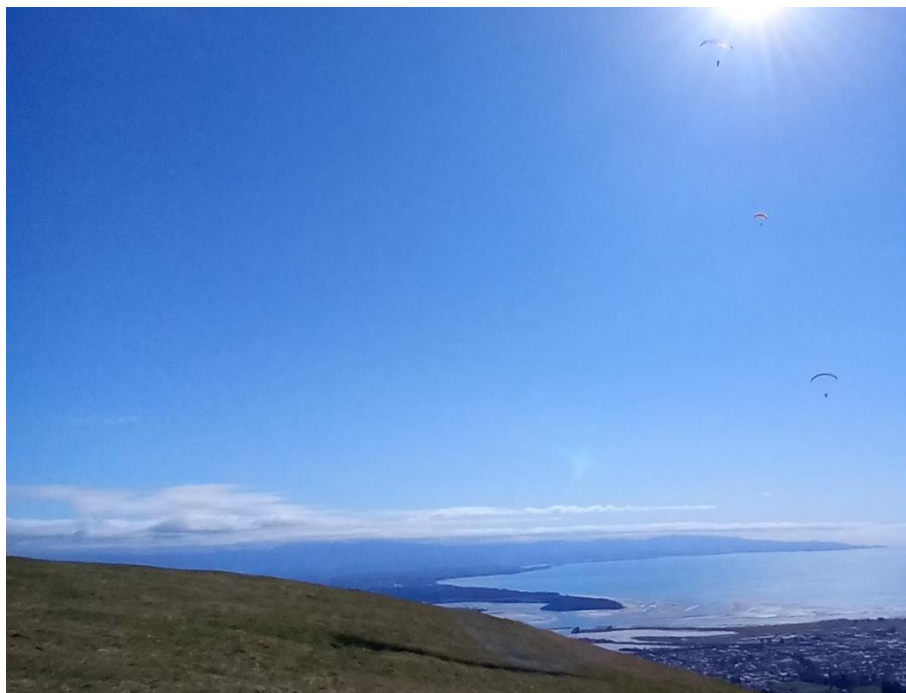


Annual Air Quality Report

1 September 2020 – 31 August 2021



Report prepared by:

Diana Worthy (Senior Policy Planner – Natural Resources), Anna MacKenzie (Resource Scientist – Contaminants), and Jane Stuart (Senior Compliance and Investigations Officer).

For further information on this report or air quality, please contact:



Tasman District Council
c/o 189 Queen Street
Private Bag 4, Richmond, 7050

Phone: 03 543 8400

Email: info@tasman.govt.nz

View: www.tasman.govt.nz/my-region/environment/environmental-management/air/

Contents

1. Introduction	4
2. Why is Air Quality Important?	4
3. Legislative Framework and Guidance	6
3.1 National Environmental Standards for Air Quality	6
3.2 Resource Management Act 1991 – Greenhouse Gas Emissions	7
3.3 Resource Management Act 1991 Reform	8
3.4 Maritime Transport (MARPOL Annex VI) Amendment Bill 2021	8
4 Air Quality Monitoring and Assessment	9
4.1 Air Quality Standards and Guidelines	9
4.2 Monitoring Instruments	10
4.3 Richmond Airshed 2021 Monitoring Results and Analysis	11
4.4 Motueka Temporary Monitoring Results and Analysis	15
4.5 Our Air 2021: preliminary data release	16
5 Complaints and Enforcement	17
5.1 Odour	17
5.2 Smoke	17
5.3 Enforcement (smoke related)	18
5.4 Richmond Airshed	19
6 Research	20
6.1 Richmond Airshed Katabatic Winds Study 2021	20
6.2 Riwaka and Brooklyn Air Quality Monitoring 2021	21
6.3 Richmond Airshed Management Options	22
7 Non-Regulatory Programmes	23
7.1 Good Wood Scheme	23
7.2 ‘Do You Stack Up?’ Firewood Storage Competition	24
7.3 Warmer Healthier Homes Te Tau Ihu Charitable Trust	24
7.4 Air Quality Education and Advice via Council Communications	25
8 Discharges to Air Policy Planning	25
8.1 Aorere ki uta, Aorere ki tai – Tasman Environment Plan: Air Issues and Options	25
8.2 Tasman Environment Plan Development and Timing of National Direction	25

1. Introduction

- 1.1. This report summarises the air quality work programme undertaken between 1 September 2020 and 31 August 2021. This includes the winter 2021 results for air quality monitoring for particulate pollution in the Richmond Airshed and Motueka township against compliance with the requirements of the Resource Management (National Environmental Standards for Air Quality) Regulations 2004 (Air Quality NES). The work programme also includes compliance and enforcement action, our non-regulatory programme (e.g. education and supporting communications), and discharges to air policy planning.
- 1.2. The report is structured as follows:
 - **Section 2** – provides information on why air quality is important
 - **Section 3** – sets out the legislative framework for air quality
 - **Section 4** – provides the winter 2021 monitoring results and analysis for Richmond Airshed and Motueka township
 - **Section 5** – summarises the complaints received in relation to discharges to air complaints and compliance actions undertaken between 1 April to 30 September 2021
 - **Section 6** – details the research work undertaken over 2021 to better understand our air quality issues in the Tasman District
 - **Section 7** – sets out the non-regulatory work programme including education and supporting communications
 - **Section 8** – sets out work undertaken over this year to inform the discharges to air section of the Aorere ki uta, Aorere ki tai – Tasman Environment Plan

