



# Effectiveness report

## Regional Air Quality Management Plan

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# **1. Introduction**

## **1.1 The need for the review**

The Regional Air Quality Monitoring Plan for the Wellington Region was publicly notified in June 1995 and, after completing the First Schedule process of submissions, hearings and appeals, was made operative on 8 May 2000. There has been one plan change, which was notified in February 2002 and made operative on 1 September 2003.

Section 35 of the Resource Management Act 1991 (the RMA) requires every local authority to monitor the efficiency and effectiveness of the policies, rules and other methods in its policy statement and plans, and to prepare a report on the results of this monitoring every five years. Councils must take appropriate action when their monitoring indicates that is necessary.

Monitoring the effectiveness of policies, rules and other methods is an on-going process from plan implementation to plan review. Such monitoring helps determine when different actions are required, and whether the level of policy intervention needs to be changed so that the objectives can be achieved.

This report presents the results of monitoring the effectiveness of the policies and methods, including rules, in the Regional Air Quality Monitoring Plan for the Wellington Region (the Plan). This report does not present any results of any efficiency monitoring. Greater Wellington does not monitor the efficiency of its policy statement or regional plans because of the difficulty in quantifying the economic costs for implementing non-regulatory methods and permitted activities and comparing those with the costs of consented activities. Monitoring the efficiency of policy statements and plans is a problem no council has yet dealt with.

## **1.2 National Environmental Standards for air quality and the Plan**

The Ministry for the Environment introduced National Environmental Standards (NES) for air quality in October 2004. The 14 standards include:

- seven standards banning activities that discharge significant quantities of dioxins and other toxics into the air (prohibited activities);
- five standards for ambient (outdoor) air quality;
- a design standard for new wood burners installed in urban areas; and
- a requirement for landfills over 1 million tonnes of refuse to collect greenhouse gas emissions.

The standards are mandatory regulations introduced through sections 43 and 44 of the RMA. They automatically supersede regional rules unless the regional rules are stricter.

The prohibited activities apply to landfill fires, burning tyres, burning bitumen, burning coated wire, burning oil, unconsented school and hospital incinerators,

and high temperature waste incinerators. The implementation and effectiveness of the rules is described and assessed in section 6. The effect of the NES on rules in the Plan is discussed in the assessment of the affected rules.

We used information about topography, meteorology, air quality monitoring results and emissions to draw up the boundaries of airsheds which were required by the NES. The report *Nominated airsheds for the Wellington region* (Davy, 2005) outlines the basis for defining gazetted airsheds. Greater Wellington took a wider approach than required by the NES by notifying airsheds where the standards would apply, not just areas where the standard was likely to be breached. The airsheds all have a confining topography, except that the whole of the Wairarapa valley was gazetted as one airshed because it has uniform meteorology.

## **2. Information used to assess the Plan**

### **2.1 Plan requirements**

Section 9.2 of the Plan sets out the procedures to be used to monitor its effectiveness. It suggests using information from the following sources:

- ambient air quality monitoring
- an emissions inventory
- complaint statistics, including about odour
- feedback from interested groups, including tangata whenua, territorial authorities, farmers and industry
- checking the supporting provisions in district plans
- monitoring results from resource consents.

Information from these sources has been used in to prepare this report, as well as staff feedback on the regional rules, actions taken to implement the methods and policies, and investigations into pollutant sources and pollution dispersion.

### **2.2 Effectiveness assessment methodology**

The effectiveness of policies, rules and other methods has been assessed by comparing the results of state of the environment monitoring, complaint statistics data, and feedback from interested groups with the implementation of the methods (including rules). Provisions have been deemed to be **effective** if implementation of the provisions has contributed to achieving the plan objectives, as measured by the state of the environment monitoring, complaint statistics data, and feedback from interested groups.

### **3. Results of the monitoring undertaken**

#### **3.1 Emissions inventory**

Between 1997 and 2001 Greater Wellington compiled an emissions inventory of the pollutants discharged from different sources across the region. The inventory covered transportation (motor vehicles), industrial, commercial, residential (home heating), agricultural (livestock and agrichemicals) and biogenic (soils and foliage). Air and Environmental Services Ltd reviewed the compiled the data, and added an analysis of greenhouse gas emissions.

According to the emissions inventory, almost all the polluting chemicals released to air in the Wellington region come from vehicle emissions. At that time, emissions from motor vehicles were estimated to account for 55% of non-methane volatile organic compounds, 94% of the nitrogen oxides, 78% of carbon monoxide, 93% of sulphur dioxide and 26% of PM<sub>10</sub> (suspended particulate matter less than 10 microns in diameter).

Shipping activities were estimated to account for most of the balance of sulphur dioxide, with most of the balance of PM<sub>10</sub> coming from residential heating (43%). Emissions of PM<sub>10</sub> vary seasonally, with people's home fires responsible for most of all fine particle emissions on cold winter nights.

#### **3.2 Elemental analysis of particulate**

Greater Wellington, in collaboration with GNS Science, identified the relative sources of airborne particulate measured at various sites in the region. Elemental fingerprints for motor vehicles, industry, domestic fires, sea salt and soils were determined using a range of techniques. This work enabled us to identify the source of airborne PM<sub>10</sub> in Masterton in 2002, 2003 and 2004.

The four major sources during air pollution events (when the National Environmental Standard of 50 µg/m<sup>3</sup> was exceeded - µg/m<sup>3</sup> is micrograms per cubic metre) were burning (smoke from home fires), sea salt, soil (elements from the earth's crust) and Ni/Cr (nickel and chromium from motor vehicle emissions). The relative contributions of very fine particulate (less than 2.5 µg/m<sup>3</sup>) on the high pollution nights was found to be burning (92 %), sea salt (6 %), soil (2 %) and Ni/Cr (< 0.1 %) (Davy et al., 2005).

#### **3.3 Regional meteorological model**

Local meteorology and its influence on the dispersion of pollutants has a significant influence on air quality and the way it is managed. The National Institute of Water and Atmospheric Research (NIWA) developed a 3-dimensional meteorological model for the Wellington region based on meteorological data collected at Greater Wellington air quality monitoring sites during 2000 and 2001.

The model has been used by applicants seeking resource consents to discharge contaminants to air to predict the impact of their proposed activities on air quality. The model could also be used for air pollution studies, modelling the

effects of hazardous substances discharged to air, and assessing the implications of changes in land use on air quality.

A shortcoming of the model is that the information used to prepare it is not owned by Greater Wellington making it difficult for model users, including Greater Wellington, to determine the meteorological conditions under which the highest ground level concentrations of pollutants are predicted. This makes it problematic to assess the cumulative impact of industrial point source discharges on air quality.

### **3.4 Vehicle emissions study**

As part of Greater Wellington's social marketing campaign *Be the Difference*, Greater Wellington participated in a national study to determine the level of tailpipe pollutants emitted by the region's vehicles in March-April 2006. Levels of carbon monoxide, nitric oxide, unburned hydrocarbons and smoke opacity (the air equivalent of water clarity) in vehicle exhausts were measured from 8000 vehicles passing a remote sensing unit. An emissions rating of good, fair or poor was determined and displayed to the passing motorist.

One of the key findings was that just 10 per cent of vehicles are responsible for over half of the total carbon monoxide and hydrocarbon emissions (Bluett and Dey, 2007). Owners of the more seriously polluting vehicles were sent letters advising them of the level of emissions from their vehicle and the benefits of tuning car engines. As an incentive they were offered the chance to be reimbursed up to \$250 towards the cost of their vehicle service.

The results highlighted the importance of engine maintenance to reduce vehicle emissions: a well tuned engine in an older vehicle can emit lower amounts of pollutants than a poorly tuned engine in a later model.

The data from this study provided an indication of emissions performance of the region's fleet in 2006 and will help us to assess the effectiveness of policies to reduce vehicle emissions in future (see section 5.5).

### **3.5 Feedback from interested groups**

Feedback from interested groups, including tangata whenua, territorial authorities, farmers and industry, was not sought specifically for the preparation of this report. Instead we have used the feedback to the regional policy statement discussion document – *Our region, their future* – sent out for public feedback in May 2006.

*Our region, their future* was sent to environmental groups, public health agencies, territorial authorities, farmers and industry, and an article seeking feedback was placed in all community newspapers. The discussion document sought people's views on significant resource management issues to be addressed in the next regional policy statement. Ninety-two people and organisations commented on the document, 24 of them made comments about air quality issues.



Air pollution caused by cars seems to be causing the most concern to people who provided feedback to us, with 14 people singling vehicles out. Suggested ways of dealing with vehicle pollution were banning heavily polluting vehicles, stopping motor sports, and putting more investment into public transport and sustainable transport initiatives.

Six people were concerned about smoke from domestic fires and wanted Greater Wellington to do more about reducing the effects of smoke. The only other matter attracting much comment was the need for more education and information – two people credited *Be the Difference* campaigns like the vehicle emissions testing with having raised awareness – and two wanted more information and subsidies about warmer homes and “clean heat”.

### **3.6 Complaint statistics**

Greater Wellington records complaints reported to its Pollution Hotline on a pollution incident database. Staff record the location, type of incident, response and the effect on the environment of all reported incidents. Information from the database is summarised in Appendix 1.

There were few pollution complaints to Greater Wellington in the first few years after regional councils took over responsibility for discharges to air in October 1991 (when the Resource Management Act came into force). It wasn't until 1998, more than two years after the plan was notified, that there was a significant jump in complaints – almost all of them about offensive odour. Complaints about smoke and dust came a distant second and third then, and have continued to do so.

Before 1998, odour complaints were largely about fish factories, meatworks, poultry farms and landfills. Odour complaints rose from 78 in 1997 to 594 in 1999, reflecting the significant impact of the sewage treatment plant at Moa Point, its associated sewage sludge de-watering plant, and the pipeline carrying the supernatant from the de-watering plant back to the treatment plant. The de-watering plant is located near a greenwaste composting plant and Wellington City Council's southern landfill at the Carey's Gully complex near Owhiro Bay and the combined effects of these activities make identification of actual odour sources problematic. Complaints about those three industries continued through 2000, with odour complaints reaching a peak of 1,063 in 2001, when odour from an asphalt plant near a residential area in Tawa added to the city's odour problems.

Over 90 per cent of the odour complaints from 1998-2002 came from ten sources:

- Asphalt Surfaces New Zealand, Tawa (formerly MKL Asphalt)
- Anglian Water International sludge dewatering plant (Carey's Gully Complex, Owhiro Bay)
- Living Earth compost plant (Carey's Gully Complex, Owhiro Bay)
- Southern Landfill (Carey's Gully Complex, Owhiro Bay)
- Moa Point (Wastewater Treatment Plant & Pump Station), Rongotai
- ChemWaste, Seaview

- Hutt valley wastewater treatment plant, Seaview
- Nuplex Environmental, Petone
- NZ Fish Products, Seaview
- Taylor Preston meatworks, Ngauranga.

Two of these enterprises have now closed - the asphalt plant in Tawa in 2001, and NZ Fish Products in 2007.

From 2002, the enforcement team began visiting the ten sites at regular times and checking for odours regardless of complaints. They compared the offensiveness of odour at these key odour sources and at affected neighbouring properties up to a few kilometres away, thereby helping staff understand what conditions exacerbated adverse odour effects. This information helped the industries manage their activities in a way to mitigate the effects on the neighbourhood.

In 2003 Greater Wellington began recording “incidents” as well as complaints, because individual incidents sometimes trigger many complaints, and this is particularly the case for odour incidents. The decline in complaints about odour since their peak in 2001 is partly because some operations have closed down, but has also been attributed to improved odour control at the meatworks in Ngauranga Gorge, Wellington, and at the Carey’s Gully complex in Wellington.

The incident database is linked to the consents and compliance database (COCO), so that staff can determine whether or not the complaint has been made about a consented activity or not. However, it was not set up to allow referencing to regional rules, making an assessment of the relevant regional plan provisions difficult. A review of all databases was completed in 2006, and a new integrated database is in the process of being designed.

### **3.7 Resource consents**

Information about all resource consents processed by Greater Wellington is recorded on the consents and compliance database (COCO). The information covers the kind of consent, the location, consent term, and notification procedures but like the incident database, COCO was not set up to assess the effectiveness of regional plan provisions. This means that information about what triggered the need for the consent, the compliance record, the other consents held for the same activity, the composition of the hearing committee – independent commissioners, iwi commissioners or councillors – is not readily accessible. A review of all databases was completed in 2006, and a new integrated database is in the process of being designed.

Prior to the enactment of the Resource Management Act 1991 (the RMA) in October 1991, discharges of contaminants to air were controlled under the Clean Air Act 1972 (the CAA). Under the CAA, activities that discharged air borne contaminants that could affect people’s health were classed as Part A, B or C processes and were regulated by either the Department of Health or city or district councils. For example, a combustion process with a rate of heat release exceeding 50 MW was a Part A process requiring a licence from the

Department of Health, combustion processes with a rate of heat release exceeding 5 MW and less than 50 MW was a Part B process licensed by city and district councils, and combustion processes with a rate of heat release between 40 kw and 5 MW required no license but had to be notified to city and district councils.

The RMA took a different approach, restricting all discharges to air from industrial or trade premises (see s 15 (1)(c)) unless allowed by a regional plan, and allowing all other discharges to air, including from mobile sources, unless specifically restricted by a regional plan. Regional councils took over the consenting role from the Department of Health and territorial authorities. The transitional provisions in the RMA deemed CAA licences to be discharge permits in terms of section 15 of the RMA (see s 385 of the RMA), and certain existing permitted uses were allowed to continue (see s 418 of the RMA). Discharges from landfills, composting plants and other waste management processes were not regulated under the CAA and were allowed to continue without RMA permits until 1 April 1995.

Most rules adopted in the Plan regulate activities that were previously regulated under the CAA. Some of these are now allowed as permitted activities subject to compliance with conditions, for example combustion processes at a rate of heat release up to 2 MW, while others require a discharge permit. Without permitted activity rules in the Plan, all new activities on industrial or trade premises would have required resource consents. For many Part C processes this would not have been appropriate because the effects were less than minor.

