Executive summary

In accordance to Environment Order (NI) 2002 Belfast City Council has carried out an Updating and Screening Assessment of the findings of the previous Review and Assessment process carried out in April 2004. The findings of this assessment are summarised below using the template available on the Air Quality Management website.

Updating and Screening Assessment Summary Checklist for Carbon Monoxide

	Item	Response
A)	Monitoring data	No exceedence of the 2003 Air Quality Objective for carbon monoxide has been monitored since 1996.
B)	Very busy roads or junctions in built-up areas	An assessment of road traffic and relevant exposures indicates that the mean annual concentration for carbon monoxide will not be exceeded.
C)	Conclusion	A 'Detailed Assessment' for carbon monoxide within Belfast City Authority is not considered necessary.

Updating and Screening	g Assessment Summary	y Checklist for Benzene
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	Item	Response
A)	Monitoring data outside an AQMA	No exceedence of the 2010 Air Quality Objective for benzene has been monitored in areas outside of AQMAs.
B)	Monitoring data within an AQMA	No exceedence of the 2010 Air Quality Objective for benzene has been monitored in areas within AQMAs.
C)	Very busy roads or junctions in built up areas	A DMRB assessment of the worst-case scenario indicates that benzene from road traffic sources will not exceed the 2010 Objective.
D)	New industrial sources	Industrial sources of benzene in Belfast do not exceed the thresholds that could jeopardise the 2010 Objective.
E)	Industrial sources with substantially increased emissions, or new relevant exposure	All industrial sources of benzene within Belfast City were considered.
F)	Petrol stations	No petrol station within Belfast City area is considered to be a significant source of benzene.
G)	Major fuel storage depots (petrol only)	There are no major fuel storage depots within Belfast City area that could jeopardise the 2010 Objective.
H)	Conclusion	A 'Detailed Assessment' for benzene within Belfast City Authority is not considered necessary.

	Item	Response
A)	Monitoring data	No exceedence of the 2003 Air Quality Objective for 1,3- butadiene has been monitored.
B)	New industrial sources	Industrial sources of 1,3-butadiene do not exceed the threshold that could jeopardise the 2003 Objective.
C)	Industrial sources with substantially increased emissions, or new relevant exposure	All industrial sources of 1,3-butadiene within Belfast City were considered.
D)	Conclusion	A 'Detailed Assessment' for 1,3-butadiene within Belfast City Authority is not considered necessary.

Updating and Screening Assessment Summary Checklist for **1,3-butadiene**

Updating and Screening Assessment Summary Checklist for Lead

Ite	em	Response
A)	Monitoring data	The last lead monitoring carried out within Belfast City during 2000 showed that the 2008 Air Quality Objective will not be exceeded.
B)	New industrial sources	There are no new industrial processes associated with lead emissions.
C)	Industrial sources with substantially increased emissions, or new relevant exposure	Since the previous assessment there have been no changes to existing industrial processes within Belfast that would result in an increase in lead emissions.
D)	Conclusion	A 'Detailed Assessment' for lead within Belfast City Authority is not considered necessary.

Updating and Screenin	g Assessment Summary	Checklist for Nitrogen	Dioxide
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	Item	Response
A)	Monitoring data outside an AQMA	A number of monitoring locations outside of AQMAs showed levels in excess of the 2005 Air Quality Objective. A 'Detailed Assessment' of these areas will be required.
B)	Monitoring data within an AQMA	Monitoring data from within AQMAs indicates that the 2005 Objective is still being breached.
C)	Narrow congested streets with residential properties close to the kerb	The new residential apartments located on narrow congested streets within the City Centre will be assessed.
D)	Junctions	The junction of the Sydenham Bypass and the Newtownards Road will proceed to a 'Detailed Assessment'
E)	Busy streets where people may spend 1-hour or more close to traffic	The Lisburn Road was assessed using the DMRB screening tool. A 'Detailed Assessment' is not considered necessary.
F)	Roads with high flow of buses and/or HGVs	No relevant receptors were identified near to such roads.
G)	New roads constructed or proposed since the previous round of R&A	No new significant roads have been constructed since the previous R&A.
H)	Roads with significantly changed traffic flows, or new relevant exposure	No roads within Belfast City have experienced a significant increase in traffic flows.
I)	Bus Stations	Both bus stations within Belfast were considered during the previous R&A.
J)	New industrial sources	There have been no new significant industrial sources since the last R&A.
K)	Industrial sources with substantially increased emissions, or new relevant exposure	One industrial source with a proposed increase in emissions was considered. A 'Detailed Assessment' of this change is not considered necessary.
L)	Aircraft	The Belfast City Airport was considered in previous R&A.
M)	Conclusions	A 'Detailed Assessment' for nitrogen dioxide will be required for the City Centre and at one busy junction.

	Item	Response
A)	Monitoring data outside an AQMA	No exceedence of the 15 minute mean, the 1 hour or the 24 hour means were monitored outside of the AQMAs
B)	Monitoring data within an AQMA	No sulphur dioxide levels are monitored within AQMAs
C)	New industrial sources	No new industrial sources have occurred since the last R&A.
D)	Industrial sources with substantially increased emissions, or new relevant exposure	One industrial source with a proposed increase in emissions was considered. A 'Detailed Assessment' of this change is not considered necessary.
E)	Areas of domestic coal burning	No significant concentrations of coal burning properties were identified that could jeopardise the Air Quality Objectives.
F)	Small Boilers > 5 MW (thermal)	No new boilers have been established since the last R&A
G)	Shipping	Sulphur dioxide emissions from the Belfast Port were reviewed. No 'Detailed Assessment' of this source is considered necessary.
H)	Railway Locomotives	No 'Detailed Assessment' of sulphur dioxide from trains is considered necessary
I)	Conclusion	A 'Detailed Assessment' for sulphur dioxide within Belfast City Authority is not considered necessary.

Updating and Screening Assessment Summary Checklist for Sulphur Dioxide

Updating and Screening	Assessment Summary Checklist for PM₁₀

	Item	Response
A)	Monitoring data outside an AQMA	No exceedences of the 2004 Air Quality Objective were recorded at monitoring stations outside of the AQMAs.
B)	Monitoring data within an AQMA	Exceedences of the 2004 Air Quality Objective were recorded at monitoring stations within the AQMA declared for particulate matter.
C)	Junctions	The junctions of Sydneham Bypass and the Newtownards Road and the Shaftsbury Square junction will proceed to a 'Detailed Assessment'.
D)	Roads with high flow of buses and/or HGVs	No relevant receptors were identified near to such roads.
E)	New roads constructed or proposed since last round of R&A	No new significant roads have been constructed since the previous R&A.
F)	Roads with significantly changed traffic flows, or new relevant exposure	No roads within Belfast City have experienced a significant increase in traffic flows.
G)	Roads close to the objective during the second round of Review and Assessment	A 'Detailed Assessment' of the Donegal Road and the Albertbridge Road will be required.
H)	New industrial sources	There have been no new significant industrial sources since the last R&A.
1)	Industrial sources with substantially increased emissions	One industrial source with a proposed increase in emissions was considered. A 'Detailed Assessment' of this change is not necessary.
J)	Areas of domestic solid fuel burning	No significant concentrations of coal burning properties were identified that could jeopardise the Air Quality Objectives.
1.0	Quarries/landfill sites/ ports etc	Quarries, landfills and the Port area within the City will not proceed to a 'Detailed Assessment.'
K)	Aircraft	The Belfast City Airport was considered in previous R&A.
L)	Conclusion	A 'Detailed Assessment' for particulate matter will be required for two busy junctions, Donegal Road and Albertbridge Road.

