greater WELLINGTON
THE REGIONAL COUNCIL

Report **03.674**
Date 11 November 2003
File ENV/06/01/03

Committee **Environment**
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2003 Annual Air Quality Monitoring Report for the Wellington Region

1. Purpose

To present the results of the air quality monitoring that has been carried out at various locations within the Wellington Region since October 2002.

2. Background

The Regional Air Quality Management Plan (Air Plan) contains the following primary Objective:

4.1.1 *"High quality air in the Region is maintained and protected, degraded air is enhanced, and there is no significant deterioration in ambient air quality in any part of the Region."*

The primary issue at the time the Air Plan was written was that there was a *"Lack of adequate data and information on ambient air quality, contaminants in discharges and climatic effects in the Wellington Region"* (Issue 2.1.1). In order to assess whether Regional air quality meets this objective the Air Plan sets out a number of Methods, the most important being the establishment of an ambient air quality monitoring network:

6.1.2 *Develop and implement an ambient air quality monitoring programme, within four years of the adoption of this Plan, sufficient to provide appropriate information on which to base future air quality management decisions.*

During 2002/2003 ambient air quality monitoring was undertaken at Upper Hutt, Wainuiomata, Masterton and Lower Hutt.

3. Regional Policy Implementation

Chapter 8 of the Regional Policy Statement contains policies and methods for air quality management within the Wellington Region. The ambient air quality monitoring programme implements Policies 1-4, relating to air quality management and Methods 2 and 3 in particular.

4. Strategic context

Clean, fresh air is an objective set for the Region in our strategic plan. The target for that objective is that by 2013 there will be no recorded instances when air pollution reaches the "Alert" levels of the National Ambient Air Quality Guidelines.

5. Air quality indicators, guidelines and standards

Ambient air quality is the general quality of the air that surrounds us. Ambient air quality reflects the cumulative effects of contaminants discharged to air from all sources, both anthropogenic (from human activities) and natural sources.

The contaminants that are currently being monitored in the Wellington Region are particulate matter (PM10), carbon monoxide (CO), and nitrogen oxides (NOx). These contaminants are identified in the Regional Air Quality Management Plan as air quality indicators for the Region. Several meteorological parameters are also being monitored, (these are wind speed, wind direction, relative humidity and temperature), as they all have an effect on air pollutant concentrations.

The Regional Maximum Acceptable Level (MAL) Guidelines (based on national guidelines) are recommended only as minimum standards of air quality to protect public health. The guidelines were developed from World Health Organisation Standards and international epidemiological research.

The Maximum Desirable Levels (MDL) are defined as the level that will provide maximum protection to the environment, (including soil, water, flora, fauna, structures, and amenity values*),* taking into account existing air quality, community expectations, economic implications, and the purpose and principles of the Resource Management Act 1991. Desirable levels are appropriate guidelines or targets in rural or residential areas, and in other areas where good air quality is considered a priority. The Regional and National Guidelines are shown in Table 3.1.

Table 3.1: Regional and national air quality guidelines

Indicator	Maximum Desirable Level (Regional)	Maximum Acceptable Level (Regional /National)	Averaging Times	Techniques for Measurement
Particulates PM_{10}		50 µg/m³	24 hours	US 40 CFR Part50
		20 µg/m³	Annual	US 40 CFR Part50
$PM_{2.5}$ (interim)		25 µg/m³	24 hours	US 40 CFR Part50
Carbon Monoxide		30 mg/m³	1 hour	AS3580.7.1-1992
	6 mg/m³	10 mg/m³	8 hours	AS3580.7.1-1992
Nitrogen Dioxide	95 µg/m³	200 µg/m³	1 hour	AS3580.5.1-1993
	30 µg/m³	100 µg/m³	24 hours	AS3580.5.1-1993

5.1 National environmental standards for air quality

The Ministry for the Environment is currently in the process of promulgating a series of National Environmental Standards, including standards for Air Quality. National standards have the force of regulation. The standards are presented as a package consisting of:

- **ambient standards** for carbon monoxide (CO), particles (PM_{10}), nitrogen dioxide (NO_2), sulphur dioxide (SO_2) and ozone (O_3);
- **prohibitive standards**, which prohibit various activities that discharge unacceptable quantities of contaminants into the air;
- **an emission standard** for the design of small, domestic solid-fuel-burning appliances.

