Air Quality in the Whangarei District

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1 Introduction

1.1 Purpose and intent

As councils plan and prepare for growth, it is important to ensure that activities usually associated with such growth do not adversely impact upon the quality of the air, to the extent where the air may affect human health and natural ecosystems.

This report briefly outlines the state of the Whangarei District's air quality in order to assess the constraints we may face in guiding future growth and development. In particular, the focus is on the two 'airsheds' identified by the Northland Regional Council, where issues regarding air quality are more likely to arise for a number of reasons.

It is intended to merely highlight and flag the potential constraints for future development, and raise awareness about the potential for cumulative effects arising from a combination of different activities operating in the same location. This is intended to inform the Whangarei District Council's Long Term Growth Strategy – Sustainable Futures 30/50 – so that possible constraints on development due to air emissions may be identified and taken into account when planning for development of the district over the next 30-50 years.

2 Importance of air quality

Air is made up of a mixture of gases including nitrogen, oxygen, water, argon, carbon dioxide and trace gases. On average, a person will inhale around 14,000 litres (14m3) of air per day; equivalent to about 150 full bathtubs. If this air contains pollutants, these pollutants are inhaled and taken up into the body, where they are able to affect a person's health (Ministry for the Environment [MfE], 2008).

Similarly, these pollutants are able to affect animal and plant life, as well as interfere with people's amenity or use of property by affecting visibility, causing odour, dust or smoke problems and so on. Hence, poor air quality also affects agriculture, horticulture and tourism industries (Northland Regional Council [NRC], 2008).

It is therefore important to keep the air as clean and pollutant-free as possible.

3 Air pollution

Pollutants, or contaminants, in the air consist of chemicals and particles that are able to harm human health, cause environmental damage, and can generally affect amenity values. These chemicals and particles are often released through everyday activities such as driving a car (chemicals in exhaust fumes) and using log fires (release of chemicals and particles). Contaminants are also released from many industrial processes and commercial activities (MfE, 2008).

Once in the atmosphere, pollutants can be transported by wind and air currents. A build-up of contaminants causes air to become polluted. The amount of pollution in the air depends on the amount of pollutants produced and the rate at which the pollutants are dispersed. The higher the amount of pollutants, the poorer the air quality becomes. Pollution is exacerbated in situations of poor dispersal, such as air inversion layers, or calm conditions. The effect on the environment and on people from air pollution depends also on the prevailing wind in relation to the pollution source and the receiving environment, e.g. location of residential housing, and so on.

4 Statutory framework

4.1 Resource Management Act (RMA)

Air quality in New Zealand is mainly regulated by the Resource Management Act, which requires an air quality management approach that involves measuring the state of the air and assessing the influence of pressures on air quality (Quality Planning [QP], n.d.).

4.2 Roles and Responsibilities under the RMA

Regional councils (and unitary authorities) hold primary responsibility for managing air quality under the RMA, while territorial authorities have a responsibility to manage the effects of land use and subdivision, which may also impact upon air quality (QP, n.d.). The Ministry for the Environment provides national guidance to assist local authorities with managing the air resource in their regions (MfE, 2008). This national guidance has included, among other things, the setting of national ambient air quality guidelines and the introduction of the Resource Management Regulations (2004) (Regulations), incorporating 14 standards (National Environmental Standards for Air Quality), setting concentration limits for clear air, regulating or prohibiting certain activities that pollute the air, and imposing air quality monitoring and reporting requirements on regional councils.

4.3 Ambient Air Quality Standards and Guidelines

The Ambient Air Quality[1] standards (Air Standards) are one of the 14 standards, and are based upon the existing Ambient Air Quality Guidelines. The guidelines were developed following a comprehensive review of international and national research, and were published by the Ministry for the Environment as guidance under the RMA (MfE, 2008).

They provide the minimum requirements that outdoor air quality should meet in order to protect human health and the environment. Guideline levels for pollutants (and averaging periods) that are not covered by the Air Standards still apply. However, the Air Standards replace any previous guideline levels for that particular pollutant and averaging period, as outlined in Schedule 1 of the Regulations, which is reproduced in table 1 below (MfE, 2008).