2. Why is Air Quality Important?

- 2.1. Good air quality is fundamental to our wellbeing and is a taonga to be protected, restored or improved. The presence of contaminants in the air can have adverse health and nuisance effects on people, property and the environment.
- 2.2. Small particles of pollution are known as particulate matter (PM) as shown in Figure 1 (over page). They consist of solid and liquid particles suspended in the air and are usually measured in two sizes:
 - PM₁₀ refers to particles that have a diameter of less than 10 microns (coarse component).
 - PM_{2.5} refers to particles that have a diameter of less than 2.5 microns (fine component) and is a subset of PM₁₀.
- 2.3. Particulate matter comes from:
 - Human activities such as burning of fuels for home heating, outdoor burning to dispose of green waste, car exhaust emissions, road dust and quarrying activities; and
 - Natural sources such as wind-blown dust, plant pollen, sea salt and volcanic eruptions.

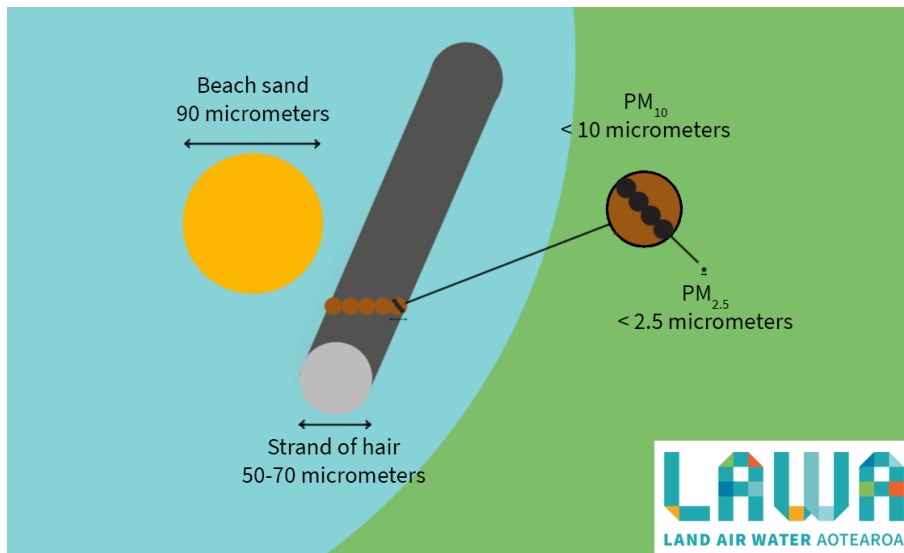


Figure 1: Relative size of PM₁₀ and PM_{2.5} (Source: Land, air and water Aotearoa)

2.4. There is a substantial body of evidence – both internationally and in Aotearoa New Zealand – relating to the adverse health impacts of particulate matter pollution. People with pre-existing respiratory and heart conditions, diabetes, the young, and older people are particularly vulnerable to air pollution. These tiny airborne particles of pollution can cause a range of health effects as shown in Figure 2.

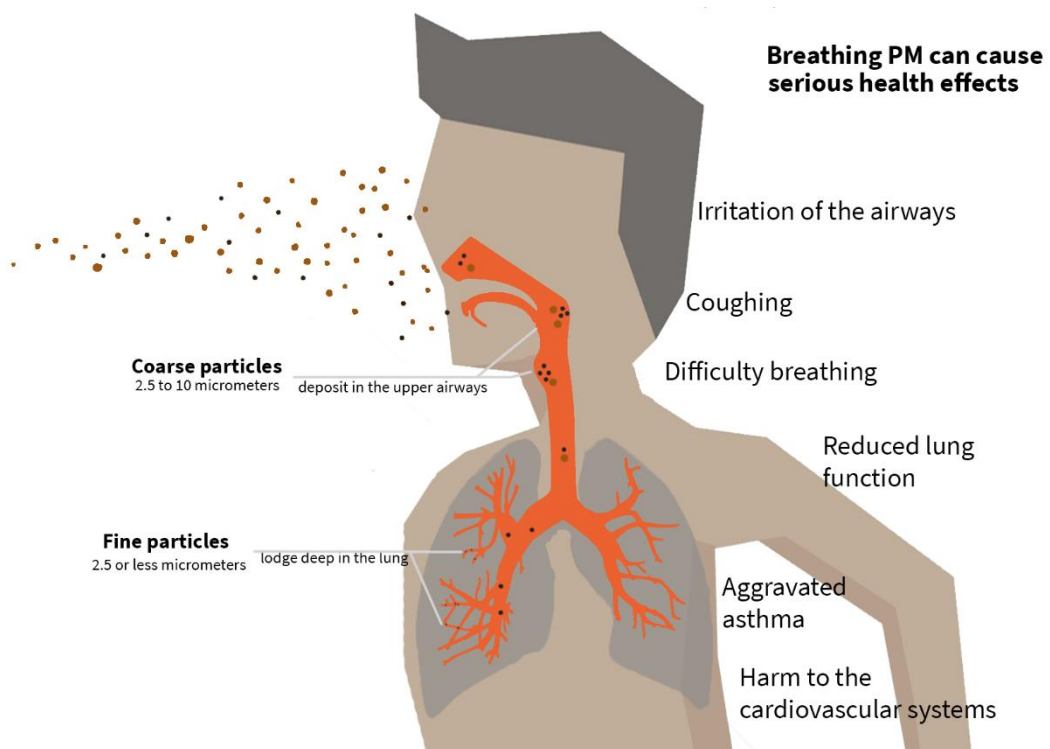


Figure 2: Examples of health effects of PM pollution. (Source: Land, air and water Aotearoa)

