EAST LOTHIAN COUNCIL
UPDATING & SCREENING ASSESSMENT

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East Lothian Council

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EXECUTIVE SUMMARY

This report presents the results of the Updating and Screening Assessment of local air quality within East Lothian Council. The Updating and Screening Assessment represents the first step in the current round of the management of local air quality, as required by Part IV of the Environment Act, 1995.

The objective of the Updating and Screening Assessment is to provide a checklist approach to identify those matters that have changed since the previous round of review and assessment was completed in 2005, and which may now require further assessment.

The Updating and Screening Assessment report should identify where there is a risk of an air quality objective being exceeded at a location with relevant public exposure by use of simple screening assessments and other similar tools. Where a risk has been identified the local authority is required to undertake a Detailed Assessment to identify with reasonable certainty whether or not an exceedence will occur.

The results of the Updating and Screening Assessment carried out for all pollutants indicates that current Air Quality Objectives are being complied with and that, furthermore, there will be no potential exceedences of the air quality objectives specified for 2008 (Lead) and 2010 (Benzene and PM_{10}). There is no requirement to proceed to a detailed assessment for any pollutants.

1. INTRODUCTION

1.1 Background to Local Air Quality Management

Local authorities have a statutory obligation to review and assess air quality within their region from time to time under Part IV of the Environment Act 1995 (Ref. 1) and subsequent Regulations. The Air Quality Strategy for England, Wales, Scotland and Northern Ireland (AQS) (Ref. 2) sets out prescribed air quality objectives for target pollutants against which each local authority must assess air quality. It also establishes a framework for air quality improvements. The role of the local authority review and assessment is to identify areas where it is considered likely that the air quality objectives will be exceeded.

1.2 The Phased Approach to Review and Assessment

Local Authorities completed the second round of review and assessment of local air quality in 2005.

Under the Environment Act 1995, local authorities are once again required to complete a review and assessment of air quality within their boundaries. This next round of review and assessment must be completed by 2007. As with the previous round of review and assessment, this round is also based on a phased approach. The first step of this round is the Updating and Screening Assessment (USA). The intention is that local authorities should only undertake a level of assessment that is commensurate with the risk of an air quality objective being exceeded.

The purpose of the Updating and Screening Assessment is to identify those matters that have changed since the last review and assessment, which might lead to a risk of an air quality objective being exceeded. It is based on a checklist to identify changes that require further consideration. If there are relevant changes, then simple screening tools are used to identify if there is sufficient risk of an air quality objective being exceeded. The USA should cover new monitoring data; new air quality objectives; new sources of air pollution or changes to existing sources or other local changes that might affect air quality etc.

If sufficient risk is identified, then the local authority must complete a Detailed Assessment to provide an accurate estimate of the likelihood of an air quality objective being exceeded at the particular location with relevant public exposure.

1.3 This Report

This report is based on the checklist approach detailed in the Local Air Quality Management (LAQM) Technical Guidance LAQM. TG (03) (as amended) document (Ref. 3) produced by the Department of Environment, Food and Rural Affairs (DEFRA) and the devolved administrations. The assessment of each pollutant is contained within separate chapters (Chapter 2 – 8) with the conclusions and recommendations in Chapter 9. References are provided in Chapter 10. Where supporting information (e.g. air quality monitoring data) or a screening assessment is required for a pollutant, this detail is shown in separate appendices to the back of this report.

This report builds on the information gathered from any assessments carried out during the previous rounds of review and assessment. For background and explanation of terminology, it is recommended that this report be read in

conjunction with East Lothian Council's (ELC) previous USA Report (Ref. 4), Detailed Assessment (Ref. 5) and Progress Report (Ref. 6).

2. REVIEW AND ASSESSMENT OF CARBON MONOXIDE

2.1 Conclusions from Updating & Screening Assessment in 2004

The previous USA Report (Ref. 4) in the second round of review and assessment concluded that concentrations of carbon monoxide (CO) were unlikely to exceed the air quality objective of 10 mg/m^3 (measured as a maximum 8-hour average) by the target date of 31 Dec 2003. No monitoring of CO was carried out in East Lothian therefore monitoring data for Edinburgh Centre (up to 2002) was obtained and used to predict a worst-case scenario, as concentrations of CO in Edinburgh Centre were likely to be higher than in Musselburgh, or any other town, in East Lothian

2.2 Monitoring

(A) Monitoring Data

Approach	
1. Collate all carbon monoxide monitoring data	There is no monitoring data available for carbon monoxide in East Lothian as no monitoring was carried out in previous rounds of review and assessment (see above). The nearest monitoring station which currently measures CO is the Edinburgh St. Leonards automatic monitoring station operated on behalf of DEFRA. Concentrations of CO measured in Edinburgh St. Leonards are likely to be higher than levels of CO in Musselburgh or any other towns in East Lothian. Therefore, as a worst-case approach, data from this station has been used in this assessment.
2. Ratify your local monitoring data if you have not already done so	Ratified Data for Edinburgh St. Leonards for 2005 was downloaded from the Air Quality Archive (Ref. 7)
3. Identify the maximum daily running 8-hour concentrations during each year of measurement	The maximum daily running 8-hour mean concentration for Edinburgh St. Leonards in 2005 was <1.0 mg/m^3.
Question	
Are any current maximum daily running 8-hour concentrations greater than 10mg/m^3?	Based on the measurements recorded at the above automatic monitoring station, there are no maximum daily running 8-hour concentrations greater than 10 mg/m^3
Action	
Even assuming a worst case in that concentrations of CO measured at the Edinburgh St. Leonards monitoring station were representative of CO levels in East Lothian, the measured concentrations are well below the 8-hour air quality objective of 10 mg/m^3. **No further action is required.**	

2.3 Road Traffic

(B) Very busy roads or junctions in built-up areas

Approach	
1. Identify 'very busy' roads and junctions in areas where the 2006 background is expected to be above 1mg/m^3.	There are no roads that match the criteria for a 'very busy' road in East Lothian.
2. Determine whether there is relevant exposure within 10m of the kerb.	N/A
3. Obtain detailed information on traffic flows, speeds and the proportion of different vehicle types.	N/A
4. Use the DMRB [1] screening model to predict the annual mean concentrations in 2006 at relevant locations.	N/A
Question	
Are there any predicted annual mean concentrations greater than 2 mg/m^3?	N/A
Action	
No action is required.	

Note 1: DMRB = Design Manual for Roads and Bridges (Ref. 8).

3. REVIEW AND ASSESSMENT OF BENZENE

3.1 Conclusions from Updating & Screening Assessment in 2004

ELC concluded from the previous USA (Ref. 4) that levels of benzene would not exceed the 2003 air quality objective of 16.25 µg/m^3 measured as a running annual mean. It was also concluded in this report that the 2010 air quality objective of 3.25 µg/m^3 would not be exceeded. This conclusion was based on monitoring data recorded during 1998 at several sites in East Lothian.

3.2 Monitoring

(A) Monitoring Data outside an AQMA

Approach	
1. Collate all benzene monitoring data	No further benzene monitoring has been carried out in East Lothian since the 1998 monitoring survey.
2. Ratify your local monitoring data, if you have not already done so.	N/A
3. Calculate annual means from the data and identify the highest values.	As a worst-case approach the highest monthly mean concentration recorded at any of the appropriate locations (i.e. where the annual mean objective would apply) in 1998 will be used in this assessment. It is assumed that the maximum monthly mean of 7.5 µg/m^3 recorded at Newbigging in Musselburgh (a street which has residential properties close to the roadside) is representative of the highest annual mean concentrations in East Lothian for 1998.
4. If the results are for a roadside location, estimate the annual mean concentrations in 2006 and 2010.	There is no correction factor available for the year 1998. The correction factor for 1999 has been used instead, which represents a slightly worst-case approach. The resulting estimated annual mean concentrations for 2006 and 2010 are 2.00 µg/m^3 and 1.75 µg/m^3 respectively.
Questions	
Are any running annual means greater than 16.25 µg/m^3? Are any annual means greater than 5 µg/m^3? Are any annual means greater than 3.25 µg/m^3? (Scotland and N Ireland only)	No. N/A (does not apply in Scotland) No.
Action	
Even though a worst-case approach was adopted, it is anticipated that the 2010 air quality objective will be met. **No further action required.**	

3.3 Road Traffic

(C) Very busy roads or junctions in built-up areas

Approach	
1. Identify 'very busy' roads and junctions in areas where the 2010 background is expected to be above 2 $\mu g/m^3$	There are no roads which match the criteria for a 'very busy' road in East Lothian
2. Determine whether there is relevant exposure within 10m of the kerb.	N/A
3. Obtain detailed information on traffic flows, speeds and the proportion of different vehicle types.	N/A
4. Use the DMRB screening model to predict the annual mean benzene concentrations in 2010 at relevant locations.	N/A
Questions	
Are any predicted annual means in 2010 greater than 5 $\mu g/m^3$? Are any predicted running annual means in 2010 greater than 3.25 $\mu g/m^3$ (Scotland and Northern Ireland only)?	N/A
Action	
No further action required	