Where air pollution levels breach **Guideline** values, emission reduction strategies should be implemented to improve air quality. Where levels do not breach the values, efforts should be made to maintain air quality and, if possible, reduce emissions. These recommendations still apply to pollutants not included within the standards. (MfE, 2008).

The **Standards**, which came into effect on 1 September 2005, provide baseline ambient air quality protection for all New Zealanders, and override any less stringent requirements in regional plans.

The major difference between the Air Standards and the Guidelines is that the Air Standards allow for a number of exceedences per year, while the Guidelines do not (NRC, 2007b).

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[1] (*Ambient air quality is the general quality of the air that surrounds us, outside buildings or structures. Ambient air quality in a region reflects the cumulative effects of human activities (industrial, commercial and domestic) and natural sources on the air (NRC Reg Air Plan).*

Table 1 Ambient air quality standards from 1 September 2005

Pollutant	Standard	Time Average	Allowable exceedences per year
Fine Particles (PM10)	50 µg/m3	24-hours	1
Sulphur Dioxide (SO_2)	350 µg/m3 570 µg/m3	1-hour 1-hour	9 0
Carbon Monoxide (CO)	10 mg/m3	8-hours (running mean)	1
Nitrogen Dioxide (NO_2)	200 µg/m3	1-hour	9
Ozone (O3)	150 µg/m3	1-hour	0

Source: Northland Regional Council, 2007

4.4 Airsheds

As well as setting standards for air quality, the regulations also called for the identification of 'airsheds'. Airsheds are areas where the concentration of air pollutants may come close to the relevant national standard at times. In most cases, they represent areas where it is known, or likely, that the inhaleable particle (PM_{10}) ambient standard is exceeded. Airsheds are also referred to as LAMAs or Local Air Quality Management Areas (NRC, 2007a).

Where an airshed is known to breach the fine particle standard, the regional council must develop a path to compliance with the standard by September 2013. If fine particles exceed the standard after 31 August 2013, the council cannot grant consent to any discharges of fine particles to air. Notice of requirement and land-use consent applications may also face constraints in airsheds that exceed the air standards.

5 Air quality in Whangarei

5.1 General state of Northland's air quality

The Regional Air Quality Plan (2008) states that Northland enjoys a high standard of air quality. This is mainly due to prevailing southwesterly winds which quickly disperse air pollutants. It is also a reflection of the region's dispersed population, low overall population numbers, the absence of heavy industrialisation throughout most of the region, and the low concentrations of motor vehicles.

This said, the Whangarei District contains the largest areas of industrial or trade premises, and is therefore more likely to encounter air quality issues than other areas within the Northland region. Whangarei is also the largest town in Northland and, in combination with the fact that the town is located at the head of a tidal estuary and with the proximity of the surrounding hills, conditions are conducive to high levels of air pollution at certain times of the year (NRC, 2008).

5.2 Key contaminants in Whangarei

A description of the main contaminants together with their common sources and their potential effects on human and environmental health are set out below.

5.2.1 Particulate Matter (PM_{10})

Particles found in the air we breathe vary greatly in size (MfE, 2008). The greatest health hazard from particles comes from the smallest ones – less than 10 microns (10 µm or 10 micrometres) across – because we easily inhale these small particles into our lungs.

Particulate matter smaller than or equal to PM10 come from sources such as burning coal, oil, wood and light fuel in domestic fires, transportation and industrial processes. Natural sources of particles include sea salt, dust, pollens and volcanic activity.

Some of the most common health effects resulting from the presence of particulate matter include irritation of the eyes, throat and lungs. For people with existing respiratory conditions, such as asthma or bronchitis, breathing in particles can make the conditions worse.

Particles can also reduce people's capacity to resist infection. Studies show that particles can increase the number of hospital admissions and emergency department visits, school absences, lost work days and restricted activity days.

Studies in the United States and Europe show a correlation between levels of particles and the number of people who die each year (the mortality rate).

Particles can also affect plants although there is little information available. In very dusty environments, particles may affect photosynthesis in plants by settling on leaves and reducing the amount of sunlight reaching the leaf.