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1.0 Introduction

In 2002, the Environment Order was introduced in Northern Ireland. This places a responsibility upon district councils to periodically review air quality within their areas. This report is a part of that periodic review and involves an updating and screening of the previous air quality assessments. The last Review and Assessment for Belfast City Council was completed in April 2004. It concluded that measures would be required in four specific areas of the city in order to mitigate the effects of nitrogen dioxide and particulate material pollution. In August 2004, Belfast City Council declared four Air Quality Management Areas (AQMAs) comprising the M1 Motorway and Westlink corridor, Cromac Street to the junction of Short Strand, Woodstock Link and the Albertbridge Road, the Upper Newtownards Road and the Ormeau Road. These AQMAs were declared for nitrogen dioxide and particulate matterial pollution for both nitrogen dioxide and particulate matter. As part of this Updating and Screening Assessment, evidence is collected to assess whether changes should be made to these areas in terms of pollutants of concern, area and extent.

To ensure completeness and consistency in the way local authorities monitor, review and assess their air quality, the government has issued guidance entitled Technical Guidance LAQM TG(03). Belfast City Council's 2006 Updating and Screening Assessment is solely based on the recently revised and updated sections of the LAQM TG(03).

The last Review and Assessment for Belfast used air quality monitoring data up to the year 2002. Consequently this report reviews all monitoring data collected between 2003 and 2005. For the national networked monitoring stations, ratified data was derived from the Air Quality website. For non-networked monitoring stations for 2003 and 2004, data was derived from the published Air Quality Monitoring in Northern Ireland (2004) published by the Department of Environment (Northern Ireland). The 2005 non-networked data was screened and ratified in-house. A major source of poor air quality within Belfast is derived from traffic. As a result, this screening process involves assessing traffic flows and data since the previous Review and Assessment. This data was supplied by the Road Service in the Department of Regional Development Northern Ireland. The Service provided all the traffic count locations and data from within Belfast and its surrounds from 2001 to

2004. At the time of writing, the 2005 data was not available. Previous review and assessment processes have used modelled traffic data as well as data from traffic count locations. During this screening assessment, updated modelled traffic data was not available. Where no specific traffic count data was available, over-estimates were used based on the nearest count locations. Where it was determined that 'Detailed Assessments' are required, site-specific data will be collected during 2006. Part A and B industrial processes were obtained from the Environment and Heritage Service and the smaller processes (Part C) from lists held by Belfast City Council. New or changed processes have been checked against the list of potentially significant processes that are set out in the LAQM TG (03).

The occurrence of other potential sources of air pollutants in the area such as airports, railways, bus stations, boilers and ports, have been identified using local knowledge and screened using the criteria set out in the LAQM TG (03).

2.0 Carbon Monoxide

2.1 Carbon Monoxide Monitoring Data

No maximum daily concentrations greater then 10 mg m^{-3} were recorded in the 2003 to September 2005 period. Annual means at the Belfast Centre Site have remained at a constant 0.2 mg m⁻³ for the past three years.

Table 2.1 Carbon monoxide results for the Belfast Centre Site, 2003 to 2005

Calendar Year	Data Capture %	Annual Mean mg m ⁻³	Max running 8-Hour Mean mg m ⁻³	Number of 8-Hour means exceeding 10 mg m ⁻³
Belfast	Centre			
2003	79	0.2	2.7	0
2004	96	0.2	2.8	0
2005	95	0.2	3.5	0

The long term trend of carbon monoxide measured at the Belfast Centre site show a distinct downward trend since monitoring began in 1992.





Based on carbon monoxide monitoring data collated during the past three years a 'Detailed Assessment' is not considered necessary.

2.2 Road Traffic

Monitoring data suggests that the carbon monoxide objective is unlikely to be exceeded. However, exceedences could occur close to busy roads and junctions. Previous assessments have considered the M1, M2, M3, the Westlink corridor and the Sydneham Bypass and as guidance LAQM TG(03) states that it is only necessary to consider roads that have seen a 10% increase in AADT or where there are new relevant exposures. Since 2002, traffic data (Appendix 1) shows that traffic flows on the upper regions of the M2 (locations 203, 204, and 205) and locations outside of the authority's area leading to the M1 (locations 520, 525 and 529) have seen an increase of more than 10%.

Guidance LAQM TG(03) defines 'very busy roads' as single carriageway roads with a daily average flow of 80,000 vehicles per day, a dual carriageway with 120,000 per day and a motorway with excess of 140,000 vehicles per day. No roads within the Belfast area fall into the classification of 'very busy roads' (Appendix 1). For the roads already considered in previous assessments there have been no new developments where relevant exposure would occur within 10 metres of the kerb. For those roads which have seen an increase of more then 10% AADT there are no relevant exposures within 10 metres of the kerb.

2.3 Conclusion for Carbon Monoxide Assessment

There is no evidence to suggest that there will be any exceedence of the 8 hour objective for carbon monoxide within Belfast. Therefore a 'Detailed Assessment' is not considered necessary.

3.0 Benzene

- 3.1 Benzene Monitoring Data
 - 3.1.1 Monitoring Data Outside of AQMAs

No running annual means have exceeded 3.25 μ g m⁻³ for the Belfast Centre site during the 2003 to 2005 period.

Calendar Year	Data Capture %	Annual Mean µg m ⁻³	Max recorded value µg m ⁻³	Running annual mean exceeding 3.25 µg m ⁻³
2003	100	1.17	2.83	No
2004	93	1.18	2.86	No
2005	87	1.06	2.37	No

Table 3.1 Benzene results for the Belfast Centre Site, 2003 to 2005

3.1.2 Monitoring Data Within AQMAs

No running annual means have exceeded $3.25 \ \mu g \ m^{-3}$ for the Belfast Roadside site (Upper Newtownards Road) during the 2003 to 2005 period.

 Table 3.2 Benzene results for the Belfast Roadside site (Upper Newtownards Road), 2003 to 2005

Calendar Year	Data Capture %	Annual Mean µg m ⁻³	Max recorded value µ m ⁻³	Running annual mean exceeding 3.25 µg m ⁻³
2003	96	2.68	5.07	No
2004	93	2.69	5.33	No
2005	83	2.80	5.17	No
Projected 2010	_	2.35	-	No

As the monitoring station is a roadside location, mean concentrations for the year 2010 have been calculated using the Year Adjustment Calculator and the annual mean from 2005.



Figure 3.1 Annual Mean Benzene Concentrations from 2002 to 2005 and Projected to 2010.

Based on benzene monitoring data collated during the past three years, a 'Detailed Assessment' is not considered necessary.

3.2 Road Traffic

Predicted 2010 levels at the Belfast Roadside site could exceed the 2 μ g m⁻³. However, guidance LAQM TG(03) states that only 'very busy roads' and areas where background levels in 2010 are expected to be above 2 μ g m⁻³ need be considered. No roads or junctions within the Belfast area fall into this classification (Appendix 1). As already considered during the carbon monoxide assessment, those areas that have seen an increase in traffic of over 10% have no receptors within 10 metres of the kerb. However, as benzene was not considered in the first review and assessment, for completeness a DMRB assessment at the worst case scenario was carried out. The worst case scenario is believed to be the dwellings on Divis Street which are 18 metres from the busy Westlink. The background data and traffic data for 2003 were used and the DMRB Output Sheet is given in Appendix 3.