2.5. Air pollution can also affect our day to day activities and quality of life. It can be a hazard or nuisance by:

- Smoke blown towards roads can reduce visibility and create a traffic hazard.
- Smoke and odour make the air unpleasant and unhealthy to breathe.
- Particulates such as ash are a nuisance by landing on houses, cars, washing, and play areas.
- Particulates can contaminate garden soil, fruit and vegetables, and drinking water collected from roofs.

3. Legislative Framework and Guidance

This section sets out the legislative framework that manages air quality in New Zealand, primarily under the Resource Management Act 1991 (RMA 1991). A number of legislative amendments (nationally and international commitments) are underway which will have implications for management of discharges to air in the Tasman District as outlined below.

3.1 National Environmental Standards for Air Quality

3.1.1 The National Environmental Standards for Air Quality (Air Quality NES) are regulations made under the RMA 1991 which aim to set a guaranteed minimum level of health protection for all New Zealanders. The Air Quality NES came into effect in 2004 and was amended in 2011. It includes a standard for PM₁₀ for outdoor air quality, being 50 µg/m³ (micrograms per cubic metre) over a 24-hour average (see Section 4.1, Table 1). The Air Quality NES does not apply to indoor air quality.

3.1.2 Under the Air Quality NES, the geographic boundary of each regional council or unitary authority is defined as an ‘airshed’, within which each council is responsible for monitoring and managing air quality. In addition, a council may apply to the Minister for the Environment to partition off a part of their region as a separate airshed for air quality management. These sub-airsheds are specified by notice in the Gazette and are commonly known as ‘gazetted airsheds’. In the Tasman District there are two airsheds – the gazetted Richmond Airshed and the ‘rest of district’ airshed. Under the Air Quality NES, airsheds are only allowed one¹ permissible exceedance of 50 µg/m³ over 24-hours, in any 12-month period.

3.1.3 While the Air Quality NES provides a level of health protection from air pollution, it should be noted that the 50 µg/m³ concentration limit for PM₁₀ is not a ‘no-effect’ threshold. Council has a regulatory obligation to comply with this limit, but achieving even lower concentrations of particulate matter will ultimately result in improved health outcomes for the community.

Air Quality NES Under Review

3.1.4 Over the last two decades, the focus on particulate matter pollution under the Air Quality NES has been to manage short-term exposure to PM₁₀. More recent international investigations suggest that greater focus should be placed on the management of smaller particles, PM_{2.5}, as these are typically more harmful and are more controllable, given their greater apportionment

¹ Prior to 1 September 2020, the Airshed was allowed 3 exceedances under the Air Quality NES.

to anthropogenic sources relative to PM₁₀. Evidence also supports management of longer-term exposure to particulate matter given the additional health effects arising².

- 3.1.5 The Air Quality NES has been under review for the last couple of years. Last year the Ministry for the Environment (MfE) released a consultation document 'Proposed Amendments to the National Environmental Standards for Air Quality (2020)' which outlined proposed amendments to address two issues, being (1) home heating which is the primary source of PM_{2.5} in New Zealand, and (2) proposed controls on mercury emissions to help New Zealand meet its obligations under the Minamata Convention on Mercury. The Council provided feedback on this engagement at that time and MfE published a summary of submissions report in December 2020.
- 3.1.6 Over 2021, the Air Quality NES review has paused subject to the release of new evidence. This has included updates to the World Health Organisation's air quality guidelines (see Section 4.1 for more details) and the Health and Air Pollution in New Zealand study (which is yet to be released at the time of writing). It is anticipated that over 2022, MfE staff will continue working with iwi partners, councils and key stakeholders to refine the proposed amendments based on feedback and advice received to date. The outcome of the review is likely to have significant implications for the management of the Richmond Airshed if the Council is required to monitor and manage PM_{2.5} given the results of monitoring to date (see Section 4.3).

3.2 Resource Management Act 1991 – Greenhouse Gas Emissions

- 3.2.1 The RMA 1991 has historically prohibited councils from considering the effects that discharges involving greenhouse gas (GHG) emissions to air have on climate change³. From 31st December 2021, those prohibitions will be repealed (under the Resource Management Amendment Act 2020). The provisions will enable councils to consider GHG emissions when consenting discharges to air under the RMA 1991. The signal from central government is that a new national direction will be provided before the end of this year in the form of a combined national policy statement and national environmental standard. This will enable consistent decision-making by councils on this issue, recognising that councils have not exercised such a function historically, and that rules in existing plans are non-existent or fit-for-purpose to address greenhouse gas emissions. A discussion document on the draft national direction released earlier this year indicated that the focus will be on GHG from the burning of fossil fuels for process heat⁴. At the time of writing, this direction is yet to be issued.
- 3.2.2 Additionally, the Resource Management Amendment Act 2020 placed requirements on councils to have regard to emissions reduction plans and national adaptation plans when making and amending regional policy statements, regional plans and district plans. It is noted that the government is currently developing an Emissions Reduction Plan that will set out national actions to meet New Zealand's first emissions budget, and ultimately enable transition towards a low-emissions future. At the time of writing, central government is

² Ministry for the Environment. 2020. *Proposed amendments to the National Environmental Standards for Air Quality: particulate matter and mercury emissions – consultation document*. Wellington: Ministry for the Environment.

