Thurrock Interim Air Quality Action Plan for Transport

2012/13 – 2014/15

September 2012 (Second Draft)

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1 Introduction

1.1 Background

In Thurrock, Air Quality issues have been highlighted in relation to two regulated air pollutants – Nitrogen Dioxide (NO_2) and Particulate Matter (PM_{10}).

Particulate Matter is generally categorised on the basis of the size of the particles and is made up of a wide range of materials and arises from a variety of sources. Concentrations of PM comprise primary particles emitted directly into the atmosphere from combustion sources and secondary particles formed by chemical reactions in the air.

PM derives from both human-made and natural sources, but in the UK the biggest human-made sources are stationary fuel combustion and transport. Road transport gives rise to primary particles from engine emissions, tyre and brake wear and other non-exhaust emissions. Other primary sources include quarrying, construction and non-road mobile sources.

Both short-term and long-term exposure to ambient levels of PM are consistently associated with respiratory and cardiovascular illness and mortality, as well as other ill-health effects, and these associations are believed to be causal. It is not currently possible to discern a threshold concentration for PM below which there are no effects on the whole population's health.

All combustion processes in air produce oxides of nitrogen (NO_x). Nitrogen Dioxide (NO_2) and Nitric Oxide (NO) are both oxides of nitrogen and together are referred to as NO_x. Road transport is typically the main source, followed by the electricity supply industry and other industrial and commercial sectors.

NO_2 is associated with adverse effects on human health. At high levels NO_2 causes inflammation of the airways. Long-term exposure may affect lung function and respiratory symptoms. NO_2 also enhances the response to allergens in sensitive individuals.

High levels of NO_x can have an adverse effect on vegetation, including leaf or needle damage and reduced growth. Deposition of pollutants derived from NO_x emissions contribute to acidification and/or eutrophication of sensitive habitats leading to loss of biodiversity, often at locations far removed from the original emissions. NO_x also contributes to the formation of secondary particles and ground level ozone, both of which are associated with ill-health effects and also damages vegetation.

1.2 Policy Context

Action to manage and improve air quality is largely driven by EU legislation. The most recent EU Ambient Air Quality Directive (2008/50/EC) is a revision of previously existing European air quality legislation, and sets out long-term air quality objectives and introduces new air quality standards. The 2008 directive replaced nearly all the previous EU air quality legislation and was made law in England through the Air Quality Standards Regulations 2010, which establishes mandatory standards for air quality and sets limits and guides values for sulphur and nitrogen dioxide, suspended particulates and lead in air. Those limit values relevant to Thurrock at set forth in **Figure 1** below.

Figure 1: Pollutant Objectives Relevant to Thurrock

Pollutant	Objective	Concentration Measured as	Date (European obligations)
Nitrogen Dioxide (NO_2)	40 µg/m^3	Annual Mean	1 January 2010
Particles (PM_{10})	50 µg/m^3 not to be exceeded more than 35 times a year	24 hour mean	1 January 2005

The UK *Air Quality Strategy* (2007) sets out a way forward for work and planning on air quality issues. It also reiterates the air quality standards and objectives to be achieved and introduces a new policy framework for tackling fine particles. Furthermore, the strategy identifies potential new national policy measures which modeling indicates could give further health benefits and move closer towards meeting the strategy's objectives.

Part IV of the Environment Act 1995 introduced air quality responsibilities to both national and local government throughout the UK. These responsibilities include the requirement upon local authorities to periodically review and assess air quality across their areas. Air quality objectives have been set for those air pollutants deemed to be of most concern. Seven of these pollutants are included under the Local Air Quality Management regime and regulations for these were introduced.

The Local Air Quality Management regime requires all local authorities to review and assess the quality of their local air quality in a staged process. Should this confirm that any of the objectives will not be met within the required timescale, the local authority must designate Air Quality Management Areas (AQMAs) and produce a Local Air Quality Action Plan setting out how it intends to improve air quality in these areas.

In April 2001 Thurrock Council declared twenty AQMAs for exceeding threshold annual average limit values for nitrogen dioxide (NO_2), four of which were also

designated for exceeding the 24-hour mean limit value for particulate matter (PM_{10}). Subsequently, an Air Quality Action Plan was published in November 2004.
Air quality in Thurrock was reassessed in 2004 through Detailed Assessment. The aim was to identify with reasonable certainty whether or not exceedences of the air quality objectives will be likely to arise. It identified that seven AQMAs should be revoked and two additional AQMAs to be designated. This resulted in a total of 15 AQMAs for exceeding the annual average NO_2 objective, four of which were previously designated for also exceeding the 24-hour mean PM_{10} objective. Source apportionment exercises determined that the primary cause of exceedence in all of the 15 AQMAs was road transport.

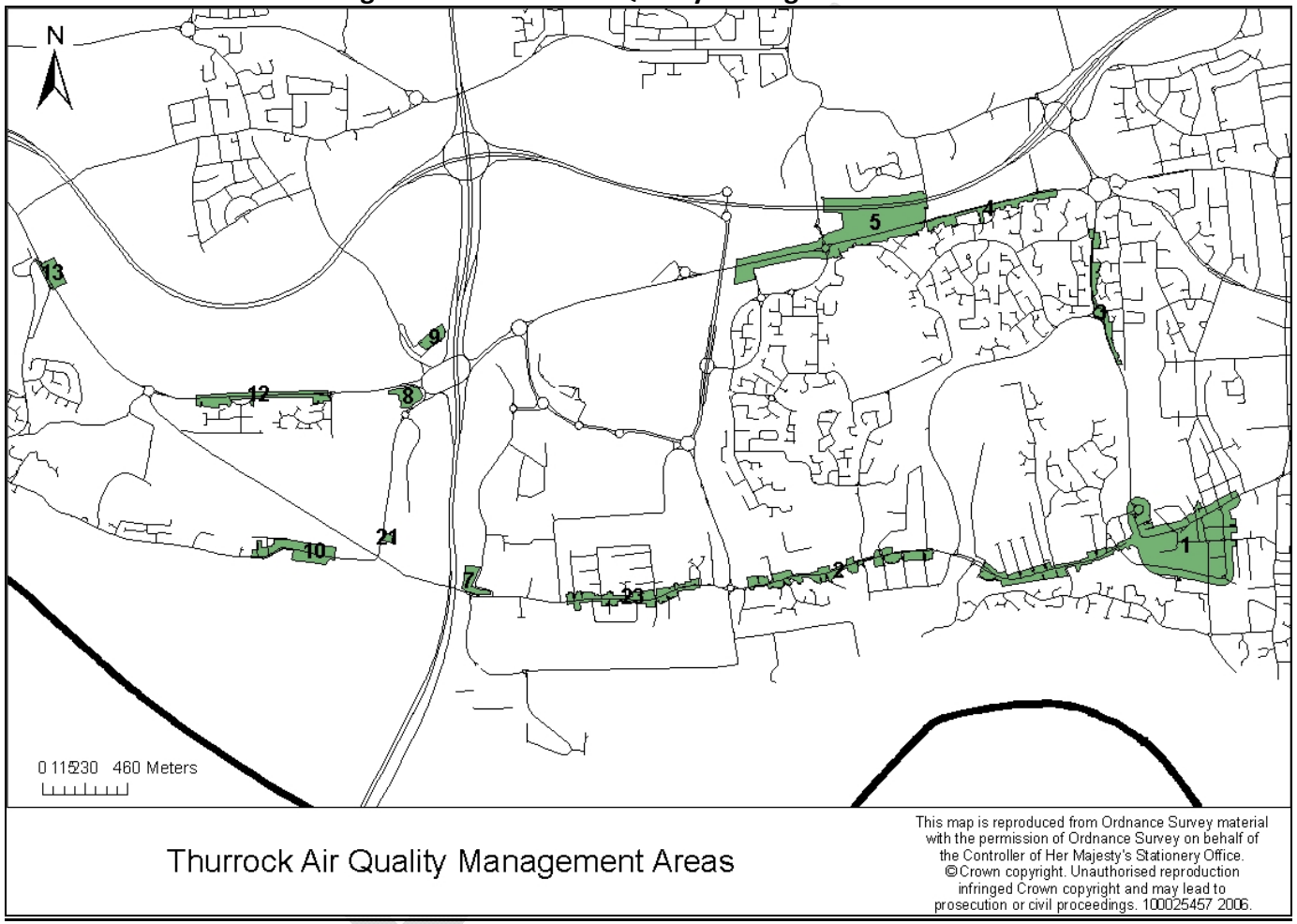
Of the 15 road transport related AQMAs in Thurrock shown in **Figure 2**, all were designated for exceeding the annual average nitrogen dioxide (NO_2) objective of 40µg/m^3. AQMAs 5, 7, 8 and 10 have also been jointly declared for also exceeding the 24-hour mean particulate matter (PM_{10}) objective of 50µg/m^3, which is not to be exceeded more than 35 times a year.

Figure 2: Thurrock AQMAs

AQMA	Pollutant	Description of Air Quality Management Area
1	NO_2	479 properties in Grays town centre and London Road Grays
2	NO_2	220 properties on London Road South Stifford and adjoining roads
3	NO_2	60 properties on the east side of Hogg Lane and Elizabeth Road
4	NO_2	56 properties to the west of Chafford Hundred Visitor Centre
5	NO_2 and PM_{10}	65 properties surrounding Warren Terrace, A13 and A1306
7	NO_2 and PM_{10}	2 hotels next to M25
8	NO_2 and PM_{10}	1 hotel next to Jct 31 of the M25
9	NO_2	1 Hotel next to Jct 31 of the M25
10	NO_2 and PM_{10}	76 properties on London Road Purfleet near to Jarrah Cottages
12	NO_2	15 properties on Watts Wood estate next to A1306
13	NO_2	15 properties on London Road Aveley next to A1306
15	NO_2	1 listed building near to M25 on edge of Irvine Gardens, South Ockendon
16	NO_2	1 Cottage next to M25 off Dennis Road
21	NO_2	1 hotel on Stonehouse Lane
23	NO_2	115 properties next to London Road West Thurrock
24	NO_2	Pending declaration – Calcutta Road in Tilbury

The spatial distribution of AQMAs in Thurrock is shown in **Figure 3.** It is evident from the map that almost all of the AQMAs in Thurrock occur in the western part of the borough.

Figure 3: Thurrock Air Quality Management Areas



1.3 Current Legal Issues

There is currently a significant amount of controversy surrounding air quality in the UK, as particulate matter and nitrogen dioxide limit values set through the EU directive have been breached and were not brought into line prior to the 2010 deadline.

In September 2011, Defra applied to the EU for a 5-year extension on nitrogen dioxide levels, including for the Eastern England zone, of which Thurrock is part. However, the extension application identified that air quality objectives for NO_2 were unlikely to be met in 16 zones, including the Eastern England zone, by the 2015 extension date. As a result, in June 2012 the European Commission determined that the UK was infringing European legislation in these 16 zones and will begin infringement proceedings in autumn 2012. This is likely to lead to significant fines levied on the UK, which could be in the region of hundreds of millions of pounds (estimated total £300 million).

Prior to the Localism Act, payments of any financial sanctions levied on the UK, as a result of any public authority's breach of EU law, would have been the sole responsibility of the UK government. There was no mechanism in place to ensure that public authorities were held to account for their part in any failure to comply with European law. Such misalignment in accountability meant there was less incentive for public authorities to meet their obligations and avoid any financial sanctions falling on UK taxpayers.

Part 2 of the Localism Act introduces a discretionary power for a Minister of the Crown to require a public authority to pay some, or all, of a European Court of Justice financial sanction where the public authority has demonstrably caused or contributed to that sanction. The Department for Communities and Local Government (DCLG) undertook a consultation on this issue in spring 2012, showing that consideration is underway as to whether to pass EU fines, such as those likely for breaching air quality objectives, down to the local authority level.

As Thurrock has the largest number of AQMAs of any local authority in the UK, this chain of events highlights a significant amount of risk to Thurrock Council, particularly in terms of possible fines. It is currently unknown exactly how much UK wide fines will amount to and how these may be distributed down to the local authority level, but several possible scenarios could mean that Thurrock Council faces significant fines, which may be in the region of millions of pounds.

However, infringement proceedings against the UK by the EU are likely to take a number of years. This delay gives Thurrock Council an excellent opportunity to attempt to improve air quality within its AQMAs, with a view to revoking as many as possible prior to the completion of infringement proceedings. This report therefore looks primarily at identifying short-term transport measures to improve air quality that can be delivered quickly and effectively.