Fine particles in the air reduce visibility because they scatter or absorb light. This is usually associated with small particles or certain gases in the atmosphere and can occur at night or during the day.

5.2.2 Sulphur Dioxide (SO_2)

Sulphur dioxide is a colourless, soluble gas with a characteristic pungent smell, which forms sulphuric acid when combined with water (MfE, 2008).

Sulphur dioxide is produced mainly from the combustion of fossil fuels that contain sulphur, such as coal and oil; for example, coal being burnt in a home fireplace for heating or the use of diesel-powered vehicles. Sulphur dioxide is also produced from some industrial processes, such as fertiliser manufacturing, aluminium smelting and steel making. Natural sources of sulphur dioxide include geothermal activity.

Sulphur dioxide can cause respiratory problems, such as bronchitis, and it can irritate the nose, throat and lungs. It may cause coughing, wheezing, phlegm and asthma attacks. The effects are worse when exercising. Sulphur dioxide has also been linked to cardiovascular disease.

Sulphur dioxide can cause acid rain that seriously affects ecosystems. Acid rain is a major problem in the northern hemisphere, where trees and whole forests have been affected. Acid rain does not occur in New Zealand. However, sulphur dioxide deposition can affect vegetation around industrial discharges and in cities. Lichens are good bio-indicators of pollution and do not like to grow where there is sulphur dioxide in the air

Sulphur dioxide can form secondary particles (sulphates) that cause haze and reduce visibility.

5.2.3 Carbon Monoxide (CO)

Carbon monoxide is a colourless, odourless and tasteless gas (MfE, 2008). It is produced both by natural processes, for example from volcanoes, fires and metabolism of organisms, and by human activities, for example, from the incomplete combustion of carbon-containing fuels and industrial processes.

The most common sources of carbon monoxide are human activities. These include large amounts of carbon monoxide produced from the incomplete combustion of fossil fuels such as petrol used by cars, and from wood and coal, which is commonly burnt in fires for home heating. Tobacco smoke and indoor gas fires are also common sources of carbon monoxide.

When you breathe in carbon monoxide, it attaches to the haemoglobin molecules in your bloodstream, which carry oxygen around your body to your tissues. Carbon monoxide reduces the amount of oxygen that your body tissues receive, which is particularly bad for your brain and heart and your general health. Low exposure to carbon monoxide can make you feel dizzy, weak, nauseous, confused and disoriented, and can also reduce your performance while doing exercise. The higher the level of carbon monoxide in your blood stream, the worse the effects. So at very high levels, coma, collapse, loss of consciousness and death can occur.

5.2.4 Nitrogen Dioxide (NO_2)

Nitrogen dioxide is a reddish-brown, pungent, acidic gas that is corrosive and strongly oxidising (MfE, 2008).

Nitrogen dioxide is not usually released directly into the air. Nitrogen dioxide forms when nitrogen oxide (NO) and other nitrogen oxides (NOx) react with other chemicals in the air to form nitrogen dioxide.

The main source of nitrogen dioxide resulting from human activities is the combustion of fossil fuels (coal, gas and oil), especially petrol used in cars. In cities, cars contribute about 80% of ambient nitrogen dioxide. Nitrogen dioxide is also produced from making nitric acid, welding and using explosives. Other sources of nitrogen dioxide include the refining of petrol and metals, commercial manufacturing, and food manufacturing. Natural sources of other nitrogen oxides include volcanoes and bacteria.

The main health effect of nitrogen dioxide is on the respiratory system. Inhalation of nitrogen dioxide by children increases their risk of respiratory infection and may lead to poorer lung function in later life. There is also an association between nitrogen dioxide concentrations in the air and increases in daily mortality and hospital admissions for respiratory disease. Nitrogen dioxide can decrease the lungs' defences against bacteria, making them more susceptible to infections, and can also aggravate asthma.

Nitrogen dioxide is toxic to plants in short-term concentrations of 120 µg/m3. It reduces plant growth. When sulphur dioxide and ozone are also present, the effects on vegetation are worse. Along with sulphur dioxide, nitrogen dioxide can also cause acid rain. However, acid rain is not a problem in New Zealand at present.

