step 3: Select a Year from the Drop-Down List

If a year is not shown, we have no data[2]

Step 4:

Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor[3] shown in blue at the foot of the final column.

If you have your own co-location study then see footnote[4]. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@uk.bureauveritas.com or 0800 0327953

Analysed By[1]	Method (To undo your selection, choose (All) from the pop-up list)	Year[5] (To undo your selection, choose (All))	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m³)	Automatic Monitor Mean Conc. (Cm) (µg/m³)	Bias (B)	Tube Precision[6]	Bias Adjustment Factor (A) (Cm/Dm)
Gradko	20% TEA in water	2015	R	Luton Borough Council	12	46	44	6.0%	G	**0.94**
Gradko	20% TEA in water	2015	R	Monmouthshire County Council	12	41	37	11.0%	G	**0.90**
Gradko	20% TEA in water	2015	B	Pembrokeshire Council	10	4	3	36.7%	G	**0.73**
Gradko	20% TEA in water	2015	R	City of Lincoln Council	12	39	33	17.9%	G	**0.85**
Gradko	20% TEA in water	2015	R	Borough Council of King's Lynn and West Nor	12	29	22	32.5%	G	**0.75**
Gradko	20% TEA in water	2015	R	Cheshire West and Chester	10	38	40	-5.2%	G	**1.06**
Gradko	20% TEA in water	2015	R	Dudley MBC	12	47	50	-5.9%	G	**1.06**
Gradko	20% TEA in water	2015	R	Dudley MBC	12	40	35	14.0%	G	**0.88**
Gradko	20% TEA in water	2015	R	Dudley MBC	12	34	31	10.0%	G	**0.91**
Gradko	20% TEA in water	2015	UB	Dudley MBC	11	23	19	20.9%	G	**0.83**
Gradko	20% TEA in water	2015	KS	Glasgow City Council	12	60	61	-0.9%	P	**1.01**
Gradko	20% TEA in water	2015	UB	Glasgow City Council	10	25	25	3.3%	P	**0.97**
Gradko	20% TEA in water	2015	R	Glasgow City Council	9	30	31	-2.8%	P	**1.03**
Gradko	20% TEA in water	2015	R	Glasgow City Council	12	43	38	14.0%	P	**0.88**
Gradko	20% TEA in water	2015	KS	Marylebone Road Intercomparison	12	102	81	26.2%	G	**0.79**
Gradko	20% TEA in water	2015	UB	Liverpool	12	20	22	-9.0%	G	**1.10**
Gradko	20% TEA in water	2015	R	Preston City Council	12	29	27	8.9%	G	**0.92**
Gradko	20% TEA in water	2015	R	Thurrock Borough Council	12	28	45	-37.1%	G	**1.59**
Gradko	20% TEA in water	2015	R	Gateshead Council	11	33	33	-0.8%	G	**1.01**
Gradko	20% TEA in water	2015	R	Gateshead Council	10	36	33	11.2%	G	**0.90**
Gradko	20% TEA in water	2015	R	Gateshead Council	12	28	25	9.2%	G	**0.92**
Gradko	20% TEA in water	2015	KS	New Forest DC	11	47	36	31.1%	P	**0.76**
Gradko	20% TEA in water	2015	R	New Forest DC	11	33	25	31.7%	G	**0.76**
Gradko	20% TEA in water	2015	R	Wokingham Borough Council	11	36	33	-69.0%	G	**0.93**
Gradko	20% TEA in water	2015	UC	Southampton City Council	12	28	29	-3.5%	G	**1.04**
Gradko	20% TEA in water	2015		**Overall Factor[3] (29 studies)**				**Use**		**0.91**

Gradko 20%TEA in Water Co-location Studies 2015

This calculator allows you to predict the annual mean NO_2 concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.