³ See RMA sections 70A, 70B, 104E, 104F for example.

⁴ Ministry for the Environment, <https://consult.environment.govt.nz/climate/phasing-out-fossil-fuels-in-process-heat/> (viewed on 29/10/2021).

consulting on a discussion paper⁵, and the Emissions Reduction Plan is expected mid-2022. Once this Plan is available, staff will be able to better understand how Council can respond to the requirements in the Plan through Council's own activities that generate GHG emissions in addition to regulation of activities under our resource management plan.

3.3 Resource Management Act 1991 Reform

3.3.1 The RMA reforms, announced in February 2021, propose to repeal the RMA 1991 and replace it with three new pieces of legislation⁶. The Natural and Built Environments Act (NBA) is proposed to be the core piece of legislation which will replace the RMA 1991. The Office of the Minister for the Environment released the Exposure Draft NBA at the end of June 2021 for consultation, providing an early look at key aspects of the legislation.

3.3.2 The draft legislation proposes a new 'National Planning Framework', providing a set of mandatory national policies and standards, including environmental natural limits, outcomes and targets. It proposes that the national planning framework and all plans will promote a number of environmental outcomes – those outcomes relating to discharges to air include:

- (a) the quality of air, freshwater, coastal waters, estuaries, and soils is protected, restored, or improved; and
- (j) greenhouse gas emissions are reduced and there is an increase in the removal of those gases from the atmosphere.

3.3.3 The government intends to pass the proposals into law in this parliamentary term (e.g. by the end of 2022). At the time of writing, it is unknown how MfE intends to incorporate the Air Quality NES review within this wider legislative reform, and if the NES review will continue in advance of the new legislation or merge into the development of the new national planning framework. It is anticipated that MfE will provide further guidance and engagement with councils over 2022 and staff will actively engage in that process.

3.4 Maritime Transport (MARPOL Annex VI) Amendment Bill 2021

3.4.1 In May 2021, the Maritime Transport (MARPOL Annex VI) Amendment Bill 2021 was introduced into parliament. This Bill seeks to amend the Maritime Transport Act 1994 to align New Zealand's legislation with Annex VI of the International Convention for the Prevention of Pollution from Ships (MARPOL). MARPOL aims to prevent and minimise ship pollution in the marine environment and is the primary international regulation to address shipping emissions. There are 6 annexes categorised by pollution type and Annex VI seeks to limit air pollution from ships around ports and harbours (including nitrogen oxides, sulphur oxides, soot). At the time of writing the Bill is awaiting its 'third reading' in parliament and if successful, will be passed into legislation⁷.

3.4.2 This proposed legislation to limit shipping emissions in ports and harbours will have positive benefits for air quality in the Richmond Airshed. Port Nelson is located approximately 11km

⁵ Ministry for the Environment. 2021. Te hau mārohi ki anamata Transitioning to a low-emissions and climate-resilient future: Have your say and shape the emissions reduction plan. Wellington: Ministry for the Environment.

⁶ The Natural and Built Environments Act, Strategic Planning Act, and the Climate Change Adaptation Act.

⁷ https://www.parliament.nz/en/pb/bills-and-laws/bills-proposed-laws/document/BILL_111372/tab/digest (viewed on 29/10/2021).

to the north-east of the Richmond Airshed’s monitoring site. Secondary sulphate, which includes shipping emissions, contributes to the overall source of particulate matter in the Airshed⁸. Any reduction in this air contaminant, such as through regulations to require the use of low-sulphur fuels at Port Nelson, will help to improve the overall air quality in the airshed and assist Council in achieving compliance with the Air Quality NES.

4 Air Quality Monitoring and Assessment

This section provides an overview of the how air quality is monitored in the Tasman District, with focus on the Richmond Airshed’s compliance under the Air Quality NES and more recent research monitoring in Motueka township. It includes the results of the winter air quality monitoring in these townships for 2021.

4.1 Air Quality Standards and Guidelines

4.1.1 Table 1 illustrates the current air quality standards for particulate matter concentrations along with relevant guidelines and proposed changes to the current standards. The particulate matter standard under the Air Quality NES is a concentration limit set to protect human health and incorporates one allowable exceedance per 12-month period. It is based on the previous World Health Organisation’s (WHO) air quality guidelines from 2005. The WHO guidelines include both short term (daily) and long-term (annual) averages of pollutant concentrations.

4.1.2 Since WHO’s last 2005 global update, there has been a marked increase of evidence that shows how air pollution affects different aspects of health. For that reason, and after a systematic review of the accumulated evidence, WHO has adjusted almost all its air quality guideline levels downwards, including those for particulate matter as shown in Table 1⁹. MfE will need to consider these updated guidelines as part of the current Air Quality NES review.