Nitrogen dioxide forms acids in the presence of moisture and these can be corrosive to building materials at high concentrations.

Nitrogen dioxide can form secondary particles called nitrates that cause haze and reduce visibility. Nitrogen dioxide is the gas that makes summer smog look brownish in colour.

5.2.5 Dust

Airborne dust is produced from a wide variety of human activities. These include:

- wind-blown dust from exposed surfaces such as bare land and construction sites
- dust caused by vehicle movements along un-sealed roads
- mines and quarries
- road works
- housing developments
- agriculture and forestry activities.
- Large quantities of dust can also be generated from natural sources, such as dry riverbeds, pollen from plants and volcanic eruptions.

Typically, the particles from dusty activities are larger than 10 μm in diameter, but they can still be a nuisance and affect health. Dust can irritate your eyes and make them itchy and watery, and can be a nuisance when it settles on windowsills and washing, making things dirty. Dust can also affect the health of plants. When dust settles on leaves it affects photosynthesis and the amount that plants grow (MfE, 2008).

5.2.6 Odour

Odour is a sensory response to the inhalation of chemicals (MfE, 2008). When the sensors in your nose come into contact with an odorous chemical, they send a signal to your brain, which interprets the signal as an odour. The human sense of smell is very sensitive to a wide range of odorous chemicals.

Odours are caused by mixtures of chemical compounds and can come from a wide range of sources, for example, garden compost heaps, landfills, mushroom farms, silage, and car and bus exhausts.

Odour affects people differently. The main effect of odours in the environment is nuisance, as odour can affect your enjoyment of the outdoors. In more serious cases, it may lead to feelings of nausea, sickness or headache. People's response to odour varies. For example, people who live and work in rural areas may find silage smells okay, while urban dwellers may find silage smells offensive.

5.2.7 Smoke

There are three primary sources of smoke and associated odours - the use of domestic heating appliances that consume fuels, the use of backyard fires to dispose of domestic wastes, and the burning of waste vegetation.

A large number of dwellings in Northland contain a fuel burning home heating appliance. The discharges from these appliances are not usually significant on an individual basis, but may give rise to adverse effects on neighbours if not installed and operated in a proper manner. The cumulative effects of many individual domestic sources may give rise to more widespread effects. When inversion conditions exist over an urban residential area, where warm smoke-filled air is trapped beneath a layer of colder air, the cumulative effects are significant.

The main effects of burning domestic wastes in backyard incinerators or fires, are nuisance to neighbouring properties through emission of smoke, toxic gases, odour and fly ash. Significant localised effects can occur, such as respiratory irritation, offensive odour, soiling of property and reduced amenity values.

Burning of vegetation, particularly when it is green or damp, can give rise to considerable volumes of smoke with widespread adverse effects. Such effects are considered to be inconsistent with the objectives of the Regional Air Quality Plan, particularly within the Whangarei Urban Area, and will be managed by the NRC accordingly. These effects regionally may also include traffic hazards when gas (odour), smoke and/or particulate material from burning activities drifts over adjacent roads and state highways, reducing drivers' ability and/or visibility (NRC, 2008).

5.2.8 Agrichemical spraying

The use of agrichemicals is widespread in Northland in the horticultural, agricultural and forestry sectors. Agrichemicals are also used by local government in public parks and reserves, and in domestic gardens. There has been increasing concern at the "off-target" or "off-site" effects of agrichemical use when spraydrift reaches sensitive environments other than the intended target. Spraydrift may have adverse effects on human health and plant and animal health. There may also be problems for adjacent land uses such as organic farming, horticulture and cropping.

Some types of equipment being used for agrichemical application, do not allow accurate calibration or give adequate directional control. Use of this equipment therefore increases the risk of adverse effects on the environment. Some agrichemicals are highly volatile or are extremely toxic, which also increase the risk of adverse effects. Users must give careful consideration to the appropriateness of the equipment and the agrichemical they use.

Only aerial applicators have been specifically regulated in the past. Ground based commercial applicators currently operate under a voluntary registration and qualification system with little or no auditing (NRC, 2008).