2 Current State of Air Quality in Thurrock

2.1 PM_{10}

Thurrock Council has declared four AQMAs (5, 7, 8 and 10) for also exceeding the 24-hour mean particulate matter (PM_{10}) objective of 50µg/m^3, which is not to be exceeded more than 35 times a year. However, as shown in **Figure 4** below, PM_{10} concentrations throughout the Borough have not exceeded the 24-hour mean objective more than 35 times a year since 2007 (Thurrock 2). As a result, the remainder of this report will therefore focus entirely on NO_2 concentrations.

Figure 4: PM_{10} monitoring in Thurrock - 2005 to 2011 (µg m^{-3})

Site		2005	2006	2007	2008	2009	2010	2011
Thurrock 1	Annual mean	23.4	19.9	18.92	18.88	21.26	24.3	24.61
	Data capture %	94.56	97.38	98.16	97.79	96.63	95.42	96.4
	Maximum 1 hr	191	244.8	152.5	115	117	331	492
	Maximum 24 hr	72.3	77.6	83.1	71	83	76	105
	Days > 50 µg m^{-3}	5	5	10	3	6	9	26
Thurrock 3	Annual mean	26.53	22.28	20.84	21	*21.3*	*20.69*	23.19
	Data capture %	99.04	98.72	97.82	99.68	*79.89*	*89.5*	96
	Maximum 1 hr	236	252.1	406.2	129.2	*153*	*217*	142
	Maximum 24 hr	63.6	85.8	80.8	85	*77*	*57*	100
	Days > 50 µg m^{-3}	10	9	11	6	*6*	*4*	18
Thurrock 2	Annual mean			*36.52*	*34.81**			
	Data capture %			*70.1*	*20.34**			
	Maximum 1 hr			*356.3*	*354.4**			
	Maximum 24 hr			*96.2*	*92.3**			
	Days > 50 µg m^{-3}			***51***	*14**			
Thurrock 8	Annual mean				*24.43**	*25.85*	29.43	27.71
	Data capture %				*70.41**	*80.61*	92.12	97.45
	Maximum 1 hr				*356.3**	*201*	408	248
	Maximum 24 hr				*73**	*79*	113	95
	Days > 50 µg m^{-3}				*8**	*5*	21	26
Thurrock 2 & 8	Annual mean				29.62*			
	Data capture %				90.75*			
	Maximum 1 hr				356.3*			
	Maximum 24 hr				92.3*			
	Days > 50 µg m^{-3}				22*			

(Note- italics indicates < 90% data capture; bold indicates > daily mean objective)
(Pink indicates TEOM FDMs Data)
(Blue indicates that ERG's VCM was used in order to meet equivalence for TEOM data)
(* & Yellow indicates that for 2008 both results for Thurrock 2 and Thurrock 8 were combined as there was a relocation of Thurrock 2 to Thurrock 8 by 35 metres along the same road)

2.2 NO_2

All of Thurrock's AQMAs have been declared for exceeding the 40 µg/m^3 limit value of annual mean concentrations of NO_2. **Figure 5** below outlines the measured NO_2 concentrations within Thurrock's AQMAs between 2007 and 2011, with bold figure identifying exceedences of the limit value.

Figure 5: NO_2 Bias corrected diffusion tube monitoring in Thurrock - 2007 to 2011 (µg m^{-3})

AQMA	Site	2007	2008	2009	2010	2011
1	London Road Grays (R)	**43.61**	**42.99**	39.36	**40.33**	37.51
1	Queensgate Centre Grays (R)	**47.23**	**41.81**	37.12	37.78	34.19
1	Cromwell Road Grays (I)	37.39	37.62	34.07	33.63	30.84
1	Poison Store AURN Site (UB)	33.91	30.83	31.01	28.55	28.65
1	Stanley Road Grays (R)	34.97	35.53	32.55	35.85	27.95
2	London Road South Stifford (R)	**50.19**	**48**	**46.08**	**46.78**	**43.08**
3	Elizabeth Road (R)	**53.82**	**53.51**	**49.28**	**53.77**	**46.95**
3	Hogg Lane (R)	38.09	37.35	32.72	36.43	29.93
5	A1306 (R)	**64.04**	**58.12**	**50.62**	**55.58**	**53.04**
5	Howard Road (R)	38.11	38.28	33.72	36.61	29.2
7	Ibis Hotel (UB)	**57.94**	**50.07**	**47.56**	**51.96**	**50.62**
10	Jarrah Cottages (R)	**68.64**	**59.3**	**60.58**	**68.33**	**62.7**
12	Watts Crescent (R)	**46.37**	**43.97**	38.06	**42.22**	38.7
13	London Road Arterial Road (R)	**78.31**	**68.36**	**69.48**	**69.11**	**63.93**
13	London Road Arterial Road (North) (R)					**40.62**
13	London Road Arterial Road (South) (R)					36.59
15	Gatehope Drive (UB)	39.17	35.41	33.43	30.53	32.42
16	Kemps Cottage (UB)	**41.51**	34.88	36.11	32.48	35.89
21	Stonehouse Lane (R)	**59.57**	**52.1**	**54.08**	**59.2**	**54**
23	London Road W Thurrock (R)	**46.12**	**45.82**	39.04	39.43	38.8
24	Broadway Intersection (R)			39.17	**41.8**	**49.87**
24	St Andrews Road (R)			35.95	**42.71**	**47.66**
24	Calcutta Road East (R)			34.42	39.31	**41.34**
24	Calcutta Road North (R)			28.65	34.04	**40.84**
24	Dock Road (R)			36.21	**41.16**	39.83

Note: There is no diffusion tube monitoring undertaken within AQMA 4, and the A1306 roadside site within AMQA 5 is typically used as a proxy measurement for this AQMA.

2.3 Projecting 2015 Concentrations

As shown in the previous section, many of Thurrock's AQMAs did not achieve the 2010 target date for compliance with annual mean NO_2 limit values, and this is a common theme across the UK. As Defra initially requested a compliance time limit extension for NO_2 to 2015, it is important to consider what NO_2 concentrations within Thurrock's AQMAs may be in that year, to determine whether some areas may be expected to fall below the limit value by 2015, without any specified action.

Box 2.1 of Defra's LAQM Technical Guidance (TG09) allows a formulaic approach to projecting future year NO_2 concentrations for inner London, outer London and the rest of the UK. As Thurrock is not in "inner London", this formula has not been used, but predictions using the TG09 formulas have been used to project possible NO_2 concentrations in Thurrock's AQMAs using both the "outer London" formula, as well as the "rest of the UK" and these results are outlined in **Figure 6** below.

However, since publication of the Technical Guidance in 2009, Defra commissioned a separate study, published in 2012 by Bureau Veritas, to develop an "alternative" NO_2 forecasting method, as studies were consistently showing that recent monitoring data was suggesting that reductions in NO_2 concentrations in recent years have been much smaller than previously forecast. The study outlines that in some areas use of the Defra TG(09) projection formula may result in overly optimistic prediction of air quality for assessment covering years 2011 to 2020. To that end, Bureau Veritas developed an alternative forecasting method and this has also been utilised to determine 2015 concentrations of NO_2 in Thurrock's AQMAs and the results are outlined **Figure 6** below.

Using the "outer London" formula, it is predicted that only one AQMA in Thurrock will remain over the limit value in 2015, and given past experience this does appear to be extremely optimistic. The "rest of the UK" formula shows only six Thurrock AQMAs over the limit value in 2015, two of which are only marginally above, but this again this seems optimistic. The alternative method shows the highest predicted 2015 concentrations of NO_2 concentrations, with 10 AQMAs predicted to remain above the limit value by 2015. It was felt that this conservative estimate was the most appropriate to use in planning for air quality improvements in Thurrock.

Figure 6: Projected 2015 NO_2 Concentrations

AQMA	2011 Concentration	2015 Estimate (Outer London)	2015 Estimate (Rest of UK)	Alternative 2015 Forecast
1 (London Road)	37.51	27.65	28.31	36.50
1 (Queensgate Centre)	34.19	25.30	25.64	33.27
1 (Cromwell Road)	30.84	22.82	23.13	30.01
1 (Poison Store)	28.65	21.20	21.49	27.88
1 (Stanley Road)	27.95	20.68	20.96	27.20
2	**43.08**	31.76	32.52	**41.92**
3 (Elizabeth Road)	**46.95**	34.61	35.44	**45.69**
3 (Hogg Lane)	29.93	22.15	22.45	29.13
4*	**53.04**	39.10	**40.03**	**51.61**
5 (Eastern End)	**53.04**	39.10	**40.03**	**51.61**
5 (Howard Road)	29.20	21.53	22.04	28.41
7	**50.62**	37.32	38.21	**49.26**
8	**54.00**	39.81	**40.76**	**52.55**
9	**54.00**	39.81	**40.76**	**52.55**
10	**62.70**	**46.22**	**47.33**	**61.01**
12	38.70	28.53	29.21	37.66
13	**40.62**	29.94	30.66	39.53
15	32.42	23.90	24.47	31.55
16	35.89	26.46	27.09	34.93
21	**54.00**	39.81	**40.76**	**52.55**
23	38.80	28.60	29.29	37.76
24 (Pending Declaration)	***49.87***	*36.76*	*37.64*	***48.53***

**AQMA 4 contains no diffusion tube monitoring, and therefore the diffusion tube within the eastern end of AQMA 5 has been used as a proxy.*

3 Prioritisation

3.1 Exclusion

In prioritising AQMAs for interim transport actions between 2012/13 and 2014/15, it was first necessary to determine whether there are any AQMAs that are unlikely to require any transport action at all. To that end, several AQMAs have been excluded from action planning on the following basis:

1) AQMAs where no relevant receptors or exposure exists, i.e. hotels; or
2) AQMAs that are either currently or forecast to be at least 10% lower than the pollution limit value in 2015, i.e. less than 36.0µ/m^3.

Under the first criteria, t was determined that in AQMAs 7, 8, 9 and 21, hotels are the only receptors within each AQMA. As hotels do not typically house permanent residents, these AQMAs do not present a risk of long term exposure to air pollutants. In accordance with LAQM TG (09), annual mean objectives should generally not apply at hotels (unless people permanently reside there). It has been confirmed with the hotels that they house no permanent residents. Therefore, these four AQMAs do not have any relevant exposure and, consequently, have been excluded from action to reduce air pollution, as they contain no relevant receptors.

Under the second criteria, we found that two of the AQMAs within Thurrock – AQMA 15 and AQMA 16 – should also be excluded from action planning. Concentrations of NO_2 in these two AQMAs are currently more than 10% below the limit value and are forecast to be even lower by 2015.

Additionally, as shown in **Figure 6** parts of AQMAs 1, 3 and 5 are also currently significantly more than 10% below the limit value and are forecast to be even lower by 2015. As only parts of these AQMAs meet this criterion, these AQMAs have not been excluded entirely from prioritisation, but transport measures will instead be focused only on those parts of these AQMAs that are above the limit value, which are as follow:

- AQMA 1: London Road only
- AQMA 3: Elizabeth Road only
- AQMA 5: Clockhouse Lane to B186/B146 junction (Pilgrim's Lane) only

3.2 Deferral

In addition to exclusion, there are several AQMAs where there is uncertainty regarding the air pollution problem, such in relation to sources of air pollutants, as well as fall off distances in relation to receptors. Developing transport actions for these AQMAs has therefore been deferred until a Further Assessment of the Borough (planned for 2013) is completed, as this assessment should provide additional information that will be critical to planning effective transport measures for improving air quality. Those AQMAs where planning actions will be deferred until Further Assessment is completed are outlined below.

AQMA 3

AQMA 3 on Elizabeth Road presents some significant issues regarding certainty of the air quality problems within this area. Although receptors are generally set back a bit from the road making some pollution fall off likely, it is unlikely to be to of a magnitude significant enough to mitigate air quality issues entirely. **Appendix A** shows the estimated fall off of NO_2 with distance for AQMA 3.

Source apportionment exercises (using road traffic data from Hogg Lane as a proxy), shows that total road transport emissions across all vehicles classes only contribute 18% to the total NO_2 concentrations, or 6.61 μ/m^3. The difficulty with this lies in the fact the measured 2011 NO_2 concentration on Elizabeth Road was 46.96 μ/m^3, which is 17.4% over the limit value. Therefore, closing Elizabeth Road to all traffic (which is unlikely to be pragmatic or feasible) would likely be the only way to effectively reduce transport emissions to bring AQMA 3 in line with the 40.0 μ/m^3 limit value. It is also uncertain whether road traffic patterns on Hogg Lane are truly representative of those on Elizabeth Road, as southbound traffic may be turning off onto Devonshire Road instead of proceeding onto Hogg Lane and vice versa.