Air Quality CONSULTANTS

Enter data into the yellow cells

Step 1	How far from the KERB was your measurement made (in metres)?	(Note 1)	1.5	metres
Step 2	How far from the KERB is your receptor (in metres)?	(Note 1)	4.5	metres
Step 3	What is the local annual mean background NO_2 concentration (in $\mu g/m^3$)?	(Note 2)	19	$\mu g/m^3$
Step 4	What is your measured annual mean NO_2 concentration (in $\mu g/m^3$)?	(Note 2)	33	$\mu g/m^3$
Result	The predicted annual mean NO_2 concentration (in $\mu g/m^3$) at your receptor	(Note 3)	29.6	$\mu g/m^3$

Note 1: In some cases the term "kerb" may be taken to be the edge of the trafficked road - see the FAQ at http://laqm2.defra.gov.uk/FAQs/Monitoring/Location/index.htm for further details. Distances should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at www.airquality.co.uk, or alternatively from a nearby monitor in a background location.

Note 3: The calculator follows the procedure set out in Box 2.3 of LAQM TG(09). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

Issue 4: 25/01/11. Created by Dr Ben Marner; Approved by Prof Duncan Laxen. Contact: benmarner@aqconsultants.co.uk

36 Victoria Road Calculation for Distance to Receptor

This calculator allows you to predict the annual mean NO_2 concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.

Air Quality CONSULTANTS

Enter data into the yellow cells

Step 1	How far from the KERB was your measurement made (in metres)?	(Note 1)	3.5	metres
Step 2	How far from the KERB is your receptor (in metres)?	(Note 1)	14	metres
Step 3	What is the local annual mean background NO_2 concentration (in $\mu g/m^3$)?	(Note 2)	18	$\mu g/m^3$
Step 4	What is your measured annual mean NO_2 concentration (in $\mu g/m^3$)?	(Note 2)	36	$\mu g/m^3$
Result	The predicted annual mean NO_2 concentration (in $\mu g/m^3$) at your receptor	(Note 3)	29.3	$\mu g/m^3$

Note 1: In some cases the term "kerb" may be taken to be the edge of the trafficked road - see the FAQ at http://laqm2.defra.gov.uk/FAQs/Monitoring/Location/index.htm for further details. Distances should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

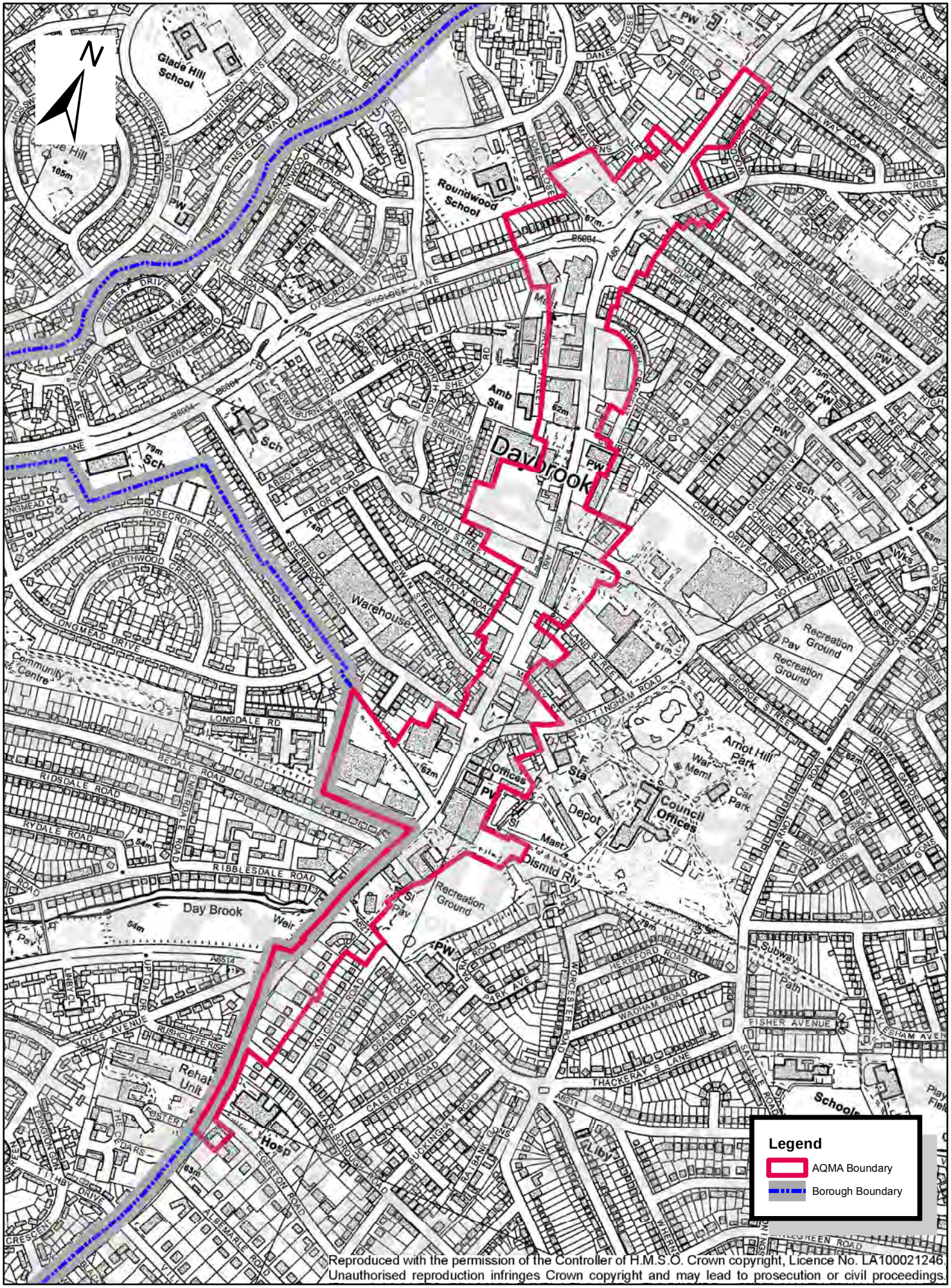
Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at www.airquality.co.uk, or alternatively from a nearby monitor in a background location.