3.4 Industrial Sources

(D) New Industrial Sources

Approach 2	
1. Use the checklist in Annex 2 to determine whether you have any sources that need to be considered further.	There are no new sources in East Lothian that require further consideration.
2. Obtain information on the total annual emission of benzene and the height of the emission	N/A
3. Use the nomograms described in paragraph 3.30 onwards (in LAQM. TG (03)). To determine if the source requires further assessment.	N/A
Question	
Does the source exceed the threshold in the relevant nomograms?	N/A
Action	
No further action required	

3.5 Other Sources

(F) Petrol stations

Approach	
1. Identify all petrol stations with an annual throughput of more than 2000 m^3 of petrol (2 million litres per annum) and with a busy road nearby that have not been covered by previous review and assessment reports.	The Granada Filling Station at Old Craighall, Musselburgh continues to be the only petrol station located in East Lothian that meets these criteria. This was assessed and screened out during previous rounds of review and assessment.
2. Determine whether there is relevant exposure within 10m of the pumps.	There is still no relevant exposure within 10m of the pumps. The nearest residential property is located in excess of 100m to the north.
Question	
Does the petrol station meet the above criteria?	No
Action	
No further action required	

(G) Major fuel storage depots (petrol only)

Approach	
1. Identify any major fuel storage depots handling petrol.	There are no major fuel storage depots handling petrol in East Lothian.
2. Determine the distance of the nearest relevant exposure.	N/A
3. Establish the annual emissions from the storage depot.	N/A
4. Use the nomograms in Figure 3.3 (2003 objective) and Figure 3.4 (2010 objective) to determine if the source requires further assessment	N/A
Question	
Does the source exceed the threshold in the nomograms?	N/A
Action	
No further action required.	

4. REVIEW AND ASSESSMENT OF 1,3-BUTADIENE

4.1 Conclusions from Updating & Screening Assessment in 2004

ELC concluded from the previous USA (Ref. 4) that levels of 1,3-Butadiene would not exceed the 2003 air quality objective of 2.25 µg/m^3 measured as a running annual mean. In the absence of any existing or planned industrial processes or storage facilities, it was considered unlikely that the air quality objective would be exceeded.

4.2 Monitoring

(A) Monitoring Data

Approach	
1. Collate all 1,3-butadiene monitoring data.	No monitoring of 1,3-butadiene has been carried out in East Lothian as this substance was screened out during previous assessments.
2. Ratify your local monitoring data if you have not already done so.	N/A
3. Calculate running annual means from the data and identify the highest value.	N/A
Question	
Are any current running annual means greater than 2.25 µg/m^3	N/A
Action	
No further action is required.	

4.3 Industrial Sources

(B) New industrial sources

Approach 2	
1. Use the checklist in Annex 2 to determine whether the source needs considering further	There are no new sources in East Lothian that require further consideration.
2. Obtain information on the total annual emission of 1,3-butadiene and the height of the emission	N/A
3. Use the nomograms described in Para 4.16 onwards of LAQM. TG (03) to determine if the source needs further assessment.	N/A
Question	
• Does the source exceed the threshold in nomograms?	N/A
Action	
No further action required	

(C) Industrial sources with substantially increased emissions, or new relevant exposure

Approach	
1. Determine whether any of the sources identified during previous rounds of review and assessment as potentially significant have substantially increased emissions or new relevant exposure.	There were no sources identified during previous rounds of review and assessment that emitted 1,3-butadiene.
2. Obtain updated information on the total annual emission of 1,3-butadiene and the height of the emission.	N/A
3. Use the nomograms described in Para 4.16 onwards of LAQM. TG (03) to determine if the source needs further assessment	N/A
Question	
Does the source exceed the threshold in the nomogram?	N/A
Action	
No further action required	

5. REVIEW AND ASSESSMENT OF LEAD

5.1 Conclusions from Updating & Screening Assessment in 2004

ELC concluded from the previous USA (Ref. 4) that levels of lead would not exceed the 2004 air quality objective of 0.5 µg/m^3 or the 2008 air quality objective of 0.25 µg/m^3, both objectives measured as annual means. This conclusion was based on the fact that there were no Part A or Part B processes in East Lothian that use any significant quantities of lead. Also, there were no such Part A processes in neighbouring areas that could impact on East Lothian. National monitoring also showed that levels of lead, even in the largest cities in the UK, were significantly below the air quality objective.

5.2 Monitoring

(A) Monitoring data outside an AQMA

Approach	
1. Collate all lead monitoring data	No monitoring of lead has been carried out in East Lothian as this substance was screened out in previous assessments.
2. Ratify your local monitoring data, if you have not already done so	N/A
3. Calculate annual means from the data	N/A
Questions	
Are any current annual means greater than 0.5 µg/m^3?	N/A
Are any current annual means greater than 0.25 µg/m^3?	N/A
Action	
No further action required	

5.3 Industrial Sources

(B) New Industrial Sources

Approach 2	
1. Use the checklist in Annex 2 to determine whether the source needs considering further	There are no new sources in East Lothian that require further consideration.
2. Obtain information on the total annual emission of lead and the height of the emission	N/A
3. Use the nomograms described in Para 5.14 onwards of LAQM. TG (03) to determine if the source needs further assessment.	N/A
Question	
• Does the source exceed the threshold in nomograms?	N/A
Action	
No further action required	

(C) Industrial sources with substantially increased emissions, or new relevant exposure

Approach	
1. Determine whether any of the sources identified during previous rounds of review and assessment as potentially significant have substantially increased emissions or new relevant exposure.	There were no sources identified during previous rounds of review and assessment that emitted lead.
2. Obtain updated information on the total annual emission of lead and the height of the emission.	N/A
3. Use the nomograms described in Para 5.15 onwards of LAQM. TG (03) to determine if the source needs further assessment	N/A
Question	
Does the source exceed the threshold in the nomogram?	N/A
Action	
No further action required	

6. REVIEW AND ASSESSMENT OF NITROGEN DIOXIDE

6.1 Conclusions from Detailed Assessment in 2005

ELC concluded from the previous USA (Ref. 4) that a detailed assessment of nitrogen dioxide was required due to road traffic sources in Musselburgh High Street. The Detailed Assessment (Ref. 5) was completed in 2005. This concluded that the Annual Mean and 1-hour mean air quality objectives would be complied with by the target date of 31 December 2005. An Air Quality Management Area (AQMA) was not required although monitoring of NO2 was recommended to continue using both the continuous analyser located at Musselburgh High Street and passive diffusion tubes located in Musselburgh and the other towns of Tranent and Haddington.

6.2 Monitoring

(A) Monitoring data outside an AQMA

Approach	
1. Collate all nitrogen dioxide monitoring data	Nitrogen dioxide diffusion tube measurements have been recorded at locations in Musselburgh, Tranent and Haddington, the location of the diffusion tubes are shown in Figures 1, 2 & 3 respectively. Data for 2004 and 2005 has been collated. Continuous nitrogen dioxide measurements have been recorded at Musselburgh High Street, the location of the analyser is shown in Figure 1. Data for 2004 and 2005 has been collated.
2. Ratify your local monitoring data, if you have not already done so	Monitoring data has been ratified and diffusion tube bias adjustment factor calculated from diffusion tubes co-located with continuous analyser. Appendix 1 gives monitoring results and explains the method used to calculate bias adjustment factor.
3. Calculate annual means from the data	Annual means calculated using diffusion tube bias adjustment factor, where applicable. The results are shown in Table 2 of Appendix 1.
4. Estimate the annual mean concentrations in 2006	Annual mean concentrations estimated using NO_2 year adjustment factors downloaded from DEFRA's Air Quality Archive (Ref. 7). The results are shown in Table 3 of Appendix 1.
5. Calculate the number of 1-hour exceedences of 200 $\mu g/m^3$ in a full year, or the 99.8th percentile of hourly means	The 99.8th percentile of hourly means has been calculated for each year of continuous analyser data available. The results are shown in Table 1 of Appendix 1.
Questions	
Are any predicted annual means in 2006 greater than 40 $\mu g/m^3$? Are there currently more than 18 exceedences of 200 $\mu g/m^3$, or are any 99.8th percentiles greater than 200 $\mu g/m^3$?	Although the Annual Mean for Tube No 3 on Musselburgh High Street, when bias adjusted, is greater than 40 $\mu g/m^3$, there is no relevant exposure at this location. No.
Action	
No further action required.	

6.3 Road Traffic

(C) Narrow congested streets with residential properties close to the kerb

Approach	
1. Check whether these locations were assessed during previous rounds of review and assessment	The High Streets in Musselburgh and Tranent and Court Street in Haddington were assessed in the first round of review and assessment. There is no need to proceed further with this part.
2. Identify all general areas where there may be narrow congested streets with residential properties within 5m of the kerb	There are no other such locations elsewhere in East Lothian that meet these criteria.
3. Obtain information on traffic flows sufficient to list those roads identified above that have a flow greater than 10,000 vehicles per day	N/A
4. Use the DMRB screening model to predict the annual mean in 2006 at relevant locations. You will also need information on traffic flows, speeds and proportion of different vehicle types	N/A
Question	
Are any of the predicted annual means greater than 40 $\mu g/m^3$?	N/A
Action	
No further action required.	