Additionally, the removal of the Devonshire Road weight restriction is likely to introduce additional HGV traffic onto Elizabeth Road, as outlined in the *South Stifford Traffic Study* (Mouchel, 2011) and this could significantly alter the composition of the HGV source contributions to NO_2 concentrations. It therefore seems prudent to wait until this scheme is fully implemented, in order to understand its air quality impacts on AQMA 3 prior to devising transport measures and solutions for improving air quality.

Therefore, further investigation and work is required in AQMA 3 to garner a better and more detailed understanding of the sources of NO_2 and the contributions of these sources to annual mean NO_2 concentrations, as well as fall off distances and traffic monitoring. As a result of these uncertainties, developing transport actions to reduce NO_2 concentrations within this AQMA at this point in time is likely to be ineffective until a full understanding of the problems and issues within AQMA 3 on Elizabeth Road can be reached.

AQMA 4

AQMA 4 is very unusual in that no diffusion tubes are located within the AQMA and currently the diffusion tube at the eastern end of AQMA 5 is being used as a proxy. Additionally, there is a significant distance between the roadside and the receptor facades and, given that NO_2 concentrations fall off considerably with distance, the magnitude of the issue at the relevant receptor facades is uncertain. There is also very tall natural screening and bunding between the roadside and the receptor facades, which likely blocks a great deal of pollution from reaching the relevant receptors. These two issues, when coupled with a lack of monitoring equipment and data, create a significant amount of uncertainty regarding whether or not there is an NO_2 pollution issue at the relevant receptors within this AQMA and if so what the true magnitude of the problem is. This should be modelled through the Further Assessment to get a more complete picture and understanding of the air pollution issues within this AQMA.

AQMA 12

Properties (and therefore receptors) in AQMA 12 are generally set back by more than 16m from the roadside, making significant pollution fall off likely. To determine the likely magnitude of NO_2 pollution fall off with distance from the roadside, Defra's "NO_2 with Distance from Roads" calculator was used to estimate the likely annual mean concentration of NO_2 at the nearest receptor façade. For AQMA 12, input of the necessary data into the calculator revealed that, although the 2010 annual mean roadside NO_2 concentration is 42.22 μ/m^3 (and 2011 was even lower at 38.7 μ/m^3), the likely concentration at the receptor facades is estimated to be only 35.9 μ/m^3, which is slightly more than 10% below the limit value – a relatively safe margin. **Appendix A** shows the estimated fall off calculations in more detail.

Fall off distances for AQMA 12 should be modelled in more detail through the Further Assessment for the Borough before any transport action planning is undertaken.

AQMA 24 (Pending)

Finally, actions to reduce emissions from transport within AQMA 24 are not proposed within this report, as the extent and magnitude of the final declaration for this is currently unknown until formal Further Assessment and source apportionment exercises are undertaken.

3.3 Prioritisation

As a result of the exclusion and deferral exercises, **Figure 7** below outlines the remaining six AQMAs prioritised for interim transport actions between the 2012/13 and 2014/15 financial years, the dominant pollution sources and the magnitude level of action required. Although the annual mean limit value for NO_2 concentrations is 40.0 μ/m^3, due to annual fluctuations in NO_2 emissions from outside factors, such as climate and meteorology, 36.0 μ/m^3 should generally be aimed for.

Figure 7: AMQAs Prioritised for Interim Transport Actions

AQMA	Notes	Dominant Source	Level of Action Required
10	Highest NO_2 concentration	HGVs	High
5 (B186 to Clockhouse Lane only)	Second highest NO_2 concentration	Cars	High
2	Just above limit value	Local Background	Medium
13	Just above limit value (at receptor façade)	HGVs	Medium
23	Just below limit value	HGVs and Background	Low
1	Just below limit value	Buses	Low

3.4 Short-Term Air Quality Management Summary

Taking together the exclusion, deferral and prioritisation exercises carried out in the previous sections, a summary of the short-term management of air quality in Thurrock for each AQMA is outlined in **Figure 8** below.

Figure 8: Thurrock AQMAs

AQMA	Short-Term Management
1	Requires low level transport action, as detailed in **Section 4.6**.
2	Requires medium level transport action, as detailed in **Section 4.3**.
3	Awaiting Further Assessment to confirm air quality issues.
4	Awaiting Further Assessment to confirm air quality issues.
5	Requires high level transport action, as detailed in **Section 4.2**.
7	Possible revocation, as a hotel. To be confirmed through Further Assessment. No transport action required.
8	Possible revocation, as a hotel. To be confirmed through Further Assessment. No transport action required.
9	Possible revocation, as a hotel. To be confirmed through Further Assessment. No transport action required.
10	Requires high level transport action, as detailed in **Section 4.1**.
12	Awaiting Further Assessment to confirm air quality issues.
13	Requires medium level transport action, as detailed in **Section 4.4**.
15	Possible revocation, as continually more than 10% below limit value since 2008. To be confirmed through Further Assessment.
16	Possible revocation, as continually more than 10% below limit value since 2008. To be confirmed through Further Assessment.
21	Possible revocation, as a hotel. To be confirmed through Further Assessment. No transport action required.
23	Requires low level transport action, as detailed in **Section 4.5**.
24	Awaiting Further Assessment to confirm air quality issues.

4 Interim Transport Action Plans

This chapter contains the interim transport action plans for the six prioritised AMQAs following on from exclusion and deferral. Each section outlines the existing air quality situations with each AQMA, as well as the source apportionment and current actions that are underway to improve air quality in these areas. Each section also includes a table showing possible transport actions that could be undertaken to improve air quality and these tables outline:

- the likely air quality impact of each action (with detailed estimates in μ/m^3 provided where possible);
- the magnitude (in £s where possible) and type of cost;
- Possible implementation timescales;
- Whether any alternative options are available; and
- Any additional comments/notes.

Following on from the summary table of possible actions is a discussion of the short-term transport actions that are recommend to be taken forward between 2012/13 and 2014/15.

4.1 AQMA 10 – London Road, Purfleet

Background

AQMA 10 is comprised of 76 properties on London Road in Purfleet including Jarrah Cottages and was declared in 2001 for exceeding both the annual mean NO_2 objective and the 24-hour mean PM_{10} objective. In 2011, the annual mean NO_2 concentration in this area was 57% above the limit value at 62.7 $\mu g/m^3$.

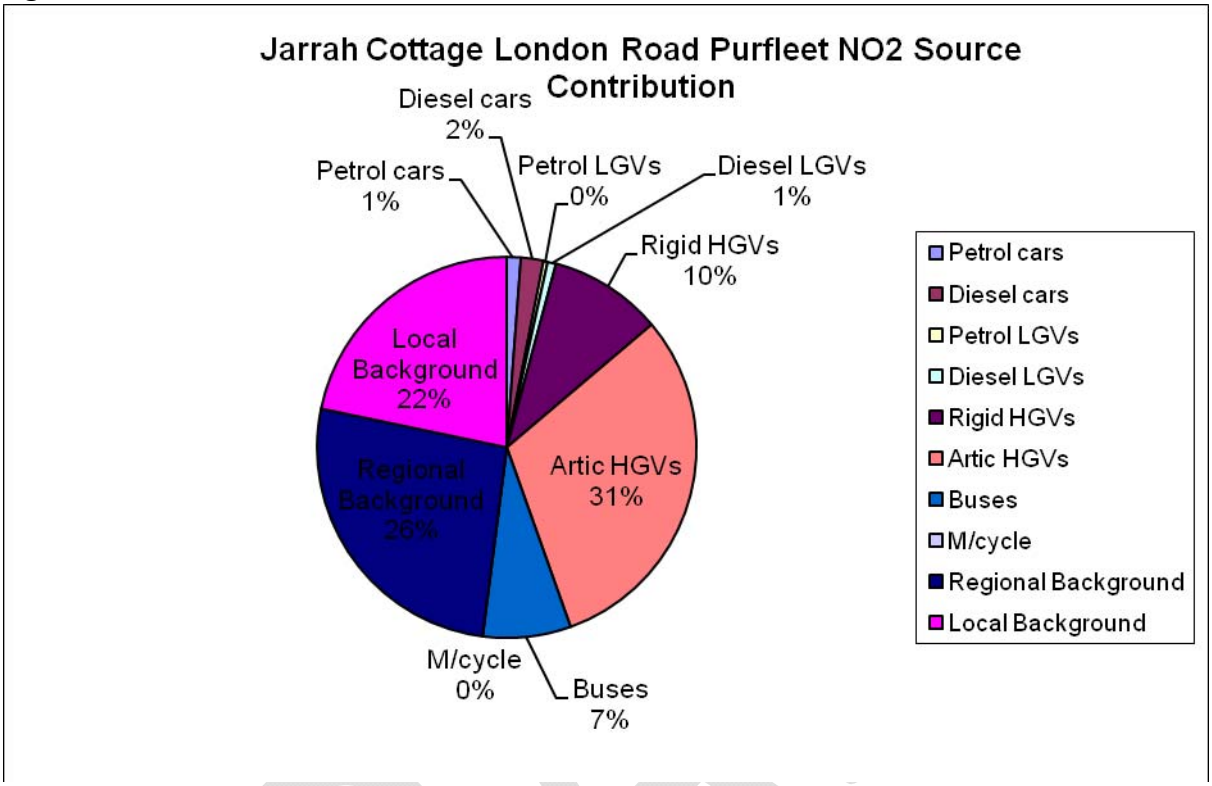
Although also declared for exceeding the 24-hour mean PM_{10} objective of 35 days per year, no PM_{10} monitoring locations in Thurrock have been shown to have exceeded this limit since 2007.

AQMA 10 on London Road in Purfleet provides access from the north, south and east to the industrial sites on the north side of the Thames in Purfleet, such as Esso and Cobelfret.

Sources of NO_2

Recent source apportionment exercises undertaken by the Thurrock Council Pollution Control Team have resulted in identifying the proportional source contributions within AQMA 10. As can be seen in **Figure 9** below, 26% of NO_2 emissions in this area arise from regional background sources, over which Thurrock Council has little, if any, influence and a further 22% arise from local background sources. Additionally, another 31% of NO_2 emissions arise from articulated HGVs, with a further 10% from rigid HGVs. This shows that HGVs are responsible for a significant proportion of NO_2 emissions within this AQMA, although background sources are also high.

Figure 9: AQMA 10 NO_2 Source Contributions



Current Actions to Reduce NO_2

Through its LSTF programme, Thurrock Council is currently undertaking a raft of freight measures focused on reducing emissions from HGVs. The programme includes the development of a Freight Quality Partnership (FQP) and this will be focused on those freight corridors with the highest volumes of freight movements, including Purfleet, Tilbury Port and the new London Gateway Port, as well as where freight transport emissions have led to the declaration of an Air Quality Management Area, such as AQMA 10.

Through this forum, they will look to deliver opportunities for freight fleets to undergo Eco-driver training, including drivers within the council's own vehicle fleet. This measure will work to inform freight vehicle drivers of ways to improve fuel economy, reduce emissions and save money through more efficient driving practices. The FQP will also encourage freight operators to purchase and retrofit pollution abatement equipment to individual freight vehicles. This will help to ensure compliance with the London Low Emission Zone and also work to have immediate effect on reducing both air pollution and greenhouse gas emissions from these vehicles throughout Thurrock.

To further incentivise these projects, a local "Eco-Freight" accreditation scheme has been agreed, where operators demonstrating significantly improved environmental performance and management, resulting from freight LSTF measures, can be recognised for their achievements.