Table 1: Particulate Matter Standards and Guidelines¹⁰

PM size	Averaging period	WHO 2005 guideline	MfE 2005 guideline	Operative NES-AQ	Draft NES-AQ 2020	WHO 2021 guideline
PM ₁₀	24-hour	50 µg/m ³	50 µg/m ³	50 µg/m ³ *	50 µg/m ³	45 µg/m ³
PM ₁₀	Annual	20 µg/m ³	20 µg/m ³	-	-	15 µg/m ³
PM _{2.5}	24-hour	25 µg/m ³	-	-	25 µg/m ³ **	15 µg/m ³
PM _{2.5}	Annual	10 µg/m ³	-	-	10 µg/m ³	5 µg/m ³

* One exceedance permitted per year; ** Three exceedances permitted per year

⁸ Davy, P.K.; and Trompetter, W.J. 2007. Apportionment of PM_{2.5} and PM₁₀ sources in the Richmond Airshed, Tasman District, GNS Consultancy Report 2017/86. The results of the source apportionment study identified that secondary sulphate accounted for 14% of PM₁₀ and 8% of PM_{2.5} from filters collected at the Richmond monitoring station over a monitoring period from October 2015 to October 2016. The study identified that secondary sulphate contributions originated from north of the monitoring site and that it is possible that shipping emissions from Port Nelson contributed to the concentrations (along with natural longer-range sources such as marine phytoplankton activity and SO₂ from the Central Plateau volcanic zone).

⁹ <https://www.who.int/news/item/22-09-2021-new-who-global-air-quality-guidelines-aim-to-save-millions-of-lives-from-air-pollution> (viewed on 29/10/2021).

¹⁰ µg/m³ = micrograms per cubic meter. For example, 50 µg/m³ refers to the weight of the particles in micrograms contained in one cubic meter of air.

4.1.3 The Air Quality NES currently does not include a national standard for PM_{2.5}. However, it is anticipated that future Air Quality NES amendments will introduce one or more standards for PM_{2.5}. The 2020 discussion document published by MfE regarding the Air Quality NES review provided an indication of likely amendments. However, that document preceded the more recent 2021 WHO guidelines and for councils there is now some uncertainty about the substance of the Air Quality NES review as a result.

4.2 Monitoring Instruments

Richmond Airshed

4.2.1 Particulate matter has been monitored in the Richmond Airshed since 2000 and the Air Quality NES standard for PM₁₀ has been exceeded every winter (where results are available). Concentrations of PM_{2.5} have been measured in Richmond since October 2015. The Richmond air quality monitoring equipment is located at the Plunket Rooms and portacom building at 56 Oxford Street, central Richmond. Three air quality instruments were used for monitoring particulate matter (PM) air quality in Richmond:

- Thermo FH62 Beta Attenuation Monitor (FH62 BAM) for period September to December 2020 fitted with a PM₁₀ inlet with adjustment factors applied.
- Partisol gravimetric air quality sampler (R&P Model 2000) for colocation with FH62 BAM.
- Continuously beta attenuation monitor (Thermo Scientific Model 5028i instrument), which measures PM₁₀ (channel A) and PM_{2.5} (channel B) simultaneously. There are no adjustment factors required for this data.

4.2.2 Two of the air quality instruments (Partisol and BAM FH62) were withdrawn from use at the end of 2020. Covid-19 travel restrictions from August 2021 have delayed the annual calibration and audits on all the instruments.

Motueka, Riwaka and Brooklyn

4.2.3 In 2018 the Council established an air quality monitoring programme to better understand if there are air quality issues in the Motueka, Riwaka and Brooklyn areas. The program spans several years and involves temporary monitoring of PM₁₀ and/or PM_{2.5} to collect baseline data. This is to understand if there are air quality issues associated with smoke pollution (home heating and/or outdoor rural burning) in the wider area, which may require permanent monitoring and a need to introduce management tools.

4.2.4 In 2020 a temporary monitoring site was established in Motueka, at Goodman Ledger Park, with one instrument set up for PM₁₀ using an Air Quality NES approved monitoring instrument (Partisol 2025). This instrument continued monitoring air quality over winter 2021.

4.2.5 Council staff also commissioned Mote Limited to undertake temporary air quality monitoring using in Riwaka and Brooklyn areas this winter using 'dustmote' air quality sensors. Further details on this study are set out in Section 6.

Future Additional Monitoring

4.2.6 Through the 2021-2031 Long Term Plan, there is budget in place to purchase a new Air Quality NES-approved monitoring instrument for Motueka if permanent monitoring is required in the township, alternatively it will be used to replace/upgrade the Partisol at Richmond (2022/23 financial year). Additionally, winter-time monitoring is budgeted for in Brightwater/Wakefield

(winter 2023) and Murchison (2026) as part of a ‘surveillance’ work programme of smaller townships in our district. The Air Quality NES only requires the identification and monitoring of airsheds where air quality standards are likely to be breached.

4.3 Richmond Airshed 2021 Monitoring Results and Analysis

4.3.1 The Richmond Airshed is monitored continuously because it exceeds the standard for concentrations of particulate matter during winter months. It is classified as a polluted under the Air Quality NES and requires targeted management. The key source of pollution in the airshed is biomass combustion (burning of wood) over the cooler winter months, primarily associated with home heating.