6 Northland Regional Council Air Quality Plan

The purpose of the Regional Air Quality Plan (RAQP) is to assist the Northland Regional Council in promoting the sustainable management of the region's air resources, as directed under the RMA. The plan has been guided by the Regional Policy Statement (RPS) for Northland which identifies the key regional resource management issues and objectives, and sets out general policies, methods and approaches to be used in achieving the integrated management of resources (NRC, 2008).

The RAQP covers all land based discharges of contaminants to air, but does not control discharges to air that occur in the coastal marine area. These discharges are regulated by the Regional Coastal Plan.

NRC's approach to the management of discharges to air is to adopt the Best Practicable Option (BPO), which means that the best method for preventing or minimising the adverse effects on the environment is selected when granting a discharge consent. By adopting this approach, resource consent applications for air discharges are dealt with on a case-by-case basis.

In addition to the BPO method, a precautionary approach may also be adopted where the effects of activities are unknown or poorly understood, but there is reason to believe that they may be significant. Again, this approach signifies a system based on a case-by-case assessment (NRC, 2008).

Separate approaches to managing emission levels are identified within the Marsden Point Air Quality Strategy, as outlined on the next page. These approaches are suggested specifically to deal with the potential cumulative effects of contaminants with the Marsden Point Airshed.

6.1 Airsheds of the Whangarei District

The Northland Regional Council has identified two airsheds for the Whangarei District, the Whangarei Airshed and the Marsden Point Airshed.

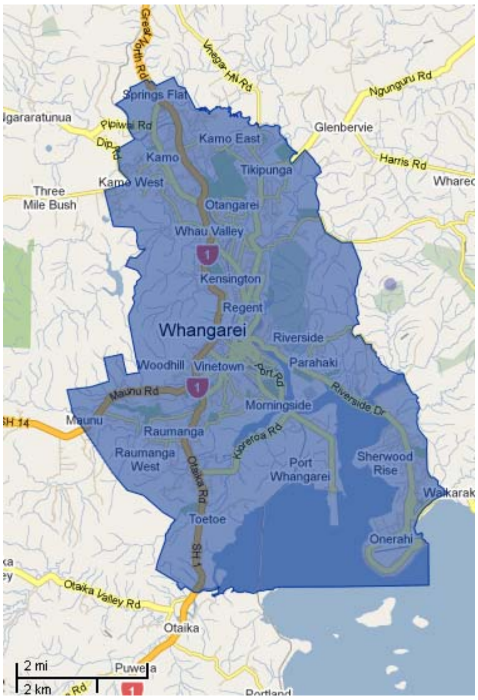
6.1.1 The Whangarei Airshed

Figure 1 represents the area identified as the 'Whangarei Airshed'. At the time of gazetting the airshed, the major contributors to contamination within this area were a mixture of domestic home heating activities, vehicle emissions, and to a lesser extent, local industry (NRC, 2007a). Under certain circumstances, such as during winter night-time inversion[2] conditions, the Whangarei Airshed approaches, and sometimes exceeds, the National Environmental Standard for PM_{10} as measured at the Robert Street and Water Street stations. However, 2008/09 monitoring data indicates that PM_{10} levels did not exceed National Environment Standards within the specified monitoring period. Nevertheless, these areas are highlighted as 'hotspots' and will require continual monitoring.

Historically, concentrations of carbon monoxide (CO) have also exceeded the relevant National Environmental Standard.

Over a time span of 30 to 50 years, additional development within the urban Whangarei area could mean that the standards are exceeded much more frequently. This may have implications for managing growth over the longer term, including both residential expansion and industrial development in the Whangarei Port Industrial area. It does not appear to be a serious constraint, but careful management of air emissions may be required, including domestic emissions, vehicle emissions and emissions from industry.