Note 3: The calculator follows the procedure set out in Box 2.3 of LAQM TG(09). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

Issue 4: 25/01/11. Created by Dr Ben Marner; Approved by Prof Duncan Laxen. Contact: benmarner@aqconsultants.co.uk

Vale PH Calculation for Distance to Receptor

Appendix D: Maps

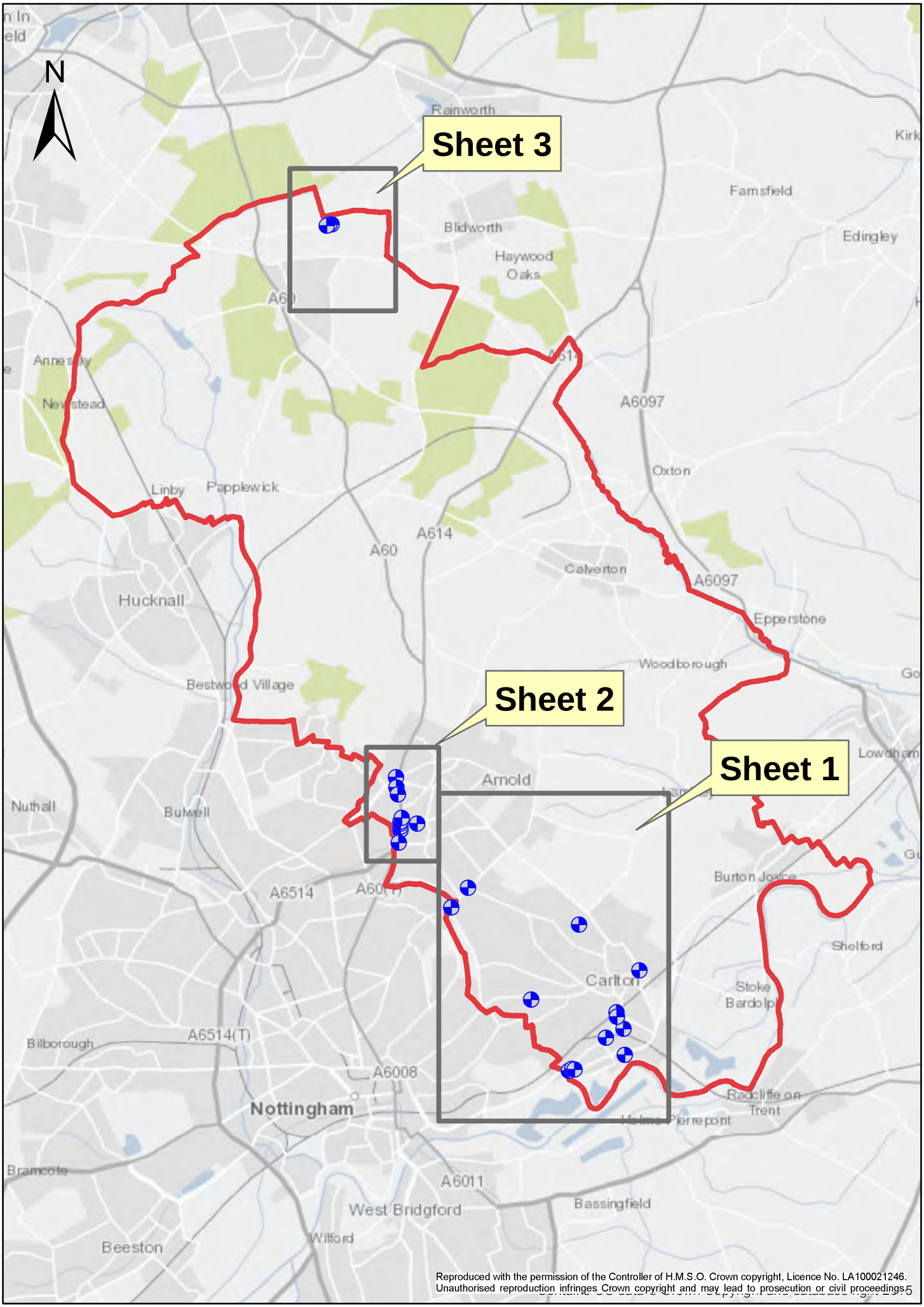


Gedling Borough Council

Map referred to in the
Gedling No: 2 Air Quality Management Order 2011
(Nitrogen Dioxide)