A summary of the consents processed since the Plan was made operative is presented in Appendix 4. Before the Plan was made operative in 1999 the number of permits issued in any year ranged from 0 to 21. Permit numbers increased slightly after the Plan was made operative, but the biggest jump came in 2005 when the National Environmental Standard for air quality required resource consents for all school boilers (see section 6.5).

### **3.8 Regional rule feedback forum**

Greater Wellington maintains a regional rule feedback forum on its intranet. This allows staff to record problems with implementing the rules, for example:

- a rule is too complicated to apply in the field
- a rule overlaps with another rule, or lacks integration with other rules
- a rule is not practical or enforceable
- a rule is irrelevant and never used.

Greater Wellington staff have recorded comments about most rules in the Regional Air Quality Management Plan.

Rules 1 and 2, which allow discharges of agrichemicals as permitted activities, have attracted the most comments. These rules are too complicated to apply,

have confusing integration with rules in the Regional Freshwater Plan for the use of herbicides over water, and are not practical or enforceable. They are also now inconsistent with regulations promulgated by ERMA for pesticide use.

Comments about specific rules are included in sections 6.1 to 6.18 below. A summary of their comments is given in Appendix 2.

### **3.9 State of the environment monitoring for air**

Greater Wellington has permanent air quality monitoring stations in Wainuiomata, Masterton, Upper Hutt, Lower Hutt, Porirua (Tawa), Karori and central Wellington, and two mobile stations currently monitoring vehicle emissions on State Highway 1 in Ngauranga Gorge and State Highway 2 at Melling.

The Wainuiomata station measures PM<sub>10</sub> (suspended particulate matter less than 10 microns in diameter) only, while the others also measure nitrogen oxides (nitric oxide (NO), and nitrogen dioxide (NO<sub>2</sub>), collectively referred to as NO<sub>x</sub>) and carbon monoxide (CO).

All results for nitrogen dioxide and carbon monoxide to date are less than 33 per cent of national standard and guideline thresholds (categorised as “good” - or “excellent” if less than 10 per cent). This level of compliance shows that these contaminants are not at concentrations that could cause adverse effects on people’s health.

Results for PM<sub>10</sub> vary seasonally and according to location. Since records began, levels have been “good” around 70 per cent of the time in Wainuiomata, Hutt City, Upper Hutt and Masterton, and around 55 per cent of the time in central Wellington city (see *Measuring up, 2005*). National standard values have been exceeded or approached on one to three days each winter in Wainuiomata, Masterton, and Upper Hutt.

## **4. Issues and objectives**

The Plan identified nine air quality issues. In summary, the issues are

1. Lack of adequate data and information on ambient air quality, contaminants in discharges and climatic effects in the Wellington region.
2. Air is a taonga and needs to be safeguarded.
3. Discharges to air from industrial or trade premises cause, or have the potential to cause, significant adverse effects on airy quality.
4. Discharges to air from domestic sources cause, or have the potential to cause, significant adverse effects on air quality.
5. Discharges to air from mobile sources, particularly mobile transport sources, cause, or have the potential to cause, significant adverse effects on air quality.

6. The spray application of agrichemicals has the potential to cause significant adverse effects resulting from spray drift.
7. The actual or potential adverse effects of odour.
8. The actual or potential adverse effects from the discharge of dust, smoke and other particulates.
9. The actual or potential adverse effects of the discharge of contaminants on global air quality.

These issues essentially follow the nine issues described in the Regional Policy Statement for the Wellington region, made operative in 1995.

There are two objectives to be achieved to address these issues:

- 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.
- 4.1.2 Discharges to air in the region are managed in a way, or at a rate which people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety while ensuring that adverse effects, including any adverse effects on:
  - local ambient air quality
  - human health
  - amenity values
  - resources or values of significance to tangata whenua
  - the quality of ecosystems, water and soil
  - the global atmosphereare avoided, remedied or mitigated.

The plan has 25 policies, 23 rules, and 31 other methods to achieve objectives 1 and 2. An assessment of the implementation and effectiveness of the non-regulatory policies and methods is given in section 5, and an assessment of the implementation and effectiveness of the rules and their related policies is given in section 6.

An overall summary of the effectiveness of all provisions in achieving the objectives of the plan is given in section 8.

## **5. Implementation and effectiveness of non-regulatory policies and methods**

Greater Wellington maintains a database of the actions staff and others, such as the Ministry for the Environment, have taken to implement the methods in each regional plan since the regional plan was made operative. A short description of what has been done to implement each of the methods is given in Appendix 3. The effectiveness of the implementation of the non-regulatory policies and methods is discussed in this section.

There has been some work towards implementing almost all non-regulatory methods in the plan. Considerable work has been completed in setting up and maintaining an ambient air quality monitoring framework and Greater Wellington now has good environmental data about air quality and the pressures on it. There has been limited provision of information and advice about reducing the effects of activities, for example, when using agrichemicals or spray painting equipment, or burning in domestic fires or in rural areas.

### **5.1 General ambient air quality management implementation**

The plan has 16 policies about general air quality management. Policies 4.2.4 to 4.2.7, and 4.2.9 to 4.2.16 are implemented when processing resource consents and are discussed in section 6 below.

Policies 4.2.1, 4.2.2 and 4.2.3 set out the direction for guidelines, indicators and data collection. These policies are implemented by methods 6.1.1 to 6.1.6, which require Greater Wellington to set up a monitoring framework for air quality in the region. These methods have been carried out (see Appendix 3.1).

The monitoring framework for air quality has been effective in assessing which areas of the region have air quality problems, and which air borne contaminants are of most concern. It is also effective in assessing our compliance with the National Environmental Standards for air quality (see section 1.1). This has contributed to our ability to achieve the objectives of the Plan.

Methods 6.1.6, 6.1.7 and 6.1.8 require Greater Wellington to support the development of national guidelines for odour, ensure complaints are responded to, and promote the use of odour diaries. These methods have been carried out.

Incidents of objectionable odour cause more complaints to Greater Wellington's Pollution Hotline than any other kind of pollution or non-compliance (see section 3.6). Many complaints relate to activities with resource consents where the effects of odour may have been better controlled by setting controls on the process rather than the effect at the property boundary.

Implementing methods 6.1.6, 6.1.7 and 6.1.8 of the Plan has had limited effectiveness. National guidelines for sampling, characterising and measuring odour have helped standardise the approach taken but responding to the numerous odour complaints can be difficult because odours can change from being offensive and objectionable to merely detectable in the time it takes an

officer to arrive at the site. Odours can also spread over very large areas affecting many people in varying intensities. Thus, complainants may feel that their complaint is not appropriately dealt with because no enforcement action is taken.

Enforcement provisions under the RMA do not deal well with cumulative effects resulting from multiple incidents of low level odour. Collectively these incidents can cause chronic effects, and would breach the “frequency” and “duration” criteria given in policy 4.2.14, but enforcement action cannot be taken because enforcement has to apply to an activity affecting a discrete time and place. Thus, unless each incident itself breaches the “objectionable” criteria, enforcement cannot be taken.

Keeping odour diaries may have helped monitor the frequency, intensity, duration, offensiveness, time and location of the odour but would not have addressed the other matters. Addressing these matters may not even be possible. Controlling odour is discussed in more detail in section 7.2.

Policy 4.2.8 directs the development and use of codes of practice and is implemented by methods 6.1.9 and 6.1.10, both of which have been carried out to a limited extent. Greater Wellington prepared leaflets about spray painting and agrichemical use in 2001 but has no data to demonstrate whether or not these have been effective in improving people’s practices when discharging these substances.

## **5.2 Discharges to air from domestic activities**

Policy 4.2.17 directs the Plan to adopt non-regulatory methods to manage discharges to air from domestic activities and policy 4.2.18 directs Greater Wellington to promote the use of the Health Act 1956 and other statutory powers to control localised nuisance effects from domestic activities. Methods 6.2.1 and 6.2.2 implement this policy by requiring Greater Wellington to provide information to the public about the adverse effects of burning treated timber and about the advantages of composting. These methods have been carried out by including information in annual environmental report cards and in *Be the Difference* campaigns (see Appendix A3.2).

Complaints about smoke have come second to odour almost every year since the Pollution Hotline was established (see Appendix 1). Some smoke sources were commercial (burning off scrub for subdivisions or smoke from the medical waste incinerator) but complaints about backyard burning and smoky fireplaces have also been made. For most cases involving domestic burning the incident was logged and no action taken because the effects were less than minor, and sometimes educational material was sent.

Throughout the region domestic fires are the source of most of the PM<sub>10</sub> (airborne particulates that are smaller than 10µm in diameter) in winter, particularly in areas where there are lots of houses and topography restricts the dispersion of the smoke. Smoke from domestic fires is the main reason that PM<sub>10</sub> concentrations approach or exceed the threshold in the National Environmental Standard (NES) in Masterton, Upper Hutt and Wainuiomata.

The effectiveness of Greater Wellington's non-regulatory approach to managing domestic fires has not been assessed because our information campaigns have been limited and any decrease in PM<sub>10</sub> levels is more likely to be associated with weather conditions than possible improved burning practices. In addition, central government introduced regulation through a design and emission standard for wood burners in the NES for air quality in 2004 that was effective from 1 September 2005.

Central government provides an interest subsidy for insulation, clean heating and other energy efficiency measures through their Energywise scheme. In the Wellington region this is implemented by EcoInsulation and the Sustainability Trust. This programme could contribute to a decrease in reliance on domestic fires, but probably only when old wood burners need removing for safety reasons or when houses are being renovated.

Taking a non-regulatory approach to managing discharges to air from domestic sources may not be effective for activities where the effects are more than minor. In particular, burning treated timber in home fireplaces, and burning rubbish in outdoor fireplaces may need specific regulation or a more widespread information campaign. These activities are probably controlled by Rule 19 but that rule is confusing and difficult to apply.

### **5.3 Discharges to air from burn-off**

Policy 4.2.19 directs Greater Wellington to avoid, remedy or mitigate effects on air quality from land clearance and promote the use of alternative means. This was to be implemented by methods 6.3.1, 6.3.2 and 6.3.3 which require Greater Wellington to liaise with relevant agencies when they grant fire permits, promote alternative means to burn offs for disposing of vegetative matter and promoting the use of guidelines which contribute to reduced emission from land clearance. There has been little work done on these methods apart from promoting composting and worm farms in schools through Take Action (see Appendix A3.3).

Complaints about smoke and unauthorised burning have come second to odour almost every year since the Pollution Hotline was established (see Appendix 1). Burning scrub for subdivision developments was the reason for some incidents but most incidents attended were compliant and no action was necessary.

It appears that this policy and the methods have had little influence on achieving the objectives of the plan and are not likely to have been effective.

### **5.4 Discharges to air from the spray and powder application of agrichemicals**

Policy 4.2.20 directs the promotion of alternative means of pest control, the use of low-effect agrichemicals, the good management of agrichemicals and training of all people applying agrichemicals. It is to be implemented by methods 6.4.1 to 6.4.6. Except for method 1 about promoting compliance through working with organisations such as Federated Farmers, and which has



not been done, Greater Wellington has taken some actions towards implementing all these methods (see Appendix A3.4).

In 2000, Douglas (2000) investigated what successful alternatives to agrichemicals and agrichemical best practice initiatives were already being used in the region, and nationally. Douglas concluded that operator concerns with cost-effectiveness and staff health had prompted some reduction in the use of pesticides and the use of weed suppressants such as mulch. To achieve further reductions, she recommended:

- Using appropriate native plants in public areas
- Supporting fledgling organics groups
- Disseminating information through the website, local papers, pamphlets, workshops and field days, and
- Working with industry groups.

The main work that Greater Wellington has done towards these methods is to support staff and Take Care volunteers in taking Growsafe courses, and using mulch and carpet in vegetation restoration projects. Training requirements for people using agrichemicals is now set out in ERMA regulations. A large part of the reason for promoting non-chemical alternatives is because changes to the ERMA regulations meant that untrained people can no longer use most chemicals.

Implementation of policy 4.2.20 has been partially effective in achieving objective 4.1.2 .

## **5.5 Discharges to air from mobile transport sources**

Policy 4.2.22 directs us to avoid, remedy or mitigate the adverse effects from discharges from mobile transport sources and promote low-polluting fuels, fuel efficient and well maintained vehicles, and good driving habits. Policy 4.2.23 directs regional and district planning practices that encourage efficient and effective public transport, walking and cycling, and reduce the growth in vehicle numbers. These policies are to be implemented by methods 6.5.1 and 6.5.2 which are to promote the need for central government initiatives and include appropriate policies in the Regional Land Transport Strategy (see Appendix A3.5).

There has been no promotion of nationwide initiatives but policy 4.2.22 has been implemented directly by *Be the Difference* campaigns and in annual environment reports. Policies in the *Wellington Regional Land Transport Strategy 2007-2016* promote public transport, cycling and walking. These were done to implement the Regional Policy Statement rather than this Plan so it seems these policies and methods have achieved little in working towards the objectives of the Plan.

## **5.6 The global environment**

Policies 4.2.24 and 4.2.25 direct us to support central government initiatives to control and minimise discharges of ozone depleting substances and greenhouse gases. These policies are to be implemented by methods 6.6.1 to 6.6.5 but there has been little work done to in implementing these methods (see Appendix A3.1).

Most of the work done towards implementing these methods has been by central government. Apart from the management of ozone depleting substances in the Ozone Layer Protection Act 1996, the main achievement has been the gazetting of the National Environmental Standards for air quality. One of these standards requires the collection and destruction of methane gas at all landfill sites with a total design capacity greater than 1 million tonnes of refuse. The regulation sets standards for the flaring of the gas, but also allows for destruction of collected gas via beneficial uses of methane such as electricity generation.