	Westlink (Divis Street)
Distance from receptor	18
AADT	60,370
Annual average speed (kph)	55
Road Type	А
Total Percentage of Light Vehicles	90
Total Percentage of Heavy Duty Vehicles	10
Background grid reference	
Background concentration (µg m ⁻³)	1.12 mg m ⁻³
DMRB annual mean benzene concentration (2003) (µg m ⁻³)	1.49 mg m ⁻³

 Table 3.2 Summary of the DMRB screening assessment for benzene

3.3 Industrial Sources of Benzene

No assessment of industrial sources of benzene was carried out during the last stage of review and assessment and as a result all industrial sources of benzene will now be considered.

There are a number of Part A processes that may emit benzene within the Belfast area. Using the checklist in Annex 2 of the LAQM TG(03) the following processes have been identified:

Site Operator Name	Site Address	Process Type
Belfast Terminal	Airport Road West, Belfast, BT2 7BA	Petroleum Storage
Kaneb		
Terminals Limited	Airport Road, Sydenham, Belfast, BT3 9DY	Petroleum Storage
CalorGas (NI) Ltd	3, Airport Road West, Belfast BT3 9EE	Gas/Odourisation
Shell UK Oil Porducts Ltd	Airport Road West, Belfast, BT3 9DY	Bitumen
DCC Energy (NI) Ltd	Airport Road West, Belfast	Gas Odourisation

 Table 3.3 Part A and B processes in Belfast that are likely to emit benzene

A full list of Part A and B processes are given in Appendix 4. No Part C processes are considered to be a significant source of benzene (Appendix 5).

It is apparent that there is a concentration of potential benzene emitting processes in the harbour area (Figure 3.2). The nearest receptor from the closest fuel storage facility is 600 metres. Assuming that all emissions from this site are fugitive and from low level stacks, and by using the nomogram in Figure 3.4 of the LAQM TG(03), it is estimated that the combined emissions of benzene would need to be in the region of 2 tonnes per annum for a breach of the threshold to occur. This figure is unlikely to be reached during current or future processes and therefore the threshold for benzene is unlikely to be breached.

Therefore a 'Detailed Assessment' for benzene from industrial sources is not considered necessary.

Figure 3.2 Area of potential benzene emitting industrial activities and the nearest receptor.



3.4 Other Sources of Benzene

3.4.1 Petrol Stations

The five largest petrol stations within Belfast were considered to see whether they could emit sufficient benzene to put the 2010 objective at risk. Four of the five stations had a throughput of more then 2 million litres of petrol per annum and two were situated on roads with more then 30,000 vehicles per day. None had relevant exposure within 10 metres of the pumps.

Petrol Station	Annual Declared Petrol Throughput	AADT (2004 Data)	Nearest Relevant Receptor to Pumps (m)	Figure
Ballyhackamore Service Stn, 275 Upper				
Newtownards Rd	< 2 million litres	24,270	29	3.3
Creighton's, 87-89 Lisburn Road	> 2 million litres	12,420	18	3.4
Tescos, Yorkgate, 100- 150 Yorkgate	7 million litres	<10,000	40	3.5
Tescos, Knocknagoney Road	12 million litres	46,150	88	3.6
Sainsbury	> 2 million litres	46,150	100+	

Table 3.4 Large petrol stations within Belfast

Figure 3.3 Nearest receptor to Ballyhackamore Service Station



Figure 3.4 Nearest receptor to Creighton's Garage



Figure 3.5 Nearest receptor to Tescos Yorkgate Service Station



Figure 3.6 Nearest receptor to Tescos Knocknagoney Service Station



3.4.2 Major Fuel Storage Depots

Due to the cluster of fuel storage facilities and other potential benzene emitting processes at the harbour area, major fuel storage depots were assessed under the industrial sources section (3.3). No breach of the threshold from fuel storage depots is likely to occur.

3.6 Conclusion for Benzene Assessment

There is no evidence to suggest that there will be any exceedence of the running annual mean of $3.25 \ \mu g \ m^{-3}$ by the year 2010 within Belfast. Therefore a 'Detailed Assessment' is not considered necessary.

4.0 1,3-butadiene

4.1 1,3-Butadiene Monitoring Data

No running annual means have exceeded 2.25 μ g m⁻³ for the Belfast Centre and Roadside site during the 2003 to 2005 period.

No 1,3-Butadiene data exists for the Belfast monitoring sites prior to 2003. Therefore it is not possible to show longer-term trends. Based on existing monitoring data a 'Detailed Assessment' is not considered necessary.

Calendar Year	Data Capture %	Annual Mean μg m ⁻³	Max recorded value μg m ⁻³	Running annual mean exceeding 2.25 µg m ⁻³
Belfast C	entre			
2003	83	0.089	0.43	No
2004	90	0.057	0.16	No
2005	100	0.02	0.11	No
Belfast R	oadside	Site (Upper	[·] Newtownards	Road)
2003	81	0.0925	0.16	No
2004	86	0.073	0.14	No
2005	96	0.05	0.16	No

 Table 4.1 1,3 Butadiene Results for Belfast, 2003 to 2005

4.2 Industrial Sources of 1,3-butadiene

No assessment of industrial sources of 1,3-butadiene was carried out during the last stage of review and assessment and as a result all industrial sources of 1,3-butadiene will be considered.

There are a number of Part A processes that may emit 1,3-butadiene within the Belfast area. Using the checklist in Annex 2 of the LAQM TG(03) the following processes have been identified:

Site Operator Name	Site Address	Process Type
Belfast	Airport Road West, Belfast,	
Terminal	BT2 7BA	Petroleum Storage
Kaneb		
Terminals	Airport Road, Sydenham,	
Limited	Belfast, BT3 9DY	Petroleum Storage
Tennants		
Textile Colours	31-43 Ravenhill Road,	Manufacture/use of
Ltd	Belfast, BT6 8DP	organic chemicals

Table 3.3 Part A and B processes in Belfast that are likely to emit 1,3-butadiene

A full list of Part A and B processes are given in Appendix 4. No Part C processes are considered to be a significant source of 1,3-butadiene (Appendix 5) The nearest receptor to the petroleum processes situated in the harbour area is 600 metres away (Figure 3.2). Assuming that all emissions from this site are fugitive and from low level stacks, and by using the nomogram in Figure 4.2 of the LAQM TG(03) it is estimated that the combined emissions of 1,3 butadiene would be in the region of 2 tonnes per annum. This figure is unlikely to be reached during current or future processes and therefore the threshold for 1,3 butadiene is unlikely to be breached.

4.3 Conclusion for 1,3-Butadiene Assessment

There is no evidence to suggest that there will be an exceedence of the running annual mean of 2.25 μ g m⁻³ within Belfast. Therefore a 'Detailed Assessment' is not considered necessary.

5.0 Lead

5.1 Lead Monitoring Data

During 2000, heavy metal monitoring was undertaken in the Harbour Estate area. The recorded concentration for lead was $0.012 \ \mu g \ m^{-3}$ which is significantly below the 2008 National Air Quality Strategy annual mean objective of $0.25 \ \mu g \ m^{-3}$. Consequently, continuous lead monitoring was not deemed necessary. (http://www.stanger.co.uk/airqual/metals/lead_and_heavymetals/Site25.xls)

5.2 Industrial Sources of Lead

5.2.1 New Industrial Sources

No new industrial sources of lead have been established in Belfast since the last Review and Assessment process.