(D) Junctions

Approach	
This assessment is required where there was no specific assessment of junctions during the first round assessment against the 2005 objectives	
1. Identify 'busy' junctions	These types of junctions were specifically identified and assessed during previous rounds of review and assessment. There is no need to proceed further with this part.
2. Determine whether there is relevant exposure within 10m of the kerb (20m in major conurbations)	N/A
3. Obtain detailed information on traffic flows, speeds and the proportion of different vehicle types	N/A
4. Use the DMRB screening model to predict the annual mean concentration in 2006 at relevant locations	N/A
Question	
Are any of the predicted annual mean concentrations greater than 40 $\mu g/m^3$?	N/A
Action	
No further action required	

(E) Busy streets where people may spend 1-hour or more close to traffic

Approach	
1. Check whether such locations were assessed during first round of review and assessment	The busiest streets where people may spend 1-hour or longer close to traffic are those in or near the town centres of Musselburgh, Tranent and Haddington. These locations have been specifically identified and assessed in previous rounds of review and assessment through monitoring, screening methods and detailed dispersion modelling. There is no need to proceed further with this part.
2. Identify all busy streets where members of the public may be exposed within 5m of the kerb for 1-hour or more	N/A
3. Obtain detailed information on traffic flows, speeds and proportion of different vehicle types	N/A
4. Use the DMRB screening model to predict the annual mean in 2006 at relevant locations	N/A
Question	
Are any of the predicted annual means greater than 60 $\mu g/m^3$?	N/A
Action	
No further action required	

(F) Roads with high flow of buses and/or HGV's

Approach	
1. Check whether such locations were assessed during the first round of review and assessment	No specific assessment of these locations was carried out in the first round of review and assessment.
2. Identify all roads with an unusually high proportion of heavy duty vehicles	There are no roads in East Lothian with an unusually high (>25%) proportion of heavy-duty vehicles.
3. Determine whether there is relevant exposure within 10m of these roads (20m in major conurbations)	N/A
4. Determine whether the flow of heavy duty vehicles is greater than 2, 500 vehicles per day	N/A
5. Use the DMRB screening model to predict the annual mean in 2006 at relevant locations	N/A
Question	
Are any of the predicted annual means greater than 40 $\mu g/m^3$ (for the annual mean objective) or 60 $\mu g/m^3$ (for the hourly mean objective)?	N/A
Action	
No further action required	

(G) New roads constructed or proposed since previous round of review and assessment

Approach	
1. Check whether an air quality assessment has already been carried out for the new road.	There have been no roads constructed or granted planning consent since the first round of review and assessment. Although the A1 dualling between Haddington and Dunbar has a traffic flow in excess of 10, 000 vehicles per day this is not a new road. In any case, there is no relevant exposure within 10m of the altered road.
Question	
Did the assessment predict any exceedences of the objectives at the relevant locations?	N/A
Action	
No further action required	

(H) Roads with significantly changed traffic flows, or new relevant exposure

Approach	
1. Identify any roads with more than 10,000 vehicles per day that have experienced 'large' increases in traffic. You should also consider existing roads with new exposure if this was not adequately assessed in previous reports	There are no roads in East Lothian with more than 10,000 vehicles per day that have experienced 'large' (>25%) increases in traffic. There are no existing roads that may be close to the air quality objectives, i.e. a predicted annual mean greater than 36 µg/m^3, with new relevant exposure.
2. Determine whether these roads had previously been identified as being at risk of exceeding the objectives	N/A
3. Obtain detailed information on traffic flows, speeds and proportion of different vehicle types	N/A
4. Use the DMRB screening model to predict the annual mean in 2006 at relevant locations	N/A
Question	
Are any of the predicted annual means greater than 40 µg/m^3?	N/A
Action	
No further action required	

(l) Bus stations

Approach	
1. Collect information on the daily movements of buses at the bus station	All bus stations within East Lothian have vehicle flows of less than 1000 buses per day and have no relevant exposure within 10m of the bus station.
2. Determine whether there is relevant exposure within 10m of the bus station	N/A
3. Determine whether the flow of vehicles is greater than 1000 buses per day	N/A
4. Use the DMRB screening model to predict the annual mean in 2006 at relevant locations	N/A
Question	
Are any of the predicted annual means greater than 40 $\mu g/m^3$ (for the annual mean objective) or 60$\mu g/m^3$ (for the hourly mean objective)?	N/A
Action	
No further action required	

6.4 Industrial sources

(J) New industrial sources

Approach	
1. Use the checklist in Annex 2 to determine whether the source needs considering further	There have not been any relevant new industrial processes constructed or granted planning consent since the previous round of review and assessment.
2. Obtain updated information on the total annual emission of nitrogen oxides and the height of the emission.	N/A
3. Use the nomograms described in Para 6.34 onwards of LAQM. TG (03) to determine if the source needs further assessment	N/A
Question	
Does the source exceed the threshold in the nomogram?	N/A
Action	
No further action required	

(K) Industrial sources with substantially increased emissions or new relevant exposure

Approach	
1. Determine whether any of the sources identified during previous rounds of review and assessment as potentially significant have substantially increased emissions or new relevant exposure.	Sources identified during previous rounds as potentially significant were Cockenzie Power Station and the Lafarge Cement Works (formerly Blue Circle). Information on emissions of nitrogen dioxide was obtained from the Scottish Environmental Protection Agency (SEPA) (Ref. 9). The emissions data are shown in Appendix 3. **Cockenzie Power Station** In summary, emissions from Cockenzie Power Station have increased from 10660 Tonnes per annum in 2002 to 11400 Tonnes per annum in 2005, i.e. an increase of 6.9%. As there has been less than a 30% increase, this is not regarded as significant, therefore no further assessment is required. **Lafarge Cement Works** In summary, emissions from Lafarge Cement Works have increased from 1110 Tonnes per annum in 2002 to 1270 Tonnes per annum in 2005, i.e. an increase of 14.4%. As there has been less than a 30% increase, this is not regarded as significant, therefore no further assessment is required.
2. Obtain updated information on the total annual emission of nitrogen dioxide and the height of the emission	N/A
3. Use the nomograms to determine if the source requires further assessment	N/A
Question	
Does the source exceed the threshold in the nomograms?	N/A
Action	
No further assessment required	

6.5 Other sources

(L) Aircraft

Approach	
1. Establish whether there is relevant exposure within 1000m of the airport boundary.	There are no airports in East Lothian.
2. Obtain information on annual throughput of passengers and tonnes of freight in the most recent year possible. Calculate the total equivalent passenger numbers in million passengers per annum (mppa).	N/A
Question	
Is the predicted total equivalent passenger throughput more than 5 mppa?	N/A
Action	
No further action required	

7. REVIEW AND ASSESSMENT OF SULPHUR DIOXIDE

7.1 Conclusions from the Detailed Assessment in 2005

ELC concluded from the previous USA (Ref 4) that a Detailed Assessment of SO_2 emissions from Cockenzie Power Station and Lafarge Cement Works was required. The Detailed Assessment (Ref 5) concluded that it was unlikely that the Air Quality Objectives for SO_2 would be exceeded at these locations.

7.2 Monitoring

(A) Monitoring data outside an AQMA

Approach	
1. Collate all sulphur dioxide monitoring data	No monitoring of sulphur dioxide has been carried out in East Lothian since the previous round of review and assessment.
2. Ratify your local monitoring data, if you have not already done so	N/A
3. Calculate the number of 15-minute exceedences of 266 µg/m^3 in a full year, or the 99.9th percentile.	N/A
4. Calculate the number of 1-hour exceedences of 350 µg/m^3 in a full year, or the 99.7th percentile.	N/A
5. Calculate the number of 24-hour exceedences of 125 µg/m^3 in a full year, or the 99th percentile.	N/A
6. For monitoring with bubblers in 8-port samplers identify the maximum daily mean	N/A
Questions	
Are there currently more than 35 15-minute exceedences of, or 99.9th percentiles greater than, 266 µg/m^3? Are there currently more than 24 1-hour exceedences of, or 99.7th percentiles greater than, 350 µg/m^3? Are there currently more than 3 24-hour exceedences of, or 99th percentiles greater than, 125 µg/m^3? Does the maximum daily mean bubbler result exceed 80 µg/m^3?	N/A N/A N/A N/A
Action	
No further action required	

7.3 Industrial sources

(C) New industrial sources

Approach 2	
1. Use the checklist in Annex 2 to determine whether the source needs considering further	Information from SEPA indicated that there have not been any relevant new industrial sources constructed or granted planning consent since the last round of review and assessment (Ref. 10).
2. Obtain updated information on the total annual emission of sulphur dioxide and the height of the emission.	N/A
3. Use the nomograms described in Para 7.17 onwards of LAQM. TG (03) to determine if the source needs further assessment	N/A
Question	
Does the source exceed the threshold in the nomogram?	N/A
Action	
No further action required	

(D) Industrial sources with substantially increased emissions or new relevant exposure