While there has been some achievement of objective 4.1.2 towards avoiding, remedying or mitigating adverse effects on the global atmosphere, the policies and methods in the Plan have done little to contribute to this.

## **6. Implementation and effectiveness of rules**

There are 23 regional rules controlling discharges of contaminants to air. Twenty of these allow the discharge as a permitted activity, one is a controlled activity, and the remaining two are discretionary activities. Apart from responding to complaints about suspected RMA non-compliance (see section 3.6), Greater Wellington did not have a specific programme to monitor compliance with permitted activity rules until 2006-07. Rule 3 (fumigation), and Rules 14 and 15 (spray painting) are the only rules in this plan to have been specifically investigated to date.

Six rules allow activities that would otherwise require a discharge permit because they are carried out on “industrial or trade premises” (the trigger for requiring a discharge permit under the RMA). Another 14 rules allow activities regardless of the kind of premises, because the effects were deemed to be less than minor and able to be controlled by general conditions.

An assessment of the implementation and effectiveness of the rules is presented here.

### **6.1 Rules 1 and 2 (agricultural)**

Rules 1 and 2 are permitted activities and apply to all premises.

Rule 1 (land-based use of agricultural) is widely used by all users of herbicides throughout the region. City and district council contractors and Greater Wellington biosecurity staff use herbicides on private and public land throughout spring, summer and autumn. The extent of herbicide use by

farmers, including market gardeners and vineyard owners has not been assessed.

Rule 2 (aerial agrichemical spray and powder application) is used by professionals rather than lay people, and although aerial applications are undertaken less commonly than land-based applications there is regular use of the rule.

Both rules are complicated and feedback suggests that people who don't use herbicides regularly struggle with interpreting them. People unsure of what they are allowed to do, particularly those in Care Groups supported by Greater Wellington, tend to ask Greater Wellington's Biosecurity department. It is likely that farmers and home gardeners are unfamiliar with the conditions of Rule 1 but we have been unable to assess that. The use of spray plans for aerial applications as required by Rule 2 is unknown, but pilots applying agrichemicals are required by CAA rules to record all facts relevant to the spraying operations at the time of spraying, so we do know that diaries are being completed.

Complaints about chemical spray to the Pollution Hotline are uncommon – only 14 complaints between 2003 and 2007. One complainant in 2005 remained dissatisfied with the response from Greater Wellington and wrote to the Parliamentary Commissioner for the Environment. The commissioner suggested that Greater Wellington update the Regional Air Quality Management Plan to refer to *NZS 8409:2004 The Management of Agrichemicals*. Any changes to the rules will be recommended after the full Plan review in 2009.

These rules are the most heavily criticised rules in the *regional rule feedback forum* (see Appendix 2) because they are too long and complicated, and they are inconsistent with rules in the Regional Freshwater Plan and the ERMA regulations. Nevertheless, they are contributing to the achievement of the objectives in the plan by allowing people to provide for their social and economic wellbeing while avoiding, remedying or mitigating adverse effects on human health and the quality of ecosystems. These rules are therefore at least partially effective.

## **6.2 Rule 3 (fumigation)**

Rule 3 is a permitted activity and applies to all premises.

The application of Rule 3 (fumigation) is unknown except for the use of methyl bromide to fumigate logs at Wellington's Centreport.

The definition of fumigant in the plan is “a substance which produces a gas, vapour, fumes or smoke.” This is ambiguous but the explanation refers to the Fumigation Regulations 1967, making it clearer that the rule is intended to allow discharges associated with fumigation procedures, not everything capable of producing gas, vapour, fumes or smoke such as a boiling kettle.

New Zealand's forest product trade relies on fumigation with methyl bromide to market-access overseas, and New Zealand's own biosecurity relies on imported logs being insect free. This rule allows the use of methyl bromide to fumigate logs at Centreport in Wellington, but to assess compliance with the rule, expensive tests have been needed to determine whether the process produced any noxious gas or vapour at the boundary. The tests have found no methyl bromide within limits of detection of the analysis undertaken, indicating that no methyl bromide goes beyond the property boundary (see file SN/05/743/03).

This rule has the general condition that the discharge does not result in dust, odour, gas or vapour which is noxious dangerous, offensive or objectionable at or beyond the boundary of the property. An assessment of this condition is given in section 7.2 below.

There is no way of assessing whether this rule is contributing to achieving the objectives in the plan.

### **6.3 Rule 4 (agricultural effluent)**

Rule 4 is a permitted activity and applies to all premises.

Rule 4 applies to farming activities and is likely to be widely used throughout the region. Clause 1 deals with effluent management and overlaps with Rule 13 in the Regional Plan for Discharges to Land, which requires a discharge permit for the application of agricultural effluent to land. This could inappropriately constrain the adoption of consent conditions about odour on those discharge permits. Other farm processes are not covered by rules elsewhere.

Apart from objectionable odours coming from a large piggery near Carterton, activities covered by this rule do not commonly cause neighbours to complain about odour. Discharges from buildings and feedlots on factory farms were added as clause 2 by plan change 1 in 2003. This addition is limited to factory farms, while buildings used for housing large numbers of other animals such as dogs and cats are excluded. This seems inappropriate because all buildings used to house large numbers of animals should be treated in the same way, regardless of whether or the building is part of a "factory farm".

This rule has the general condition that the discharge does not result in dust, odour, gas or vapour which is noxious, dangerous, offensive or objectionable at or beyond the boundary of the property. An assessment of this condition is given in section 7.2 below.

This rule makes it clear that farm activities cannot cause adverse effects on people beyond the property boundary, but it should have a wider scope and apply to applications of chicken manure and the housing of all animals. Nevertheless the rule contributes to the achievement of the objectives in the plan by allowing people to provide for their social and economic wellbeing while avoiding, remedying or mitigating adverse effects on human health and amenity values.

## 6.4 Rule 5 (animal and plant matter)

Rule 5 is a permitted activity and applies to a wide range of food production processes carried out on industrial or trade premises only. Some processes covered by the rule are coffee roasting and deep fat frying at fast food outlets regardless of the quantities involved. These processes are widespread in the region. Problems with the rule construction are discussed in section 7.1.

Some of the processes excluded from the rule (rendering, fellmongery etc) were categorised as Class A processes under the Clean Air Act, 1972. The CAA was more specific than this rule and required permission from the Department of Health for:

Any animal or plant matter processes having singly or together a raw material capacity in excess of—

(a) 0.5 of a tonne an hour, and being processes for rendering or reduction or drying through application of heat to animal matter (including feathers, blood, bone, hoof, skin, offal, whole fish, and fish heads and guts and like parts, and organic manures ...); or

(b) 5 tonnes an hour, and being processes for deep fat frying, oil frying, curing by smoking, roasting of berries or grains, or where organic matter including wood is subject to such temperatures or conditions that there is partial distillation or pyrolysis[[]; or]]

[[c) 2 tonnes an hour, and being processes for the drying of milk or milk products.]] ]

Activities allowed by this rule but requiring consents under the CAA, such as fish factories and large scale food processing factories, have been the cause of many complaints about offensive and objectionable odour. New activities allowed by this rule can set up without consultation with the affected community who can then be left to cope with unpleasant and sometimes predictable odours. Most costs associated with responding to complaints from premises causing objectionable odour are borne by Greater Wellington whereas if the activity was consented costs could be recovered from the consent holder.

The effects of the activities allowed by this rule could be more effectively controlled if premises in sensitive areas were excluded from the rule. In addition, controlling discharges to air from processing animal or plant matter would be more effective if the volume thresholds in the CAA were used instead of the reliance on the general condition about objectionable odour.

This rule has the general condition that the discharge does not result in dust, odour, gas or vapour which is noxious dangerous, offensive or objectionable at or beyond the boundary of the property. An assessment of this condition is given in section 7.2 below.

Given the high number of odour complaints about activities permitted by this rule, it appears it is only partly contributing to avoiding, remedying or mitigating adverse effects on amenity values, and therefore is not very effective in achieving the objectives of this plan.

## 6.5 Rules 6 and 7 (combustion engines, heating appliances, electrical generation plants)

Rule 6 is a permitted activity, and Rule 7 is a controlled activity, both apply to all premises.

Rule 6 allows discharges of products of combustion from external and internal combustion engines, electrical generation plants and heating appliances with a generating capacity of 2 MW or less. This rule therefore covers domestic fires and other heating appliances such as boilers that heat schools, hospitals and many other large buildings around the region. The 2002 National Environmental Standard for air quality overrides parts of this rule, requiring resource consents for school boilers, and requiring wood burners (but not multi-fuel burners or domestic open fires) to comply with emission standards and a minimum thermal efficiency standard of 65%.

Condition (i) of both rules requires discharges to have particulate concentrations less than 250 mg/m<sup>3</sup>. Staff have found this condition very difficult to assess. Only one other regional plan (Gisborne) uses this condition (Ministry for the Environment, 2008) and its inclusion in a rule that covers domestic fires may have been unintentional. The emission rate is as relevant to the effects of the activity on ambient air quality as the discharge concentration.

Staff find the requirements in condition (iii) of Rule 6 unclear, making it difficult to apply. The condition is probably unnecessary because flue heights are controlled in *AS/NZS 2918:2001 Domestic Solid Fuel Burning Appliances*, and compliance with the standard is taken as an “acceptable solution” to the building code. Condition (iv), which requires “uninterrupted vertical discharge of vapours” is also covered in *AS/NZS 2918:2001* which requires any chimney flue to be installed in a way that ensures that no flue gases will enter nearby windows or other openings such as fresh air inlets, mechanical ventilation inlets or exhausts.

Rule 7 is a controlled activity requiring a resource consent for external and internal combustion engines, electrical generation plants and heating appliances with a generating capacity between 2 and 5 MW. This is a similar level of regulation to what was required under the Clean Air Act 1972 which required combustion processes with a rate of heat release between 40 kw and 5 MW to be notified to city and district councils. It is not known how many activities have been consented under this rule.

Neither rule distinguishes between fuel types, some of which produce less smoke and pollution than others. There is a confusing and possibly unenforceable comment in the explanation to Rule 6 that “the burning of materials explicitly excluded from Rule 19 is a discretionary activity”. The rules would be more effects-based if different levels of control were applied to wood, coal, oil and gas, and if some materials, such as painted and treated timber, chipboard, rubber, plastics and waste oil, were explicitly excluded.

Rule 6 does not deal with the cumulative effects of heating appliances, particularly domestic fires. Furthermore, council staff cannot enter private

dwellings to check compliance with the conditions with this rule or the NES for wood burners. A condition about objectionable smoke could be more effective, but is probably only necessary in gazetted airsheds because elsewhere in the region particulate matter is dispersed and does not cause a health hazard.

Complaints about smoke have come second to odour almost every year since the Pollution Hotline was established (see sections 3.6 and Appendix 1). Sources tend to be domestic fires or industrial burning of metal or timber rather than generators or boilers and most incidents attended were compliant and no action was necessary. Feedback from interested groups on *Our region – their future* (Greater Wellington, 2006) indicates that smoke from domestic fires is an issue, though one said that use of domestic fires to provide heat, and sometimes water heating, should not be restricted because it is a sustainable home heating option, especially in rural areas where wood is grown on the property.

Rule 6 has the general condition that the discharge does not result in dust, odour, gas or vapour which is noxious dangerous, offensive or objectionable at or beyond the boundary of the property. An assessment of this condition is given in section 7.2 below.

Given the high number of complaints about smoke from domestic fires, it appears it is not effective in avoiding, remedying or mitigating adverse effects of combustion processes on amenity values. Further, domestic fires are the largest contributor to PM<sub>10</sub> in three airsheds in the region (Upper Hutt, Wainuiomata and Masterton), demonstrating that this rule is not effective in dealing with the cumulative effects of domestic fires on people's health. Rule 6 is not effective in achieving the objectives of this plan, and now that the NES has adopted specific standards for wood burners and school boilers, the rules about heating appliances need to be reviewed.

## **6.6 Rules 8 and 9 (hydrocarbons, biogas and fuel conversion processes)**

Rule 8 is a permitted activity and Rule 9 is a discretionary activity, with both rules applying only to discharges from industrial or trade premises. Other premises where biogas might be produced, such as closed landfills or a piggery with an anaerobic digester are not covered. Regulations 26 and 27 of the National Environmental Standards for air quality cover discharges and flaring of landfill gas from a landfill that is or is likely to be accepting waste. The regulations do not restrict discharges of gas from closed landfills. Biogas is flared at some open and closed landfills, but the extent to which this rule is used is not known.

No consents have been issued under Rule 9.

Rule 8 has the general condition that the discharge does not result in dust, odour, gas or vapour which is noxious dangerous, offensive or objectionable at or beyond the boundary of the property. An assessment of this condition is given in section 7.2 below.

It is not known whether these rules are contributing to achieving the objectives of the plan, and whether they are effective.

### **6.7 Rule 10 (mineral extraction, sorting and storage of bulk products)**

Rule 10 is a permitted activity and applies to discharges from all premises where materials that may cause problems of dust are sorted, stored or conveyed. Clause (a) which excluded the “extraction, quarrying, mining, size reduction and screening of minerals which is part of an industrial or trade process and takes place outside the bed of any river” from being allowed by this rule was deleted by Plan change 1 in 2003.

Comments on the regional rule feedback forum (see Appendix 2) indicate that this rule is difficult to interpret and apply with some problems being:

1. The term “bulk products (whether in solid or liquid form)” could apply to anything and makes the application of the rule ambiguous.
2. The materials listed in clause 1 are mainly products that can cause dust nuisance to neighbours though “live animals” do not seem to fit in and although timber storage is included, timber mills do not appear to be. Some industrial yards can cause dust problems for neighbours and should be included.
3. The pneumatic conveying of bulk materials is specifically excluded from the rule but pneumatic conveying is not the issue – filtering the exhaust is more important. For example, a woodwork shop may extract sawdust from a work area by pneumatic conveyance but if properly controlled, this is preferable to allowing dust to circulate around the premises. Notwithstanding this, it is appropriate to require resource consents for the pneumatic conveyance of cement and other very fine materials.