5.2.2 Changes to Existing Sources

There have been no changes to existing industrial processes within Belfast that would result in an increase in lead emissions since the previous assessment.

5.3 Conclusion for Lead Assessment

There is no evidence to suggest that lead concentrations within Belfast would warrant a 'Detailed Assessment.'

6.0 Nitrogen Dioxide

6.1 Nitrogen Dioxide Monitoring Data6.1.1 Monitoring Data Outside of AQMAs.

Table 6.1 Continuous Monitoring Data for Nitrogen Dioxide at the BelfastCentre Site, 2003 to 2006.

Calendar Year	Data Capture %	Annual Mean μg m ⁻³	Number of 1 hour means exceeding 200 µg m ⁻³	Annual Mean over 40 μg m ⁻³	More then 18 exceedences of 200 μ g m ⁻³
Belfast	: Centre				
2003	95	32	0	No	No
2004	92	28	0	No	No
2005	54	34	4	No	No
2006	-	33	-	No	-

Data capture for the year 2005 fell below the 90% mark. Consequently the 99.8th percentile was used to determine the hourly mean (323 μ g m⁻³) and the number of exceedences of the 200 μ g m⁻³ 1 hour means (4).

Taking the worst year (2005) and predicting forward for 2006 using the Year Adjustment Calculator an annual mean of $33.2 \ \mu g \ m^{-3}$ is derived.

Calendar Year	Data Capture %	Unadjusted Annual Mean μg m ⁻³	Bias Adjusted Mean µg m ⁻³	Annual Adjusted Mean Over 40 μg m ⁻³			
Doneg	all Squar	e South (1N)					
2003	100	41	48	Yes			
2004	100	34	43	Yes			
2005	100	34	37	No			
Lisbur	n Road						
2003	-	-	-	-			
2004	100	25	32	No			
2005	83	29	31	No			
Belfas	Belfast Centre, Lombard Street						
2003	100	32	37	No			
2004	100	27	34	No			
2005	100	26	29	No			

 Table 6.2 Nitrogen Dioxide Diffusion Tube Data Outside of AQMAs, 2003 to

 2005

Calendar Year	Data Capture %	Unadjusted Annual Mean μg m ⁻³	Bias Adjusted Mean µg m ⁻³	Annual Adjusted Mean Over 40 μg m ⁻³
Prima	ry School	, North Road		
2003	100	17	20	No
2004	100	20	25	No
2005	100	21	22	No
Royal	Victoria I	Hospital		
2003	100	26	30	No
2004	100	18	23	No
2005	66	19	20	No
Short	Strand (J	unction Bridge	End / Sydenl	nam Flyover)
2003	-	-	-	-
2004	100	28	36	No
2005	50	40	43	Yes
Victor	ia Street			
2003	-	-	-	-
2004	100	35	44	Yes
2005	100	30	33	No
White	well Road	1		
2003	-	-	-	-
2004	100	25	32	No
2005	92	22	23	No
Saintf	ield Road	(Southern App	proaches)	
2003	100	38	45	Yes
Statio	n Road			
2003	100	24	28	No
Upper	Malone F	Road		
2003	100	34	40	Yes
Ivan S	Street			
2005	42	33	35	No

All diffusion tube data has been bias-corrected using the co-location study and the continuous monitoring station at Lombard Street. For the years 2003 and 2004 the data was derived from Department of Environment Air Quality Monitoring in Northern Ireland 2004 report. For 2005, the bias-corrected calculations are given in Appendix 6.

The monitoring sites at Donegal Square South, Short Strand, Victoria Street, Saintfield Road and the Upper Malone Road sites have all experienced means in excess of the 40 μ g m⁻³ concentrations in the past three years. Therefore, based on nitrogen dioxide monitoring data collated from locations outside of the currently declared AQMAs a 'Detailed Assessment' will be required. 6.1.2 Nitrogen Dioxide Monitoring Data from within AQMAs

Calendar Year	Data Capture %	Annual Mean μg m ⁻³	Number of 1 hour means exceeding	Annual Below 40 μg m ⁻³	Less then 18 exceedences of 200 μ g m ⁻³
			200 μg m °		
Belfast	Roadsid	e Site (Uppe	r Newtownar	ds Road)	
2003	96	45	0	No	Yes
2004	92	42	0	No	Yes
2005	55	48	0	No	Yes
2006	-	46	-	No	-
Westli	nk				
2003	94	53	27	No	No
2004	92	46	20	No	No
2005	49	40	3	No	Yes
2006	-	48	-	No	-

Table 6.3	Continuous	Monitoring	Data for	· Nitrogen	Dioxide fr	om v	vithin
AQMAs, 2	2003 to 2006.	. –		_			

Data capture for the year 2005 fell below the 90% mark. Consequently the 99.8th percentile was used to determine the hourly mean and the number of exceedences of the 200 μ g m⁻³ 1 hour means. For the Westlink the 99.8th percentile for 2005 was 184 μ g m⁻³ and for the Belfast Roadside Site 130 μ g m⁻³. Taking the highest mean values (2005 at the Roadside Site and 2003 at the Westlink) and predicting forward to 2006 using the Year Adjustment Calculator the values 46 and 48 μ g m⁻³ respectively is achieved.

Figure 6.1 Hourly mean nitrogen dioxide concentrations recorded by the Westlink continuous monitoring station 2003 to 2005.



Table 6.4 Nitrogen Dioxide Diffusion Tube Data from within AQMAs, 2003 to2005

Calendar Year	Data Capture %	Unadjusted Annual Mean μg m ⁻³	Bias Adjusted Mean µg m ⁻³	Annual Adjusted Mean Below 40 μg m ⁻³				
301 Orm	eau Roa	d						
2003	100	37	43	No				
2004	100	30	38	Yes				
2005	75	22	24	Yes				
400 Orm	eau Roa	d	-					
2003	100	27	32	Yes				
2004	100	26	33	Yes				
2005	100	26	28	Yes				
Black's F	Road							
2003	100	38	45	No				
2004	100	29	37	Yes				
2005	100	36	38	Yes				
Cromac	Street (A)	-					
2003	100	38	45	No				
2004	100	37	47	No				
2005	100	36	38	Yes				
East Brid	East Bridge Street							
2003	-	-	-	-				
2004	100	34	43	No				
2005	_	-	-	-				

Calendar Year	Data Capture %	Unadjusted Annual Mean µg m ⁻³	Bias Adjusted Mean µg m ⁻³	Annual Adjusted Mean Below 40 µg m ⁻³				
Junction of East Bridge Street and Short Strand								
2003	-	-	-	-				
2004	100	34	43	No				
2005	92	26	28	Yes				
Stockma	n's Lane							
2003	100	35	41	No				
2004	100	32	41	No				
2005	100	29	31	Yes				
Upper No	Upper Newtownards Road							
2003	100	34	40	No				
2004	100	29	37	Yes				
2005	100	29	31	Yes				
Westlink	2							
2003	100	45	53	No				
2004	100	35	44	No				
2005	100	35	38	Yes				
Cromac	Street (B)						
2003	100	35	41	No				
Knock R	oad							
2005	100	33	35	Yes				
Milner St	treet							
2003	100	38	44	No				
2004	50	32	41	No				
2005	66	27	29	Yes				
Great Ge	orge's St	treet						
2003	100	47	55	No				
2004	100	40	51	No				
2005	100	38	40	No				

All diffusion tube data has been bias-corrected using the co-location study and the continuous monitoring station at Lombard Street. For the years 2003 and 2004 the data was derived from the Department of Environment Air Quality Monitoring in Northern Ireland 2004 report. For 2005 the bias-corrected calculations are given in Appendix 6. For those diffusion tube sites where the data capture fell below 75%, the yearly mean was adjusted following the procedure as laid out in Box 6.5 of the LAQM TG(03).