Approach	
1. Determine whether any of the sources identified during previous rounds of review and assessment as potentially significant have "substantially" increased emissions, i.e. >30%, or new relevant exposure	Sources identified during previous rounds as potentially significant are Cockenzie Power Station and the Lafarge Cement Works. Information on emissions of sulphur dioxide was obtained from SEPA (Ref. 9). The emissions data are shown in Appendix 3. **Cockenzie Power Station** In summary, emissions from Cockenzie Power Station have decreased from 19740 Tonnes per annum in 2002 to 16000 Tonnes per annum in 2005, i.e. a decrease of 18.9%. As there has not been a significant increase in SO_2 emissions no further assessment is required. **Lafarge Cement Works** In summary, emissions from Lafarge Cement have remained unchanged at 5360 Tonnes per annum between 2002 and 2005. As there has not been a significant increase in SO_2 emissions no further assessment is required.
2. Obtain updated information on the total annual emission of nitrogen dioxide and the height of the emission	N/A
3. Use the nomograms to determine if the source requires further assessment	N/A
Question	
Does the source exceed the threshold in the nomograms?	N/A
Action	
No further action required	

7.4 Domestic sources

(E) Areas of domestic coal burning

Approach	
1. Identify areas where significant coal burning still takes place. Smokeless fuel has a similar sulphur content to coal so should be treated in the same way	There are no additional areas of domestic coal burning that have not been assessed in previous rounds of review and assessment.
2. Collect information on the actual use of domestic coal in these areas	N/A
Question	
Does the density of coal burning premises exceed 100 per 500 x 500 m area?	N/A
Action	
No further action required	

7.5 Boilers

(F) Small boilers > 5MW *(THERMAL)*

Approach	
1. Identify all boiler plant > *5MW (thermal)* that burn coal or fuel oil.	No information is available on boiler emissions rated between 5MW – 20MW (THERMAL). However, monitoring carried out in the first round of review and assessment indicated relatively low levels of SO_2 in East Lothian.
2. Establish whether there is relevant exposure 'near' to the source	Not carried out.
3. Obtain information on total annual emissions of sulphur dioxide and the stack height and diameter	Not carried out.
4. Use the nomograms to determine if the source requires further assessment	Not carried out.
Questions	
Does the source exceed the threshold in the nomograms?	Not carried out.
Action	
No further action required.	

7.6 Other sources

(G) Shipping

Approach	
1. Establish whether there is relevant exposure within 250m or 1km of the berths and main areas of manoeuvring	There is no relevant exposure within 1km of shipping berths in East Lothian
2. Collect information on the number of ship movements per year	N/A
Question	
Are there between 5,000 and 15, 000 movements per year (exposure within 250m?) Or, Are there more than 15, 000 movements per year (exposure within 1km?).	N/A
Action	
No further action required	

(H) Railway Locomotives

Approach	
1. Identify locations where diesel or steam locomotives are regularly stationary for periods of 15-minutes or more	Freight trains deliver goods to Cockenzie Power Station and to the Viridor Landfill site adjacent to the Lafarge cement works at Dunbar.
2. Establish whether there is the potential for regular outdoor exposure of members of the public within 15m of the stationary locomotives	There is no exposure to members of the public within 15m of each location identified above, where trains may occasionally stop.
3. Obtain information on the number of trains per day that might affect these locations, and the typical duration that they are stationary with their engines running	N/A
Question	
Are there more than two occasions a day when there might be a locomotive stationary with its engine running for 15-minutes or more?	N/A
Action	
No further action required	

8. REVIEW AND ASSESSMENT OF PM_{10}

8.1 Conclusions from the Detailed Assessment in 2005

ELC concluded from the previous USA (Ref. 4) that a detailed assessment of PM_{10} was required due to road traffic sources in Musselburgh and also due to the activities of Scottish Power's Coal Storage Facility at Cockenzie. The Detailed Assessment (Ref. 5) of PM_{10} levels in Musselburgh was completed in 2005. This concluded that, for the 2004 Objectives, the Annual Mean would be met, although the 24-hour mean was forecast to marginally exceed the objective. With regards to the 2010 Objectives, it was forecast that the 24-hour mean would be met, although the annual mean would be exceeded. As the results were based on monitoring influenced by major roadworks, an AQMA was not declared, although monitoring was recommended to continue, using a tapered element oscillating microbalance (TEOM) analyser. This analyser was commissioned on 01 June 2005. With regards to the Detailed Assessment of PM_{10} levels in Cockenzie, SEPA (Ref. 9) completed their assessment (Ref. 11) in April 2006. This concluded that, although the coal facility was a significant source of particulate material in the local area, the 2010 Objectives were already being complied with.

8.2 Monitoring

(A) Monitoring data outside an AQMA

Approach	
1. Collate all PM_{10} monitoring data	Concentrations of PM_{10} have been recorded at Musselburgh North High Street since 01 June 2005. The location of the continuous analyser (TEOM) is shown in Figure 1.
2. Ratify your local monitoring data, if you have not already done so	The current air quality objectives are based on a gravimetric method of assessment. The continuous analysers that recorded the data used in this assessment were TEOM analysers. Accordingly, TEOM to Gravimetric Correction factors of 1.3 (National) and 1.14 (Local) have been applied to all TEOM data, as per guidance in LAQM TG (03) update. The results of the monitoring are given in Appendix 1.
3. Calculate annual means and the number of 24-hour exceedences of 50 µg/m ^{3}	Annual means and the number of 24-hour exceedences of 50 µg/m ^{3} were calculated Full details of the monitoring are given in Appendix 1, Table 4
4. Estimate the number of 24-hour exceedences of 50 µg/m^3 in 2005/06	N/A
5. Estimate the annual mean concentrations in 2010.	Annual mean concentrations estimated in future years up to 2010 are given in Appendix 1, Table 5. The method for assessment is given in Appendix 1, Table 6
Question	
For 2010 Objectives: Are any predicted annual means in 2010 greater than 18 µg/m^3?	No. There are no predicted Annual Means for 2010 greater than 18 µg/m^3.
Action	
No further Action required	

8.3 Road Traffic

(C) Busy roads and junctions in Scotland

Approach	
1. Identify 'busy' roads and junctions. It is only necessary to include busy roads or junctions not considered in previous review and assessment reports, where there had been a significant increase (>10% AADT) in traffic flows, or where there is new relevant exposure	There are no busy roads and/or junctions where there has been a significant increase in traffic flows or there is new relevant exposure. All busy roads and junctions were assessed in previous rounds of review and assessment.
2. Determine whether there is relevant exposure within 10m of the kerb (20m in major conurbations)	N/A
3. Obtain detailed information on traffic flows, speeds and the proportion of different vehicle types.	N/A
4. Use the DMRB screening model to predict the annual mean in 2010 at relevant locations.	N/A
Question	
Are any of the predicted annual mean PM_{10} concentrations in 2010 greater than 18 $\mu g/m^3$?	N/A
Action	
No further Action required	

(E) Roads with high flows of buses and/or HGV's

Approach	
1. Identify all roads with an unusually high proportion of heavy duty vehicles	There are no roads with unusually high proportion (>20%) of heavy-duty vehicles.
2. Determine whether there is relevant exposure within 10m of the kerb (20m in major conurbations)	N/A
3. Obtain detailed information on traffic flows, speeds and the proportion of different vehicle types.	N/A
4. Use the DMRB screening model to predict the number of 24-hour exceedences of 50 µg/m^3, in 2006 and annual mean in 2010 at relevant locations.	N/A
Question	
Are there more than 35 24-hour exceedences of 50 µg/m^3 predicted in 2006?	N/A
Are any of the predicted annual mean PM_{10} concentrations in 2010 greater than 18 µg/m^3?	N/A
Action	
No further action required	

(F) New roads constructed or proposed since last round of review and assessment

Approach	
1. Check whether an air quality assessment has already been carried out for the new road	There have been no new roads constructed or granted planning consent since the previous round of review and assessment.
Question	
Did the assessment predict any exceedences of the objectives at the relevant locations?	N/A
Action	
No further action required	

(G)) Roads with significantly changed traffic flows, or new relevant exposure

Approach	
1. Identify any roads with more than 10,000 vehicles per day that have experienced 'large' increases in traffic or new relevant public exposure	There are no roads in East Lothian with more than 10,000 vehicles per day that have experienced 'large' (>25%) increases in traffic.
2. Determine whether these roads had previously been identified as being at risk of exceeding the objectives	N/A
3. Obtain detailed information on traffic flows, speeds and proportion of different vehicle types	N/A
4. Use the DMRB screening model to predict the number of 24-hour exceedences of 50µg/m^3 in 2006 at relevant locations	N/A
Question	
Are there more than 35 24-hour exceedences of 50 µg/m^3 predicted in 2006 at relevant locations?	N/A
Action	
No further action required	

(H) Roads close to the objective during the second round of review and assessment

Approach	
1. Identify any roads where between 25 and 35 days exceedence of the 24-hour objective were predicted at relevant locations	There were no roads where between 25 and 35 days exceedence of the 24-hour objective were predicted at relevant locations
2. Identify any roads where the predicted annual mean concentration in 2010 was above 16 µg/m^3 (Scotland only)	The predicted annual mean in 2010 at Musselburgh High Street was 21.4 µg/m^3 (Ref. 5). The predicted annual mean in 2010 at Musselburgh North High Street was 20.0 µg/m^3 (Ref. 5).
3. Re-run DMRB for these locations	The DMRB screening model was used to predict the number of 24-hour exceedences and the annual means in 2005 and 2010 at above locations. Details of the study inputs and results of the DMRB assessment are shown in Tables 7 and 8 in Appendix 2.
Question	
Are there more than 35 24-hour exceedences of 50 µg/m^3?	No
Action	
No further action is required	