This rule has the general condition that the discharge does not result in dust, odour, gas or vapour which is noxious dangerous, offensive or objectionable at or beyond the boundary of the property. An assessment of this condition is given in section 7.2 below.

Rule 10 has too much ambiguity to be an effective means of achieving the objectives of the plan.

### **6.8 Rule 11 (mineral drying and heating)**

Rule 11 is a permitted activity and applies only to industrial or trade premises. The number of operations on industrial or trade premises with processes involving drying or heating minerals and that would comply with this rule is not known.

The conditions in the rule are difficult to monitor and enforce, especially the generation capacity limit of 100 kW, the maximum particulate discharge of 250 mg/m<sup>3</sup> and the potential to emit any hazardous air pollutant listed in Appendix 1 of the Plan. The list in Appendix 1 is particularly problematic and cannot be applied in practice because it contains such an enormous range of substances



that may or may not be present in hundreds of materials. In fact, any burning will produce hazardous substances in some quantities.

There have been 30 resource consents issued for discharges of contaminants to air from mineral processes. Some consents were for asphalt plants where the activity has not complied with this rule, others were for quarries.

This rule has the general condition that the discharge does not result in dust, odour, gas or vapour which is noxious dangerous, offensive or objectionable at or beyond the boundary of the property. An assessment of this condition is given in section 7.2 below.

Some consents would have been required because the activity was excluded from this rule, indicating that the rule is contributing to achieving the objectives in the Plan. Nevertheless, some activities that required consents, such as asphalt plants, have caused significant numbers of complaints about offensive and objectionable odour. The level of compliance with this rule is also very difficult to determine and so it is not known whether this rule is effective.

## **6.9 Rule 12 (metallurgical processes)**

Rule 12 is a permitted activity and applies to all premises. The number of operations in the region that produce or process metals and that would comply with this rule is not known.

Like Rule 11, the conditions in the rule are difficult to monitor and enforce, especially the aggregated melting capacity limit of 100 kg/hour, the maximum particulate discharge of 250 mg/m<sup>3</sup> and the potential to emit any hazardous air pollutant listed in Appendix 1 of the Plan. The list in Appendix 1 is particularly problematic and cannot be applied in practice because it contains such an enormous range of substances that may or may not be present in hundreds of materials.

Condition (ii) requires the discharge to be vented through a chimney at least 3 metres higher than adjacent areas. Depending on the neighbouring terrain this can be difficult to apply.

Rule 12 has the general condition that the discharge does not result in dust, odour, gas or vapour which is noxious dangerous, offensive or objectionable at or beyond the boundary of the property. An assessment of this condition is given in section 7.2 below.

The lead re-processing plant in Seaview is an example of a metallurgical process that requires a consent because melting and sweating of lead at a rate exceeding 25 kg/hour is excluded from the metallurgical processes allowed. This threshold may be too high and it may be appropriate for all processes involving lead melting or sweating to require consents because lead is cumulative in the environment and discharges of lead to air can cause adverse on human health.

The thresholds set for allowing metallurgical processes are contributing to achieving the objectives in the plan, and this rule could be effective, but without knowing how many premises comply with the rule its effectiveness is difficult to ascertain.

#### **6.10 Rule 13 (chemical processes)**

Rule 13 is a permitted activity and applies only to industrial or trade premises. The number of operations in the region that process chemicals and that would comply with this rule is not known.

Like Rules 11 and 12, the conditions in the rule are difficult to monitor and enforce, especially the maximum particulate discharge of 250 mg/m<sup>3</sup> and the potential to emit any hazardous air pollutant listed in Appendix 1 of the Plan. The list in Appendix 1 is particularly problematic and cannot be applied in practice because it contains such an enormous range of substances that may or may not be present in hundreds of materials.

Apart from the reliance on Appendix 1, consents staff find the list of processes excluded from this rule helps them decide when a resource consent is required.

Rule 13 has the general condition that the discharge does not result in dust, odour, gas or vapour which is noxious dangerous, offensive or objectionable at or beyond the boundary of the property. An assessment of this condition is given in section 7.2 below.

There is no way of assessing whether this rule is contributing to achieving the objectives in the plan, and therefore not known whether this rule is effective.

#### **6.11 Rules 14 and 15 (spray painting)**

Rules 14 and 15 are permitted activities and apply to all premises. Spray painting processes are widespread in the region, both in industrial or trade premises – with over 500 panel beater shops and around 200 furniture making shops – and in ordinary premises where people varnish floors and glaze pottery.

There was significant public concern about the effects of spray painting when the plan was notified, in particular the effects of di-isocyanates on people's health. The Moir Street residents group appealed rules 15, 16 and 17 of the plan to the Environment Court. As a result, Greater Wellington (Davy, 2000), carried out some dispersion modelling of the discharge of these contaminants to air, followed by some sampling of the emissions from an automotive spray painting workshop in Mount Victoria, an inner city suburb in Wellington, to determine:

- the actual concentration of solvents and di-isocyanates being discharged to air; and
- the relationship between the amount of contaminants discharged and the amount of coating material used.

All predicted maximum ground level concentrations were at least an order of magnitude less than the relevant ambient air quality guideline. The low di-isocyanate concentrations could have been because most di-isocyanate compounds in modern paints are in the form of a prepolymer, which is much less volatile than corresponding monomeric di-isocyanate. Davy concluded that provided all major spray painting was carried out in purpose built spray booths and ventilated through appropriately located stacks, emissions of the application rates specified in the rules are unlikely to cause adverse health effects on neighbours.

The effects of spray painting on neighbours appears to be of less concern now with very few complaints made to the Pollution Hotline – less than 20 since the plan was made operative.

Comments on the *regional rule feedback forum* (see Appendix 2) note that the maximum particulate discharge of 250 mg/m<sup>3</sup> is very expensive to measure, has been superseded by new technology, and no longer represents best practice. Rule 15 requires air to be vented through a chimney but even small commercial operations that do not comply with this condition have no odour problems in the community.

These two rules have the general condition that the discharge does not result in dust, odour, gas or vapour which is noxious dangerous, offensive or objectionable at or beyond the boundary of the property. An assessment of this condition is given in section 7.2 below.

Given the high level of concern about spray painting when the plan was notified, and the high number of spray painting activities in the region, it is notable that there have been very few complaints about odour or fumes from activities permitted by this rule during the last six years. It appears that providing information about ways to mitigate adverse effects of spray painting on human health and amenity values may be helping to achieve the objectives of this plan. It is also possible that the Building Code requirement to comply with *AS/NZS 4114.1: 2003 Spray painting booths, designated spray painting areas and paint mixing rooms - Part 1: Design, construction and testing* is contributing to mitigating the effects on human health and amenity values inside and outside the premises.

With the apparent compliance with the rules, and lack of effects on amenity values and air quality, Rules 14 and 15 could be contributing to achieving the objectives of this plan. It is likely, however, that the Building Code is more effective than the rules in achieving the objectives.

## **6.12 Rule 16 (abrasive blasting)**

Rule 16 is a permitted activity allowing “abrasive blasting processes” but not “dry abrasive blasting” from all premises. The extent of the use of this rule is unknown.

Comments on the *regional rule feedback forum* (see Appendix 2) note that the practice of abrasive blasting structures in or over water are regulated by this

rule as well as rules in the Regional Freshwater Plan or Regional Coastal Plan. This is confusing and probably unnecessary. They state that the term “abrasive blasting”, wet or dry, needs to be better defined and should clarify that abrasive blasting processes may contain a blasting agent, and that “dry” blasting is “solid” matter.

This rule has the general condition that the discharge does not result in dust, odour, gas or vapour which is noxious dangerous, offensive or objectionable at or beyond the boundary of the property. An assessment of this condition is given in section 7.2 below.

With the apparent compliance with the rule, and lack of effects on amenity values and air quality, Rule 16 could be effective in achieving the objectives of this plan.

### **6.13 Rule 17 (cooling towers and ventilation)**

Rule 17 is a permitted activity that applies to industrial or trade premises only. It allows discharges from cooling towers, heat exchanges and forced air ventilation from working spaces and would apply to hundreds of air ventilation systems throughout the region, except those on premises not used for industrial or trade processes such as office buildings.

Limiting the application of this rule to industrial or trade premises appears to be inappropriate because all ventilation systems would need to be vented in a way that doesn’t adversely affect neighbours. The Department of Building and Housing has “Compliance Documents” which set out acceptable solutions for ventilation of all premises and installation of these systems would be checked by city and district council building inspectors.

This rule has the general condition that the discharge does not result in dust, odour, gas or vapour which is noxious dangerous, offensive or objectionable at or beyond the boundary of the property. An assessment of this condition is given in section 7.2 below.

With the apparent compliance with the rules, and lack of effects on amenity values and air quality, Rules 14 and 15 could be partly effective in achieving the objectives of this plan. It is likely, however, that compliance with the Building Code is more effective in avoiding, remedying or mitigating adverse effects of cooling towers, heat exchangers or forced air ventilation on human health and amenity values than compliance with this rule.

### **6.14 Rules 18 and 19 (land clearance and burning combustible matter)**

Rules 18 and 19 are permitted activities and apply to all premises. Rule 18 applies to burning vegetation to clear land, while Rule 19 covers all other burning including domestic fires and backyard incinerators. A plan change in 2003 corrected a minor wording error to clause (g) of this rule.

Rule 18 permits burning for land clearance, which is defined as “the removal of vegetative matter and/or construction material from land, usually occurring when new crops are to be planted or buildings erected”. Comments on the

*regional rule feedback forum* (see Appendix 2) note that this could allow all sorts of materials, including rubbish, to be burned along with the burning vegetation and construction material, and that there is no guidance on what is required to conform with the requirement to take “all reasonable steps” in the conditions.

Rule 19 allows chemical containers to be burnt in a purpose built incinerator but the incinerator guidelines in Appendix 4 of the Plan do not require any minimum temperature and would be insufficient to control the effects of the products of combustion. Rule 19 also allows the combustion of “other materials” which could include animals burned in pet crematoria. Consent requirements for pet crematoria have been ambiguous for consent staff to determine and they have requested that pet crematoria be excluded from the rule as human crematoria are, or explicitly included.

Like Rules 11, 12 and 13, Rule 19 does not allow the emission of any hazardous air pollutant listed in Appendix 1 of the Plan. The list in Appendix 1 is particularly problematic and cannot be applied in practice because it contains such an enormous range of substances that may or may not be present in hundreds of materials.

The NES bans the open burning of materials that discharge significant quantities of dioxins and other toxics into the air. These materials are tyres, bitumen, coated wire, and oil. Discharges of contaminants to air from the combustion of these materials were all specifically excluded from Rule 19, and therefore, prior to the gazetting of the NES, required a consent.

Six regional councils (Northland, Auckland, Bay of Plenty, Horizons, Nelson and Tasman) have prohibited outdoor burning of waste in particular airsheds (Ministry for the Environment, 2008). The rules in this plan were adopted before Wellington’s airsheds were gazetted but given the contribution all combustion processes make to PM<sub>10</sub> levels in airsheds, these rules could benefit from taking the same approach as those councils.

Rule 19 has the general condition that the discharge does not result in dust, odour, gas or vapour which is noxious dangerous, offensive or objectionable at or beyond the boundary of the property. An assessment of this condition is given in section 7.2 below.

With some exceptions, these rules allow the uncontrolled combustion of many kinds of material and rely on the person to take all reasonable steps to minimise adverse effects or ensure there is no objectionable smoke beyond the boundary. Products of combustion can be harmful to people’s health and reduce amenity in the area. Before and after the plan was made operative, complaints about unwanted smoke have come second only to complaints about odour. These rules are not effective in avoiding, remedying or mitigating adverse effects of open burning on human health and amenity values.

## 6.15 Rule 20 (landfilling and composting)

Rule 20 is a permitted activity and applies to all premises. It allows people to dispose of rubbish on their own properties by “landfilling” and by composting. This is likely to happen throughout the region in people’s backyards and on farms so the rule is likely to be widely applied.

Comments on the *regional rule feedback forum* (see Appendix 2) note that small commercial composting operations are not allowed by this rule yet many don’t cause objectionable odour beyond the boundary. Small “domestic landfills” are allowed by Rule 9 in the Regional Plan for Discharges to Land so it seems unnecessary and inefficient to have an additional rule in this plan. The only application of this rule in practice would be to allow Greater Wellington to take enforcement action for landfills and compost systems that cause objectionable odour beyond the boundary, but such a condition could be included in the discharges to land rule.

The rule explicitly allows discharges of gas from closed landfills provided there is no smoke, dust, odour, gas or vapour that is noxious dangerous, offensive or objectionable at or beyond the boundary of the premises or property. Because no monitoring is required, someone must show that any gas escaping from the landfill is noxious or dangerous, whereas this should be the responsibility of the landowner. Closed landfills are also allowed by Rule 21 in the Regional Plan for Discharges to Land and it would be more efficient if one rule covered this activity. Comments on the *regional rule feedback forum* (see Appendix 2) note that the rule should recognise that discharges from recently closed landfills require site closure plans, and that landfills closed 20 years ago may still emit potentially dangerous quantities of landfill gas.

The rule does not allow discharges of dust to air from cleanfills, which come under the definition of industrial or trade premises in the RMA. This means that cleanfills require a resource consent under Rule 23 of the Plan. Road construction spoil fits the definition of cleanfill and would require a consent. Rule 20 excludes discharges to air from waste transfer stations, whereas the effects of waste transfer stations, including odour, may better controlled by conditions on a land use consent required by a district plan.

This rule has the general condition that the discharge does not result in dust, odour, gas or vapour which is noxious dangerous, offensive or objectionable at or beyond the boundary of the property. An assessment of this condition is given in section 7.2 below.