Agencies responsible for managing emissions to air under the Resource Management Act 1991 (RMA) will need to implement policies and rules to achieve the National Standards. The proposed National Environmental Standards aim to:

- create a level playing field across New Zealand;
- provide certainty and consistency;
- guarantee a level of protection for the health of all New Zealanders;
- drive effective regional and national policies to improve air quality.

The proposed Standards for Air Quality are similar to the national guidelines, except that provision for an 'allowable' number of exceedences has been included. The implementation of National Standards will have implications for Greater Wellington. For example;

(i) all exceedences of the Standard will need to be publicly notified;

(ii) Greater Wellington will be held accountable for non-compliance with the Standard.

A more comprehensive report on the new National Standard for Air Quality will be presented to the Environment Committee when it is released.

5.2 Air quality indicators

A useful method to illustrate the significance of the results is to depict the percentage of time that the results fall into certain categories. This method is described by the Ministry for the Environment in the discussion document on Environmental Performance Indicators (Ministry for the Environment, October 1997). Table 3.2 provides a description of these categories.

Table 3.2: Air quality categories

Category	Maximum Measured Value	Comment
Action	Exceeds Guideline	Completely unacceptable by national and international standards.
Alert	Between 66% and 100% of the guideline	A warning level which can lead to guidelines being exceeded if trends are not curbed.
Acceptable	Between 33% and 66% of the guideline	A broad category, where maximum values might be of concern in some sensitive locations, but are generally at a level that does not warrant dramatic action.
Good	Between 10% and 33% of the guideline	Peak measurements in this range are unlikely to affect air quality.
Excellent	Less than 10% of the guideline	Of little concern.

The results of the air quality monitoring have been assessed using the Regional Ambient Air Quality Guidelines and the categories described above. A full analysis of the results is provided in the 2003 Annual Air Quality Monitoring Report for the Wellington Region.

6. Ambient air quality monitoring results

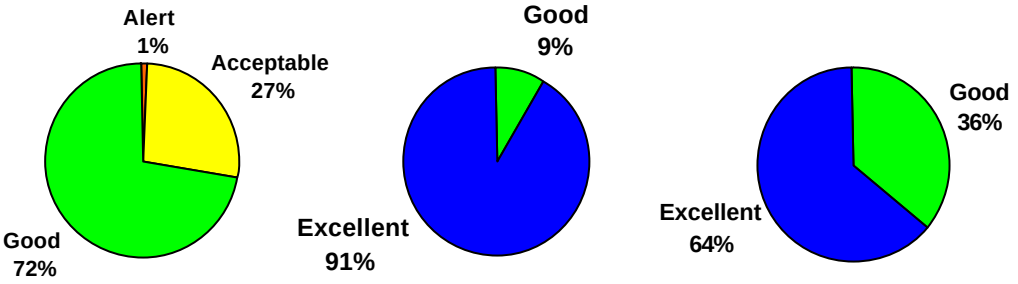
6.1 Summary of monitoring results

The ambient air quality monitoring results presented below have been compared to the National Ambient Air Quality Guidelines or Maximum Acceptable Levels for the protection of human health, instead of using the Maximum Desirable Levels set in the Regional Air Quality Management Plan. The purpose of this was to reflect how air quality in the Region may perform against the proposed National Environmental Standards.

Upper Hutt

A mobile ambient air quality monitoring station has been located at Trentham Fire Station in Upper Hutt since June 2000. The period from October 2002 through to October 2003 has been reported in this document.