8.4 Industrial sources

(I) New industrial sources

Approach 2	
1. Use the checklist in Annex 2 to determine whether the source needs considering further	Information from SEPA indicated that there have not been any relevant new industrial sources constructed or granted planning consent since the last round of review and assessment (Ref. 10).
2. Obtain updated information on the total annual emission of PM_{10} and the height of the emission.	N/A
3. Use the nomograms described in Para 8.36 onwards of LAQM. TG (03) to determine if the source needs further assessment	N/A
Question	
Does the source exceed the threshold in the nomogram?	N/A
Action	
No further action required	

(J) Industrial sources with substantially increased emissions, or new relevant exposure

Approach	
1. Determine whether any of the sources identified during previous rounds of review and assessment as potentially significant have "substantially" increased emissions (>30%). Also, consider whether there is any new relevant exposure. You should also consider sources in neighbouring authorities close to your boundary.	Sources identified during previous rounds as potentially significant were Cockenzie Power Station and the Lafarge Cement Works (formerly Blue Circle). Information on emissions of particulates was obtained from SEPA (Ref. 9). The emissions data are shown in Appendix 3. **Cockenzie Power Station** In summary, emissions from Cockenzie Power Station have increased from 797 Tonnes per annum in 2002 to 871 Tonnes per annum in 2005, i.e. an increase of 9.3%. As there has not been a substantial increase in particulate emissions no further assessment is required. **Lafarge Cement Works** In summary, emissions from Lafarge Cement Works have increased from 70.4 Tonnes per annum in 2002 to 117 Tonnes per annum in 2005, i.e. an increase of 66.2%. As there has been a significant increase in particulate emissions a further assessment is required.
2. Obtain updated information on the total annual emission of PM_{10} and the height of the emission.	Updated information on emissions and emissions parameters were obtained for Lafarge Cement Works from SEPA (Ref. 9). Details are shown in Appendix 3.
3. Use the nomograms described in Para 8.35 onwards to determine if the source requires further assessment	The screening assessment for Lafarge Cement Works was carried out using the nomograms detailed in LAQM.TG (03) update. Details of the assessment are shown in Appendix 4.
Question	
Does the source exceed the threshold in the nomograms?	No
Action	
No further assessment is required	

8.5 Domestic sources

(K) Areas of domestic solid fuel burning

Approach	
1. Identify areas where significant solid fuel burning still takes place.	There are no new locations that require to be assessed, or existing locations that have new relevant exposure, where significant solid fuel burning still takes place since the previous round of review and assessment.
2. Collect information on the actual use of solid fuel in these areas	N/A
3. Use the nomogram in Figure 8.8 to determine the risk of exceeding the objective. (In Scotland, use Figure 8.9 as well to cover 2010).	N/A
Question	
Does the density of coal burning premises exceed the criterion in the nomograms?	N/A
Action	
No further action required	

8.6 Other sources

(L) Quarries/landfills sites/opencast coal/handling of dusty cargoes at ports etc

Approach	
1. Check whether an air quality assessment has already been carried out for the relevant source	Other sources of dust in East Lothian were screened during the previous round of review and assessment. The only potential source of complaints related to the Coal Handling Plant associated with Cockenzie Power Station. In 2005 SEPA carried out an assessment of PM_{10} and coal dust from this facility to determine whether or not it was a potential source of dust deposition on nearby housing in Cockenzie and Port Seton and also if the Air Quality Objectives for PM_{10} were in danger of being exceeded. This study involved Gravimetric Monitoring techniques.
2. Establish whether there is relevant exposure 'near' to the sources of dust emission ('near' is defined depending on the estimated annual mean background PM_{10} concentration in 2004 and 2010 at each source).	
3. Determine whether there are dust concerns associated with the facility.	
Question	
Are there recent complaints about dust? Does the visual inspection indicate significant dust?	The SEPA study (Ref. 11), which was completed in April 2006, concluded that, although the coal facility was a significant source of particulate material in the local area, the 2010 Objectives were already being complied with in Cockenzie and Port Seton.
Action	
No further action required	

(M) Aircraft

Approach	
1. Establish whether there is relevant exposure within 500m of the airport boundary	There are no airports in East Lothian.
2. Obtain information on annual throughput of passengers and tonnes of freight in the most recent year possible (and 2010 in Scotland). Calculate the total equivalent passenger numbers in million passengers per annum (mppa)	
Questions	
• Is the predicted total equivalent passenger throughput more than 10 mppa? • Is the predicted total equivalent passenger throughput in 2010 more than 5 mppa (Scotland Only)?	N/A
Action	
No further action required	

9. CONCLUSIONS AND RECOMMENDATIONS

The results of the updating and screening assessment carried out for all pollutants indicates that current Air Quality Objectives are being complied with and that, furthermore, there will be no potential exceedences of the air quality objectives specified for 2008 (Lead) and 2010 (Benzene and PM_{10}). There is no requirement to proceed to a detailed assessment for any pollutants.

Monitoring of NO_2 and PM_{10}, using both passive and automatic monitoring techniques, will continue in Musselburgh in order to report progress in maintaining concentrations of pollutants below the relevant air quality objectives.

10. REFERENCES

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4. East Lothian Council, Local Air Quality Management: Updating and Screening Assessment, March 2004

5. East Lothian Council, Local Air Quality Management: Detailed Assessment, April 2005.

6. East Lothian Council, Local Air Quality Management: Progress Report, August 2005.

7. Department of Environment, Food and Rural Affairs, Air Quality Information Archive, accessed via www.airquality.co.uk, 2005

8. Highways Agency, Design Manual for Roads and Bridges Screening Method, Version 1.02, November 2003.

9. Communication from SEPA to East Lothian Council, 24 April 2006

10. Communication from SEPA to East Lothian Council, 26 January 2006

11. Scottish Environmental Protection Agency, Report No. SE05_02 – Deposition of Coal Dust in Cockenzie and Port Seton, Summer/Autumn 2005, April 2006

12. Count-on-Us, Traffic Survey on behalf of East Lothian Council, May 2004

FIGURES

Figure 1 NO_x Diffusion Tube and Continuous Analyser Locations and PM_{10} Monitoring Locations in Musselburgh