Scale 1:7,500

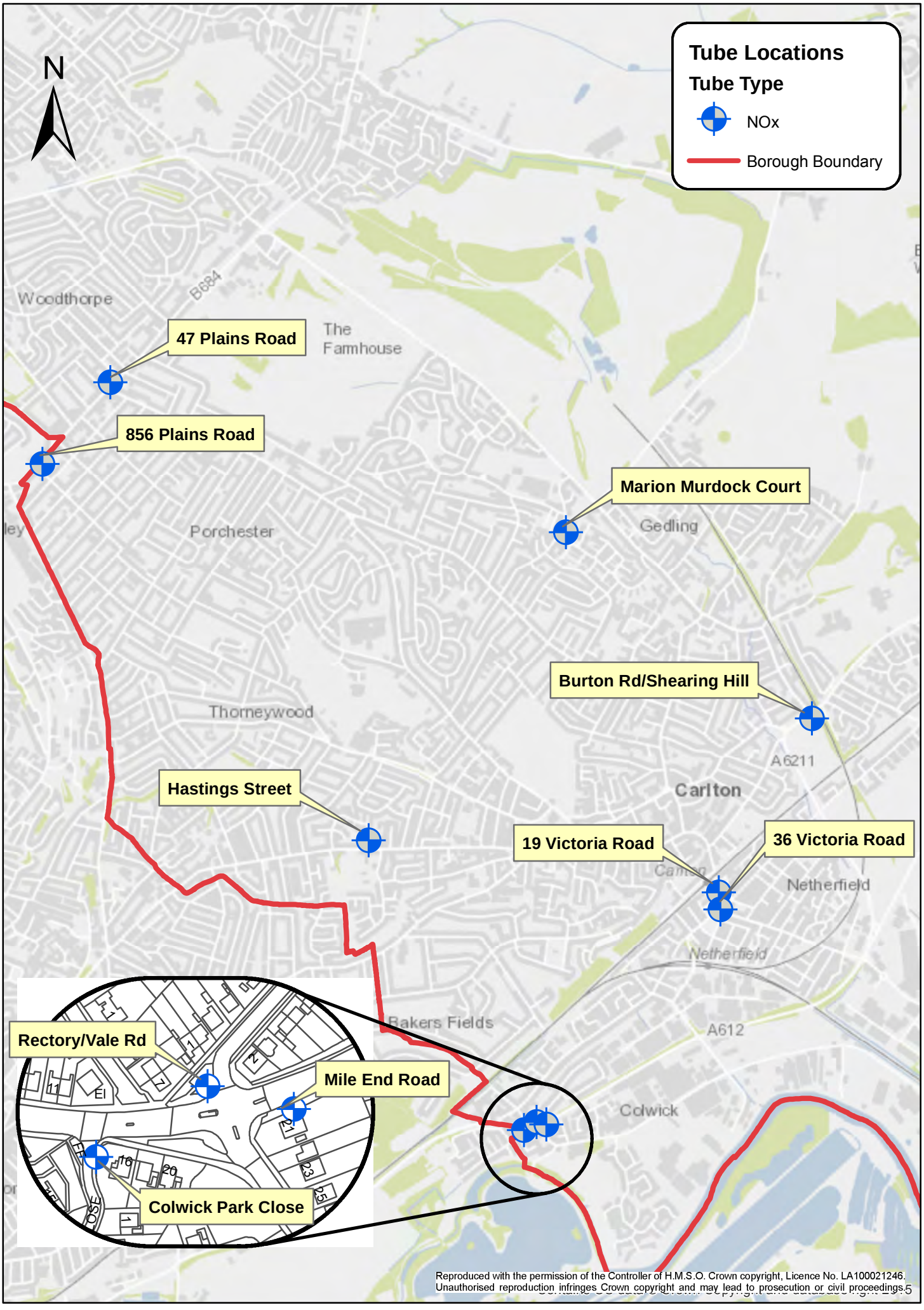
Date April 2011



Gedling Borough Council

Sheet Locations

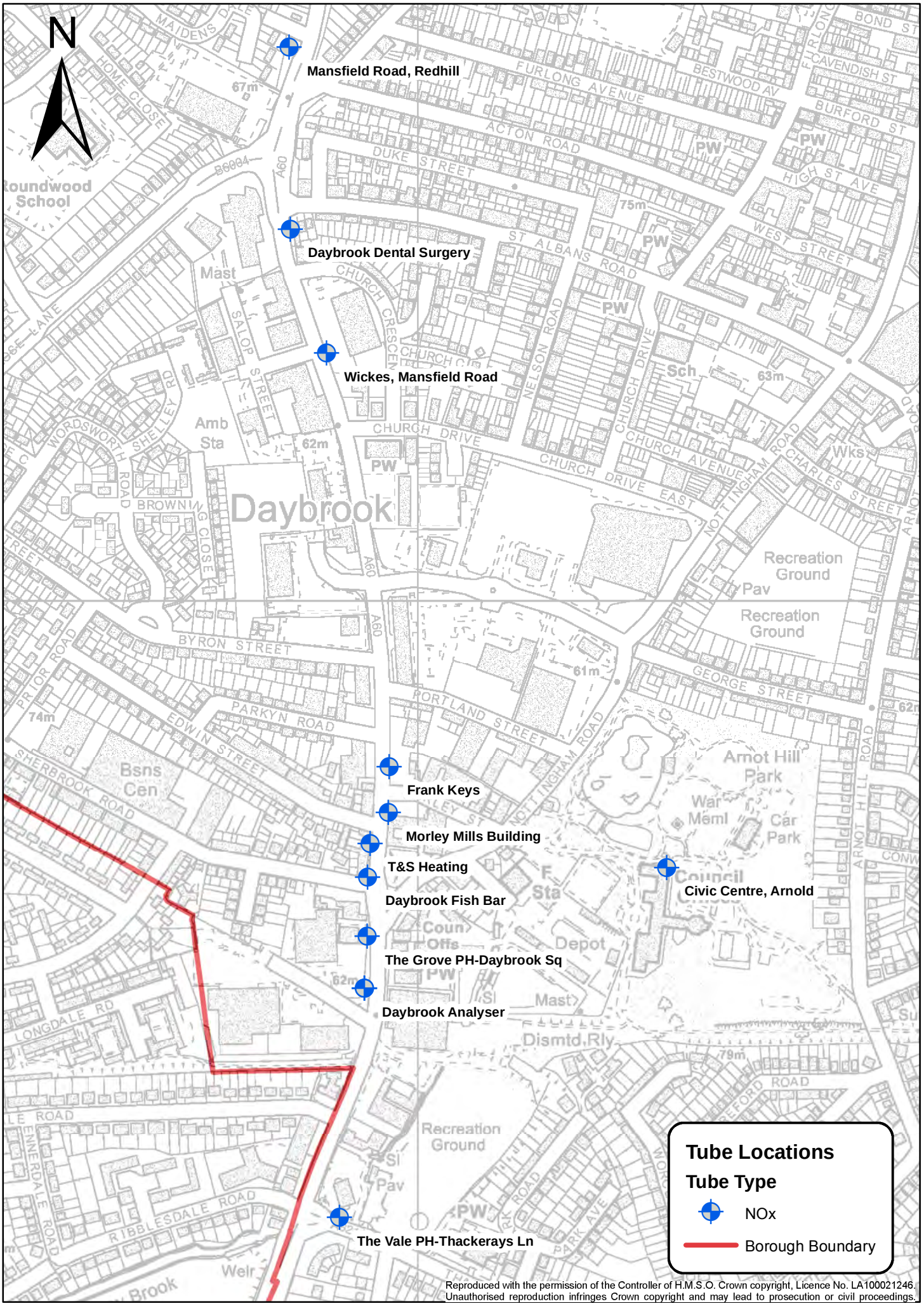
Scale: nts



Gedling Borough Council

DiffusionTube Locations - Sheet 1

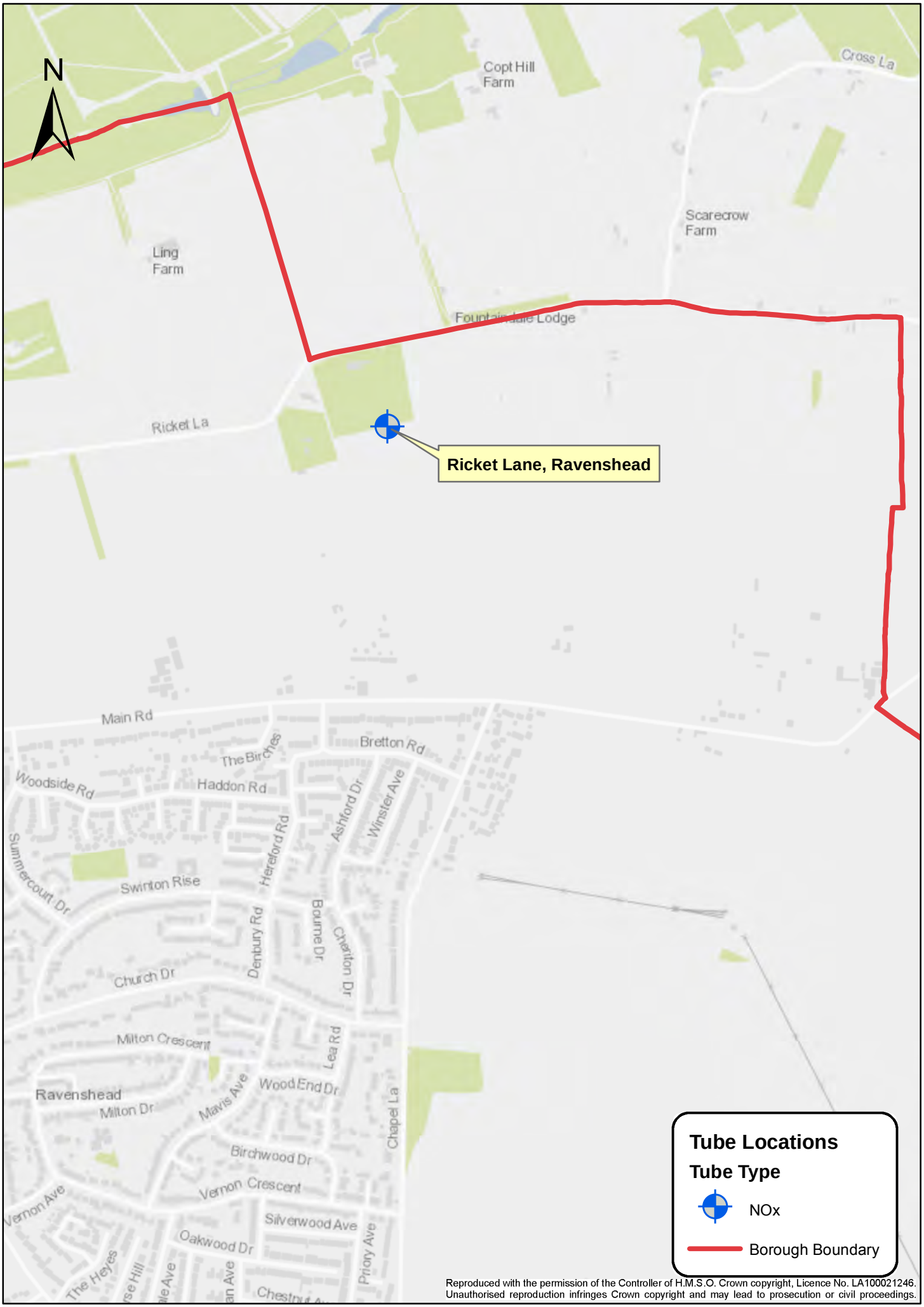
Scale: nts



Gedling Borough Council

DiffusionTube Locations - Sheet 2

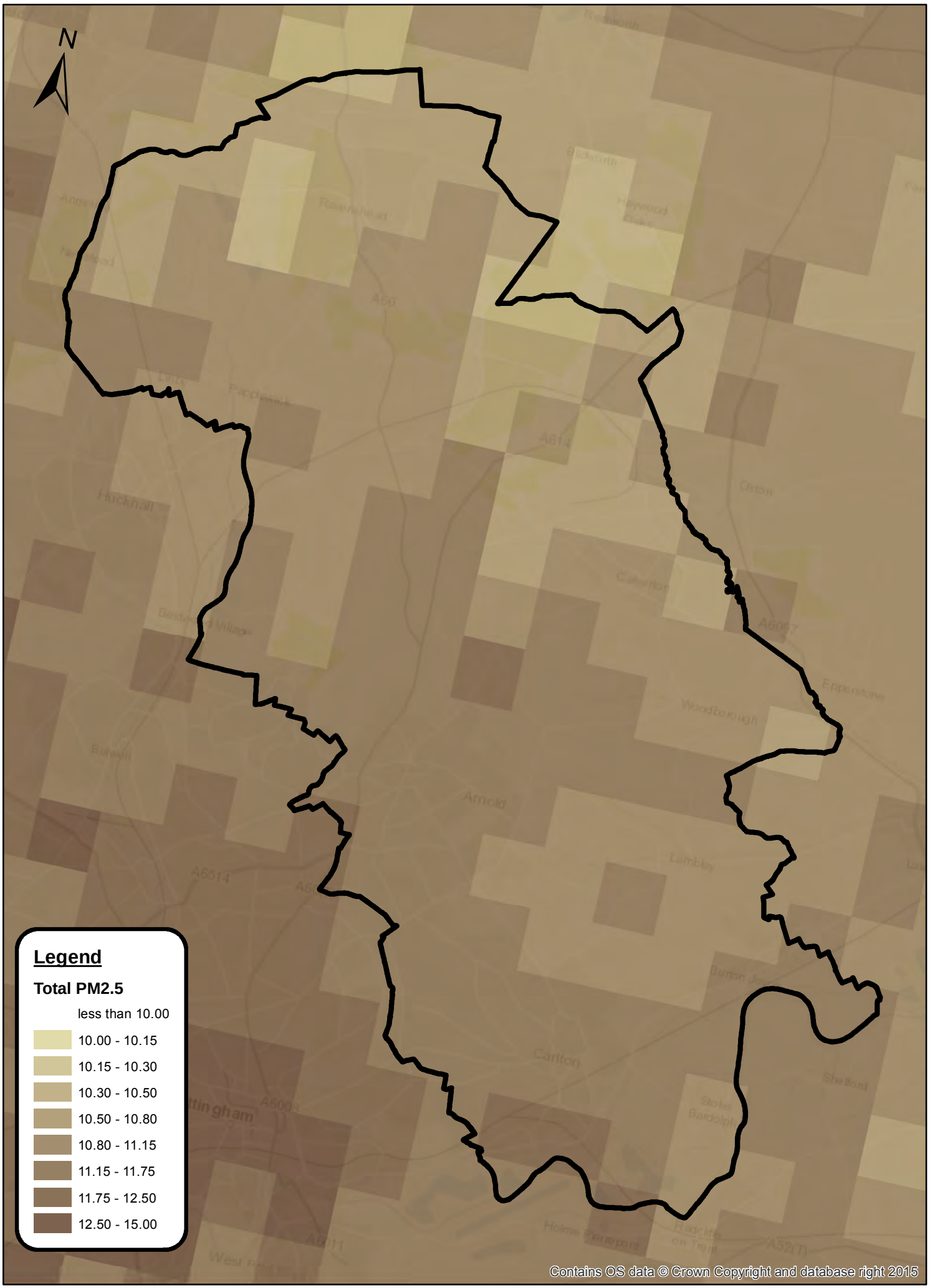
Scale: nts



Gedling Borough Council

DiffusionTube Locations - Sheet 3

Scale: nts



Gedling Borough Council

2015 PM2.5 Background Concentrations above WHO limit value (scaled from 10ugm3 to 15ugm3)

Scale 1:75,000

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[7]	
	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