Richmond Airshed PM₁₀ Results and Meteorology

- 4.3.2 Based on the weather records from the Tasman District Council, 189 Queen Street meteorological monitoring site, the winter of 2021 had above mean temperatures for winter with a cooler period in July. The wind speed has been similar to the ten-year average for the first half of the winter (May/June), and windier than average for July and August.
- 4.3.3 Daily 24-hour average PM₁₀ concentrations measured using the BAM monitoring instrument in Richmond over the monitoring year period (1 September 2020 to 31 August 2021) are shown in Figure 3. The data for winter 2021 shows peak particulate matter concentrations, breaching the standard, occurring during the start of June and in early July, and coincides with periods of cool and calm weather. Previous source apportionment work has shown smoke in the Richmond airshed is mainly associated with biomass combustion (wood smoke) from the use of wood burners for home heating.

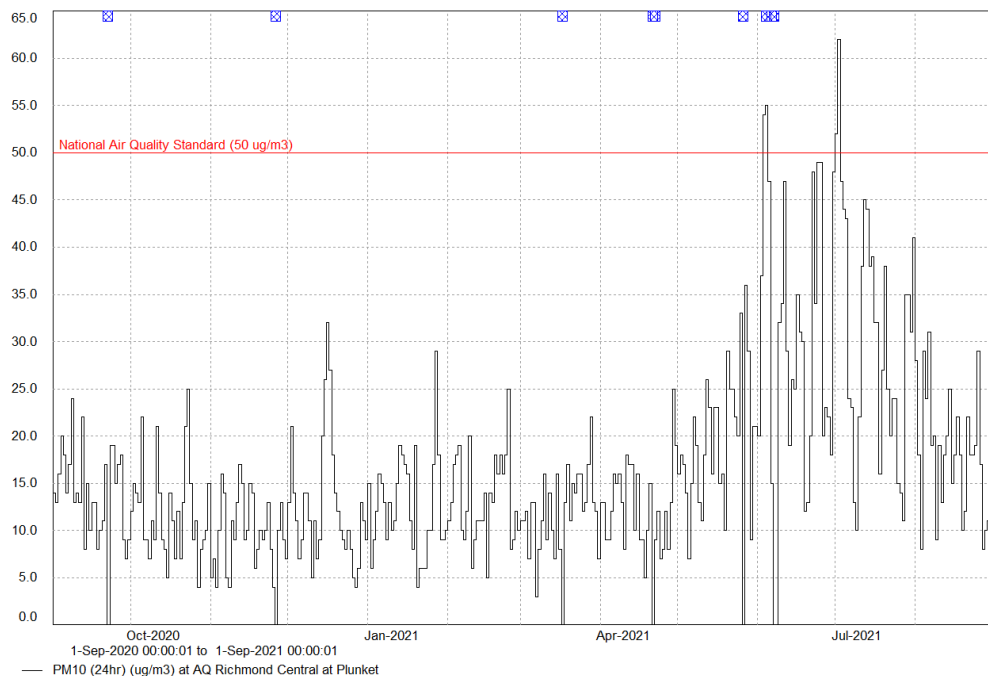


Figure 3: Richmond daily PM₁₀ concentrations in µg/m³ (1 Sep 2020 – 31 Aug 2020)

4.3.4 Table 2 shows the PM₁₀ daily average data for the year, starting 1 September 2020. The summary of annual average PM₁₀ concentrations for Richmond for 2020/2021 is 16 µg/m³, which meets the current annual ambient air quality guideline value of 20 µg/m³ but exceeds the WHO 2021 guideline of 15 µg/m³. The winter (May-August) average was 25 µg/m³ and the average for the non-winter months (September – April) was 12 µg/m³. The maximum PM₁₀ was 62 µg/m³.

Table 2: Richmond Daily Average PM₁₀ concentrations in µg/m³ in 2020/2021

Richmond at Plunket Rooms												
01-09-2020 to 31-08-2021												
PM ₁₀ daily average												
Method:	FH62 BAM / 5028i BAM											
Valid Data:	98.6%											
Data Capture Rate:	100%											
Units	µg/m ³											
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Minimum	3	3	2	1	4	5	3	5	7	12	10	8
Mean	13	10	9	12	12	13	12	13	20	32	31	18
Maximum	24	26	17	34	29	25	22	25	36	55	62	31
Lowest				1								
Highest											62	
Exceedances (>50 µg/m ³)	0	0	0	0	0	0	0	0	0	2	2	0
Exceedances (>45 µg/m ³)	0	0	0	0	0	0	0	0	0	8	4	0
Annual Mean	16											
Note: Year starts in September												

4.3.5 In 2021, there were four exceedances and three breaches of the Air Quality NES daily standard in the Richmond airshed (Table 3). The exceedances occurred when there were cool calm conditions, with light wind speeds of 3-4km/hr and generally cool night-time temperatures. There were 12 exceedances of the WHO 2021 guideline value of 45 µg/m³ which occurred in the months of June and July.

Table 3: Exceedances of 24-hour PM₁₀ in Richmond in 2021

Date	PM ₁₀ Concentration measured (µg/m ³)	Extent of PM ₁₀ Exceedance (µg/m ³)	Daily Wind speed (km/hr)	Night time 4-hour Temp (8pm-12pm) °C
3 June 2021	54	4	4.1	7.5
4 June 2021	55	5	3.7	7.9
1 July 2021	52	2	4	5.5
2 July 2021	62	12	3.5	5.4

4.3.6 PM₁₀ has been measured in Richmond since 2000, with gaps in the data for 2001/2002 and continuous monitoring using a BAM from 2006. Figure 4 shows the number of exceedances of the daily particulate matter standard since monitoring began in Richmond, and Figure 5 (over page) shows the winter PM₁₀ trend, normalised to take into account seasonal variations in wind speed and temperature. The trend in PM₁₀ exceedances over the monitoring period has shown an improvement (i.e decrease in number of exceedances) up until 2010 and then an indeterminate trend for the last few years.