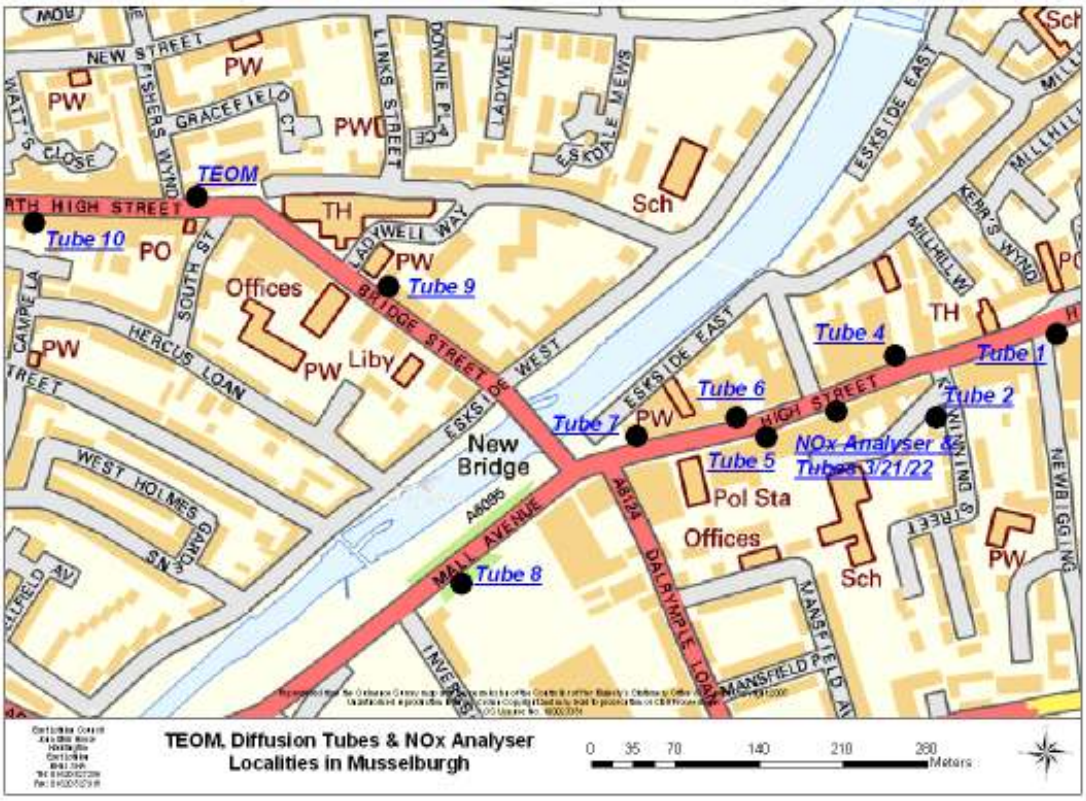


Figure 2 NO_x Diffusion Tube Locations in Tranent

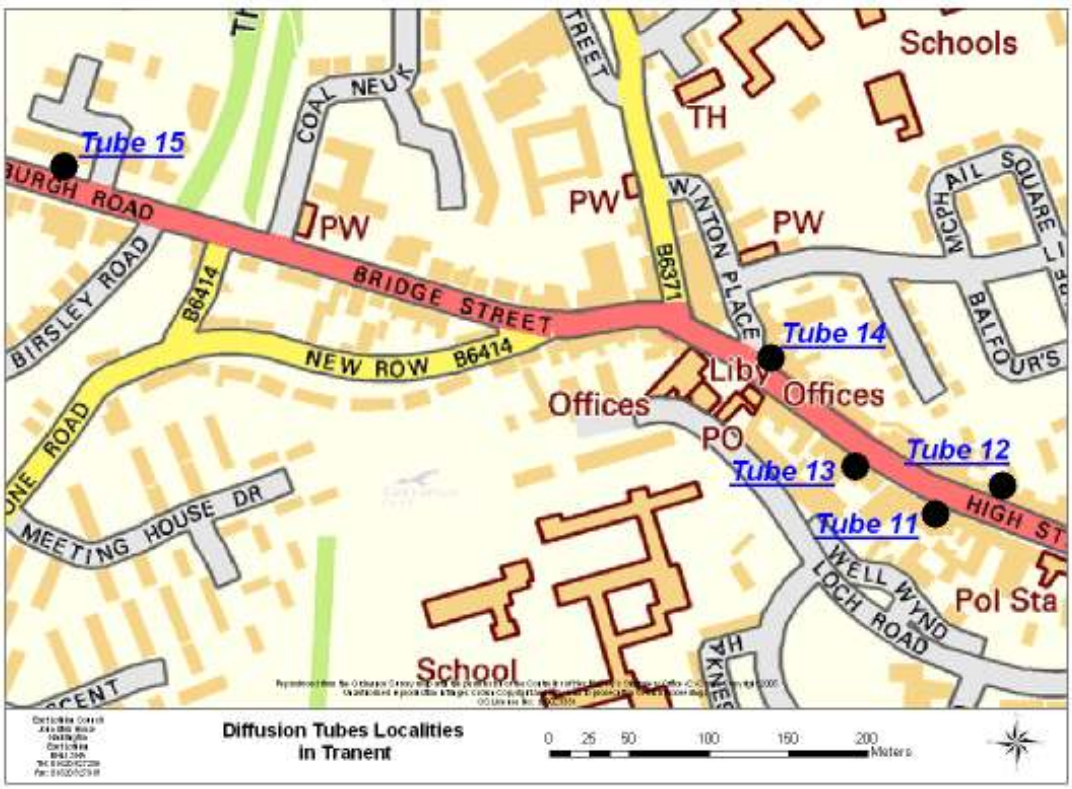
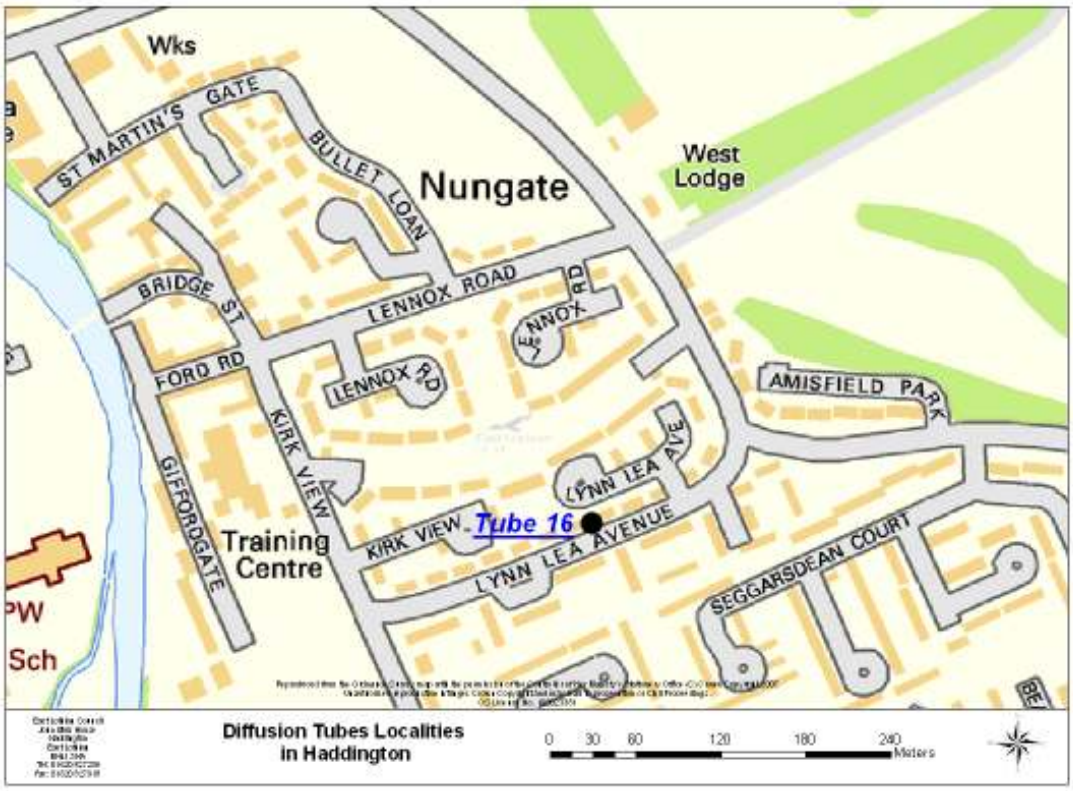


Figure 3 Diffusion Tube Locations in Haddington



APPENDICES

1. AIR QUALITY MONITORING

Nitrogen Dioxide Monitoring in East Lothian

This appendix contains details and results of the nitrogen dioxide monitoring which has been carried out in East Lothian in the previous three years. Table 1 shows the results of the continuous analyser monitoring in Musselburgh High Street. Table 2 shows the results of the nitrogen dioxide diffusion tube monitoring carried out at several locations in East Lothian. Table 3 shows the predicted Annual Means in 2006.

Table 1 Continuous analyser results for 2003 – 2005

Analyser Location	Status	Year	Average Concentration ($\mu g/m^3$)	99.8th Percentile of hourly means	Capture Rate	Notes
Musselburgh High Street (Happit)	Roadside	2003	33.3	119.4	76%	Data missing for all or part of May, June, July and October.
		2004	30.9	115.1	92%	Data missing for parts of May and December
		2005	29.0	116.4	84%	Data missing for parts of June and July. Remaining available data used to calculate diffusion tube bias adjustment factor (see note below).

Diffusion Tube Bias Adjustment Factor

It is important to note that three of the diffusion tubes are co-located with the continuous analyser at the Happit building in Musselburgh High Street (see Table 2 – Tubes 3, 21 & 22). The bias adjustment factor has been calculated from the comparison of the diffusion tube and continuous analyser measurements. However, the comparison can only be made for 10 months of data, as the analyser was offline during all or parts of June and July of 2005. The average nitrogen dioxide concentration recorded by the analyser for the 10-month period was 29.0 $\mu g/m^3$. The average concentration recorded by the diffusion tubes over the same period was 50.5 $\mu g/m^3$. The bias adjustment factor is calculated as 0.57. This local bias adjustment is quite large so the average bias adjustment for 2005 for the laboratory that carried out the analysis, Cassella Cre Air, of 0.81 has also been applied to the uncorrected concentrations so that comparisons against the relevant air quality objective can be made.

It should be noted that bias adjustment factors are site specific and their use on diffusion data from other locations should be treated with caution.