The activities covered by this rule, particularly composting, are carried out at many residences around the region with few complaints to our Pollution Hotline, indicating that incidents of odour effects on neighbours are rare. This rule allows people to provide for their social, economic, and cultural wellbeing without adverse effects on amenity or human health, but it is unlikely that people are even aware of the conditions of this rule. The rule may be contributing to achieving the objectives in the plan but its effectiveness is difficult to ascertain.

## **6.16 Rule 21 (sewage treatment)**

Rule 21 allows discharges of gas from on-site sewage systems and sewage pumping stations that are part of sewerage systems. It applies to all premises and therefore allows (subject to the conditions) thousands of discharges that would be allowed as of right under the RMA (on-site sewage) and discharges from hundreds of pumping stations, some of which cause objectionable odour. For example, when the dewatering plant for the Moa Point sewage sludge was commissioned at Carey's gully in 1999 and the supernatant was piped back to the Moa Point sewage treatment plant, offensive and objectionable odour from the sewage pumping stations en route affected hundreds of residents in Lyall Bay, Island Bay and Owhiro Bay.

This rule has the general condition that the discharge does not result in dust, odour, gas or vapour which is noxious dangerous, offensive or objectionable at or beyond the boundary of the property. An assessment of this condition is given in section 7.2 below.

The activities covered by this rule, particularly discharges from on-site sewage treatment and sewage pumping stations, are carried out around the region. On-site sewage systems prompt few complaints to our Pollution Hotline, but conveyance of trade waste and sewage has had significant effects. It appears that sewage conveyance does have effects on amenity or human health, and it is unlikely that the rule is an effective means of achieving the objectives in the plan. The part of the rule covering on-site sewage treatment is not necessary because these systems are not generally on industrial or trade premises and their effects could be more effectively controlled on the rule or discharge permit that allows the discharge.

## **6.17 Rule 22 (miscellaneous processes)**

Rule 22 allows, subject to a condition, the discharge of contaminants to air from a variety of industrial or trade processes where the effects are likely to be less than minor. The list includes two processes that are not industrial or trade processes – laboratory fume cupboards, and tunnels and car parks.

Fume cupboards are required by the Building Act 1991 to be tested for a Building Warrant of Fitness, for which the owner of the building is responsible. The nature and frequency of testing is specified in a compliance schedule which is unique to each building and prescribed by the city or district council.

In general, fume cupboards must be audited to the standard in effect at the time of installation. *AS/NZS 2001: 2243.8 Safety in laboratories Part 8: Fume cupboards* is the current standard, replacing NZS 7203. The standard specifies that the fume cupboard and exhaust system must be maintained at least annually. Including laboratory fume cupboards in this rule controls an activity that is more specifically controlled by other means, and which would otherwise not be controlled by the RMA unless the discharge was from an industrial or trade process.

Vents from road or train tunnels may contain significant volumes of non-methane volatile organic compounds, nitrogen dioxide, carbon monoxide, sulphur dioxide and PM<sub>10</sub>, all of which can be hazardous to people's health. Car parking buildings may have similar emissions, but open car parks are unlikely to generate these fumes in any significant volume. There is no industrial or trade process connected with such discharges and if they are to be included in the rule, there needs to be more specificity about what is being controlled. Their inclusion as a permitted activity is unlikely to be contributing to ensuring that people's health and wellbeing is safeguarded.

Comments on the *regional rule feedback forum* (see Appendix 2) note that fumes from dry cleaning operations could cause adverse effects and should be required to have appropriate extraction units and comply with the dry cleaning industry's code of practice to reduce perchlorethylene discharges. Discharges from other miscellaneous activities allowed by this rule are vehicle service stations, welding, spray painting, road construction, and equipment used for natural gas lines.

This rule has the general condition that the discharge does not result in dust, odour, gas or vapour which is noxious dangerous, offensive or objectionable at or beyond the boundary of the property. An assessment of this condition is given in section 7.2 below.

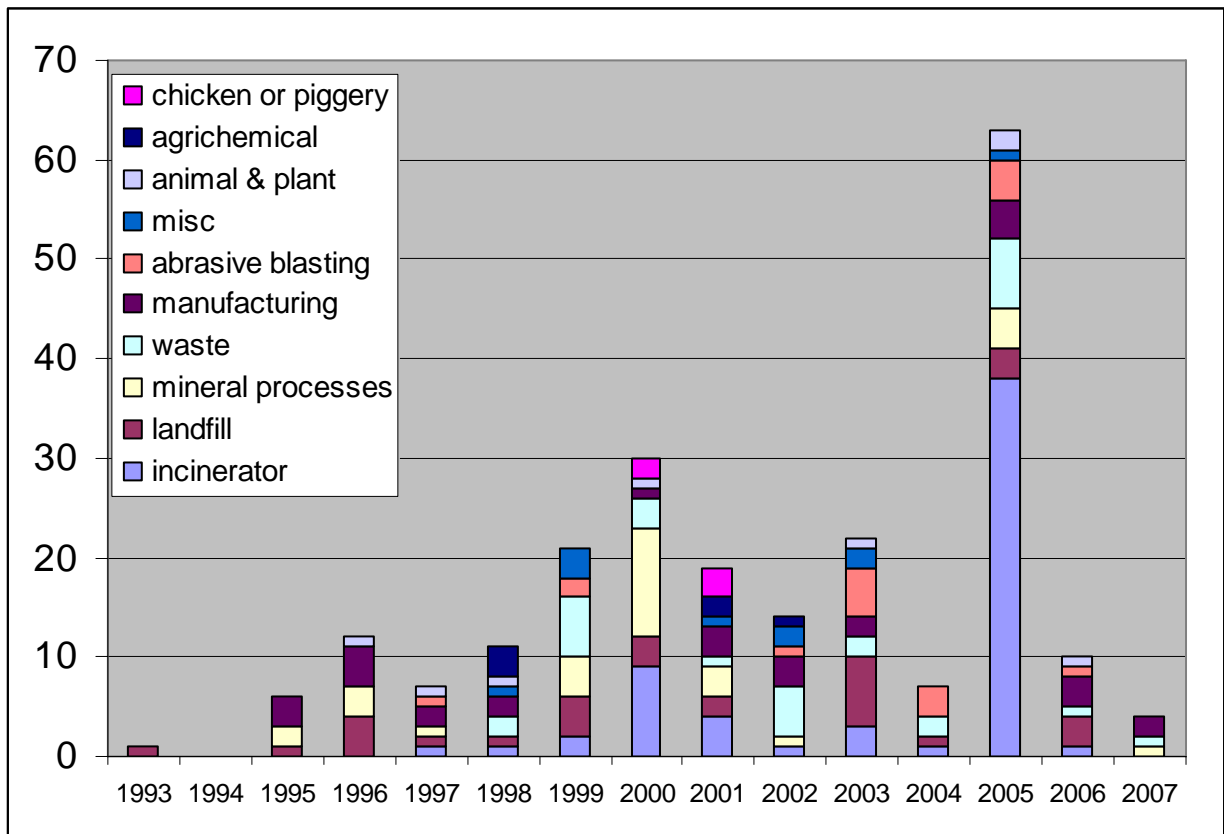
With the apparent compliance with the rules, and lack of effects on amenity values and air quality, Rule 22 could be partly effective in achieving the objectives of this plan. It is likely, however, that compliance with NZ standards is more effective in avoiding, remedying or mitigating adverse effects of these activities on human health and amenity values than compliance with this rule.

## **6.18 Rule 23, and the policies guiding consent decision-making**

Rule 23 is a discretionary activity and retains the presumption of the RMA by requiring discharge permits for discharges from industrial or trade premises unless they are specifically allowed by a rule in the Plan. There have been 169 resource consents for discharging contaminants to air issued since the plan was made operative in 2000, and of these, over a fifth (38) were required for school incinerators by one of the National Environmental Standards for air quality.

The breakdown of consented activities that discharge contaminants to air is given in Figure 1 below.





**Figure 1 Resource consents granted for discharges of contaminants to air**

There are 12 policies used to guide decision-making on consents. Five of these contain with the phrase “to avoid, remedy or mitigate...”. This adds nothing to requirements of the RMA and is not effective policy guidance for determining whether or not to grant the consent, and what conditions to include on a consent if granted.

Policy 4.2.9 lists 13 matters the consents authority must have regard to when assessing consent applications, policy 4.2.10 lists six matters the consent authority must follow when placing conditions on consents, and policy 4.2.12 list ten matters that the consent authority must have regard to when determining the nature and extent of any conditions to be placed on a consent. All matters relate to the actual or potential effects of the discharge and ways to mitigate those effects. They are not effective guidance to consent applicants or consent authorities.

Policy 4.2.15 requires the potential effects of discharges to air to be assessed using dispersion models using NIWA 1996 guidelines. These guidelines have been superseded by MfE good practice guide for atmospheric dispersion modelling (June 2004). The NES requires an assessment of whether proposed discharges will cause standards to be breached or compromise straight line paths, therefore robust dispersion modelling to predict impact of discharges on air quality will become more important.

Policy 4.2.16 requires the consent authority to have regard to the stack height guidelines in Appendix 3 when setting stack heights for burning coal, oil or

natural gas. AS/NZS 2918:2001 is an acceptable solution to the Building Code for the installation of domestic solid fuel appliances, so most district and city councils require burners to be installed in accordance with this standard in any case (Ministry for the Environment, 2008) making Appendix 3, and therefore Policy 4.2.16, redundant.

## **7. Problems that apply to many rules**

### **7.1 Rule construction and terminology**

Rules 5, 10, 11, 12, 13, 19, 20 and 21 have a clumsy construction where clause (1) allows some specified activity, then certain exemptions are introduced in an exclusion clause, then standard conditions about effects beyond the boundary are introduced.

This type of rule construction has proved difficult for people to understand and apply. It may be preferable to rewrite rules with this construction so that the exemptions are either part of the conditions or part of a new discretionary activity rule.

### **7.2 General condition about noxious, dangerous, offensive or objectionable**

There are 18 rules in the Plan with the general condition that the discharge does not result in dust, odour, gas or vapour which is noxious, dangerous, offensive or objectionable at or beyond the boundary of the property.

To address the adverse effects of odour (issue 2.3.5), the approach directed in policy 4.2.14 of the Plan is “to avoid, remedy or mitigate any adverse effects (including on human health or amenity values) which arise as a result of the frequency, intensity, duration, offensiveness, time and location of the discharge to air of odorous contaminants.” The general condition adopted in the permitted activity rules addresses the offensiveness of the odour, but not the other matters. Conditions included on resource consents do the same.

Incidents of objectionable odour are the most common complaint to Greater Wellington’s Pollution Hotline (see section 3.6 and Appendix 2). Some reasons that odour has been difficult for Greater Wellington to respond to and address are given here.

- In the laboratory, odour can be measured quantitatively by dynamic dilution olfactometry to determine odour units and individual sensitivity to odour. However, in the field, odour can only be measured qualitatively – by a person rather than an instrument – making it difficult to prove when an odour is or is not offensive or objectionable to another person.
- It is often difficult to determine the cause of an odour, and odour dispersion modelling has limited effectiveness for determining odour nuisance.
- Odours can spread over very large areas affecting many people in varying intensities.

- Odours come and go over short periods and can change from being offensive and objectionable to merely detectable during the time it takes an officer to arrive at the site.
- People are often affected by odours outside normal working hours, most commonly when they go home or try to go to sleep, often causing a delay in officers arriving at the site to respond to their complaint.
- Odour effects are generally chronic rather than acute, meaning that the odour is unpleasant, disrupts sleep and is difficult to live with but is not “objectionable” and does not cause significant health effects.
- It can be difficult to treat discharges to reduce their odour effects.

Since the plan was made operative, Council officers have presented five reports to the Environment Committee about odour. These are -

- resolution of odour problems at Taylor Preston Limited, Ngauranga Gorge (report 99.186)
- update on odour issues at Moa Point wastewater treatment plant (99.405)
- rationalising our response approach for odour complaints (02.616)
- proactive odour monitoring – update (03.57)
- odour response – outcomes of proactive monitoring (06.11)

Policy 4.2.14 requires us to avoid, remedy or mitigate any adverse effects which arise as a result of the frequency, intensity, duration, offensiveness, time and location of the odour. Rules in the Plan, and conditions on resource consents, generally address only one aspect of odour - “offensiveness”.

The main message from staff is that while offensiveness of odours can be assessed on-site, staff experience with responding to complaints about odour from both consented and unconsented activities, suggests that requiring process controls on the activity, combined with appropriate site housekeeping would be more effective than applying the condition “the discharge does not result in objectionable odour at or beyond the boundary of the property”. This would mean including process thresholds in permitted activity rules in line with thresholds used under the Clean Air Act 1972.

Staff preference is for odorous activities to be located away from sensitive land uses like residential areas and schools. Addressing the frequency, intensity, duration, time and location of the odour is more problematic and may not even be possible in a permitted activity rule.

Unlike assessments of “offensiveness”, which can be made without the use of instruments, assessments of whether dust, odour, gas or vapour is “noxious or dangerous” cannot be made without specific instruments and often predictive modelling as well. This condition has been included on 18 rules that allow

activities as permitted activities because the effects of these activities was thought to be no more than minor. However, to prove or disprove compliance with the condition, people carrying out the activity would have to carry out onerous and expensive monitoring and possibly modelling as well. Instead of including this condition, it should first be determined that the activities will not cause “noxious or dangerous” effects beyond the boundary.

If methyl bromide fumigation had been shown to cause “noxious and dangerous” effects beyond the boundary, this condition could have been invoked to stop the activity. In practice it would be preferable for methyl bromide fumigation to be controlled with specific conditions rather than relying on this condition. It is doubtful that this part of the condition is an effective or efficient means of achieving the objectives of the Plan.