Figure 10: Recommend Transport Actions for AQMA 10

Measure	AQ Impact	Cost	Cost Type	Possible Implementation Timescale	Comments	Alternative?
Public Transport						
Hybrid Buses (Route 44)	Medium – Up to 2.0 µg/m^3	Approx. £275k per bus	Capital (operator)	Short	Funding secured for six from the DfT Green Bus Fund	
Bus Eco-Driver Training (Route 44)	Low – up to 0.5 µg/m^3	Approx. £350 per driver	Revenue (LSTF)	Short	Ancillary benefits in other AQMAs, as well as fuel and CO_2 reductions	
HGVs						
FQP	None	Approx. £60k per annum	Revenue (LSTF)	Short (underway)	No emissions reductions on its own, but needed to facilitate HGV measures	
Eco-Freight Accreditation	None	Included in FQP?	Revenue (LSTF)	Short (underway)	No reductions on its own, but may encourage uptake of other measures	
HGV Eco-Driver Training	Low - Up to 0.6 µg/m^3	Approx. £350 per driver	Revenue (LSTF)	Short (underway)	Focused on Esso, Cobelfret, etc.	
Measure	**AQ Impact**	**Cost**	**Cost Type**	**Possible Implementation Timescale**	**Comments**	**Alternative?**

HGV Weight Restriction on London Road within AQMA	High – Up to 25.0 µg/m^3	Medium	Revenue & Capital	Medium	May displace NO_2 emissions elsewhere and increase CO_2 emissions	HGV Distributor Road
HGV distributor road from London Road to freight destinations	High - Up to 25.0 µg/m^3	High	Capital	Long	As indicated in Purfleet Masterplan (Fig.11 p. 43)	Weight restriction

NO_2 Impact:
Low = < 1.0 µg/m^3
Medium = 1.0 – 5.0 µg/m^3
High > 5.0 µg/m^3

Cost:
Low = < £25k
Medium: £25-£100k
High = > £100k

Timescale:
Short: Possible by 2015
Medium: Between 2015 and 2017
Long: 2017 and beyond

Recommendations

Taken together, the LSTF freight measures being delivered in Thurrock are likely to provide some air quality benefits to AQMA 10 when coupled with other actions. However, as the AQMA with the highest pollutant concentrations (57% above the limit value), additional high-level action will be necessary in order to ensure the NO_2 limit value is met as soon as possible. Those items in **Figure 10** above are recommended for further investigation and/or implementation.

In the shorter term, there are several smaller scale measures that could be undertaken in order to improve air quality in AQMA 10 include:

Public Transport

- Provide eco-driver training for all bus drivers along route 44 (is this something that is being progressed by TTR??)
- Ensure hybrid buses (where already available) are run along route 44; or

HGVs

- Ensure that the Freight Quality Partnership are aware of the impact of HGVs on AQMA 10 and that freight measures delivered through the Partnership are (where possible) focused on those HGVs travelling through this AQMA
- Establish a relationship with Esso and Cobelfret (and any other major freight movement attractors) through the FQP, as these are the most likely origins and destinations of the HGVs travelling within this AQMA
- Provide eco-driver training for Esso and Cobelfret hauliers
- Encourage the uptake of the eco-freight accreditation scheme for Esso and Cobelfret hauliers

It is important to note that all of the above options taken together are unlikely to bring AQMA10 to below the limit value. Nearly a 23.0 µg/m^3 reduction on NO_2 concentrations is necessary in this AQMA and HGVs account for approximately 25.0 µg/m^3. Therefore, the most effectively way to tackle this AQMA is likely to be to remove HGVs entirely. As a result, a small scale HGV only Low Emission Zone is unlikely to entirely mitigate the air quality problems, as emissions from HGVs would still remain, although they would be significantly reduced.

One option for removing HGV traffic from this section of London Road is to impose a weight restriction on HGVs. Although this is likely to be popular with residents, issues may arise from the industrial businesses that the weight restriction would impact upon. Additionally, a weight restriction may increase air pollution emissions elsewhere through displacement and increase fuel consumption (and therefore CO_2 emissions), as HGVs travel further out of their way to access their destinations.

The second option for reducing air pollution emissions in AQMA 10 to below the limit value is to build a HGV distributor road linking London Road to the industrial sites along the Thames in Purfleet, running to the south of London Road and AQMA 10, as proposed in the *Purfleet Mast Plan* (TTGDC, 2007) and as shown in **Appendix A**. Although this is likely to be

the most expensive option, it is likely to be the most amendable to residents and businesses alike. However, design options may be complicated by the rail line.

These options should be worked up and costed in more detail without delay in order to begin progressing a scheme with a view to implementing a one of these schemes as soon as possible.

4.2 AQMA 5 – A1306, North Stifford

Background

AQMA 5 is comprised of 65 properties surrounding Warren Terrace, the A13 and the A1306 and was declared in 2001 for exceeding both annual average limit values for NO_2 and the 24-hour mean PM_{10} objective. In 2011, the highest measured NO_2 concentration in this area was 53.04 µg/m^3, which is 32.5% above the limit value.

AQMA 5 includes two diffusion tube monitoring locations and could be treated as two district areas: the western side of AQMA from the A126 to the B186 and the eastern end of the AQMA from the B186 to Clockhouse Lane. Given the significant difference in monitored pollution concentrations between the western side (29.2 µg/m^3) and the eastern side (53.04 µg/m^3) there may be scope to reduce the size of this AQMA to exclude the western area, which is well below the limit value. This interim action plan therefore only deals with the eastern part of AQMA 5 between the Pilgrims Lane roundabout (B186/B146) to Clockhouse Lane.

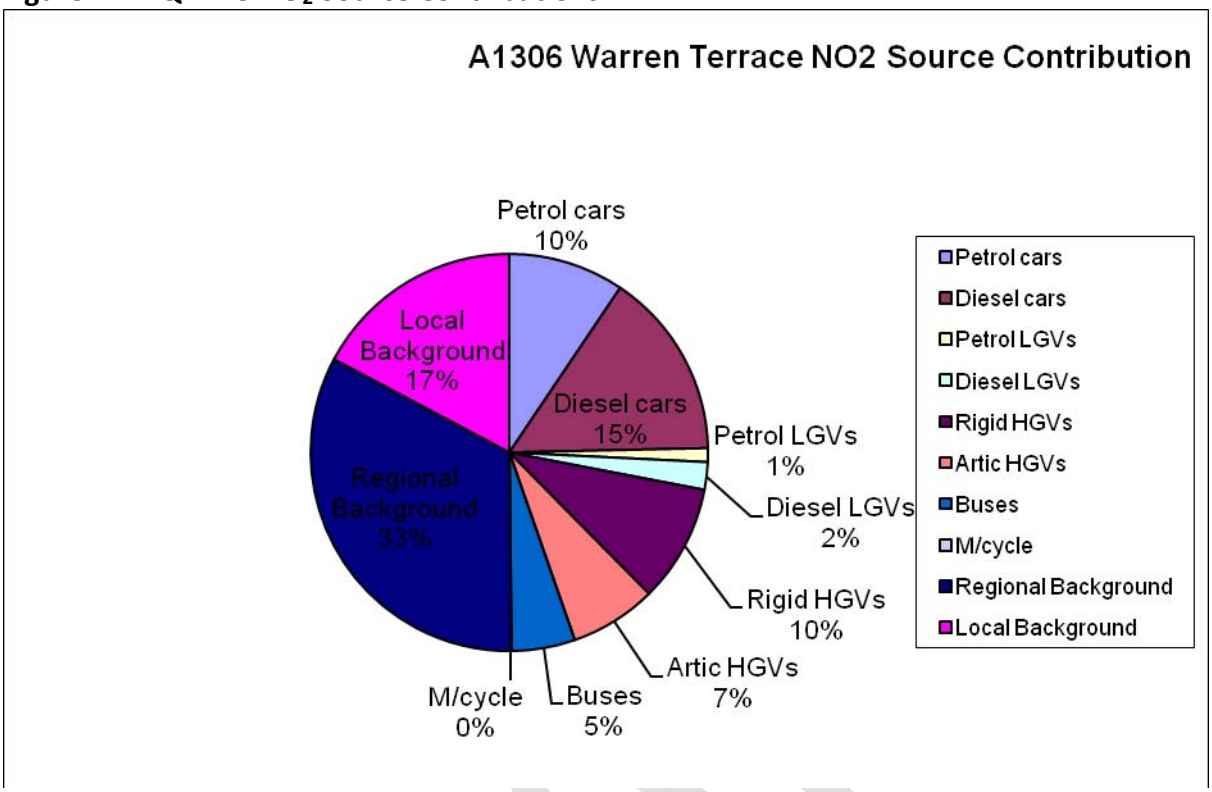
Although also declared for exceeding the 24-hour mean PM_{10} objective of 35 days per year, no PM_{10} monitoring locations in Thurrock have been shown to have exceeded this limit since 2007.

The A1306 through AQMA 5 provides access to the Lakeside Regional Shopping Centre and Retail Park and together these developments form one of Europe's largest shopping areas. South of the A1306 in AQMA 5 is Chafford Hundred, a large residential development in a former quarry area. The A1306 in AQMA 5 also provides access to the B186 to North Stifford and South Ockendon.

Sources of NO_2

Recent source apportionment exercises undertaken by the Thurrock Council Pollution Control Team have resulted in identifying the proportional source contributions within AQMA 5. As can be seen in **Figure 11** below, 33% of NO_2 emissions arise from regional background sources, over which Thurrock Council has little, if any, influence and a further 17% arise from local background sources. In terms of transport sources, 25% of NO_2 emissions arise from cars, 17% from HGVs, with a further 5% from buses and 3% from light goods vehicles.

Figure 11: AQMA 5 NO_2 Source Contributions



Current Actions to Reduce NO_2

Currently, no transport actions to improve air quality within this AQMA have been delivered nor are programmed for delivery. However, in 2009 the traffic signals at the roundabout junctions of the B186/B146 were switched off in order to improve traffic flows and reduce delays. However, as a result pedestrians (and possibly cyclists) are finding it difficult to cross through the arms of the roundabout, as the signals had offered a pedestrian cycle.

Figure 12: Recommended Transport Actions for AQMA 5

Measure	AQ Impact	Cost	Cost Type	Possible Implementation Timescale	Comments	Alternative?
Fiscal Incentives						
Bus and Rail Fares to Lakeside	Low/Medium	Up to £5.70 per ticket, depending on subsidy	Revenue	Short	Could be tied in with Metrorail	
Cycling						
Cycle route improvements (B146 to Lakeside)	Low	£50,000 – £100,000	Capital	Short	Could be secured through s106 with Lakeside	
Cycle link improvements (A1306 Pilgrims Roundabout)	Low	??	Capital	Short	Signals switched off to improve traffic flow but may have scuppered cycling	
Cycle Parking	Low	£50 to £750 per stand	Capital (could be secured through S106)	Short	Chafford Hundred Station and/or Lakeside Shopping Centre	
Public Transport						
Hybrid Buses (Route 66 & 265)	Medium – Up to 1.3 $\mu g/m^3$	Approx. £275k per bus	Capital (operator)	Short	If only a few would be better utilised on Route 44 through AQMA 10	Eco-Driver Training
Bus Eco-Driver Training (Route 66 & 265)	Low – Up to 0.25 $\mu g/m^3$	£350 per driver	Revenue (LSTF)	Short	Ancillary benefits in other AQMAs, as well as fuel and CO_2 reductions	Hybrid Buses
sert	Medium	£32 million	Capital (Major Scheme)	Short	If approved, to be open by 2015	
Metrorail	Low	Medium	Capital an Revenue (LSTF)	Short	Focussed on trips to Lakeside initially. Could be complemented by fiscal incentives.	
Smarter Choices						

Measure	AQ Impact	Cost	Cost Type	Possible Implementation Timescale	Comments	Alternative?
Personalised Journey Planning	Low/Medium	High	Revenue (LSTF)	Short (underway)	Focussed on Chafford Hundred, Grays and North Stifford/South Ockendon	
Workplace Travel Planning	Low/Medium	Approx. £7.5 per WTP	Revenue (but should be supported by capital improvements)	Short (underway)	Focus on Lakeside and Grays Town Centre employers	
Traffic Management						
Traffic Management Schemes	Requires modelling	£120,000	Capital	Medium	Widen the road, formalise two lanes on northern approach. Will manage traffic rather than reduce traffic	
SCOOT/UTMC	Low/Medium	Medium	Capital & Revenue	Short (already in use?)	Ensure SCOOT is programmed to optimise emissions.	

NO_2 Impact:

Low = < 1.0 µg/m^3
Medium = 1.0 – 5.0 µg/m^3
High > 5.0 µg/m^3

Cost:

Low = < £25k
Medium: £25-£100k
High = > £100k

Timescale:

Short: Possible by 2015
Medium: Between 2015 and 2017
Long: 2017 and beyond

Recommendations

As the AQMA with the second highest pollutant concentrations (32.5% above the limit value), high-level action will be necessary in order to ensure the NO_2 limit value is met as soon as possible in AQMA 5. This is a complex area, with a variety of sources, origins and destinations. As a result of this complexity, a raft of measures is likely to be necessary in order to bring NO_2 concentrations down to (or below) the limit value. Those items in **Figure 12** above are recommended for further investigation and/or implementation in the shorter-term and are discussed in more detail below.