24-Hour Average PM_{10} **8-Hour Average CO** **24-Hour Average NO_2**

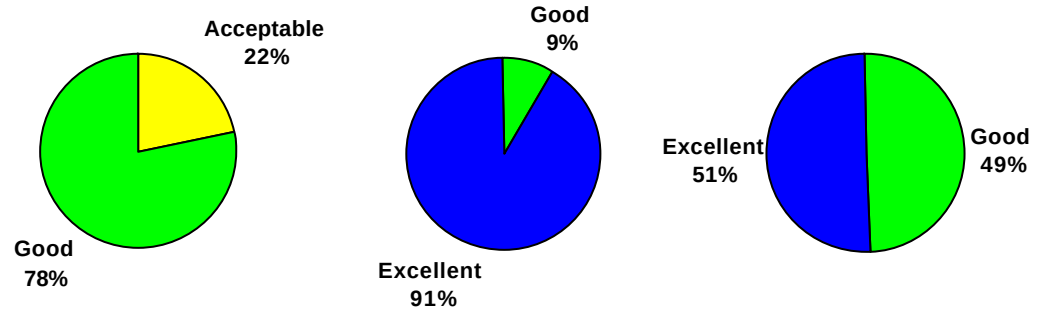


The monitoring data shows that the Upper Hutt area is susceptible to wintertime air pollution episodes due to PM10. The winter of 2003 was milder than previous winters monitored at the site and no exceedences of any National Ambient Air Quality Guidelines were recorded. Significant sources of air pollutants in Upper Hutt are motor vehicles and domestic solid fuel fires.

Lower Hutt

Greater Wellington's first permanent ambient air quality monitoring station has been operating at Birch Lane in Lower Hutt since February 2001. Monitoring results for the period from October 2002 through to October 2003 have been reported in this document.

24-Hour Average PM_{10} **8-Hour Average CO** **24-Hour Average NO_2**

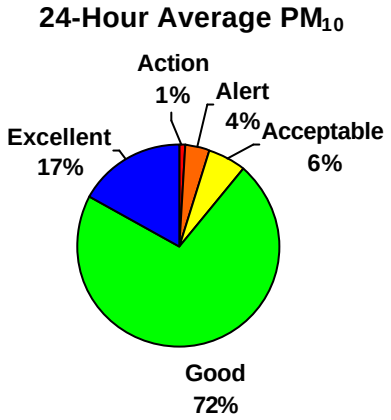


The results indicate that nitrogen dioxide levels were elevated during the winter in Lower Hutt, though there were no exceedences of ambient guideline levels. This is likely to be due to the combined effect of motor vehicle emissions and combustion emissions from residential and commercial heating, and with cold calm meteorological conditions. Peak levels occurred at similar

times as those recorded at Upper Hutt, indicating the predominant influence of the weather on air pollution levels.

Wainuiomata

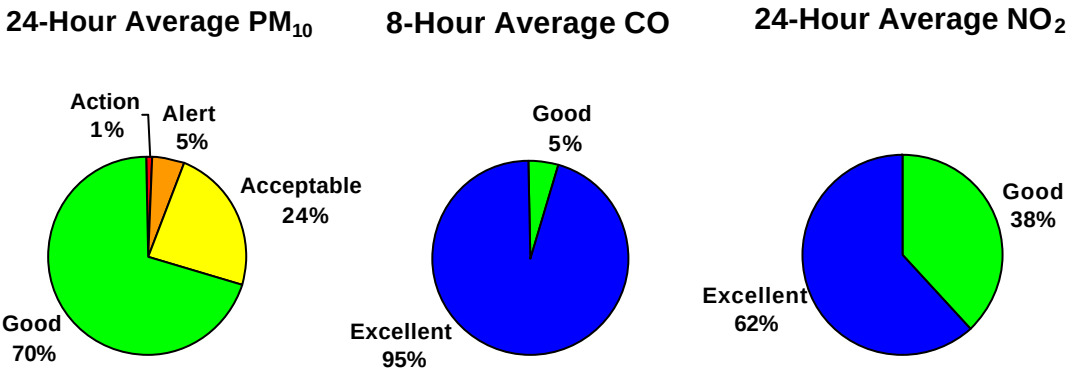
PM10 was monitored at Wainuiomata Bowling Club from October 2002 through to October 2003. Fine particulate concentrations equalled the National ambient air quality guideline on one occasion during the past winter. Peaks in air pollution occurred during cold calm weather conditions when dispersion of air pollutants was poor.