Figure 1 Whangarei Airshed



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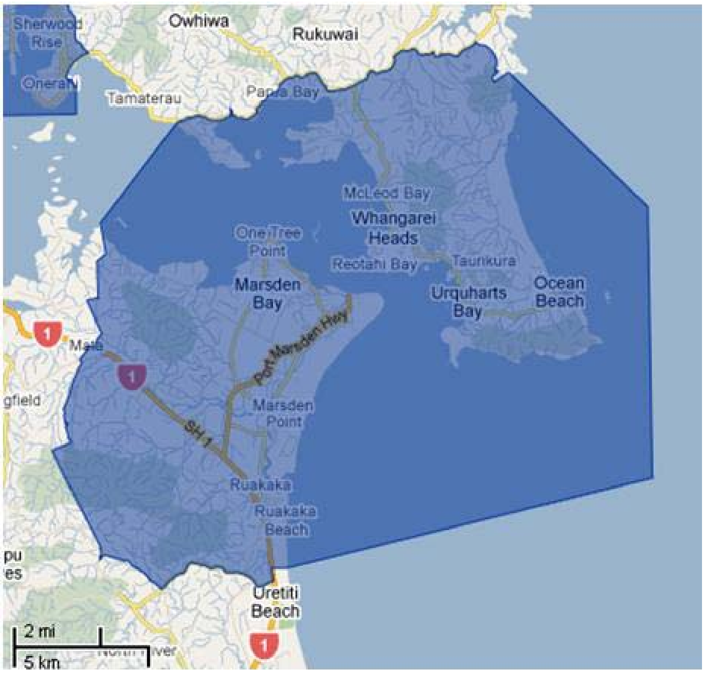
[2] *By definition, an inversion exists when air temperature increases with increasing height above the Earth's surface. This often occurs overnight when skies are clear and the surface has cooled significantly, cooling the air directly above the ground. Since cold air is denser (thus, heavier) than warm air, when an inversion exists the colder air at the surface remains there – along with the smoke and pollution – until it warms up. This warming typically occurs when the sun makes its morning appearance and warms the ground which, in turn, warms the air at the surface. Often when the inversion then "breaks up", pollution levels seem to rise as the trapped layer of air begins to circulate. (Otago Regional Council, 2008)*

6.1.2 The Marsden Point Airshed

Figure 2 represents the area identified as the 'Marsden Point Airshed'. One of the main reasons for identifying this area as an 'airshed' is the presence of heavy industrial operations, plus the potential for more industry to establish on the large amount of land currently zoned 'Business 4', but as yet under-utilised. Industrial development around Marsden Point has the potential to significantly affect the air quality of the surrounding area (NRC, 2007a).

At the time the Marsden Point Air Quality Strategy (MPAQS) was introduced, the NRC noted particular concern for the residential areas of Whangarei Heads, Ruakaka and One Tree Point. In addition, mention was made of surrounding areas with significant ecological values.

Figure 2 Marsden Point Airshed



Contaminants identified as being critical in this area are particulate matter smaller than ten micron (PM_{10}), sulphur dioxide (SO_2) and nitrogen dioxide (NO_2), with further potential for discharges of other contaminants. In particular, emissions from the New Zealand Refining Company Ltd (NZRC) together with emissions from Carter Holt Harvey LVL Plant (CHH) were estimated to produce 98% of the PM_{10} levels, 99% of the NO_x levels and 100% of the SO_2 levels (NRC, 2007a).

Particulate Matter

The MPAQS, states that monitoring data and air discharge assessments have indicated that PM_{10} levels are not exceeding any standards or guidelines. However, under the NES, PM_{10} emissions constitute a critical contaminant for managing air quality (NRC, 2007a). It will therefore be important to manage PM_{10} levels as residential areas are developed and emissions from domestic and industrial sources increase, particularly given the adoption of the newly introduced Marsden Point Structure Plan, which indicates significant potential for residential and industrial development in the area.

Sulphur Dioxide

The Marsden Point Airshed is the only airshed in the country which is gazetted on the basis of sulphur dioxide (SO_2) rather than PM10. Monitoring data has indicated that the area may have experienced very high short-term concentrations of SO_2 in the past. However, on-going monitoring in the airshed has shown peak concentrations of SO_2 to be below national guidelines. Atmospheric dispersion modelling carried out by NIWA has revealed that predictions of SO_2 levels approach the NES for 1-hour averages within the immediate vicinity of the NZRC, and that the airshed may be close to capacity for SO_2 near this location (MPAQS, 2007).