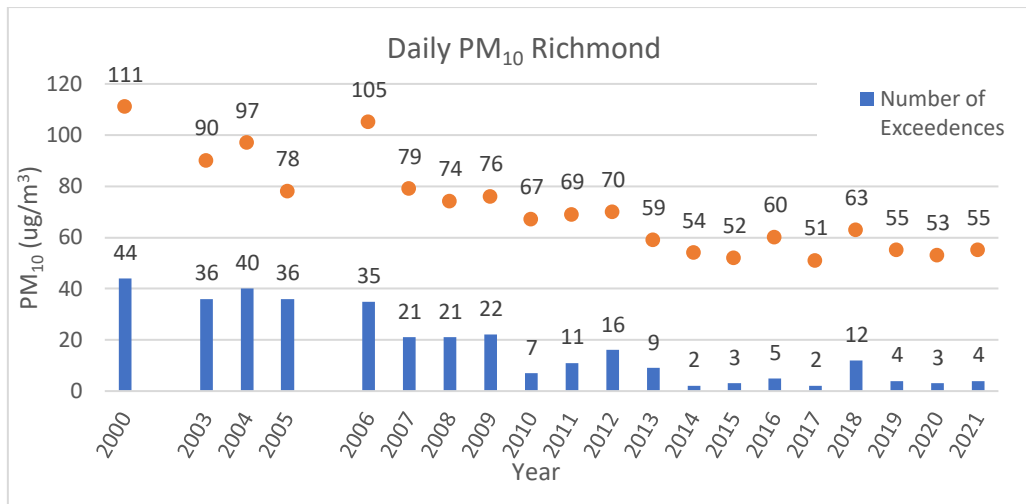


Figure 4: Number of Exceedances of 24-Hour PM₁₀ for Richmond (2000 to 2021)

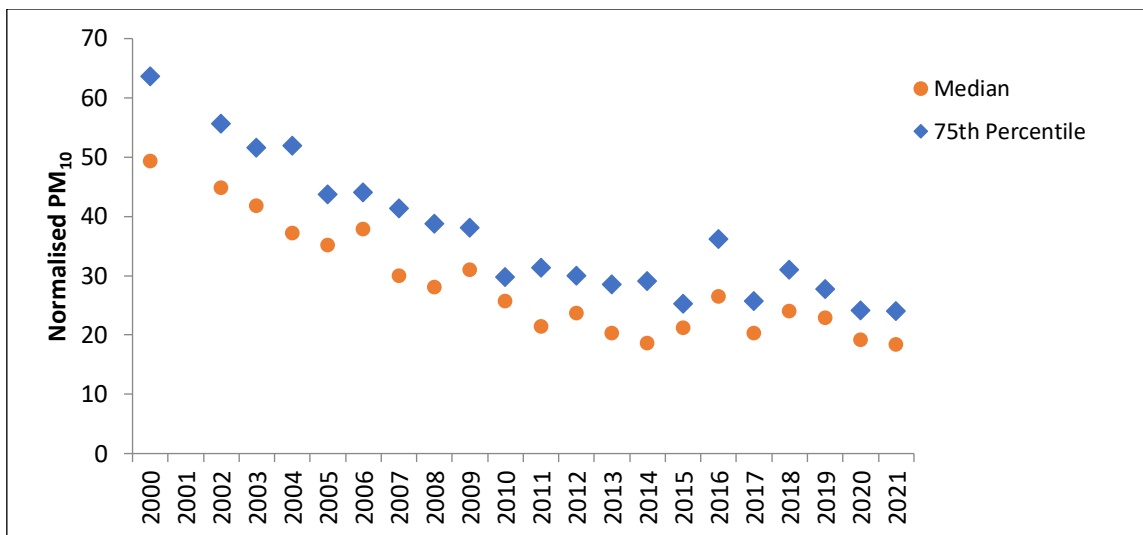


Figure 5: Richmond Winter PM₁₀ normalised for meteorological conditions (2000 to 2021)

Richmond Airshed PM_{2.5} Results

4.3.7 The daily 24-hour average PM_{2.5} concentrations available for Richmond from the continuous BAM is shown in Figure 6 (over page). The PM_{2.5} breached the 2021 WHO daily guideline value of 15 µg/m³ a total of 63 times. The data for winter 2021 shows the typical seasonal pattern, with peak PM concentrations occurring in winter and is associated with the use of wood for home heating.