Sustainable Transport and Lakeside

Lakeside boasts over 6,000 jobs and hosts nearly 500,000 visitors a week, with up to 30,279[1] vehicles accessing the site each day. It is estimated that 25%[2] of the traffic passing through AQMA 5 is going to or coming from Lakeside Shopping Centre, and this figure does not include those accessing the Lakeside Retail Park. The development is very accessible via public transport, with rail access from the Chafford Hundred station connected via a pedestrian bridge and its own on-site bus station. Lakeside offers nearly 19,000 car parking spaces, with around 13,000 free parking spaces at the shopping centre and approximately 6,000 at the retail park, and the availability of so many free car parking spaces does little to promote the use of sustainable transport. Free parking coupled with the convenience of arriving by car is likely to continue to win visitors over when public transport to the site is not free. Alternatives for promoting modal shift to more sustainable modes of transport will need to be explored.

Although sustainable transport infrastructure to Lakeside is generally good (if not excellent by public transport), more needs to be done to encourage employees and visitors to use sustainable modes of transport to access the site. Surveys in October 2010 indicated that 85% of people visiting the centre travel by car, 9% by bus, 5% by train and only 1% on foot, with cycling at 0%[3], showing there is scope to significantly increase the number of visitors accessing the shopping centre by sustainable modes of transport.

Similarly, 70% of those who work at Lakeside Shopping Centre arrive by car[4] and a forthcoming initiative being proposed by the Lakeside Travel Plan is to target employees within local areas who it is known drive, but could use the bus as it passes close to their residence. The current Lakeside planning application (11/50433/TTGOUT) also proposes a new bus station, shuttle bus services, better pedestrian and cycle links *within* the Lakeside development itself, as well as off-site Variable Message Signing.

In the absence of the "stick" approach of car park charging to encourage a modal shift to less polluting forms of transport to Lakeside, a "carrot" approach could instead be adopted. This would require a focus on incentivising sustainable trips to Lakeside, such as through subsidised/reduced bus and rail ticket pricing or validation. On the rail side, this could be delivered partially through the Thurrock Local Sustainable Transport Fund "metrorail"

[1] Royal Haskoning, *Lakeside Shopping Centre Transport Assessment*, November 2011.
[2] Royal Haskoning, *Lakeside Shopping Centre Transport Assessment*, November 2011.
[3] Royal Haskoning, *Lakeside Shopping Centre Transport Assessment*, November 2011.
[4] Royal Haskoning, *Lakeside Shopping Centre Transport Assessment*, November 2011.

project. This marketing and promotional campaign will focus on encouraging local people to utilise the train more for off-peak local journeys, and could be further promoted through discounted ticketing arrangements.

Completing sustainable transport infrastructure gaps to Lakeside could also help to promote sustainable transport to this site and work to reduce traffic flows within AQMA 5. For example, there is significant scope to improve cycling infrastructure both within and to Lakeside. The development of a better cycle and pedestrian route between the B146 and Lakeside beneath the A126 (as the pedestrian bridge from Lakeside is currently unsuitable for cyclists), which is part of the Core Walking and Cycling Routes network, should be fully explored.

Coupled with this, cycle parking facilities at Lakeside itself could be improved as the Shopping Centre provides 13,000 car parking spaces, but only 58 covered cycle parking stands. It could also be explored as to whether there is any scope for offering cycling parking *inside* the shopping centre at the access to the pedestrian bridge and this could be coupled with financial incentives, such as vouchers for use in the shopping centre, to encourage cycling.

Alternatively, Chafford Hundred rail station currently only has 34 cycle parking spaces and this should be increased significantly if a better cycle route between the station and Lakeside is not delivered.

Additionally, the removal of the traffic signals at the B146/B186 junction on the A1306, although significantly improving traffic flows, may have made cycle access to and from Lakeside more difficult and this should be investigated further.

It should be borne in mind that impact of these sustainable transport schemes (even taken together) on traffic levels on the A1306 within AQMA 5 may be significantly less than car park charging, but these types of schemes would be ideal to deliver in advance of car park charging, ensuring that excellent alternatives are available.

Smarter Choices

Personalised Journey Planning focuses on making direct contact with residents, and in some cases employees, to provide travel information and support for sustainable transport, motivating people to consider a modal shift for their daily journeys. Thurrock's Local Sustainable Transport Fund (LSTF) programme includes the delivery of Personalised Journey Planning and this is currently focused on residents of Grays, Tilbury and Purfleet. Although not identified as a priority within the LSTF programme, consideration should be given to rolling out Personalised Journey Planning to residents of Chafford Hundred, North Stifford and South Ockendon, if possible, as residents of these areas are likely to be making vehicle trips through AQMA 5.

The LSTF programme also includes funding for developing workplace travel plans at the largest employers, particularly those in Grays Town Centre, and this programme should continue to be rolled out. Additionally, Thurrock Council should liaise with the Travel Plan

Coordinator for Lakeside Shopping Centre to determine whether they require any additional support either for developing or delivering travel plans measures. Work to this effect could also help to identify any complementary sustainable transport infrastructure required outside of Lakeside, which could either be delivered by Thurrock Council or through s106 agreements for development at Lakeside.

Traffic Management

The use of Urban Traffic Management and Control (UTMC) for improving air quality should be fully maximised within and around this AQMA, where there are a number of traffic signals. It is understood that many of the junctions along the A1306 already utilise UTMC and possibly also SCOOT. SCOOT (Split Cycle Offset Optimisation Technique) can respond automatically to fluctuations in traffic flow through the use of on-street detectors embedded in the road. SCOOT typically reduces traffic delay by an average of 20% in urban areas, but also contains other traffic management facilities such as bus priority, traffic gating, and most importantly in this case, vehicle emissions estimates. It should be checked that, where SCOOT is available, it is being fully utilised to optimise vehicle emissions within AQMA 5 and beyond to those junctions affecting traffic within the AQMA (such as at the A1012 junction). As signals have been turned off at the Pilgrims Lane junction, the use of SCOOT is no longer feasible there. However, if these signals are reinstated at any point in the future, it should be ensured that vehicle emissions are optimised through SCOOT, if at all possible.

In 2010, Colin Buchanan produced the *Thurrock Infrastructure Prioritisation and Implementation Programme*. This study concluded that there were likely to be an infrastructure deficits within AQMA 5, with the A1306 being "above desired capacity" (i.e. where flow is between 85-100% of capacity) in the 2006 base year and predicted that the road would be "above capacity" by 2021 (i.e. where flows are 100-115 of capacity), with the junction at the B186 well above capacity (i.e. where flows are greater than 115% of capacity). They recommended a junction improvement to the A1306/B146/B186 roundabout to widen the road and formalise the two lanes on the southbound approach and lengthen the flare on the eastbound approach arm[5] in order to increase capacity and reduce congestion.

The report also outlined that the A1306/A1012 junction was "above desired capacity" and would be well above capacity (PM only) by 2025. It recommended that the offset and green time on all arms of the A1306/A1012 junction be adjusted, which may impact on traffic flows within AQMA 5.

These junction deficit solutions will need to be studied in further detail from an air quality perspective to determine whether they would lead to NO_2 emissions reductions from traffic.

[5] SKM Colin Buchanan, *Thurrock Lakeside Basin Preliminary Infrastructure Assessment*, March 2012.

Summary

In the shorter-term, Thurrock Council should consider implementing the following measures without delay:

- Metrorail (including financial incentives for using rail to access Lakeside)
- Provide bus Eco-Driver training (routes 66 and 265)
- Improve cycle access to Lakeside via the B146 Fenner Road *and* cycle parking at Lakeside *and/or* improve cycle parking at Chafford Hundred Station
- Identify which junctions affecting AQMA 5 have SCOOT and ensure they are utilised to optimise vehicle emissions
- Continue delivering personalised journey planning to Grays residents, and determine whether this could also be rolled out to Chafford Hundred, North Stifford and South Ockendon residents
- Liaise with Lakeside Travel Plan co-ordinator to determine whether any support is needed from Thurrock Council
- Continue to develop workplace travel plans for large scale employers in Grays
- Prior to delivering any traffic management schemes that may affect the A1306, model potential air quality impacts

4.3 AQMA 2 – London Road, South Stifford

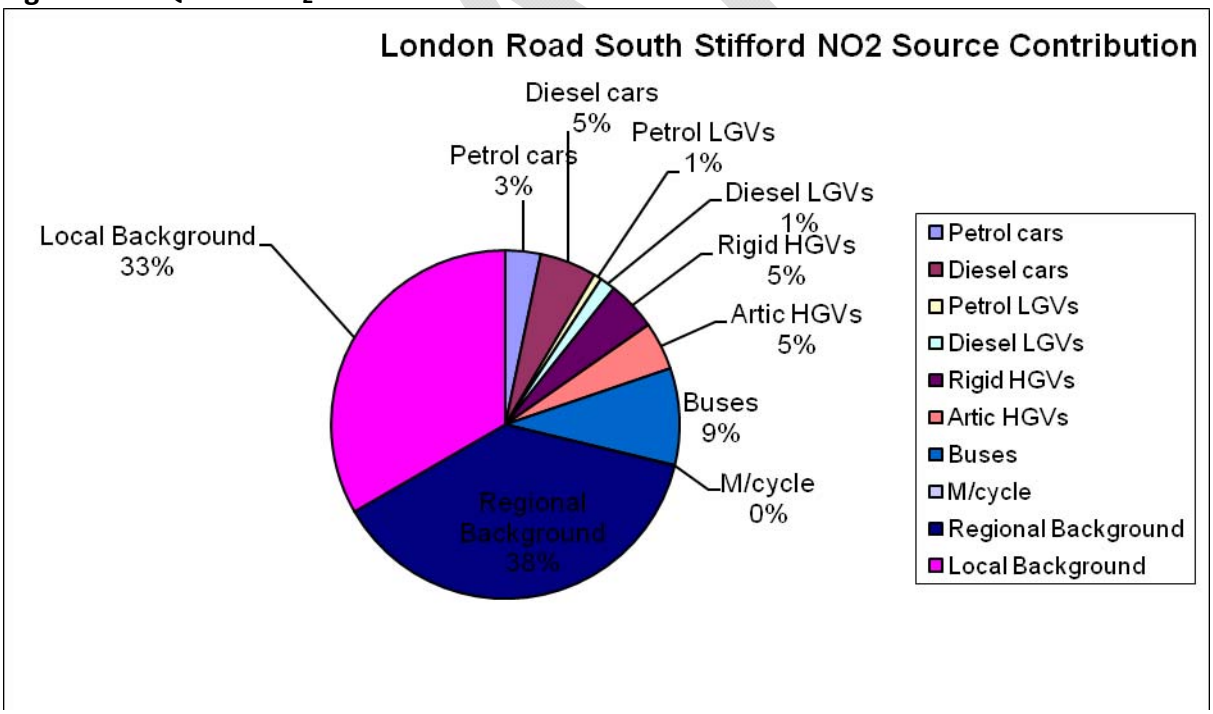
Background

AQMA 2 is comprised of 220 properties on London Road South Stifford and adjoining roads and was declared in 2001 for exceeding threshold limit values for annual mean NO_2 concentrations. In 2011, the annual mean NO_2 concentration in this area was 7.75% above the limit value at 43.1 µg/m^3.

Sources of NO_2

Recent source apportionment exercises undertaken by the Thurrock Council Pollution Control Team have resulted in identifying the proportional source contributions within AQMA 2. As can be seen in **Figure 13** below, 38% of NO_2 emissions arise from regional background sources, over which Thurrock Council has little, if any, influence and a further 33% arise from local background sources, which Thurrock Council may be able to influence through discussion with local industrial businesses within and near to this AQMA. Additionally, another 10% of NO_2 emissions arise from HGVs, with a further 9% from buses, 8% from cars and 2% from light goods vehicles.

Figure 13: AQMA 2 NO_2 Source Contributions



Current Actions to Reduce NO_2

Through its LSTF programme, Thurrock Council is currently undertaking a raft of freight measures focused on reducing emissions from HGVs. The programme includes the development of a Freight Quality Partnership (FQP) and this will be focused on those freight corridors with the highest volumes of freight movements, including Purfleet, Tilbury Port and the new London Gateway Port, as well as where freight transport emissions have clearly led to the declaration of an Air Quality Management Area.