There was one recorded exceedence of the ambient air quality guideline for fine particles, although with the type of monitoring we are using there is the possibility that the actual number of exceedences could be three times this figure. It is likely that emissions from domestic solid fuel fires are the main source of air pollutants in Wainuiomata and are directly responsible for the pollution events.

Masterton

A permanent air quality monitoring station was established in Masterton at Wairarapa College in September 2002.



The ambient monitoring results for the past year indicate that Masterton has episodes of air pollution during the winter. There were five exceedences of the air quality guideline for fine particles (PM10), and if this trend continues it is unlikely that, during the winter, air quality in Masterton will meet the National Environmental Standard for Air Quality.

7. Discussion

The results of the ambient air quality monitoring carried out in the Wellington Region over the past year have indicated that the highest concentrations of air pollutants occurred during the winter. The higher winter time air pollution levels are the consequence of periods of cold, calm weather combined with emissions from combustion sources to atmosphere. Cool, calm conditions restrict the dispersion of air pollutants. The major pollution sources are most likely to be motor vehicles and residential and commercial heating.

8. Conclusion

Ambient air quality monitoring within the Wellington Region shows that air quality is generally good during the summer months at suburban locations. However, at times during the winter, certain areas experience degraded air quality that may pose a risk to the health of the local community. With the establishment of a permanent air quality monitoring network clear trends in air pollution levels are becoming evident, with winter being the likely time for pollution episodes to occur, the severity of which are entirely dependent on the type of winter we experience.

The introduction of National Environmental Standards for Air Quality will require Greater Wellington to ensure that air quality in the Region meets these Standards. Ambient air quality monitoring during the past year suggests that, during the winter, air quality in Masterton and Wainuiomata may not meet the proposed Standard for fine particles.

As the primary regulatory agency responsible for air quality management in the Region, Greater Wellington will need to take appropriate action in order to reduce air pollution at locations not complying with the national standards.

The two major sources of air pollutants in the Region, motor vehicles and domestic solid fuel fires are permitted as of right in the Regional Air Quality Management Plan. A range of policy options and mechanisms are available in order to reduce emissions from these sources:

For domestic fires:

- Banning open fires;
- Banning the installation of fires in new dwellings and installation of fires in dwellings that do not currently one;
- Setting strict emission standards for solid fuel burners;
- Requiring resource consents for domestic fires and capping the number available;

- Encouraging and/or subsidising energy efficiency measures;
- Educational programmes.

For motor vehicles:

- Initiate an 0800 SMOKY programme, (very effective in getting people to tune their vehicles);
- Support a voucher programme for engine tuning;
- Encourage the use of public transport;
- Road pricing policies;
- Advocate for, and support, national initiatives to improve vehicle emission standards, such as the improvement in fuel specifications and the introduction of emission standards and testing.

9. Future monitoring

The Resource Investigations Department, in conjunction with the Transport Division, is now in the process of establishing a permanent air quality monitoring station in central Wellington City. The monitoring station will monitor local air quality in order to assess the impact of motor vehicle emissions including trends in air pollution levels and the health implications for the local population.

10. Communications

The results of the air quality monitoring will be reported to the public by media releases and the information is available on Greater Wellington's web site.

Copies of the 2003 Annual Air Quality Monitoring Report will be sent out to constituent Councils, the Public Health Service, the Ministry for the Environment, other Regional Councils and tertiary academic institutions. Copies of the report will also be available on request to members of the public. The 2003 Annual Air Quality Monitoring Report also contains the monitoring results and statistics necessary to fulfil our part of the Environmental Monitoring Partnership Protocol Agreement between Greater Wellington and Ministry for the Environment.

Information about air quality has also been summarised into an Annual Report Card which will be available for more general distribution to the public.

11. Recommendation

It is recommended that the Committee:

1. ***receive** the report;*

2. ***note** the contents; and*

3. ***assess** policy options and other mechanisms that may be used to reduce emissions of air pollutants at source in order to ensure air quality in the Region meets the National Environmental Standards and safeguard the health of our communities.*

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