Monitoring data from within the declared AQMAs shows that there are locations within these areas where nitrogen dioxide annual means are below the 40 μ g m⁻³ level.

However, only one site (the Upper Ormeau Road) consistently fell below the 40µgm⁻³ mean level.



Figure 6.2 Annual Mean Nitrogen Dioxide Concentrations Recorded by Continuous Monitoring Locations Since 1992 and Projected to 2006.

Although Figure 6.2 displays a distinct downward trend for nitrogen dioxide at the background site, it is still evident that exceedences of the 2005 Air Quality Strategy objective for annual means will occur at the roadside sites. There is clear evidence that indicates that within the declared AQMAs, the objective for nitrogen dioxide is being breached. Therefore, based on the monitoring data from these areas a 'Detailed Assessment' with the review of revoking the AQMAs is not deemed appropriate.

6.2 Road Traffic

6.2.1 Narrow Congested Streets with Nearby Residential Properties Within the City Centre there are a number of narrow, congested streets where the average speed is less then 50 kilometres per hour and where there are residential properties within 5 metres of the kerb. However, none of these residential properties are situated on busy carriageways of less then 10 metres width. City Centre modelling was carried out in the last round of R&A and marginal exceedences of the nitrogen dioxide annual mean objective were predicted at three particular junctions for the year 2005. Due to these previously modelled exceedences, the recent development of residential apartments in this area, and because readings from City Centre nitrogen dioxide diffusion tubes have in the past three years exceeded

40 µg m⁻³ it is proposed to repeat the 'Detailed Assessment' for the City Centre.

6.2.2 Junctions

During the previous rounds of R&A the following major junctions were considered:

Junction 3 of the M1 and Blacks Road Junction 2 of the M1 and Stockman's Lane Junction 1 of the M1 and Westlink Westlink and Grosvenor Road Westlink, M2, M3 Junction at York Street and Great Georges Street Ormeau Road and Ravenhill Road Albert Bridge and Ravenhill Road Newtownards Road and Hollywood Road Upper Newtownards Road and North Road

The yellow shaded areas in Figure 6.3 denote the above areas. The blue shaded areas are those junctions considered for a 'Detailed Assessment' using the DMRB screening method. These junctions are where the Sydneham By-pass meets the Newtownards Road (Junction 1), the Lisburn Road and Stockman's Lane at the Kings Hall (Junction 2), the Shaftsbury Square area (Junction 3) and the Sydneham By-pass and the Parkway (Junction 4).

Figure 6.3 Busy junctions considered in the last R&A assessment and proposed junctions for the next 'Detailed Assessment'.



No traffic flow data for these particular junctions were available. Therefore an over estimate is made based on the traffic counts for the corresponding roads and the

nearest traffic count monitoring sites. For Junction 1 the flow along the Sydneham By-Pass (209) was added to the counts from Upper Newtownards Road (216) giving an AADT of 75,500. For Junction 2 the flow at count location 208 (Lisburn Road) was added to that of 227 which assumes that all the traffic on Stockman's Lane flows through this junction. The AADT at Junction 2 is hugely overestimated at 61,550. At Junction 3 the flows of the three roads coming into this junction were considered to be similar to that counted at location 208. Therefore, following LAQM TG(03) guidance the flows were added and then multiplied by 2/3 giving an AADT of 24,840. At Junction 4 the Sydneham By-Pass flow (209) was added to Parkway flow (222) giving an AADT of 71,800.

The DMRB Output Sheets for all the Junctions considered is given in Appendix 3. All the junctions' flows are considered a large over-estimate and Junction 1 would appear to require a 'Detailed Assessment' during which time junction-specific traffic flow data will be obtained. This is also confirmed by the diffusion tube monitoring data which shows that levels during 2005 exceeded the 40 μ g m⁻³ level. The DMRB assessment, the monitoring data and the fact that land adjacent to this junction is likely to be developed for a mixed residential development would suggest that a 'Detailed Assessment' of this junction is required.

	Junction 1	Junction 2	Junction 3	Junction 4
Distance from receptor	10	19	20	25
AADT	75500	61550	24840	71800
Annual average speed (kph)	25	15	15	25
Road Type	А	В	В	А
Total Percentage of Light Vehicles	90	90	90	90
Total Percentage of Heavy Duty				
Vehicles	10	10	10	10
	335,650	331,665	333,572	338,894
Background grid reference	374,456	370,642	373,460	375,452
Background nitrogen dioxide				
concentration ($\mu g m^{-3}$) (2004)	21.6	18.5	28.9	16.2
DMRB annual mean nitrogen				
dioxide concentration ($\mu g m^{-3}$)	40.0	32.5	38.3	29.9

 Table 6.5 Summary of the DMRB screening assessment for nitrogen dioxide at busy junctions

6.2.3 Busy Streets Where People Spend 1 Hour or More

The Lisburn Road had a traffic flow of over 10,000 vehicles per day in 2004. There are many outdoor street cafes and bars located along this route and subsequently there is the possibility that members of the public could be exposed within 5m of the kerb and for a period of 1-hour or more. No other road within Belfast is considered to meet these criteria.

 Table 6.6 Summary of the DMRB screening assessment for nitrogen dioxide along the Lisburn Road

	Lisburn Road
Distance from receptor	5
AADT	12420
Annual average speed (kph)	15
Road Type	В
Total Percentage of Light Vehicles	90
Total Percentage of Heavy Duty Vehicles	10
Background grid reference	331665 370642
Background nitrogen dioxide concentration (µg m ⁻³)	18.5
DMRB annual mean nitrogen dioxide concentration (µg m ⁻³)	28.7

The DMRB Output Sheet for the Lisburn Road is given in Appendix 3. As the predicted annual mean is well below the 60 μ g m⁻³ level deemed necessary by the guidance LAQM TG(03) to warrant a 'Detailed Assessment' and because the diffusion tube located on this road is regularly below the 40 μ g m⁻³ mark, it is not proposed to carryout on a 'Detailed Assessment' for the Lisburn Road.

6.2.4 Roads With High Bus and HGV Flows

An assessment of roads within Belfast where a high proportion of heavy duty vehicles could occur was carried out. The only roads where the proportion of heavy duty vehicles could exceed 25% of the overall flow were considered to be the access road (Figure 6.4) to Belfast Port. As this road is in a predominantly industrial area no relevant receptor was identified within 10m of the road.