Through this forum, they will look to deliver opportunities for freight fleets to undergo Eco-driver training, including drivers within the council's own vehicle fleet. This measure will work to inform freight vehicle drivers of ways to improve fuel economy, reduce emissions and save money through more efficient driving practices. The FQP will also encourage freight operators to purchase and retrofit pollution abatement equipment to individual freight vehicles. This will help to ensure compliance with the London Low Emission Zone and also work to have immediate effect on reducing both air pollution and greenhouse gas emissions from these vehicles throughout Thurrock.

To further incentivise these projects, a local "Eco-Freight" accreditation scheme has been agreed, where operators demonstrating significantly improved environmental performance and management, resulting from our freight LSTF measures, can be recognised for their achievements.

Recently, the HGV weight restrictions were lifted from Devonshire Road, allowing HGVs to now use this route to connect to and from London Road in South Stifford and the A1012, which provides access to the A1306 and the A13. The *South Stifford Traffic Study* (Mouchel, 2011) estimated that HGV movements through AQMA 2 should be reduced to between 0 and 100 movements a day with a new weight restriction in place on London Road. This should provide a NO_2 reduction of between 3.9 and 4.5 µg/m^3, which would put NO_2 concentrations in AQMA 2 just below the 40.0 µg/m^3 limit value.

Additionally, there remains the possibility that *sert* (South Essex Rapid Transit) may yet be approved for Development Pool funding in the Department for Transport (DfT) major scheme programme. If approved, *sert* will operate through AQMA 2 along London Road, and aims for the first phase to be fully operational by April of 2015. This service would likely lead to reductions in traffic flows through AQMA 2 through increased public transport patronage and bus priority measures, and would also likely reduce emissions from buses through the use of environmentally friendly vehicles.

Figure 14: Recommended Transport Actions for AQMA 2

Measure	AQ Impact	Cost	Cost Type	Possible Implementation Timescale	Comments	Alternative?
Public Transport						
Hybrid Buses (Route 44)	Medium – Up to 2.0 µg/m^3	Approx. £275k per bus	Capital (operator)	Short	Funding secured for six from DfT Green Bus Fund	
Bus Eco-Driver Training (Routes 22, 22A, 44, 73, 73A, 83 and 100)	Low – Up to 0.3 µg/m^3	£350 per driver	Revenue (LSTF)	Short	Ancillary benefits in other AQMAs, as well as fuel and CO_2 reductions	
sert	Medium	£32 million	Capital (Major Scheme)	Short	If approved, to be open by 2015	Road layout review
Smarter Choices						
Workplace Travel Planning	Low	Approx. £7.5 per WTP	Revenue (but should be supported by capital improvements)	Short (underway)	Focused on businesses on London Road	
Traffic Management						
Road Layout Review	Low	High	Capital	Short-Medium	Could be tied in with either sert or bus priority	*sert*
SCOOT/UTMC	Low	Medium	Capital & Revenue	Short	Ensure SCOOT is programmed to optimise emissions or UTMC used to smooth traffic flows	
HGVs						
HGV Weight Restriction	Approx. 3.0 µg/m^3	High	Capital	Short (underway)	Must be enforced to be effective	

Measure	AQ Impact	Cost	Cost Type	Possible Implementation Timescale	Comments	Alternative?
Eco-Driver Training (HGVs)	Low – up to 0.1 µg/m^3	£350 per driver	Revenue (LSTF)	Short (underway)	Marginal reduction only due to HGV restriction	

NO_2 Impact:
Low = < 1.0 µg/m^3
Medium = 1.0 – 5.0 µg/m^3
High > 5.0 µg/m^3

Cost:
Low = < £25k
Medium: £25-£100k
High = > £100k

Timescale:
Short: Possible by 2015
Medium: Between 2015 and 2017
Long: 2017 and beyond

Recommendations

Although the LSTF freight work and the Devonshire Road weight restriction removal scheme will clearly help address the air quality problem significantly, further action may be required in order to ensure the limit value is continually met in AQMA 2, particularly if *sert* is not approved for major scheme funding by the DfT. Those items in **Figure 14** above are recommended for further investigation and/or implementation in the shorter-term and are discussed in more detail below.

Traffic Management

A number of traffic management schemes have been undertaken in this area in recent years for road safety and traffic reduction purposes and such schemes have proved effective, shown by decreases in traffic along London Road. However, the implementation of such schemes has likely lead to a substantial amount of stop-start and erratic driving that can lead to increases in vehicle emissions, therefore neutralising the air quality benefits enjoyed from the initial reduction in traffic volumes. It is therefore recommended that, if *sert* is not approved for funding, this stretch of London Road between Grays and the A282 be reviewed, to determine what could be done to reduce the number of pinch points in this AQMA (as well as AQMA 1 and AQMA 23 on either side), and introduce a more even flow of traffic, where doing so would not compromise road safety or induce additional traffic movements back onto this road.

Public Transport

Several bus services run along London Road through AQMA 2. In particular, bus route 44 runs through AQMA 2, as well as AQMA 10 and 23, and the 426 bus movements a day along London Road are estimated to contribute 9% to total NO_2 emissions in AQMA 2. Therefore, there is scope to reduce emissions from buses by ensuring that, where hybrid buses are available, they are run along route 44, as this will maximise air quality benefits in a number of AQMAs. Additionally, the provision of eco-driver training for bus drivers of all routes passing through AQMA 2 should help to reduce emissions both within this AQMA and throughout the other parts of the Borough where these routes run.

Summary

The recommendations for improving air quality within AQMA 2 are therefore as follow:

- Ensure hybrid buses are run along route 44, which also runs through AQMA 10 and 23
- Provide eco-driver training for bus drivers operating on routes 22, 22A, 44, 73, 73A, 83, 100 and 201
- If *sert* funding approval does not come forward, consider undertaking a London Road pinch point review with a view to smoothing traffic flows

4.4 AQMA 13 – A1306, Aveley

Background

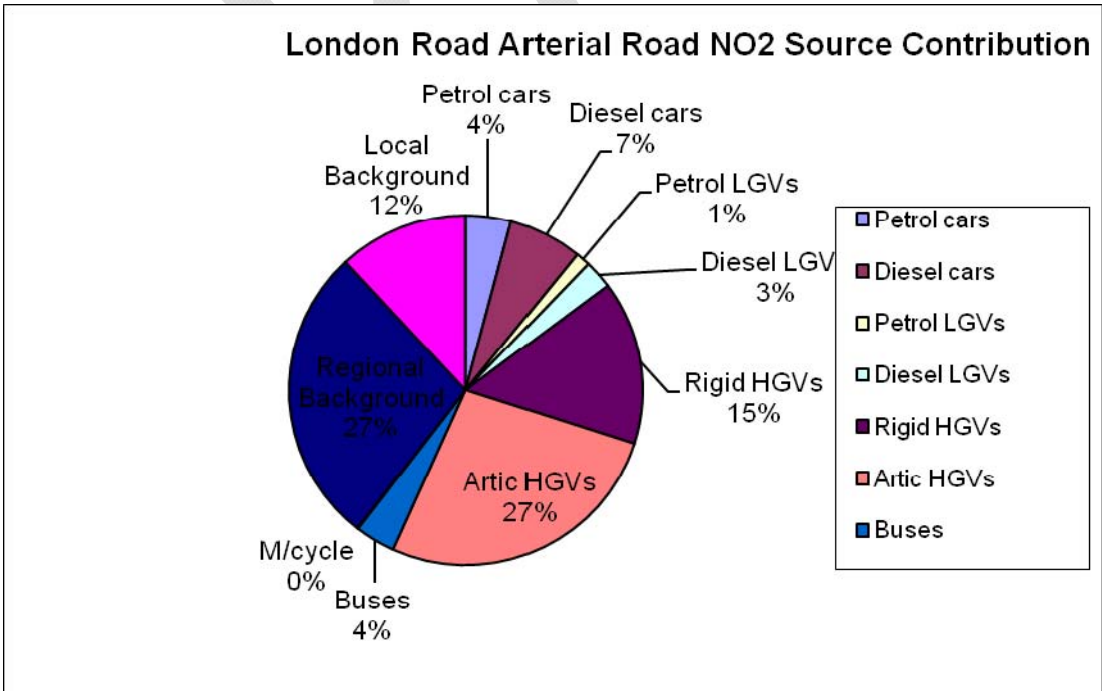
AQMA 13, comprised of 15 properties on London Road in Aveley next to the A1306, was declared in 2001 for exceeding threshold limit values for annual mean NO_2 concentrations. In 2011, the NO_2 concentrations at the roadside in this area were measured at 63.93 µg/m^3.

Additionally, in February 2011 a diffusion tube was placed on one of the property facades within the AQMA to give a clearer indication of the magnitude of the problem at the receptor façade, where public exposure is most likely and therefore most relevant. This shows annual average NO_2 concentrations in 2011 being 40.62 µg/m^3, which is only slightly above the annual average 40.0 µg/m^3 limit value. Although this data can be used to give an indication of the magnitude of the pollutant's fall off between the roadside and receptor facade, the results should be treated with some caution until a longer and more established monitoring programme has been carried out.

Sources of NO_2

Recent source apportionment exercises undertaken by the Thurrock Council Pollution Control Team have resulted in identifying the proportional source contributions within AQMA 13. As can be seen in **Figure 15** below, 27% of NO_2 emissions arise from regional background sources, over which Thurrock Council has little, if any, influence. Additionally, another 27% of NO_2 emissions arise from articulated HGVs, with a further 15% from rigid HGVs. This shows that HGVs are responsible for the majority of NO_2 emissions within this AQMA.

Figure 15: AQMA 13 NO_2 Source Contributions



Current Actions to Reduce NO_2

Through its LSTF programme, Thurrock Council is currently undertaking a raft of freight measures focused on reducing emissions from HGVs. The programme includes the development of a Freight Quality Partnership (FQP) and this will be focused on those freight corridors with the highest volumes of freight movements, including Purfleet, Tilbury Port and the new London Gateway Port, as well as where freight transport emissions have led to the declaration of an Air Quality Management Area, such as AQMA 13.

Through this forum, they will look to deliver opportunities for freight fleets to undergo Eco-driver training, including drivers within the council's own vehicle fleet. This measure will work to inform freight vehicle drivers of ways to improve fuel economy, reduce emissions and save money through more efficient driving practices. The FQP will also encourage freight operators to purchase and retrofit pollution abatement equipment to individual freight vehicles. This will help to ensure compliance with the London Low Emission Zone and also work to have immediate effect on reducing both air pollution and greenhouse gas emissions from these vehicles throughout Thurrock.

To further incentivise these projects, a local "Eco-Freight" accreditation scheme has been agreed, where operators demonstrating significantly improved environmental performance and management, resulting from the freight LSTF measures, can be recognised for their achievements.

Signal timings at the junction of the A1306 and A1090 were adjusted in December 2011 in an attempt to reduce queuing in the northbound lane of the A1306. This will need to be monitored carefully to determine the impact this alteration has on pollution levels.

Additionally, investigation has been undertaken to identify the costs of trialling pollution absorbent paint, KNOxOUT, in this area. This paint purports to be an air cleaning paint that uses a catalyst to break down and neutralise NOx emissions.

Figure 16: Recommended Transport Actions for AQMA 13

Measure	AQ Impact	Cost	Cost Type	Possible Implementation Timescale	Comments	Alternative?
Traffic Management						
Signal Timing adjustment	Low	Low	Revenue	Complete	12 month watching brief should be undertaken to determine air quality impact	MOVA
MOVA	Medium	Low	Capital	Short		Signal Timing Adjustment
HGVs						
FQP	None	High (£60k per annum)	Revenue (LSTF)	Short (underway)	No emissions reductions on its own, but needed to facilitate HGV measures	
Eco-Freight Accreditation	None	Included in FQP?	Revenue (LSTF)	Short (underway)	No reductions on its own, but may encourage uptake of other measures	
HGV Eco-Driver Training	Low - Up to 0.9 µg/m^3	£350 per driver	Revenue (LSTF)	Short (underway)		Low Emission Zone
Other						
Pollution Absorbent Paint / Pollution Barrier	To be determined	Low	Capital	Short (underway)	Must be undertaken in consultation with residents	

NO_2 Impact:

Low = < 1.0 Low = < 1.0 µg/m^3
Medium = 1.0 – 5.0 µg/m^3
High > 5.0 µg/m^3

Cost:

Low = < £25k
Medium: £25-£100k
High = > £100k

Timescale:

Short: Possible by 2015
Medium: Between 2015 and 2017
Long: 2017 and beyond

Recommendations

Taken together, the measures being delivered in Thurrock are likely to provide some air quality benefits to AQMA 13. However, additional action may be required in order to ensure the NO_2 limit value is met as soon as possible, and actions should be focused on reducing the queuing and idling at the junction of AQMA 13, which, other than the number of HGV movements as a whole, is likely to be significantly impacting on the emissions profile within this AQMA. Those items in **Figure 16** above are recommended for further investigation and/or implementation in the shorter-term and are discussed in more detail below.