### **7.3 General condition about emissions of hazardous substances**

Rules 11, 12, 13, and 19 do not allow the emission of any hazardous air pollutant listed in Appendix 1 of the Plan. These rules all allow discharges associated with heating or burning substances or materials, or processing chemicals. The compounds listed in Appendix 1 are often not stated on product information, and there are so many substances listed that many of them could be present in materials undergoing some industrial and trade process. It is extremely difficult for members of the public or Greater Wellington staff to recognise whether these compounds are present in the raw material and even more difficult to know what happens to the raw material once it is heated or burned. Testing for these contaminants in the raw material or the air discharge would be too onerous for small businesses if they wanted to demonstrate compliance with the rule.

This list is completely ineffective in helping to achieve the objectives of this Plan.

## **8. Summary of plan effectiveness**

### **8.1 Implementation and effectiveness of regional rules**

The Plan has 25 policies, 23 regional rules and 31 “other methods” to achieve two objectives. The objectives are to maintain high quality air, and avoid, remedy or mitigate adverse effects of air contamination on the environment, including people.

Six rules allow activities that would otherwise require a discharge permit because they are carried out on “industrial or trade premises” (the trigger for requiring a discharge permit under the RMA). Another 14 rules allow activities regardless of the kind of premises, because the effects were deemed to be less than minor and able to be controlled by general conditions. Some examples of contaminants allowed to be discharged as Permitted Activities (with conditions) are agrichemical sprays and powders, fumigants, fumes from fish and chip shops and panel beaters, and smoke from domestic fires and land clearance.

### 8.1.1 Rules deemed to be effective

The application of many Permitted Activity rules is widespread with a good level of compliance – or at least, few complaints. The rules fitting this are Rules 1 and 2 (agricultural processes), Rule 4 (agricultural processes), Rules 12 (metallurgical processes), Rule 16 (abrasive blasting), and Rule 20 (landfilling and composting). Some activities allowed by Rule 5, which allows discharges from a wide range of food production processes like coffee roasting and deep fat frying at fast food outlets, also have widespread application with few effects.

These rules allow people to provide for their social and economic wellbeing, there are few complaints about their effects on people and communities, and air quality monitoring has not shown any level of pollution that could adversely affect amenity values or people's health. These rules were deemed to be helping achieve Objective 2 of the Plan and so are at least partially effective.

Four rules allow activities that are widespread in the region but where the good level of compliance may in fact be due to the enforcement of requirements of the Building Code or NZ standards. These are rules 14 and 15 (spray painting), Rule 17 (cooling towers and ventilation) and Rule 22 (miscellaneous processes).

### 8.1.2 Rules deemed to be ineffective

There are two kinds of activity where the rules are not helping to achieve the objectives of the plan and so are not effective. The first is activities, both consented and unconsented, that cause offensive and objectionable odour beyond the property boundary and adversely affect amenity values. The second kind is combustion processes that cause concentrations of particulate matter to breach threshold levels in the National Environmental Standards and could be adversely affecting people's health.

Incidents of objectionable odour cause more complaints to Greater Wellington's Pollution Hotline than any other kind of pollution or non-compliance. Many complaints relate to activities with resource consents where the effects of odour may have been better controlled by setting controls on the process rather than setting an "effects-based" condition about the effect at the property boundary.

Complaints about smoke have come second to odour almost every year since the pollution hotline was established. Sources tend to be residential (domestic fires) or industrial (burning metal or timber) rather than generators or boilers and most incidents attended were compliant and no action was necessary. Domestic fires are the source of most of the PM<sub>10</sub> (airborne particulates that are smaller than 10µm in diameter) in winter throughout the region wherever there are many houses and topography restricts the dispersion of the smoke. This is particularly so in the airsheds where PM<sub>10</sub> concentrations approach or exceed the threshold in the National Environmental Standard (Masterton, Upper Hutt and Wainuiomata). Any change to the permissive approach in the Plan, which does not deal with the cumulative effects of domestic fires effectively, is

probably only necessary in gazetted airsheds because elsewhere in the region particulate matter is dispersed and does not cause a health hazard.

Permitted Activity rules deemed to be ineffective in achieving the objectives in the Plan are parts of Rule 5, which allows processing of large amounts of plant and animal matter, rules about combustion – 6, 18 and 19, Rule 10 (sorting and storage of bulk products), and Rule 21 (sewage treatment).

### 8.1.3 Rules where too little is known to judge effectiveness

There are four permitted activity rules whose application is unknown and about which complaints appear to be rare. These are Rules 8 and 9 (hydrocarbons, biogas and fuel conversion processes), Rule 11 (mineral drying and heating) and Rule 13 (chemical processes).

### 8.1.4 Some points of interest

Two activities that were highly contentious when the plan was being developed have caused few problems since it was made operative. These are the use of agrichemicals and the escape of diisocyanates from spray painting at panel beating shops. Greater Wellington's biosecurity department provide advice around the region about how to comply with the two agrichemical rules and minimise adverse effects from the use of agrichemicals. This advice, together with promoting compliance with agrichemical training requirements, has helped with the effectiveness of those rules.

For spray painting, Greater Wellington undertook extensive testing and modelling to determine the actual effects of harmful paint constituents on people living near panel beater shops. The conclusions were that provided all major spray painting is carried out in purpose built spray booths and ventilated through appropriately located stacks, emissions of the application rates specified in the rules are unlikely to cause adverse health effects on neighbours.

At least six rules in the Plan control activities that are also controlled by New Zealand Standards or under the Building Code. For example, fume cupboards are required by the Building Act 1991 to be tested for the Building Warrant of Fitness, for which the owner of the building is responsible. The nature and frequency of testing is specified in a compliance schedule which is unique to each building and prescribed by the city or district council. Compliance with the rule may contribute to achieving the objectives, but may not be the most efficient means of doing so.

## 8.2 Ambient air quality and community feedback

Results of the ambient air quality monitoring show that very fine particulate matter (PM<sub>10</sub>) is the contaminant of most concern in the region. National standard levels have been exceeded or approached on one to three days each winter in Wainuiomata, Masterton and Upper Hutt since records began. However, even in these vulnerable areas, levels have been "good" (less than 33 percent of the threshold level) around 70 per cent of the time.

Almost all of the polluting chemicals discharged to air come from vehicles (carbon monoxide, nitrogen dioxide and unburned hydrocarbons), but all results for carbon monoxide and nitrogen dioxide testing are less than 33 percent of the threshold level.

Community feedback, both as comments to our regional policy statement review and as complaints to the Pollution Hotline, indicates that while smoke from fires and pollution from vehicles is of concern, it comes second to the effects of odour on their health and wellbeing as a public concern.

## **9. Recommendations for “appropriate action”**

When the Plan was made operative, little was known about the actual state of ambient air quality in the region. The significant issues were identified according to the potential adverse effects of activities historically controlled under the Clean Air Act 1972, and the effects on amenity identified by the region’s community. The Plan largely regulated activities and processes that had a history of regulation, and applied an “effects-based” approach by including a condition about effects at the property boundary.

As a result of the assessment of the effectiveness of the policies and rules in the Plan, the following actions should be undertaken:

1. Investigate whether some rules should be based on the process rather the activity. For example, the volumes of material processed, the method of combustion (from open burning to high temperature incineration) and fuel type (gas, wood, etc). This would be effects-based, but build on the approach of the Clean Air Act 1972.
2. Investigate whether use of the condition that “the discharge does not result in dust, odour, gas or vapour which is noxious dangerous, offensive or objectionable at or beyond the boundary of the property” be discontinued and replaced only with “the discharge does not result in dust or odour that is offensive or objectionable at or beyond the boundary of the property”.
3. Investigate whether activities covered by regional rules in other plans, such as agricultural effluent discharges, composting, and sewage treatment, are deleted and reliance left on the ‘primary’ rule in the other plan.
4. Investigate whether regional rules are necessary for activities already covered by New Zealand Standards or Building Code requirements, for example discharges from fume cupboards and air conditioning units.
5. Investigate the circumstances when it would be appropriate for a rule to apply to activities on industrial or trade premises only, and when it would be appropriate for a rule to apply to all premises.

## 10. References

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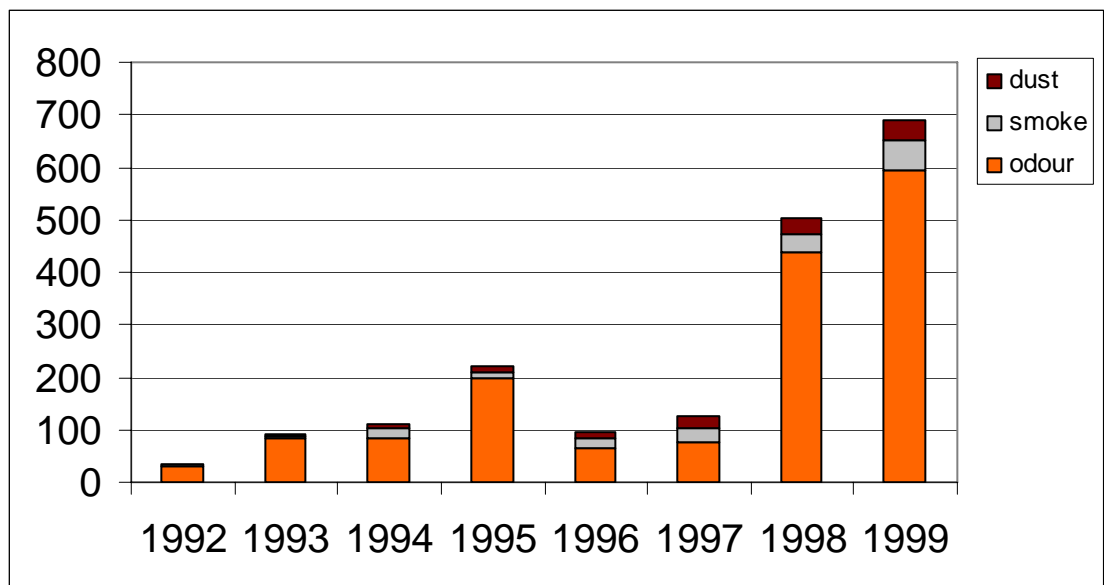
## Appendix 1 Pollution incidents reported to Greater Wellington

The incident database is a record of pollution complaints according to the location, type of incident, response and effect on the environment. The original database has a record of all incidents reported between 1995 and February 2003. This version did not record which plan (or rule) was affected so a new database was set up in February 2003 with a new field where this information can be recorded, as well as any follow-up work that was done by staff.

Data from complaints recorded prior to the Plan being made operative is presented in Table 1 below. Only dust, smoke and odour are presented prior to 2003 because the numbers were so low.

**Table 1 Reported pollution incidents 2003 to 2007**

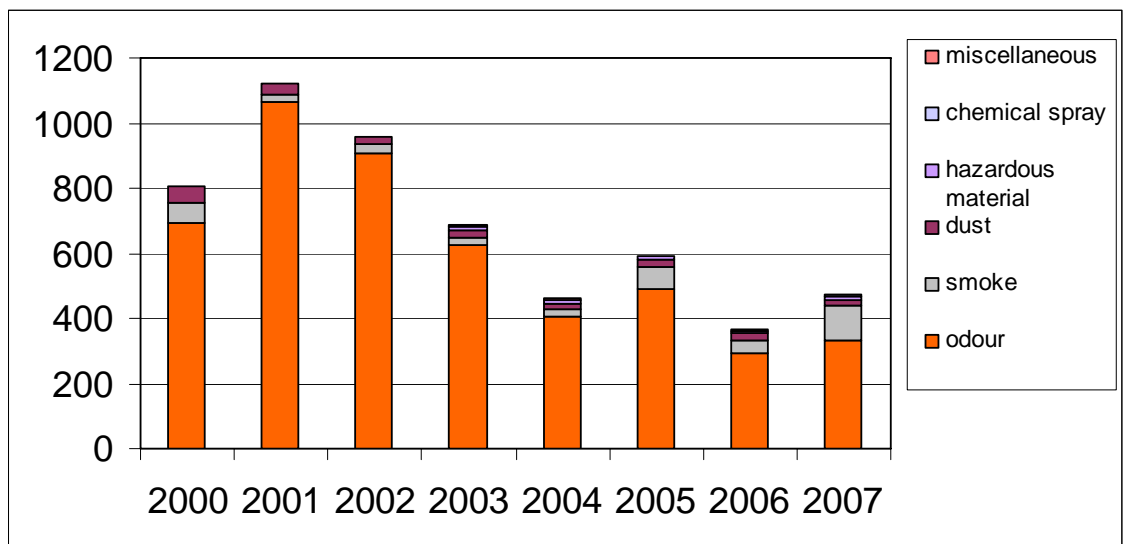
	1992	1993	1994	1995	1996	1997	1998	1999
Dust	1	2	8	10	13	24	30	36
Smoke	4	5	17	13	18	24	31	58
Odour	29	84	85	198	66	78	440	594



**Figure 2 Reported pollution incidents 1992-1999**

**Table 2 Reported pollution incidents 2000-2007**

	2000	2001	2002	2003	2004	2005	2006	2007
miscellaneous				8	2	2	4	5
chemical spray				0	2	3	3	6
hazardous material				10	12	8	8	9
Dust	48	30	23	24	17	25	22	17
Smoke	60	27	25	24	21	65	40	104
Odour	695	1063	909	623	406	491	291	335



**Figure 3 Reported pollution incidents 2000-2007**

## Appendix 2 Regional rule feedback forum

Rule number	Rule description	Problem identification	Comment
1 and 2	<p>Permitted Activity: Agrichemical spray and powder application</p> <p>Permitted Activity: Agrichemical spray and powder application (aerial application)</p>	<p>Too long and impractical. Paragraphs 2 and 3 neutralise each other, and only serve to provide a convoluted path to application of the conditions.</p>	<p>The rules need to re-written in plain English, with advice from Greater Wellington's Biosecurity department.</p>
		<p>Condition (ix) was changed by plan change 1 2003 but the explanation was not changed.</p> <p>Changes to the herbicide regulations by ERMA will make many of these conditions redundant. ERMA now requires everyone buying and using herbicides to have an "Approved Handler's Certificate" so some requirements in this rule are superfluous.</p>	<p>It would be preferable if the rule referred to the required certificate number rather than the GROWSAFE name.</p>
		<p>Condition (ix) assumes that all agrichemical applications in public areas are carried out by contractors. It does not cover non-commercial applicators very well, e.g., greenkeepers, school caretakers, etc.</p> <p>Spraying a bit of rank grass with roundup before planting public land should not have to be done by a contractor. Care group members can be taught to use roundup and attend growsafe courses.</p>	<p>These applicators should not be required to obtain a Registered Chemical Applicators certificate for such limited agrichemical usage. The GROWSAFE standard certificate, and preferably the applied certificate is appropriate.</p>