The modelling results furthermore suggest that particular care needs to be taken when considering proposals for future activities that may add to the impact of these sources. This may mean that plans for any new combustion processes to establish in the area need to undergo meticulous examination. Any growth in the port operations may also translate into higher levels of SO_2 due to shipping emissions (NRC, 2007a).

Nitrogen Dioxide

Although the results of a limited amount of monitoring, carried out during the 2002/03 monitoring period, have indicated that ambient levels of nitrogen oxides are low, they may increase in the future, especially if large combustion facilities were to develop within the area (NRC, 2007a).

Since the publication of the MPAQS, the Whangarei District Council has adopted a Structure Plan for the Marsden Point area (Figure 3), providing for future land use activities. This plan potentially offers many more opportunities for residential development than was envisaged when the Air Quality Strategy was first brought in. This residential development is in addition to the existing industrial zone.

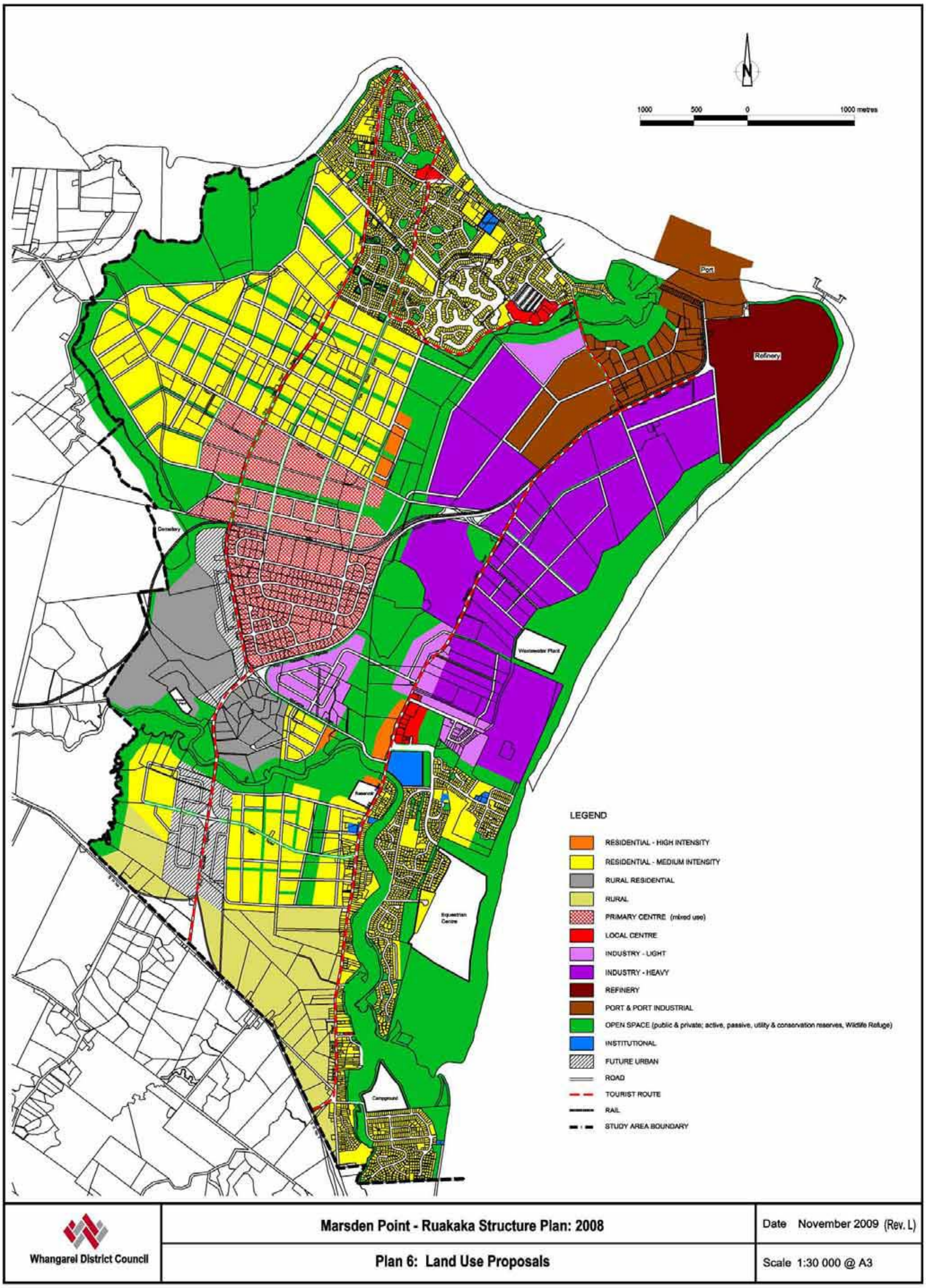
As stated in the MPAQS, whatever is done, air quality objectives for the Marsden Point area will, as a minimum, need to comply with the National Environmental Standards. In order to achieve this compliance, it is suggested that emissions from existing sources may need to be reduced before a new entrant can obtain a resource consent to discharge.