Table 2 Diffusion Tube results for 2004 and 2005 and Estimate of NO_2 concentration in 2006

Tube No.	Diffusion Tube Location	Tube Status	Year	Uncorrected concentration ($\mu g/m^3$)	Biased adjusted concentration for 2005 (uncorrected x bias) ($\mu g/m^3$)		Capture Rate
					Local Bias (0.57)	Laboratory Average Bias (0.81)	
1	Musselburgh - Newbigging junction	Roadside	2004	39	-	-	100%
			2005	**43**	**25**	**35**	**100%**
2	Musselburgh – Kilwinning	Intermediate	2004	20	-	-	100%
			2005	**24**	**24[1]**	**24**	**100%**
3	Musselburgh - High Street (Happit) 3	Roadside	2004	44	-	-	100%
			2005	**49**	**28**	**40**	**100%**
21	Musselburgh - High Street (Happit) 3a	Roadside	2004	44	-	-	100%
			2005	**47**	**27**	**38**	**100%**
22	Musselburgh - High Street (Happit) 3b	Roadside	2004	50	-	-	100%
			2005	**49**	**28**	**40**	**100%**
4	Musselburgh - High Street (Woolworths)	Roadside	2004	32	-	-	100%
			2005	**36**	**21**	**29**	**100%**
5	Musselburgh - High Street (Boots)	Roadside	2004	53	-	-	100%
			2005	**61**	**35**	**49**	**100%**
6	Musselburgh - High Street (Coble Pub)	Roadside	2004	47	-	-	100%
			2005	**32**	**18**	**26**	**83%**
7	Musselburgh - High Street (Day Centre)	Roadside	2004	42	-	-	100%
			2005	**47**	**27**	**38**	**100%**
8	Musselburgh - Mall Avenue (Opposite Tesco)	Roadside	2004	27	-	-	100%
			2005	**34**	**19**	**28**	**92%**

Table 2: Diffusion Tube results for 2004 and 2005 (Cont)

Tube No.	Diffusion Tube Location	Tube Status	Year	Uncorrected concentration (µg/m^3)	Biased adjusted concentration for 2005 (uncorrected x bias) (µg/m^3)		Capture Rate
					Local Bias (0.57)	Laboratory Average Bias (0.81)	
9	Musselburgh - Bridge Street (Garage)	Roadside	2004	33	-	-	100%
			2005	**37**	**21**	**30**	**100%**
10	Musselburgh - North High Street	Roadside	2004	44	-	-	100%
			2005	**47**	**27**	**38**	**100%**
11	Tranent - High Street (No 89)	Roadside	2004	40	-	-	100%
			2005	**44**	**25**	**36**	**100%**
12	Tranent - High Street (Opposite chip shop)	Roadside	2004	34	-	-	100%
			2005	**33**	**19**	**27**	**100%**
13	Tranent - High Street (No)	Roadside	2004	39	-	-	100%
			2005	**45**	**26**	**36**	**100%**
14	Tranent - opposite Post office	Roadside	2004	30	-	-	100%
			2005	**32**	**18**	**26**	**100%**
15	Tranent - Forth View	Roadside	2004	34	-	-	100%
			2005	**22**	**13**	**18**	**92%**
16	Haddington – Lyn Lea	Urban background	2004	11	-	-	100%
			2005	**14**	**14**[1]	**14**[1]	**100%**

Table 3 Estimation of annual mean concentration in 2006 from continuous analyser and diffusion tube measurements

Tube No.	Monitoring Location	Measurement Method	Measured Concentration in 2005 (µg/m^3)		Estimated annual mean concentration in 2006 (µg/m^3)	
			Local Bias Adjustment of 0.57 applied	Laboratory Average Bias Adjustment of 0.81 applied	Local Bias Adjustment of 0.57 applied	Laboratory Average Bias Adjustment of 0.81 applied
1	Musselburgh - Newbigging junction	Diffusion tube	25	**35**	24	**34**
2	Musselburgh – Kilwinning	Diffusion tube	24[1]	**24**[1]	23[1]	**23**[1]
3	Musselburgh - High Street (Happit)	Continuous Analyser	29[1]	**29**[1]	28[1]	**28**[1]
4	Musselburgh - High Street (Woolworths)	Diffusion tube	21	**29**	20	**28**
5	Musselburgh - High Street (Boots)	Diffusion tube	35[2]	**49**[2]	34[2]	**48**[2]
6	Musselburgh - High Street (Coble Pub)	Diffusion tube	18	**26**	17	**25**
7	Musselburgh - High Street (Day Centre)	Diffusion tube	27	**38**	26	**37**
8	Musselburgh - Mall Avenue (Opposite Tesco)	Diffusion tube	19	**28**	18	**27**
9	Musselburgh - Bridge Street (Garage)	Diffusion tube	21	**29**	20	**29**
10	Musselburgh - North High Street	Diffusion tube	27	**38**	26	**37**
11	Tranent - High Street (No 89)	Diffusion tube	25	**36**	24	**35**
12	Tranent - High Street (Opposite chip shop)	Diffusion tube	19	**27**	18	**26**
13	Tranent - High Street (No)	Diffusion tube	26	**36**	25	**35**
14	Tranent - opposite Post office	Diffusion tube	18	**26**	17	**25**
15	Tranent - Forth View	Diffusion tube	13	**18**	13	**17**
16	Haddington – Lynlea	Diffusion tube	14[1]	**14**[1]	14[1]	**14**[1]
Annual Mean Air Quality Objective			40	**40**	40	**40**

Note 1: Concentrations not bias adjusted.
Note 2: No relevant exposure at this location

PM_{10} Monitoring in East Lothian

This appendix contains details and results of the PM_{10} monitoring which has been carried out in East Lothian. Table 4 shows the results of continuous analyser monitoring at North High Street, Musselburgh. Table 5 shows the PM_{10} concentrations in 2005/06 and estimated concentrations for 2010 for comparison to the relevant Air Quality Objectives. The current air quality objectives are based on a gravimetric method of assessment. The data used in this assessment was obtained using a Tapered Element Oscillating Microbalance (TEOM) analyser. Therefore correction factors of 1.3 (National) and 1.14 (Local) have been applied to data, as per guidance in LAQM TG(03) update, in order to obtain Gravimetric equivalent concentrations. Table 6 shows how future predictions were assessed using 2005 as the reference year for measured data.

Table 4 PM_{10} continuous analyser results

Analyser Location	Status	Year	Measured Concentration (µg/m^3)			Capture Rate (%)	Notes
			Annual Mean		Number of exceedences of 24 hour mean of 50		
			*standard conversion factor of 1.3 (µg/m^3)	*local conversion factor of 1.14 (µg/m^3)			
North High Street, Musselburgh (ID TEOM)	Roadside	2005/06	19.2	16.9	3	98.6	TEOM was only commissioned on 01 June 2005 so data obtained for 1 year from 01/06/05-31/05/06.
PM_{10} Air Quality Objective value for 2004			**40**	**40**	**35 Exceedences**		

Table 5 Estimation of PM_{10} concentration in 2010 following approach described in LAQM TG (03) update.

Monitoring Location	Measured Concentration in 2005 ($\mu g/m^3$)	Estimated annual mean concentration, 2006 ($\mu g/m^3$)	Estimated annual mean concentration, 2007 ($\mu g/m^3$)	Estimated annual mean concentration, 2008 ($\mu g/m^3$)	Estimated annual mean concentration, 2009 ($\mu g/m^3$)	Estimated annual mean concentration, 2010 ($\mu g/m^3$)
North High Street, Musselburgh	19.2	18.95	18.66	18.37	18.09	17.84
PM_{10} Air Quality Objective value for 2010						**18**

*Note - Primary and secondary PM_{10} fractions for future years have been derived from measured data using 2005 as the reference year. See Table 6 for explanation as to how future concentrations were assessed.

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Table 6 Method for assessing future PM_{10} concentrations as per LAQM TG(03) update.

Particulate source category	YEAR					
	2005	2006	2007	2008	2009	2010
Secondary $PM_{10\ (2004)}$[1]	4.03	4.03	4.03	4.03	4.03	4.03
Secondary $PM_{10\ (2005)}$[2]	3.93	3.93	3.93	3.93	3.93	3.93
Primary $PM_{10\ (2005)}$[3]	9.47	9.47	9.47	9.47	9.47	9.47
Secondary $PM_{10\ (future\ year)}$[4]	N/A	3.83	3.73	3.63	3.53	3.43
Primary $PM_{10\ (future\ year)}$[5]	N/A	9.32	9.13	8.94	8.76	8.61
Residual Fraction[6]	5.8	5.8	5.8	5.8	5.8	5.8
TOTALS[7]	**19.2**	**18.95**	**18.66**	**18.37**	**18.09**	**17.84**

Note 1 - Secondary PM_{10} value for 2004 derived from Background maps.
Note 2 - Secondary PM_{10} value for 2004 used in spreadsheet to project secondary PM_{10} value for 2005.
Note 3 - Primary PM_{10} value for 2005 derived by subtracting the secondary and coarse fractions for 2005 from the Total measured PM_{10} in 2005.
Note 4 - The Secondary PM_{10} for 2005 can then be used in spreadsheet to predict Secondary PM_{10} for future years
Note 5 - The Primary PM_{10} for 2005 can then be used in spreadsheet to predict Primary PM_{10} for future years
Note 6 - The residual (previously coarse) fraction of PM_{10} is assumed to be 5.8 $\mu g/m^3$ (gravimetric) for all years in all locations
Note 7 - The Total predicted PM_{10} for each future year is therefore the primary + secondary + residual.

2. TRAFFIC DATA AND DMRB SCREENING ASSESSMENTS

Traffic Flow Data and Results of DMRB Screening Assessment

Tables 7 and 8 provide details of the traffic information that was obtained from a survey carried out in 2004 (Ref.12) and also the results of the DMRB Screening Assessments that were carried out for Musselburgh High Street and North High Street.