Rule number	Rule description	Problem identification	Comment
		There is no allowance in the Freshwater Plan for discharges of herbicides into water, yet this rule allows discharges into air over water. This is difficult to administer when someone discharges over water with the intent of killing hornwort in the water.	A list of chemicals authorised for use over water has been compiled (see powerdocs #235771)
		Perhaps the setback distances and notification requirements should be different for properties neighbouring organic farms.	Greater Wellington maintains a database of organic farmers in the region.
		Update to refer to NZS 8409:1999, not NZS 8409:1995.	NZS 8409:1999 is about to be updated
		Condition (vii)(d) is not allowable in a regional rule because it doesn't refer to a specific publication.	
		A complaint about spray drift in the Wairarapa was sent to the PCE who commented that the plan be updated to reflect best practice for agrichemical applications.	
		Rule 2 allows discharges of roundup over unlimited lengths of a river. When round up was used to kill willows in the Tauweru River this created a flood risk because dead willows were left in the river bed.	GW needs to link this rule with advice about landowner responsibilities for clearing debris from streams.
		Condition (iv) of rule 2 excludes discharges over catchments managed for water supply. It should also exclude catchments managed in their natural state.	
		Rule 2 only covers aerial application of agrichemicals, which means aerial application of other chemicals require consent or come under other plans. People worry	

Rule number	Rule description	Problem identification	Comment
		when chemicals, resulting from overspray and drift, are dumped on them.	
3	Permitted Activity: Fumigation	This rule could be made more consistent with rules 1 and 2.	
4	Permitted Activity: Agricultural effluent and other on-farm processes	Does not cover discharges to air from effluent disposal off-farm very well, e.g., a market garden may obtain chicken dung from a poultry farm, stockpile it, then spread it, causing significant odour.	
		Back yard chicken coops and pig pens require a resource consent if they discharge to air because they are not “factory farms” as allowed by clause (2).	Most problems with this rule were addressed by Plan change 1 in 2003.  Change clause (2) to include any building used to house animals, including pig pens, chicken coops, dog kennels, catteries and so on.
5	Permitted Activity: Processing of animal and plant matter	Not clear what “plant matter” means.	This seems to cover fast food outlets, coffee roasting, bark chipping, wood work shops etc
6 and 7	Permitted Activity: Small combustion engines, heating and electrical generation processes.  Controlled Activity: Combustion engines, heating and electrical generation	All but two of the 57 school boilers around the region cannot comply with the stack conditions, particularly the “uninterrupted vertical discharge of vapours” yet they are not causing adverse effects. The NES requires all school boilers to have a resource consent.	The conditions about the stack need to be re-written (see powerdocs #208629).

Rule number	Rule description	Problem identification	Comment
	processes		
		<p>There is confusing integration between rules 6 and 7, and with rule 19, which explicitly restricts burning some materials.</p> <p>For small combustion engines with no chimneys (e.g., semi-portable generators), condition (iv) of Rule 6 cannot be applied. It may be easier for an operator to rip their chimney off than to comply with condition (iv).</p> <p>The rules should allow 5 minutes start up time for diesel generators before the conditions apply.</p>	<p>The explanation should state the reason for this cumulative approach, i.e., 1 larger heat output has equivalent emissions to multiple smaller heat outputs.</p> <p>Rules 6 and 7 should explicitly state that they are sub-ordinate to the requirements of Rule 19.</p>
8	Permitted Activity: Processing, storage, transfer and flaring of hydrocarbons and biogas	No comments.	
9	Discretionary Activity: Fuel conversion processes	No comments.	
10	Permitted Activity: Mineral extraction and the sorting and storage of powdered and bulk products	<p>Clause (a) which excluded the “extraction, quarrying, mining, size reduction and screening of minerals which is part of an industrial or trade process and takes place outside the bed of any river” from being allowed by this rule was deleted by Plan change 1 in 2003.</p> <p>The term “bulk products (whether in solid or liquid form)” could apply to anything and makes the</p>	<p>Timber mills need their own rule, or need to be specifically provided for in this rule.</p> <p>There needs to be a specific rule about quarries and dust.</p>

Rule number	Rule description	Problem identification	Comment
		<p>application of the rule ambiguous.</p> <p>The materials listed in clause 1 are mainly products that can cause dust nuisance to neighbours though “live animals” do not seem to fit in and although timber storage is included, timber mills do not appear to be. Some industrial yards can cause dust problems for neighbours and should be included.</p> <p>The pneumatic conveying of bulk materials is specifically excluded from the rule but pneumatic conveying is not the issue – filtering the exhaust is more important. For example, a woodwork shop may extract sawdust from a work area by pneumatic conveyance but if properly controlled, this is preferable to allowing dust to circulate around the premises. Notwithstanding this, it is appropriate to require resource consents for the pneumatic conveyance of cement and other very fine materials.</p> <p>This rule has been used for timber mills because no other rule mentions them, but it doesn’t adequately address the effects from timber mills.</p> <p>According to the explanation quarrying requires a consent under rule 23 but because of the plan change in March 2003, this is no longer the case. Also, clause 2 is about quarrying but works associated with quarrying such as removal of overburden to another part of the site. This has been raised as an issue at Belmont quarry.</p>	

Rule number	Rule description	Problem identification	Comment
11	Permitted Activity: Drying and heating of minerals	Difficult to monitor or enforce the 100KW threshold.	
12	Permitted Activity: Metal production and processing	Difficult to monitor or enforce the 100kg/hr threshold.	
		<p>The exclusions are difficult to understand.</p> <p>Exclusion (c) refers to Appendix 1 – a large list of contaminants – these can't be measured.</p> <p>Needs a definition of 'general access' in condition (iii).</p>	
13	Permitted Activity: Chemical processes	<p>The exclusions are difficult to understand.</p> <p>Condition 1(a) excludes discharges arising from the emission of any hazardous air pollutants listed in Appendix 1. One of these is di isocyanates. Yet di isocyanates are allowed under Rule 14.</p>	
14	Permitted Activity: Di-isocyanate and organic plasticiser processes	<p>There appears to be a conflict between rules 14 and 15 with respect to di-isocyanates and organic plasticisers.</p> <p>The 250mg/m3 standard is very expensive to measure, has been superseded by new technology doesn't represent best practice anymore.</p>	It's much easier to look at functionality of filter systems.
15	Permitted Activity: Coating processes (including spray painting)	<p>When applied to residential premises, this rule penalises those who spray paint indoors.</p> <p>Stack emissions are rarely compliant - no stacks,</p>	



Rule number	Rule description	Problem identification	Comment
		insufficient height etc. Some small commercial spray painting operations have no 3m discharge, and no odour problems in the surrounding community either. This condition seems unnecessary.	
16	Permitted Activity: Abrasive blasting processes (mobile and stationary)	Confusing integration with rules in the coastal plan and freshwater plan for bridge blasting.  Abrasive blasting, wet or dry, needs to be more clearly defined.	
17	Permitted Activity: Cooling towers/ventilation	No comment.	
18	Permitted Activity: Burn-offs and burning associated with land clearance	No guidance on what “all reasonable steps” in conditions (i) and (ii) means.  Conditions don’t restrict burning to plant matter, just “land clearance”. All sorts of material could be burned.  Is this rule appropriate in residential areas?	
19	Permitted Activity: Burning not associated land clearance	This rule is inconsistent with national guidelines.  The rule construction with the exclusions is difficult to apply.  Rule 19 allows agrichemical containers to be burnt in a purpose built incinerator, which is described in Appendix 4. Appendix 4 does not prescribe any minimum temperatures and in any case such burning should be	

Rule number	Rule description	Problem identification	Comment
		better controlled.	
20	Permitted Activity: Landfilling and composting	<p>Closed landfills don't require consents unless they emit gas or dust that is noxious or dangerous. This must be proved with extensive testing and modelling. Closed landfills are also permitted under Rule 21 in the Regional Plan for Discharges to Land.</p> <p>Small commercial composting operations require a consent, yet they don't have objectionable odour beyond the boundary. This is not effects based.</p> <p>Cleanfills are excluded from the plan's definition of landfill. They are therefore not permitted by rule 20, and so are discretionary activities under rule 23(3).</p>	
21	Permitted Activity: Sewage and trade waste conveyance and treatment processes	No comments.	
22	Permitted Activity: Miscellaneous processes	Drycleaning is permitted under this rule yet emissions can be harmful. The rule should require appropriate extraction units and compliance with the drycleaning industry's code of practice to reduce perchlorethylene discharges.	
23	Discretionary Activity: General rule	This rule is the only way to address dusty industrial yards, such as timber mills, but if this is used for them, it will have to be used for all yards.	The Plan does not explicitly mention cell phone sites. MFE has a draft guide line for cell phone sites states that they may be part of a trade and industrial premises, but electromagnetic radiation is not a

Rule number	Rule description	Problem identification	Comment
			contaminant or, if it is, it is de minimus.
Appendix 1	Hazardous air contaminants	This list is referred to in some permitted activity rules, yet testing for these contaminants is too onerous for small business, and for compliance.	
Appendix 2	Regional ambient air quality guidelines	These guidelines are based in-part on 1999 MfE guidelines that were updated in 2002. Some of the indicators are now subject to the NES. A number of the measurement techniques are now outdated, and at least one is wrong (AS 3580.9.7 – 1990). Particulates need to specify how these are assessed e.g., PM10 or TSP etc.	Regional guidelines need to be reviewed if these are going to be lower than NES or existing national ambient air quality guidelines (eg MfE indicators category of acceptable is 66% of the relevant guideline or standard)
Appendix 3	Guidelines for setting chimney heights	Ambiguous reference to air quality guidelines.	
General		<p>The use of “arising from processes involving” and “in connection with” throughout the rules in the Plan is confusing.</p> <p>The rule construction where certain activities are included, and then certain activities are excluded, and then there are a set of conditions, is very difficult to follow and apply.</p> <p>There could be a general standard for all activities, wherever they are and whatever they do, about dust and odour.</p> <p>The conditions on most permitted activity rules restricting discharges which are noxious or dangerous are</p>	

<b>Rule number</b>	<b>Rule description</b>	<b>Problem identification</b>	<b>Comment</b>
		very difficult to apply and enforce without extensive monitoring and modelling.	

## Appendix 3 Assessment of method implementation

### A3.1 General ambient air quality management

Method	Related Policies	Method Description	Implementation assessment to 2007	Achieved?
6.1.1	4.2.1, 4.2.2, 4.2.3	<p>Develop and implement a pilot programme for monitoring ambient air quality in the Wellington Region, within three years of the adoption of this Plan, which includes:</p> <p>(a) determining areas of concern;</p> <p>(b) identifying (or confirming) ambient air quality indicators for each of the pilot areas;</p> <p>(c) confirming the proposed objectives of the monitoring programme (see Method 6.1.2); and</p> <p>(d) ensuring appropriate site selection for the final monitoring programme (see Method 6.1.2).</p>	<p>Pilot programme set up in 1998 with screening studies in Otaki, Hutt City, Wellington city and Masterton.</p> <p>Permanent stations now set up in five sites (Upper Hutt, Wainuiomata, Hutt City, Masterton, Linden, Karori and inner city Wellington).</p>	Yes
6.1.2	4.2.1, 4.2.2, 4.2.3	<p>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.</p>	<p>Davy, P 2000 Wellington regional air quality monitoring strategy 2000-2005. June 2000. WRC/RINV-T-00/20</p>	
6.1.3	4.2.1, 4.2.2, 4.2.3	<p>Develop a regional emission inventory, within three years of the adoption of this Plan, that is appropriate to the Region's needs and which identifies the sources, scale and distribution of discharges of contaminants to air.</p>	<p><i>Air pollutant emissions in the Wellington region</i>, a report prepared for the Wellington Regional council by Air and Environmental Services was completed in April 2001.</p>	Yes

Method	Related Policies	Method Description	Implementation assessment to 2007	Achieved?
6.1.4	4.2.3	Assess the influence of meteorology and topography on the Region's ambient air quality and their effects on the dispersion of contaminants discharged from point sources.	A qualitative assessment carried out as part of the process of identifying airsheds.  Davy, P. 2005: Nominated airsheds for the Wellington region. June 2005	Yes
6.1.5	4.2.3	Develop a regional meteorological data base which:  (1) is appropriate to monitor climate changes and ambient air quality; and  (2) allows the prediction of the environmental effects of emissions from existing and proposed activities.	A CALMET model was created but is of limited use in determining the meteorological conditions under which high ambient pollutant concentrations are predicted. The model is not suitable for monitoring climate change – this function should be undertaken by upper atmosphere climatologists.	In part
6.1.6	4.2.3	Advocate and support the development of:  (a) national modelling guidelines and maximum ground level concentrations for contaminants commonly found in discharges and for contaminants with potentially significant effects on the environment; and  (b) national guidelines for sampling, characterising and measuring odour.	Greater Wellington participates in the National Air Quality Working Group with all other regional councils, air quality experts and the Ministry for the Environment. Through this forum GW supported the development of the Environmental Performance Indicators for air in 1997 and the National Environmental Standards for air in 2004.  MfE Good practice guide for assessing and managing odour in New Zealand. June 2003	Yes
6.1.7	4.2.3	Ensure that complaints relating to the discharge of contaminants to air are registered and appropriately dealt with, including where necessary, forwarding relevant information to	All complaints about air quality are responded to in accordance with the pollution response protocols. To address specific problems with the effects of odour on communities in Wellington,	Yes