Traffic Management

It is recommended that a watching brief is kept on the impact of the signal timing alteration for at least twelve months. This watching brief should include analysis both at the roadside diffusion tube as well as the residential façade over the period of at least a year in order to determine the change in annual mean concentrations of NO_2.

If it is determined that the signal timing adjustment has not or will not produce the reduction in NO_2 required, consideration should be given next to upgrading the signal further, if possible, to integrate a SCOOT (Split Cycle Offset Optimisation Technique) or MOVA (Microprocessor Optimised Vehicle Actuation) system into the junction. These types of system are adaptive and can respond automatically to fluctuations in traffic flow through the use of on-street detectors embedded in the road, and SCOOT can also provide vehicle emissions estimates.

HGVs

Small-scale HGVs measures should also be implemented, in combination with the traffic management measures listed above, to ensure that NO_2 concentrations at the receptor façade achieve the limit value. HGV measures that are recommended to be taken forward in the short-term include:

- Ensuring that the Freight Quality Partnership are aware of the impact of HGVs on AQMA 13 and that freight measures delivered through the Partnership are (where possible) focused on those HGVs travelling through this AQMA
- Establishing a relationship with any known major freight movement attractors through the FQP, as these are the most likely origins and destinations of the HGVs travelling within this AQMA
- Providing eco-driver training to hauliers known to be regularly travelling through this AQMA
- Encouraging the uptake of the eco-freight accreditation scheme for hauliers known to regularly be travelling through this AQMA

4.5 AQMA 23 – London Road West Thurrock

Background

AQMA 23 is comprised of 115 properties next to London Road in West Thurrock and was declared in 2001 for exceeding threshold limit values for annual mean NO_2 concentrations. In 2011, the annual mean NO_2 concentration in this area was marginally below the limit value at 38.8 µg/m^3.

Sources of NO_2

Detailed transport source apportionment exercises undertaken during Further Assessment of this AQMA in 2007 determined that HGVs were responsible for approximately 43.6% of NO_x emissions within the AQMA, with the majority (45%) arising from background sources. However, this should be treated with caution, as it estimated bus contributions at zero, despite bus route 44 travelling regularly (every 30 minutes) through this AQMA.

Current Actions to Reduce NO_2

Through its LSTF programme, Thurrock Council is currently undertaking a raft of freight measures focused on reducing emissions from HGVs. The programme includes the development of a Freight Quality Partnership (FQP) and this will be focused on those freight corridors with the highest volumes of freight movements, including Purfleet, Tilbury Port and the new London Gateway Port, as well as where freight transport emissions have clearly led to the declaration of an Air Quality Management Area.

Through this forum, they will look to deliver opportunities for freight fleets to undergo Eco-driver training, including drivers within the council's own vehicle fleet. This measure will work to inform freight vehicle drivers of ways to improve fuel economy, reduce emissions and save money through more efficient driving practices. The FQP will also encourage freight operators to purchase and retrofit pollution abatement equipment to individual freight vehicles. This will help to ensure compliance with the London Low Emission Zone and also work to have immediate effect on reducing both air pollution and greenhouse gas emissions from these vehicles throughout Thurrock.

To further incentivise these projects, a local "Eco-Freight" accreditation scheme has been agreed, where operators demonstrating significantly improved environmental performance and management, resulting from the freight LSTF measures, can be recognised for their achievements.

Figure 17: Recommended Transport Actions for AQMA 23

Measure	AQ Impact	Cost	Cost Type	Possible Implementation Timescale	Comments	Alternative?
Public Transport						
Hybrid Buses (Route 44)	Low	Approx. £275k per bus	Capital (operator)	Short	Funding secured for six from DfT	
Bus Eco-Driver Training (Routes 22 & 44)	Low	£350 per driver	Revenue (LSTF)	Short	Ancillary benefits in other AQMAs, as well as fuel and CO_2 reductions	
Traffic Management						
Road Layout Review	Low	High	Capital	Short-Medium	To smooth traffic flows and reduce pinch points	SCOOT/UTMC
SCOOT/UTMC	Low	Medium	Capital & Revenue	Short	Ensure SCOOT is programmed to optimise emissions or UTMC used to smooth traffic flows	Road Layout Review
HGVs						
FQP	None	High (£60k per annum)	Revenue (LSTF)	Short (underway)	No emissions reductions on its own, but needed to facilitate HGV measures	
Eco-Freight Accreditation	None	Included in FQP?	Revenue (LSTF)	Short (underway)	No reductions on its own, but may encourage uptake of other measures	
HGV Eco-Driver Training	Low	£350 per driver	Revenue (LSTF)	Short (underway)	Focused on AQMA 23 origins/destinations	

NO_2 Impact:
Low = < 1.0 µg/m^3
Medium = 1.0 – 5.0 µg/m^3
High > 5.0 µg/m^3

Cost:
Low = < £25k
Medium: £25-£100k
High = > £100k

Timescale:
Short: Possible by 2015
Medium: Between 2015 and 2017
Long: 2017 and beyond

Recommendations

Taken together, the LSTF freight measures being delivered in Thurrock are likely to provide some air quality benefits to AQMA 23. However, additional action should be delivered in order to ensure that NO_2 concentrations remain below the limit value. Those items in **Figure 17** are recommended for further investigation and/or implementation in the shorter-term and are discussed in more detail below.

A number of traffic management schemes have been undertaken in this area in recent years for road safety and traffic reduction purposes and such schemes have proved effective, shown by decreases in traffic along London Road. However, the implementation of such schemes can cause a substantial amount of stop-start and erratic driving that can lead to increases in vehicle emissions, therefore neutralising the air quality benefits enjoyed from the initial reduction in traffic volumes.

The *sert* public transport scheme is currently awaiting DfT funding approval and, if approved, will result in significant changes to London Road to the east of AQMA 23, within AQMA 2. If *sert* is approved, there may still be a need to undertake a review of pinch points along London Road in AQMA 23, to the west of West Thurrock Way. However, if *sert* does not receive DfT funding, it is recommended that the whole of London Road between Grays and the A282 be reviewed, to determine what could be done to reduce the number of pinch points in AQMA 23 as well as AQMA 2, in order to introduce a more even flow of traffic, where doing so would not compromise road safety or induce additional traffic movements back onto this road.

Two bus services run along London Road through AQMA 23, route 22 and 44. In particular, route 44 runs through AQMA 1, AQMA 2 and AQMA 10 as well. Therefore, there is scope to reduce emissions from buses by ensuring that where hybrid buses are available that they are run along route 44 (to maximise air quality benefits in the greatest number of AQMAs) and also ensuring that bus drivers for these routes have been given an appropriate level of eco-driver training.

The recommendations for improving air quality within AQMA 23 are therefore as follow:

- Identify those large businesses along London Road in AQMAs 2 and 23 with a large amount of freight operations with a view to:
    - Establishing a relationship with relevant businesses along London Road in West Thurrock through the FQP
    - Encouraging the uptake of the eco-freight accreditation scheme for HGVS with origins and/or destinations within this area
    - Providing eco-driver training for businesses and hauliers operating HGVs through this AQMA
- Ensure hybrid buses are run along route 44, which also runs through AQMAs 1, 2 and 10
- Provide eco-driver training for bus drivers operating on routes 22 and 44
- Consider undertaking a London Road pinch point review with a view to smoothing traffic flows

4.6 AQMA 1 – London Road, Grays

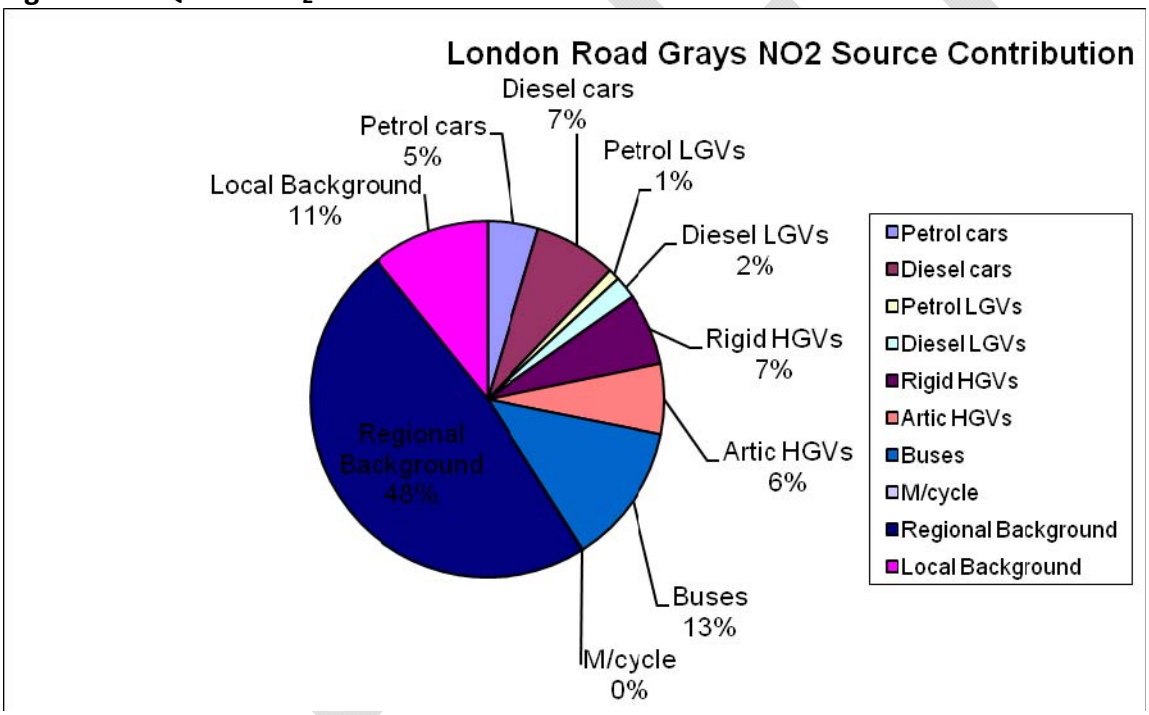
Background

AQMA 1 is comprised of Grays Town Centre. It is the largest AQMA in Thurrock and was declared in 2001 for exceeding threshold limit values for NO_2. It is predominantly comprised of Grays town centre. Pollutant concentrations in this area are monitored through four diffusion tubes. In 2011, the highest NO_2 concentration was 37.51 µg/m^3, which is around 6% below the limit value.