Currently, NRC's approach is to encourage any potentially new entrant to negotiate with existing dischargers in order to obtain an offset that would allow them to operate in the airshed. In other words, there needs to be a private trading agreement between dischargers. In addition, existing consent holders will need to apply for a change in their consent conditions limiting the emission rate should they wish to relinquish some of their discharge rights (NRC, 2007a).

The only other way for a new entrant to obtain a discharge permit once private negotiations have concluded, is for the RAQP to allow the transfer of air discharge permits within the Marsden area, in accordance with the provisions of the Resource Management Amendment Act 2005. However, this will require a plan change.

Given the potential for both significant residential and industrial development, as signaled in the Marsden Point/Ruakaka Structure Plan, air quality may well become a serious constraint in the Marsden Point Airshed, particularly in relation to particulate matter and sulpher dioxide. Careful management of air emissions will be required over the longer term. This may well require a much more proactive management approach than that presently relied upon by the NRC.

Figure 3 Marsden Point Structure Plan



7 Conclusions

As the population in the Whangarei District grows, managing the air quality, particularly within the identified airsheds, will become more and more crucial. The cumulative impact of several sources of one contaminant or a combination of different contaminants may pose limits on the type and size of development that can take place in various locations. Collaboration between the Whangarei District and Northland Regional Councils offer opportunities to better manage the impacts of future development on air quality.

Should urban intensification within the Whangarei Airshed be contemplated, issues such as increases in vehicle emissions and the burning of fuel for home heating purposes may need to be considered as limiting factors. However improvements in vehicle emissions have seen a reduction in the concentration of gaseous contaminants in urban Whangarei and most other urban areas around New Zealand and this trend is expected to continue into the future. Similarly, the introduction of the National Environmental Standard for Air Quality has meant that older less efficient wood fires in urban areas are gradually being replaced with more efficient, less polluting wood burners further reducing emissions of inhaleable particulate matter in Whangarei City during the cooler winter months.

In the Marsden Point Airshed, future constraints appear to be more complex, given the potential for a large increase in both population and industry. In particular, the levels of sulphur dioxide pose an issue in maintaining the concentration limits, providing limited scope for additional future discharges of this pollutant, leaving mainly opportunities for industries that discharge pollutants other than sulphur dioxide. PM_{10} levels, although currently within national guideline levels, will necessitate meticulous management given the significant development potential within the Marsden Point area.

It is questionable whether the case-by-case approach for discharge consents, adopted by the NRC, will be adequate for dealing with air quality issues in the future. The approach taken seems to favour a first-in, first-served type of system, which may not necessarily result in the establishment of land-use activities that will be beneficial to the Whangarei District's economy, social fabric, environment and culture.

Additionally, the approaches to managing air discharge permits, favoured by NRC, lay considerable responsibility with applicants for resource consents to obtain emission rights from existing emitters and to consider cumulative discharges at the time of applying for resource consent. It would seem that this kind of approach creates a less favourable environment in which to establish new operations.

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