6.2.5 Roads Constructed or Proposed Since the Last Round of Assessment There have been no significant new roads constructed in Belfast since the last round of assessments. However, it must be noted that Belfast is currently undergoing a huge alteration to its road network. This alteration predominantly affects the M1 and Westlink corridor and is scheduled to end in 2009. It is therefore highly likely that this work will impact upon traffic flows to the extent that a new 'Detailed Assessment' would be required. It is not proposed to carry out this detailed assessment at this stage as reliable and consistent traffic flow data would not be possible due to the continuous and considerable disrupted flow patterns expected in this area for the next few years. Therefore, although the road alterations along the Westlink would warrant a 'Detailed Assessment' it is not proposed to carry one out at this stage but rather to wait until the work is complete in 2009.

6.2.6 Roads with Significantly Changed Traffic Flows or New Relevant Traffic flow counts for Belfast since the last R&A have increased on average by 3%. None of the flow count locations within Belfast experienced an increase of more than 25%, the level at which the guidance would consider as being significant. One traffic count location outside the authority's boundary (number 529) experienced a 26% increase. However, the AADT for this location is below 10,000.

6.2.7 Bus Stations

Both the Europa and Laganside bus stations were considered in the previous R&A. No significant changes have occurred to these stations or around them. It is therefore not considered necessary to reassess bus stations.

Figure 6.4 Access roads to Belfast Port



6.3 Industrial Sources of Nitrogen Dioxide

6.3.1 New Industrial Sources

During the first R&A a number of industrial sources of nitrogen dioxide were identified and assessed. None were considered to have a noticeable effect on nitrogen dioxide levels. Since then, and using the checklist in Annex 2 of the guidance, no new industrial sources of nitrogen dioxide have been established within or close to the boundary of Belfast City Council.

6.3.2 Industrial Sources with Increased Emissions or New Exposure Since the previous R&A an application to build a second incinerator at the DOE Waste Sludge Incinerator at Duncrue Road has been received. The application states that the current annual throughput of dry solids will rise from 22,000 tonnes to 46,000 tonnes. During the previous R&A assessment of this industrial source, it was determined that emissions of nitrogen dioxide would have to exceed 180 tonnes per annum for a 'Detailed Assessment' to be required. The current process emits 9.26 tonnes per annum and, as the new incinerator is identical to the existing one, it can be assumed that emissions will double to 18.52 tonnes per annum. This is still well below what would be considered necessary for a 'Detailed Assessment.'

6.4 Other Sources of Nitrogen Dioxide

6.4.1 Aircraft

Belfast City Airport was reviewed in the first R&A when a 'Detailed Assessment' was not considered necessary. Since that time no change in public exposure has occurred and there remain relevant receptors within 1000m of the airport boundary. The airport's Master Plan published in October 2005 (Reference: http://www.belfastcityairport.com/UPLOADS/DOCS/MasterPlan2006.pdf) states that current passenger numbers are over 2.2 million per year. It predicts an increase of between 2 to 3 percent per annum until the year 2020 when it is expected that passenger numbers will increase to 3.2 million. The city airport operates under a planning agreement with the Department of the Environment (NI) and is restricted to 45,000 air traffic movements per year and is to offer no more the 1.5 million seats per year. Therefore, under these restrictions, it would not be possible for the airport to exceed 5 million passenger numbers per annum. Therefore, under guidance LAQM (TG03) a 'Detailed Assessment' of the impact of the city airport on nitrogen dioxide levels is considered unnecessary.

6.5 Conclusion for Nitrogen Dioxide Assessment

Based on the Updating and Screening assessment for nitrogen dioxide, it is considered that a 'Detailed Assessment' will be required for the City Centre and at the Sydneham Bypass and Newtownards Road Junction with the view of assessing whether the expansion of existing AQMAs is necessary.

7.0 Sulphur Dioxide

- 7.1 Sulphur Dioxide Monitoring Data
 - 7.1.1 Monitoring Data Outside of AQMAs

No exceedence of the 15-minute mean, the 1 hour mean or the 24 hour mean were recorded at either of the continuous monitoring locations during the period 2003 to 2005.

 Table 7.1 Continuous Monitoring Data for Sulphur Dioxide, 2003 to 2005.

Calendar Year	Data Capture %	Annual Mean μg m ⁻³	Number of 15-minute means exceeding 266 µg m ⁻³	Number of 1 hour means exceeding 350 µg m ⁻³	Number of 24 hour means exceeding 125 μg m ⁻³			
Belfast	Belfast Centre							
2003	91	8	0	0	0			
2004	95	7	0	0	0			
2005	95	6	0	0	0			
Belfast	Belfast East							
2003	97	8	0	0	0			
2004	97	6	0	0	0			
2005	99	5	0	0	0			

 Table 7.2
 8-Port Bubbler Data for Sulphur Dioxide, 2003 to 2005.

Calendar Year	Mean Hourly Mean µg m ⁻³	Annual Maximum Daily Mean µg m ⁻³				
Royal	Victoria H	lospital				
2003	18	66				
2004	16	66				
2005	17	49				
Belfast East (Templemore)						
2003	27	51				
2004	26	64				
2005	24	96 (51)				
Duffer	in Road					
2003	29	51				
2004	29	90 (58)				
2005	27	96 (45)				
Shankhill						
2003	28	64				
2004	27	71				
2005	24	83 (58)				

Calendar Year	Mean Hourly Mean µg m ⁻³	Annual Maximum Daily Mean µg m ⁻³				
City Ha	all					
2003	25	45				
2004	25	58				
2005	22 83 (45)					
Museu	Museum					
2003	28	57				
2004	26	64				
2005	25	96 (64)				
Hazelwood School						
2003	21	45				
2004	22	51				
2005	20	70 (58)				

During 2005 the maximum daily mean increased at a number of sites despite the yearly mean showing a consistent downward trend. On analyses of the data set for that year it became apparent that these high figures are due to one occurrence on the 12^{th} December 2005. As no other monitoring station within Belfast showed any particular increase on this date the data was considered to be an outlier. The figures in brackets are therefore the Annual Maximum Daily Mean without these outliers and would appear to be more in line with previous year data sets. Once these outliers were removed no site exceeded the 80 µg m⁻³ threshold that would necessitate a 'Detailed Assessment.'

7.1.2 Monitoring Data Within AQMAs

There are no sulphur dioxide monitoring stations within the declared AQMAs The long term trend of sulphur dioxide at both the Belfast Centre and East sites shows a distinct downward trend since monitoring began in 1992.



Figure 7.1 Annual Mean Sulphur Dioxide at the Belfast Centre and Belfast East Site, 1992 to 2005

Based on the sulphur dioxide monitoring data collated during the past three years, a 'Detailed Assessment' is not considered necessary.

7.2 Industrial Sources of Sulphur Dioxide

7.2.1 New Industrial Sources

During the first R&A, an industrial source at Bombardier Aerospace was assessed for sulphur dioxide. No breach of the AQS Objective for sulphur dioxide was detected. Since then, and using the checklist in Annex 2 of the guidance, no new industrial sources of nitrogen dioxide have been established within or close to the boundary of Belfast City Council.

7.2.2 Industrial Sources with Increased Emissions or New Exposures Since the previous R&A, an application to build a second incinerator at the DOE Waste Sludge Incinerator at Duncrue Road has been received. The application states that the current annual throughput of dry solids will rise from 22,000 tonnes to 46,000 tonnes. During the previous R&A assessment of this industrial source, it was determined that emissions of sulphur dioxide would have to exceed 400 tonnes per annum to warrant a 'Detailed Assessment.' The current process emits 1.02 tonnes per annum and, as the new incinerator is identical to the existing one, it can be assumed that emissions will double to 2.04 tonnes per annum. This is still well below what would be considered necessary for a 'Detailed Assessment.