Sources of NO_2

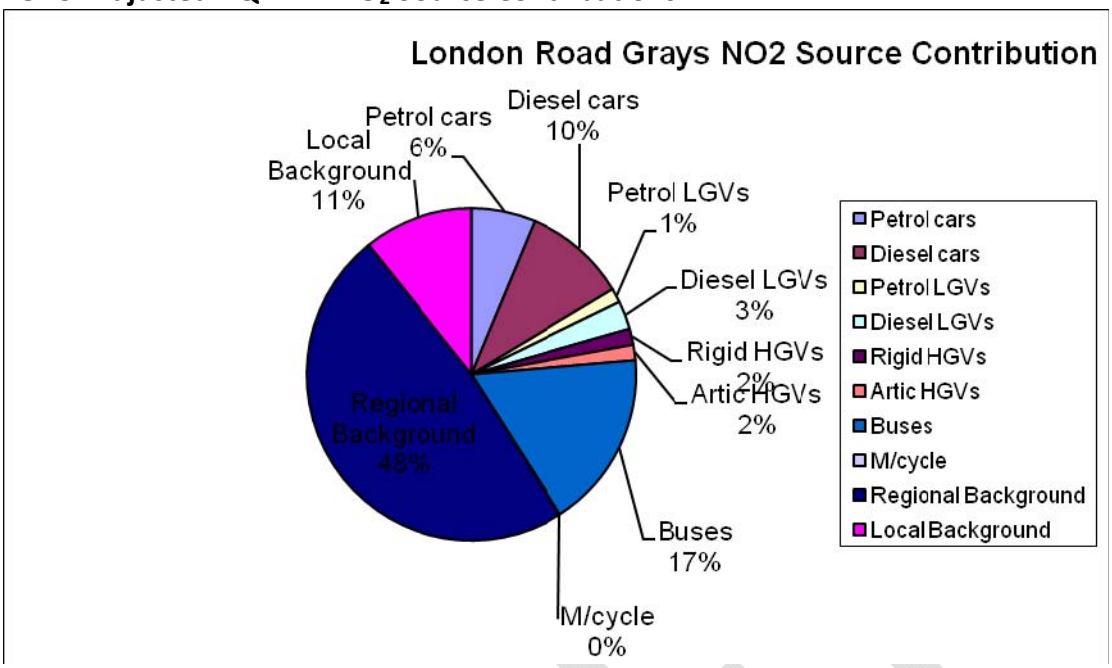
Recent source apportionment exercises undertaken by the Thurrock Council Pollution Control Team have resulted in identifying the proportional source contributions within AQMA 1. As can be seen in **Figure 18** below, 48% of NO_2 emissions arise from regional background sources, over which Thurrock Council has little, if any, influence and a further 11% arise from local background sources. Additionally, another 13% of NO_2 emissions arise from HGVs, with a further 13% from buses, 12% from cars and 3% from light goods vehicles.

Figure 18: AQMA 1 NO_2 Source Contributions



However, there is currently a HGV weight restriction in place within AQMA 1, but the DfT traffic counter is just west of this restricted area. The *South Stifford Traffic Study* (Mouchel, 2011) found that there is evidence that up to 100 HGVs a day ignore the weight restriction on London Road within AQMA 1. HGV figures for source apportionment were therefore adjusted to account for the weight restriction, including those vehicles that ignore it. This resulted in an adjusted source apportionment for AQMA 1, and can be seen in **Figure 19**, below.

Figure 19: Adjusted AQMA 1 NO_2 Source Contributions



As can be seen in Figure 18 above, HGVs are likely to only account for 4% of NO_2 concentrations within AQMA 1. This significantly alters the road transport composition of source contributions, making buses the highest contributors at 17%, followed closely by cars at 16%. The focus for short-term transport actions clearly lies in reducing emissions from buses and cars.

Current Actions to Reduce NO_2

Thurrock's LSTF programme includes the delivery of Workplace Travel Planning, which is focused on large employers, particularly those found in Grays Town Centre. Additionally, the Thurrock LSTF programme is delivering Personalised Journey Planning in Grays. Taken together, these measures should help to bring about a modal shift from people travelling by car toward more sustainable transport modes, such as walking, cycling and public transport. Reductions in car use should lead to requisite reductions in air pollutions emissions in AQMA 1.

Additionally, HGV weight restrictions were recently lifted from Devonshire Road, allowing HGVs to now use this route to connect to and from London Road in South Stifford and the A1012, which provides access to the A1306 and the A13. Although London Road in AQMA 1 already had a weight restriction in place, the *South Stifford Traffic Study* (Mouchel, 2011) estimated that up to 100 HGVs a day have been ignoring this. However, in March 2012 Thurrock Council reiterated the weight restrictions on this part of London Road through a Traffic Regulation Order.

There also remains the possibility that *sert* (South Essex Rapid Transit) may yet be approved for Development Pool funding in the DfT major scheme programme. If approved, *sert* will operate through AQMA 1 along London Road, and aims for the first phase to be fully operational by April of 2015. This service would likely lead to reductions in traffic flows through AQMA 1 through increased public transport patronage and would also likely reduce emissions from buses through the use of environmentally friendly vehicles.

Figure 20: Recommended Transport Actions for AQMA 1

Measure	AQ Impact	Cost	Cost Type	Possible Implementation Timescale	Comments	Alternative?
Public Transport						
Hybrid Buses (Route 44)	Medium – Up to 2.0 µg/m^3	Approx. £275k per bus	Capital (operator)	Short	Six secured through DfT funding	
Bus Eco-Driver Training (Routes 22, 22A, 44, 73, 73A, 83 and 100)	Low – Up to 0.35 µg/m^3	£350 per driver	Revenue (LSTF)	Short	Ancillary benefits in other AQMAs, as well as fuel and CO_2 reductions	
sert	Medium	£32 million	Capital (Major Scheme)	Short	If approved, to be open by 2015	
Smarter Choices						
Workplace Travel Planning	Low	Approx. £7.5 per WTP	Revenue	Short (underway)	Focused on Grays	
Traffic Management						
SCOOT/UTMC	Low	Medium	Capital & Revenue	Short	Ensure SCOOT is programmed to optimise emissions or UTMC to smooth traffic flows	
HGVs						
HGV Weight Restriction	Approx. 3.7 µg/m^3	High	Capital	Short (underway)	Must be enforced to be effective	

NO_2 Impact:
Low = < 1.0 µg/m^3
Medium = 1.0 – 5.0 µg/m^3
High > 5.0 µg/m^3

Cost:
Low = < £25k
Medium: £25-£100k
High = > £100k

Timescale:
Short: Possible by 2015
Medium: Between 2015 and 2017
Long: 2017 and beyond

Recommendations

Taken together, the LSTF measures being delivered in Thurrock are likely to provide some air quality benefits to AQMA 1, particularly in terms of reducing emissions from cars. However, additional action should be delivered in order to ensure that NO_2 concentrations remain below the

limit value and this should clearly be focused on reducing emissions from buses. Those items in **Figure 20** above are recommended for further consideration and/or implementation in the shorter-term for improving air quality within AQMA 1 are therefore as follow:

- Ensure hybrid buses are run along route 44, which also runs through AQMA 2, AQMA 10 and AQMA 23
- Provide eco-driver training for bus drivers operating on routes 22, 22A, 44, 73, 73A, 83 and 100
- Ensure the HGV weight restrictions are enforced

5 Summary

Thurrock currently has 15 AQMAs declared for exceeding NO_2 EU limits values, four of which are also declared for exceeding PM_{10} limit values. As Thurrock has the largest number of AQMAs of any local authority in the UK, maintaining the current number of AQMAs poses is a considerable risk, particularly in terms of possible fines from the European Union being distributed down to the local authority level.

As a result, Thurrock Council is currently in the process of undertaking a Further Assessment of air quality across the Borough, with a view to revoking AQMAs, where possible. This Interim Air Quality Action Plan therefore focuses on short-term transport actions that could lead to further revocations of AQMAs over the next couple of years. **Figure 21** below provides an overall summary of all of the transport measures that are recommended to be taken forward for improving air quality between 2012/13 and 2014/15, within the prioritised AQMAs as a matter of urgency and priority.

Figure 21: Interim Transport Air Quality Actions – Summary Table

Measure	AQMA(s) Affected	Priority	Costs and Funding	When	Notes
Public Transport					
Hybrid Buses	AQMA 1, AQMA 2, AQMA 23, & AQMA 10 (Route 44) AQMA 5 (Route 66)	High	Green Bus Fund – Capital	ASAP (2012)	Route 44 as priority, 66 if any hybrids remain available after that
Bus Eco-Driver Training (Routes 22, 22A, 44, 66, 73, 73A, 83, 100 and 265)	AQMA 1, AQMA 2, AQMA 5, AMQA 10, & AQMA 23	Medium	Revenue - LSTF?	2012/13 – Routes 22, 44 and 66 2013/14 – Routes 73, 83, 100, 2014/14 – Routes 22A, 73A, 265	Route 100 and 265 in conjunction with Essex CC
Metrorail	AQMA 5	Medium	Revenue - LSTF	2012/13	Part of promotional campaign should focus on access to Lakeside
Public Transport Ticketing to Lakeside	AQMA 5	Medium	Revenue – LTP/ Lakeside Shopping Centres	2013/14	Could be tied in with Metrorail? Validated?

Measure	AQMA(s) Affected	Priority	Costs and Funding	When	Notes
HGVs					
HGV Weight Restriction	AQMA 1 & AQMA 2	High	Capital – LTP Revenue (enforcement) – LTP	Underway	Must be enforced to be effective
Freight Quality Partnership	AQMA 10, AQMA 13 & AQMA 23	Low	Revenue – LSTF	Underway	Should be briefed to focus on Purfleet
Eco-Freight Accreditation	AQMA 10, AQMA 13 & AQMA 23	Medium	Revenue – LSTF	Underway	Should be briefed to focus on Purfleet
HGV Eco-Driver Training	AQMA 10, AQMA 13 & AQMA 23	High	Revenue – LSTF	Underway	Should be briefed to focus on Purfleet (Esso, etc.)
HGV Weight Restriction **or** Distributor Road	AQMA 10	High	Capital – LTP/Purfleet Regeneration Project?	2012/13 - Investigation 2013/14 - Design 2014/15 - Implementation	Could be tied into Purfleet Regeneration Project?
Cycling Infrastructure					
Cycle Routes	AQMA 5	High	Capital – LSTF/LTP/s106	2012/13 – Design 2013/14 - Implementation	Core Walking and Cycling Network between Chafford Hundred Station and Lakeside Fenner Road Access May also be an issue at Pilgrims Lane roundabout
Cycle Parking	AQMA 5	High	Capital – LSTF/LTP/s106	2012/13 – Chafford Hundred Station Lakeside – dependant on development timescales	At Lakeside if completing above cycle route, otherwise at Chafford Hundred Station

Measure	AQMA(s) Affected	Priority	Costs and Funding	When	Notes
Smarter Choices					
Workplace Travel Planning	AQMA 1 and AQMA 5	High	Revenue – LSTF	Lakeside – Underway Grays – underway	
Personalised Journey Planning	AQMA 1 and AQMA 5	High	Revenue – LSTF	• Grays – underway • Chafford Hundred – 2013/14 • North Stifford/South Ockendon – 2014/15	
Traffic Management					
London Road Layout/Pinch Point Review	AQMA 1, AQMA 2 & AQMA 23	Medium	Capital – LTP (TMP)	2012/13 - Investigation 2013/14 - Design 2014/15 - Implementation	East of West Thurrock Way only if *sert* not forthcoming
A1306 schemes	AQMA 5	Medium	Capital– LTP (TMP)	2012/13 - Investigation 2013/14 - Design 2014/15 - Implementation	Proposed schemes need to be modelled for air quality impacts
UTMC/SCOOT/MOVA	AQMA 5 and AQMA 13	High	Capital – LTP (TMP) Revenue (ETCC) – LTP (TMP)	AQMA 5 – 2012/13 AQMA 13 – Revisit January 2013 (once a full year of monitoring signal changes is complete)	ETCC to manage, once online

6 Appendix A

Figure A1: AQMA 3 NO_2 Fall-Off with Distance from Road (2010)

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.

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Enter data into the yellow cells

Step 1	**How far from the KERB was your measurement made (in metres)?**	(Note 1)	**0.512658**	metres
Step 2	**How far from the KERB is your receptor (in metres)?**	(Note 1)	**7.4**	metres
Step 3	**What is the local annual mean background NO_2 concentration (in $\mu g/m^3$)?**	(Note 2)	**25.72**	$\mu g/m^3$
Step 4	**What is your measured annual mean NO_2 concentration (in $\mu g/m^3$)?**	(Note 2)	**53.77**	$\mu g/m^3$
Result	**The predicted annual mean NO_2 concentration (in $\mu g/m^3$) at your receptor**	(Note 3)	**40.5**	$\mu g/m^3$

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

Figure A2: AQMA 12 NO_2 Fall-Off with Distance from Road (2010)

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.

Enter data into the yellow cells

Step 1	**How far from the KERB was your measurement made (in metres)?**	(Note 1)	**2.111094**	metres
Step 2	**How far from the KERB is your receptor (in metres)?**	(Note 1)	**16.2110077**	metres
Step 3	**What is the local annual mean background NO_2 concentration (in µg/m^3)?**	(Note 2)	**29.1656**	µg/m^3
Step 4	**What is your measured annual mean NO_2 concentration (in µg/m^3)?**	(Note 2)	**42.22**	µg/m^3
Result	**The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor**	(Note 3)	**35.9**	µg/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.

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Figure A3: Purfleet Master Plan Road Hierachy, showing HGV Distrbutor Road