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

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
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
ASR	Air quality Annual Status Report
CAZ	Clean Air Zone
Defra	Department for Environment, Food and Rural Affairs
EU	European Union
GBC	Gedling Borough Council
HGV	Heavy Goods Vehicle
JSNA	Joint Strategic Needs Assessment
LA	Local Authority
LAQM	Local Air Quality Management
NEPWG	Nottinghamshire Environmental Protection Working Group
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
NCC	Nottinghamshire County Council
PHE	Public Health England
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
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide
WHO	World Health Organisation
WASP	Workplace Analysis Scheme for Proficiency

References

Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance for Laboratories and Users, 2008. AEA Energy & Environment.

Estimating Local Mortality Burdens associated with Particulate Air Pollution, Gowers, A.M. et al. Public Health England, 2014

Joint strategic needs assessment: Air Quality (2015), Health Protection Strategy Group; http://jsna.nottinghamcity.gov.uk/insight/Strategic-Framework/Nottinghamshire-JSNA/Cross-cutting-themes/Air-Quality.aspx ; Accessed May 2015.

LTP3, 3rd Local Transport Plan for Nottingham, 2011-2026; Nottinghamshire County Council; 2011.

Part IV of the Environment Act 1995 - Local Air Quality Management: Policy Guidance; LAQM.PG(16); Department for Environment and Food and Rural Affairs; 2016.

Part IV of the Environment Act 1995 - Local Air Quality Management; Technical Guidance; LAQM.TG(16); Department for Environment and Food and Rural Affairs; 2016.

The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, 2007. Department for Environment and Food and Rural Affairs.

ML®9841B Nitrogen Oxides Analyser Operational and Service Manuals; Monitor Labs; Rev H; October 1998.

Royal College of Physicians. Every breath we take: the lifelong impact of air pollution. Report of a working party. London: RCP, 2016.