7.3 Domestic Sources

The previous R&A considered the contribution of domestic coal burning within Belfast. It found that 62% of domestic properties were fuelled by oil, 18% by natural gas and 8% by solid fuel. 70% of solid fuel properties were owned by the Northern Ireland Housing Executive. Since then the Executive has been converting their properties to gas fired central heating systems at a rate of 9000 per year (throughout Northern Ireland). For 2005, the proportions of Executive housing using coal had fallen to 14% and, under the 'Decent Homes Standard,' they are committed to converting all their properties from solid fuel by 2010.

This uptake of cleaner burning central heating systems throughout the city has substantially reduced the sulphur dioxide emissions from domestic sources. It is therefore not considered necessary to complete a 'Detailed Assessment' of this source.





7.4 Boilers

During the previous R&A, fourteen small boilers of more then 5 MW (thermal) were identified. None used coal or fuel oil. Due to the high uptake of natural gas amongst commercial premises, there is no evidence to suggest that this situation would have altered.

7.5 Other Sources of Sulphur Dioxide

7.5.1 Shipping

Around two thirds of Northern Ireland's seaborne trade, and a quarter of that for Ireland as a whole, is handled at Belfast City Port which received over 9000 vessels in 2005. This comprises of 1.2 million passengers and half a million freight units annually. It is also the island's leading dry bulk port, dominating the market with regard to imports of grain and animal feeds, and handles over 95% of Northern Ireland's petroleum and oil products. In 2005 the Port handled over 17m tonnes of goods.

Figure 7.2 depicts the main berths for the port and the nearest receptors to these areas. The yellow areas correspond to the main dry bulk handling areas; the purple highlights the main RoRo area and the green the current passenger ferry terminal. The nearest receptor to the dry bulk handling birth is some 290 metres away and the nearest to the passenger terminal is more then 500 metres distant. Relevant exposures are more then 250 metres from the main berthing and manoeuvring areas. The number of ship movements for the entire port area is above the 15,000 per annum mark but these movements are spread amongst a number of berthing areas, most of which have no relevant exposure within 500 metres (Figure 3.2 and 7.3). A 'Detailed Assessment' of sulphur dioxide from shipping is therefore not considered necessary.



Figure 7.3 Main berthing and docking areas for dry bulk and passenger ferries.

7.5.2 Railway Locomotives

In October 2004 a continuous sulphur dioxide monitoring station was installed at Ivan Street. The site was chosen as the worst case scenario for sulphur emissions from idling trains which could be stationary for more then fifteen minutes and where there is nearby residential properties. The monitoring station was maintained until March 2005. During that time no exceedence of the 15 minute mean was recorded (the mean 15 minute mean over the winter period was 10.1 μ g m⁻³). Therefore, it is concluded that railway locomotives in the Belfast authority will not jeopardise the sulphur dioxide objectives.

Figure 7.4 Fifteen Minute Mean Sulphur Dioxide at Ivan Street October 2004 to March 2005



7.6 Conclusion for Sulphur Dioxide Assessment

There is no evidence to suggest that there will be any exceedence of the 15 minute, the 1 hour and the 24 hour mean objectives for sulphur dioxide within Belfast. Therefore a 'Detailed Assessment' is not considered necessary.

8.0 PM₁₀

8.1 PM₁₀ Monitoring Data

8.1.1 Monitoring Data Outside of AQMAs

There were no years where the 24 hour mean exceeded the 2004 Objective more than 35 times at monitoring locations outside of the AQMAs. The 2010 Objective was met at both sites in 2005 and at Clara Street in 2003.

Table 8.1 Continuous Monitoring Data PM₁₀ outside of AQMAs, 2003 to 2005.

Calendar Year	Data Capture %	Annual Mean μg m ⁻³	Number of 24 hour means exceeding 50 μg m ⁻³	More then 35 exceedences of the 24 hour mean			
Belfast Centre							
2003	97	24	26	No			
2004	96	21	10	No			
2005	95	19	7	No			
Clara S	Street						
2003	95	22	34	No			
2004	92	13	5	No			
2005	95	13	6	No			

8.1.2 Within an AQMA

The 2004 and 2010 Objectives were exceeded at the Westlink site during 2003 and 2004.

Calendar Year	Data Capture %	Annual Mean μg m ⁻³	Number of 24 hour means exceeding 50 μg m ⁻³	Less then 35 exceedences of the 24 hour mean
Westli	nk			
2003	98	36	63	No
2004	95	41	30	Yes
2005	0	-	-	-



Figure 8.1 PM_{10} at the Belfast Centre, Belfast Clara Street and Westlink, 1992 to 2005

Although the background monitoring data for PM_{10} suggests that there has been a distinct downward trend since 1992 the data from within the Westlink AQMA would suggest that particulate matter levels are on the increase.

8.2 Road Traffic

8.2.1 Junctions

Figure 6.3 denotes those junctions that were assessed in the previous R&A and those that are assessed in this round of screening assessments.

 Table 8.3 Summary of the DMRB screening assessment for PM₁₀ at busy junctions

	Junction 1	Junction 2	Junction 3	Junction 4
Distance from receptor	10	19	20	25
AADT	75500	61550	24840	71800
Annual average speed (kph)	25	15	15	25
Road Type	А	В	В	А
Total Percentage of Light Vehicles	90	90	90	90
Total Percentage of Heavy Duty Vehicles	10	10	10	10
Background grid reference	335,650 374,456	331,665 370,642	333,572 373,460	338,894 375,452
Background PM_{10} concentration (µg m ⁻³) (2004)	23.8	21.5	28.4	18.9
DMRB annual mean PM_{10} concentration (µg m ⁻³)	35.7	29.9	34.1	26.6
Number of days exceeding 50 (µg m ⁻³)	53	27	45	17

The DMRB Output Sheets for all the Junctions considered is given in Appendix 3. As for the nitrogen dioxide assessment, no precise traffic flow data for the specific junctions is available. As a result, all flows are considered to be a large over-estimate. Junctions 1 and 3 are predicted to have more then 35 exceedences of the 24 hour mean and as a result a 'Detailed Assessment' will be required.

8.2.2 Roads with high flow of buses or HGVs An assessment of roads within Belfast where a high proportion of heavy duty vehicles could occur was carried out. The only roads where the proportion of heavy duty vehicles could exceed 20% of the overall flow were considered to be the access road (Figure 6.4) to Belfast Port. As this road is in a predominantly industrial area no relevant receptor was identified within 10m of the road.

8.2.3 New roads constructed or proposed since last round of R&A There have been no significant new roads constructed in Belfast since the last round of assessments. However, it must be noted that Belfast is currently undergoing a huge alteration to its road network. This alteration predominantly affects the M1 and Westlink corridor and is scheduled to end in 2009. This road was declared an AQMA on both nitrogen dioxide and PM_{10} . It is therefore highly likely that this work will impact upon traffic flows to the extent that a new 'Detailed Assessment' would be required. It is not proposed to carry out this detailed assessment at this stage as reliable and consistent traffic flow data would not be possible due to the continuous and considerable disrupted flow patterns expected in this area for the next few years. Therefore, although the road alterations along the Westlink would warrant a 'Detailed Assessment' for PM_{10} it is not proposed to carry one out at this stage, but rather to wait until the work is complete in 2009.