Method	Related Policies	Method Description	Implementation assessment to 2007	Achieved?
		other authorities for their action.	the team set up a “proactive” monitoring programme where problem sites were assessed regularly, whether or not complaints were made.	
6.1.8	4.2.3	Promote the use of odour diaries, where appropriate, to record complaints about potentially odorous activities.	Odour diaries have been used on a case-by-case basis as one of the tools for assessing community odour impacts and for determining the source of problem odours. For example, Moa Point, Southern Landfill and Taylor Preston.	Yes
6.1.9	4.2.8	<p>Prepare and disseminate information to agencies and resource users, as appropriate, on ways of preventing or minimising the adverse effects of discharges of contaminants to air. This could include information on:</p> <p>(1) the best practicable option for preventing or minimising odour;</p> <p>(2) good practice for land clearance by burn-off;</p> <p>(3) the requirement for discharge consents for the burning of certain materials and substances, especially those noted in Rule 19; and</p> <p>(4) the application of all or particular rules contained within this Plan.</p>	<p>GW prepares and sends out information about reducing smoke from domestic fires on the annual environment report cards, and through <i>Be the Difference</i>. The effectiveness of disseminating this information by these means has not been assessed to determine whether it has been effective in bringing about behaviour change.</p> <p>Information sheets were prepared about the agrichemical rules and the spray painting rules in 2001. These are given out by pollution control officers when appropriate.</p> <p>There has been no work done about the requirement for discharge consents for burning materials listed in Rule 19, or about other rules except the agrichemical rules.</p>	In part

Method	Related Policies	Method Description	Implementation assessment to 2007	Achieved?
6.1.10	4.2.8	Assist other agencies and resource user groups, where appropriate, with the preparation and dissemination of guidelines, codes of practice, information programmes and similar initiatives where these will contribute to achieving the objectives of this Plan.	GW contributes the preparation of guidelines and codes practice when requested.	Yes
6.1.11	4.2.7	To encourage provisions in district plans which promote the avoidance, remedying or mitigation of the adverse effects of discharges of contaminants to air on amenity values.	Submission made on all district plans to this effect.	Yes
6.1.12	4.2.18	Encourage territorial authorities to include, where necessary, appropriate provisions in district plans or bylaws for the management of domestic open burning, burn-offs relating to subdivision development, and the control of dust.	Open burning controlled by GW. Dust associated with earthworks generally controlled by city and district councils in their district plans.	Yes
6.1.13	4.2.4 and 4.2.18	Co-ordinate regular meetings between the Council and territorial authorities in the Region to discuss air management issues and the roles of the different authorities.	Greater Wellington coordinates a regular meeting (3 monthly) with the 8 territorial authorities and other interested agencies including Fish and Game, DoC and Regional Public Health to discuss environmental issues which affect the region. These meetings have regularly addressed air issues such as the burning of treated timber. The meetings provide a forum to discuss trends and share different management techniques for environmental problems.	Yes



### A3.2 Discharges to air from domestic activities

Method	Related Policies	Method Description	Implementation Assessment to 2004	Achieved?
6.2.1	4.2.17	Provide information to the public, in association with other agencies, on the adverse effects of burning treated timbers, targeted at times and in areas where burning treated timber is a particular problem.	GW prepares and sends out information about not burning treated timber through <i>Be the Difference</i> .  The effectiveness of disseminating this information by these means has not been assessed to determine whether it has been effective in bringing about behaviour change.	In part
6.2.2	4.2.17 and 4.2.19	Provide information on alternatives to burning vegetative matter, such as composting.	GW prepares and sends out information about composting and worm farms through Take Action and <i>Be the Difference</i> .	In part

### A3.3 Discharges to air from burn-off

Method	Related Policies	Method Description	Implementation Assessment to 2004	Achieved?
6.3.1	4.2.19	Liaise with relevant central government agencies, territorial authorities, and rural fire authorities regarding the need to take environmental matters into consideration when granting fire permits.	Not done.	No
6.3.2	4.2.19	Promote the use of alternative means of disposing of waste vegetative matter which take into account effects on other	GW prepares and sends out information about composting and worm farms through Take	In part

Method	Related Policies	Method Description	Implementation Assessment to 2004	Achieved?
		environmental media.	Action and <i>Be the Difference</i> .	
6.3.3	4.2.19	Promote guidelines and codes of practice which contribute to reduced emissions to air from land clearance (e.g., the New Zealand Forest Code of Practice (Vaughan, Visser and Smith 1993)).	GW encourages adherence to the Forestry code of practice but the code doesn't contain guidance on reducing air emissions.	No.

#### A3.4 Discharges to air from the spray and powder application of agrichemicals

Method	Related Policies	Method Description	Implementation Assessment to 2004	Achieved?
6.4.1	4.2.20	Promote compliance with the relevant rules and policies in this Plan on the part of agrichemical sprayers and through organisations such as the New Zealand Agrichemical Education Trust and Federated Farmers.	Not done.	No
6.4.2	4.2.20 and 4.2.21	Promote the use of educational material relating to the safe and responsible application of agrichemicals.	Greater Wellington produced a leaflet after the plan was made operative and this was distributed to people using sprays but when the leaflet ran out it was out of date with ERMA regulations and it was not reprinted.	In part
6.4.3	4.2.20	Encourage the adoption of more "environmentally friendly" alternatives to the	An investigation into pesticide use in the region (Douglas, 2000). <i>Reducing pesticide use: the results of an investigation in the Wellington</i>	In part

Method	Related Policies	Method Description	Implementation Assessment to 2004	Achieved?
		use of agrichemicals.	<i>region</i> . Contains recommendations.  This is done mainly because changes to the ERMA regulations mean that untrained people are no longer allowed to use most herbicides. So alternatives such as use of mulch and carpets are promoted for weed suppression for care groups.	
6.4.4	4.2.20	Liaise with territorial authorities and other agencies which use agrichemicals in public areas and along water bodies to reduce the adverse effects of the use of these chemicals.	Wayne Cowan reviewed and asked for changes to the herbicide list used by Wellington City Council because they had been using inappropriate herbicides near streams. This was not done as a results of this method.	In part
6.4.5	4.2.20	Encourage agrichemical spray users to undertake GROWSAFE courses, or other relevant courses, which contribute to the responsible application of agrichemicals.	GW supported Take Care people in taking Growsafe courses.	Yes
6.4.6	4.2.20	Ensure that Council staff administering Rules 1 and 2 of this Plan are adequately trained to ensure compliance with these rules.	These are permitted activity rules and are not administered by staff although Biosecurity staff have necessary training and do advise members of the public when asked.	In part

### A3.5 Discharges to air from mobile transport sources

Method	Related Policies	Method Description	Implementation Assessment to 2004	Achieved?
6.5.1	4.2.22	Promote the need for more comprehensive nationwide initiatives to reduce the discharge of contaminants from mobile transport sources, most notably to the Ministry of Commerce, Ministry for the Environment, the Ministry of Transport, the Land Transport Safety Authority, Transit NZ, Transfund NZ, and the Civil Aviation Authority.	Not done although Auckland Regional Council promoted the need for less polluting diesel and succeeded.	No
6.5.2	4.2.23	Include appropriate policies in the Wellington Regional Land Transport Strategy aimed at reducing the discharge of contaminants from motor vehicles.	Policies in the <i>Wellington Regional Land Transport Strategy 2007-2016</i> promote public transport, cycling and walking.	In part

### A3.6 The global environment

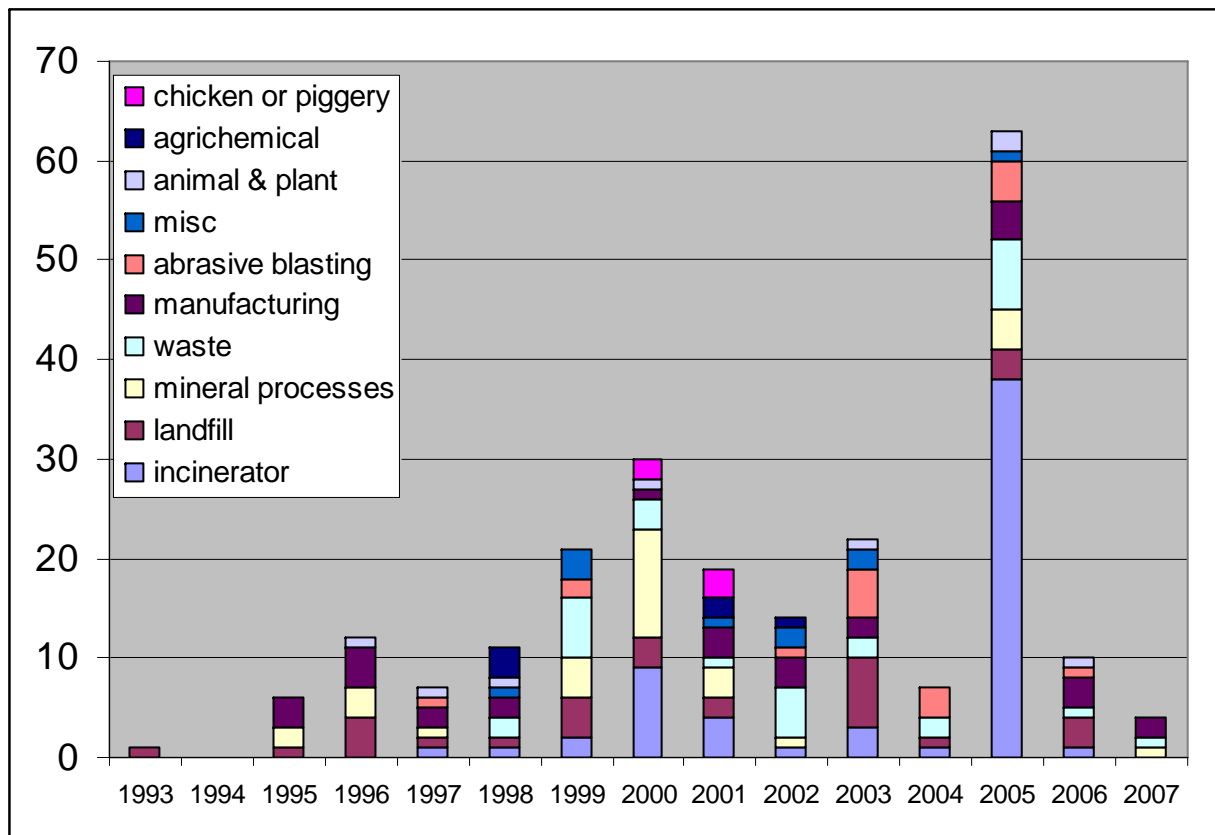
Method	Related Policies	Method Description	Implementation Assessment to 2004	Achieved?
6.6.1	4.2.24	Promote the recovery, re-use and recycling of ozone depleting substances and the use of alternative technologies where appropriate.	Achieved by central government through the <i>Ozone layer protection act 1996</i> .	Yes
6.6.2	4.2.24 and	Liaise with the Ministry of Commerce and the Ministry for the Environment to ensure	GW consistent with all central government	Yes

Method	Related Policies	Method Description	Implementation Assessment to 2004	Achieved?
	4.2.25	consistency with central government initiatives on greenhouse gases and ozone depletants.	initiatives.	
6.6.3	4.3.25	Prepare an inventory of all significant sources and sinks of greenhouse gases in the Region, including carbon dioxide, methane and nitrous oxide.	The <i>New Zealand Greenhouse Gas Inventory 1990-2003</i> was prepared by the NZ climate change office in 2005.  The Regional emissions inventory included a survey of greenhouse gas emissions.	Yes
6.6.4	4.2.25	Promote waste management practices that reduce greenhouse gas emissions, in particular the collection and utilisation of landfill gases.	The National Environmental Standard for greenhouse gas emission from landfills is part of the NES for air quality. The standard requires the collection and destruction of methane gas at all landfill sites with a total design capacity greater than 1 million tonnes of refuse. The regulation sets standards for the flaring of the gas, but also allows for destruction of collected gas via beneficial uses of methane such as electricity generation.	In part
6.6.5	4.2.25	Assess the potential effects of climate change on air quality in the Region in consultation with appropriate expert organisations and central government.	Not done. Climate change has an indirect effect on air quality in that air pollution episodes are largely driven by meteorology. Climate change impacts on air quality cannot be predicted for the 10-year timescale relevant to this Plan.	No

## Appendix 4 Consents granted

**Table 3 Summary of resource consents granted for discharges to air since 1993**

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Total
Incinerator	0	0	0	0	1	1	2	9	4	1	3	1	38	1	0	61
Landfill	1	0	1	4	1	1	4	3	2	0	7	1	3	3	0	31
Mineral processes	0	0	2	3	1	0	4	11	3	1	0	0	4	0	1	30
Waste	0	0	0	0	0	2	6	3	1	5	2	2	7	1	1	30
Manufacturing	0	0	3	4	2	2	0	1	3	3	2	0	4	3	2	29
Abrasive blasting	0	0	0	0	1	0	2	0	0	1	5	3	4	1	0	17
Misc	0	0	0	0	0	1	3	0	1	2	2	0	1	0	0	10
Animal & plant	0	0	0	1	1	1	0	1	0	0	1	0	2	1	0	8
Agrichemical	0	0	0	0	0	3	0	0	2	1	0	0	0	0	0	6
Poultry or piggery	0	0	0	0	0	0	0	2	3	0	0	0	0	0	0	5
Fumigation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>1</b>	<b>0</b>	<b>6</b>	<b>12</b>	<b>7</b>	<b>11</b>	<b>21</b>	<b>30</b>	<b>19</b>	<b>14</b>	<b>22</b>	<b>7</b>	<b>63</b>	<b>10</b>	<b>4</b>	<b>227</b>



**Figure 4 Resource consents granted for discharges of contaminants to air**