Table 7 Traffic Information and results of DMRB Screening Assessment for 2005

Road	AADT in 2004	Predicted AADT in 2005	LDV (%)	HDV (%)	Average Speed (Km/h)	Background PM_{10} Concentration in 2005 ($\mu g/m^3$)	Distance of nearest sensitive receptor to centre of road (m)	Predicted PM10 concentration at nearest sensitive receptor in 2005 ($\mu g/m^3$)	Predicted number of exceedences of the 24-hour objective of 50 $\mu g/m^3$ (Days)
High Street, Musselburgh	17088	18696[1]	92.17	7.83	25[2]	14.9[3]	10	20.44	3.96
North High Street, Musselburgh	15024	16608[1]	93.97	6.03	25[2]	14.9[3]	10	19.51	2.83
PM10 air quality objectives								**40**	**35 Exceedences**

Note 1: Traffic Flows for 2005 were forecast by applying Tempro 3.1as per Detailed Assessment (Ref. 5)
Note 2: No vehicle speed data available. Vehicle speeds estimated based on the speed limit of the road.
Note 3: Figures obtained from updated background maps provided by DEFRA (Ref. 7)

Table 8 Traffic Information and results of DMRB Screening Assessments for 2010

Road	AADT in 2004	Predicted AADT in 2005	LDV (%)	HDV (%)	Average Speed (Km/h)	Background PM_{10} Concentration in 2005 ($\mu g/m^3$)	Distance of nearest sensitive receptor to centre of road (m)	Predicted PM10 concentration at nearest sensitive receptor in 2005 ($\mu g/m^3$)	Predicted number of exceedences of the 24-hour objective of 50 $\mu g/m^3$ (Days)
High Street, Musselburgh	17088	20568[1]	92.17	7.83	25[2]	13.8[3]	10	17.04	0.76
North High Street, Musselburgh	15024	18288[1]	93.97	6.03	25[2]	13.8[3]	10	16.55	0.52
PM10 air quality objectives								**18**	**7 Exceedences**

Note 1: Traffic Flows for 2005 were forecast by applying Tempro 3.1as per Detailed Assessment (Ref. 5)
Note 2: No vehicle speed data available. Vehicle speeds estimated based on the speed limit of the road.
Note 3: Figures obtained from DEFRA (Ref. 7)

3. INDUSTRIAL SOURCES EMISSIONS DATA

Cockenzie Power Station

Table 7 shows the emissions data for Cockenzie Power Station, provided by SEPA. Table 8 shows the additional data such as emissions parameters and details of the nearest buildings.

Table 9 Emissions from Cockenzie Power Station

Substance	Emission rate (Tonnes per annum)		Change (%)
	2002	2005	
NOx	10660	11400	+6.9
SO_2	19740	16000	-18.9
Total Particulates	797	871	+9.3

Table 10 Additional Emissions Parameters for Cockenzie Power Station

Parameter	
Number of stacks	2
Stack height	149.4m
Stack diameter	7.35
Temperature	132 ^oC
Height of tallest building within 5 stack heights of stacks	62m

Lafarge Cement Works

Table 9 shows the emissions data for Lafarge Cement Works, provided by SEPA. Table 10 shows the additional data such as emissions parameters and details of the nearest buildings.

Table 11 Emissions from Lafarge Cement Works

Substance	Emission rate (Tonnes per annum)		Change (%)
	2002	2005	
NOx	1110	1270	+14.4
SO_2	5360	5360	0
Total Particulates	70.4	117	+66.2

Table 12 Additional Emissions Parameters

Parameter	
Number of stacks (flues in stack)	1 (1)
Stack height	105.5 m
Stack diameter	3 m
Temperature	95 – 112 ^oC [1]
Height of tallest building within 5 stack heights of stacks	45m

Note1: temperature varies with the Raw Mill either on or off (lowest temperature is during Raw Mill on)

4. SCREENING ASSESSMENTS OF INDUSTRIAL SOURCES

SCREENING ASSESSMENT OF INDUSTRIAL SOURCES

Lafarge Cement Works

The results are shown below. The Maximum Emission Rate calculated using the tool after the appropriate emissions parameters have been entered was compared to the actual emission rates detailed in Appendix 3. The background concentrations for each pollutant were taken from the active maps provided by DEFRA (Ref. 10). The values used to represent the background concentrations in the vicinity of the cement works were those representing the 1km by 1km grid square 2 km to the south east from the site (adjacent to the A1). This was done to avoid 'double counting' emissions from the cement works.

PM_{10} Screening Assessment

Tool for PM_{10} from combustion stacks > 10m high		
TG03 Figure Ref: 8.2		
The emissions of PM_{10} in tonnes per annum from combustion source emissions (>100°C) are calculated for your given stack details that would result in a 90th percentile 24-hour ground level PM_{10} concentrations less than 1 µg/m^3		
Enter required information in Yellow Cells Resulting Emission in Red Bold		
Diameter	3	m
Stack height	105.5	m
Building height	45	m
PM_{10} Background concentration (include roadside contribution at relevant receptors)	11.4	µg/m^3
Objective year	2004	
Location (UK, London, Scotland)	Scotland	
Calculated Effective stack height	100.4	m
Maximum Emission Rate	**2038.4**	Tonnes per annum
If your actual stack emissions in tonnes per annum are less than the target above you do not need to proceed, if your actual emissions are greater than the target refer to TG03 for further advice		

Tool for PM_{10} from low temperature stacks < 100°C and > 10m high

TG03 Figure Ref: 8.3

The emissions of PM_{10} in tonnes per annum from low temperature source emissions (<100°C) are calculated for your given stack details that would result in a 90th percentile 24-hour ground level PM_{10} concentrations less than 1 μg/m³

Enter required information in Yellow Cells
Resulting Emission in Red Bold

Diameter	3	m
Stack height	105.5	m
Building height	45	m
PM_{10} Background concentration (include roadside contribution at relevant receptors)	11.4	μg/m³
Objective year (2004 or 2010)	2004	
Location (UK, London, Scotland)	Scotland	
Calculated Effective stack height	100.43	m
Maximum Emission Rate	**896.57**	Tonnes per annum

If your actual stack emissions in tonnes per annum are less than the target above you do not need to proceed, if your actual emissions are greater than the target refer to TG03 for further advice

Tool for PM_{10} from combustion stacks > 10m high

TG03 Figure Ref: 8.5

The emissions of PM_{10} in tonnes per annum from combustion source emissions (>100°C) are calculated for your given stack details that would results in a maximum annual mean ground level PM_{10} concentrations less than 1 μg/m³

Enter required information in Yellow Cells
Resulting Emission in Red Bold

Diameter	3	m
Stack height	105.5	m
Building height	45	m
PM_{10} Background concentration (include roadside contribution at relevant receptors)	10.9	μg/m³
Objective year (2010)	2010	
Location (UK, London, ,Scotland)	Scotland	
Calculated Effective stack height	100.4	m
Maximum Emission Rate	**1440.3**	Tonnes per annum

If your actual stack emissions in tonnes per annum are less than the target above you do not need to proceed, if your actual emissions are greater than the target refer to TG03 for further advice

Tool for PM_{10} from low temperature stacks < 100°C and > 10m high		
TG03 Figure Ref: 8.6		
The emissions of PM_{10} in tonnes per annum from low temperature source emissions (<100°C) are calculated for your given stack details that would results in a maximum annual mean ground level PM_{10} concentrations less than 1 μg/m³		
Enter required information in Yellow Cells Resulting Emission in Red Bold		
Diameter	3	m
Stack height	105.5	m
Building height	45	m
PM_{10} Background concentration (include roadside contribution at relevant receptors)	10.9	μg/m³
Objective year (2010)	2010	
Location (UK, London, Scotland)	Scotland	
Calculated Effective stack height	100.43	m
Maximum Emission Rate	**633.47**	Tonnes per annum
If your actual stack emissions in tonnes per annum are less than the target above you do not need to proceed, if your actual emissions are greater than the target refer to TG03 for further advice		

Conclusions of Lafarge Cement Works Screening Assessment

The results of the screening assessments for Lafarge Cement Works indicate that emissions of PM_{10} are below the thresholds in each nomogram.

5. AIR QUALITY OBJECTIVES FOR SCOTLAND

UK objectives set in Regulations				
Pollutant	**Applies**	**Concentration**	**Measured as**	**Compliance Date**
Benzene	All UK	16.25 µg/m^3	Running annual mean	31 December 2003
	Scotland	3.25 µg/m^3	Annual mean	31 December 2010
1,3-Butadiene	All UK	2.25 µg/m^3	Running annual mean	31 December 2003
Carbon Monoxide	All UK	10 mg/m^3	Maximum daily running eight hour mean	31 December 2003
Lead	All UK	0.5 µg/m^3	Annual mean	31 December 2004
		0.25 µg/m^3	Annual mean	31 December 2008
Nitrogen Dioxide	All UK	200 µg/m^3	1-hour mean, 18 exceedences	31 December 2005
		40 µg/m^3	Annual mean	31 December 2005
Particles (PM_{10}) (gravimetric)	All UK	50 µg/m^3	24-hour mean, 35 exceedences	31 December 2004
		40 µg/m^3	Annual Mean	31 December 2004
	Scotland	50 µg/m^3	24-hour mean, 7 exceedences	31 December 2010
		18 µg/m^3	Annual Mean	31 December 2010
Sulphur Dioxide	All UK	350 µg/m^3	1-hour mean, 24 exceedences	31 December 2004
		125 µg/m^3	24-hour mean, 3 exceedences	31 December 2004
		266 µg/m^3	15-minute mean, 35 exceedences	31 December 2005