8.2.4 Roads with significantly changed traffic flows or new relevant exposure

Traffic flow counts for Belfast since the last R&A have increased on average by 3%. None of the flow count locations within Belfast experienced an increase of more than 25%, the level at which the guidance would consider as being significant. One traffic count location outside of the authority's boundary (number 529) experienced a 26% increase. However, the AADT for this location is below 10,000.

8.2.5 Roads close to the objective during previous assessmentsDuring the previous R&A, a number of roads were predicted to have between 25 and35 days per annum where the 24 hour objective was predicted to be exceeded. These

are listed in Table 8.4 and the background maps for Northern Ireland are given in Appendix . The background PM10 for the majority of the Belfast area is predicted to be in the range of 20 to 30 μ g m⁻³ in 2005, this range is expected to drop to 15 to 25 μ g m⁻³ by 2010. For those areas identified during the first R&A as being close to the objective only two show an increase in the predicted background levels, these are the Donegal Road and the Albertbridge Road. Based on this evidence it proposed to carry out a 'Detailed Assessment' on these areas.

	2004 Predicted Annual Mean μg m ⁻³	Predicted number of 24 hour means exceeding 50 μg m ⁻³	Background levels during first R&A μg m ⁻³	Current predicted 2005 background concentrations µg m ⁻³	Change in background concentrations µg m ⁻³
Albertbridge Road (Short Strand / Ravenhill					
Road)	31	28	25.3	26.6	+1.3
Carlisle Circus	30	28	24.5	23.4	-1.1
Donegal Road	30	28	25.8	28.0	+2.2
Dunbar Link	30	28	28.4	26.6	-1.8
Newtownards Road (Junction with Holywood Road)	29	25	27.2	23.3	-3.9
Ormeau Road (at Annadale Avenue)	29	26	27.3	27.3	0
Ormeau Road (Cromac Street)	28	26	28.9	28.8	-0.1
Upper Newtownards Road (North Road Junction)	30	26	26.8	23.0	-3.8
Victoria Street (At High Street Junction)	31	29	28.2	26.6	-1.6

Table 8.4 Roads identified in Previous R&As close to the PM10 2004 objective

8.3 Industrial Sources of PM10

8.3.1 New industrial sources of PM10

During the first R&A, a number of industrial sources of PM10 were identified and assessed. None were considered to have a noticeable impact on particulate levels. Since then, and using the checklist in Annex 2 of the guidance, no new industrial

processes that could generate particulate matter have been established within or close to the boundary of Belfast City Council.

8.3.2 Industrial sources of PM10 with increased emissions or new relevant exposure

Since the previous R&A, an application to build a second incinerator at the DOE Waste Sludge Incinerator at Duncrue Road has been received. The application states that the current annual throughput of dry solids will rise from 22,000 tonnes to 46,000 tonnes. During the previous R&A assessment of this industrial source, it was determined that emissions of PM10 would have to exceed 25 tonnes per annum to warrant a 'Detailed Assessment.' The current process emits 0.018 tonnes per annum and as the new incinerator is identical to the existing one it can be assumed that emissions will double to 0.036 tonnes per annum. This is still well below what would be considered necessary for a 'Detailed Assessment.

8.4 Domestic Sources of PM10

8.4.1 Areas of domestic solid fuel burning

The previous R&A considered the contribution of domestic coal burning within Belfast. It found that 62% of domestic properties were fuelled by oil, 18% by natural gas and 8% by solid fuel. 70% of solid fuel properties were owned by the Northern Ireland Housing Executive. Since then the Executive has been converting their properties to gas fired central heating systems at a rate of 9000 per year (throughout Northern Ireland). For 2005, the proportions of Executive housing using coal had fallen to 14% (Figure 7.2) and, under the 'Decent Homes Standard,' they are committed to converting all their properties from solid fuel by 2010. This uptake of cleaner burning central heating systems throughout the city has substantially reduced the particulate matter emissions from domestic sources. It is therefore not considered necessary to complete a 'Detailed Assessment' of this source.

8.5 Other PM10 Sources

8.5.1 Quarries/ Landfill Sites/ Ports

During the first R&A, uncontrolled and fugitive emissions of particulate matter from the Dargan Road Landfill, the Port of Belfast and the Blackmountain Quarry were assessed. Dargan Road Landfill site is due to cease accepting municipal waste for landfilling in November 2006. A waste transfer station is to be constructed on the southern portion of the site. This development is not expected to increase the total daily vehicle movements to this site. There are no nearby relevant receptors and the majority of the waste transfer activities will be carried out in an enclosed building. It is therefore not proposed to consider the land-use changes at the landfill site as a source of particulate matter.

The background PM10 levels around the Dry Bulk area are less then $26\mu g \text{ m}^{-3}$ and the nearest receptor is 292m away from the nearest dry bulking unloading berth (Figure 7.2). Consequently, the Port is not considered a significant source of particulate matter.

The background PM10 levels at Blackmountain Quarry are less then 26µg m⁻³ and the nearest receptor is 270 metres away from the site boundary (Figure 8.2). No new receptors have been built within 200 metres of this source since the previous R&A. **Figure 8.2 Blackmountain Quarry and the nearest receptor.**



8.5.2 Poultry Farms

There are no registered poultry farms within the Belfast City Council area.

8.5.3 Aircraft

Belfast City Airport was reviewed in the first R&A when a 'Detailed Assessment' for PM10 was not considered necessary. Since that time, no change in public exposure

has occurred and there remain relevant receptors within 500m of the airport boundary. The total equivalent passenger throughput does not exceed 10 million passengers per year and as a result a 'Detailed Assessment' for PM10 from the airport is not considered necessary.

8.5 Conclusion for Particulate Matter Assessment.

Based on the Updating and Screening assessment for particulate matter it is considered that a 'Detailed Assessment' will be required for the Sydneham Bypass and Newtownards Road Junction, the Shaftsbury Square Junction, Donegal Road and Albertbridge Road.

9.0 Conclusions

Evidence presented in the 2006 Updating and Screening Assessment would suggest that it is not necessary to conduct a 'Detailed Assessment' on carbon monoxide, sulphur dioxide, benzene, 1,3 butadiene and lead levels within Belfast City Council Authority.

It is not proposed to carry out a 'Detailed Assessment' of nitrogen dioxide in any of the declared AQMAs as there is insufficient evidence to indicate that air quality in these areas have improved enough to allow them to be revoked.

However, it is proposed to carry out a 'Detailed Assessment' in the following areas and for the following pollutants:

Table 7.1 Summary of the areas requiring a Detaneu Assessment						
Area	Reason	Pollutant				
City Centre	Exceedences monitored at city centre diffusion tube monitoring sites and new residential receptors	Nitrogen dioxide				
Junction 1 Sydenham Bypass and Newtownards Road	DMRB assessment shows breach of the Air Quality Objectives	Nitrogen dioxide Particulate matter				
Junction 3 Shaftsbury Square	DMRB assessment shows breach of the Air Quality Objectives	Particulate matter				
Donegal Road	An increase in predicted background concentrations on a road which was identified as being close to the objective in a previous R&A	Particulate matter				
Albertbridge Road	An increase in predicted background concentrations on a road which was identified as being close to the objective in a previous R&A	Particulate matter				

Table 9.1 Summary of the areas requiring a 'Detailed Assessment'