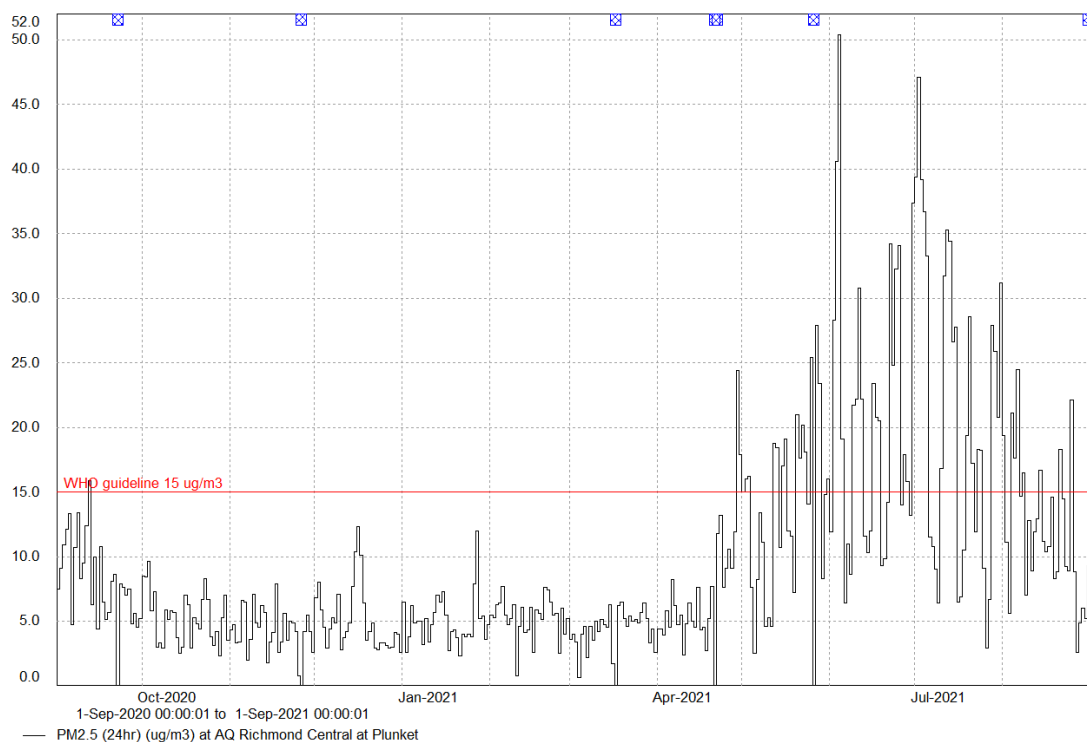


Figure 6: Richmond Daily PM_{2.5} concentrations in µg/m³ (1 Sep 2020 – 31 Aug 2021)

4.3.8 Table 4 summarises the PM_{2.5} daily average data for the year, starting 1 September 2020, with highlighted cells exceeding the WHO 2021 daily guideline (15 µg/m³)

Table 4: Daily Average PM_{2.5} measured in Richmond in 2020/2021

Richmond at Plunket Rooms
 01-09-2020 to 31-08-2021
 PM_{2.5} daily average
 Method: 5028i BAM
 Valid Data: 98.9%
 Data Capture Rate: 100.0%

	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Minimum	4.4	2.3	0.8	2.6	2.3	0.8	0.6	2.4	2.5	6.4	2.9	2.6
Mean	8.4	5.2	4.4	5.1	5.0	5.3	4.4	7.5	14.2	21.0	21.6	12.1
Maximum	15.9	9.6	7.9	12.3	12.0	7.7	6.5	24.4	27.9	50.4	47.1	24.5
Lowest							0.6					
Highest										50.4		
Exceedances (>25)	0	0	0	0	0	0	0	0	2	8	14	0
Exceedances (>15)	1	0	0	0	0	0	0	2	14	18	20	8
Annual Mean	9.6											

4.3.9 The annual average PM_{2.5} concentrations for Richmond for 2020/2021 is 10 µg/m³, which is double the 2021 WHO annual air quality guideline value of 5 µg/m³. The winter (May-August) average was 17 µg/m³ and the average for the non-winter months (September – April) was 6 µg/m³. The WHO daily guideline value of 15 µg/m³ was exceeded six months of the year from May-September, with the majority of exceedances occurring over the months of May-July.

4.3.10 The maximum daily PM_{2.5} concentration measured in Richmond was 50 µg/m³ on 4 June 2021, which is on the same date as one of the PM₁₀ exceedances in June. The PM_{2.5} data for 2021 is similar to the last few years monitoring in Richmond, however the WHO guideline has changed, which has given rise to more breaches than previously reported (using the WHO

2005 guideline). In 2019 and 2020, there were between 24-25 breaches of the previous daily PM_{2.5} guideline of 25 µg/m³ over the winter period, compared with 24 in 2021.

4.4 Motueka Temporary Monitoring Results and Analysis

Analysis of Motueka PM₁₀ Results

4.4.1 A Partisol gravimetric sampler (Thermo 2025i) monitoring PM₁₀ operated daily over the period 22 April 2021 to 31 August 2021, with a two-week data gap at the end of July due to an electrical fault. The average temperature during this period at the end of July was 10 degrees which was above the 3-year average of 8.7 degrees for the same period. There were no exceedances in Richmond during this period. The warmer than average temperatures, along with similar wind speeds, indicates that exceedances were unlikely to have occurred in Motueka. The winter daily PM₁₀ data is presented in Figure 7. The monitoring was set up to coincide with optical instruments deployed as part of the Riwaka and Brooklyn Mote Ltd study (see Section 6.2). The gravimetric data has shown there were no exceedances of the PM₁₀ daily standard over the winter period (May-August). The maximum PM₁₀ recorded in Motueka was 32 µg/m³. A full review of the 2021 Motueka data will be completed following the additional air quality work undertaken by Mote Ltd using optical instruments.

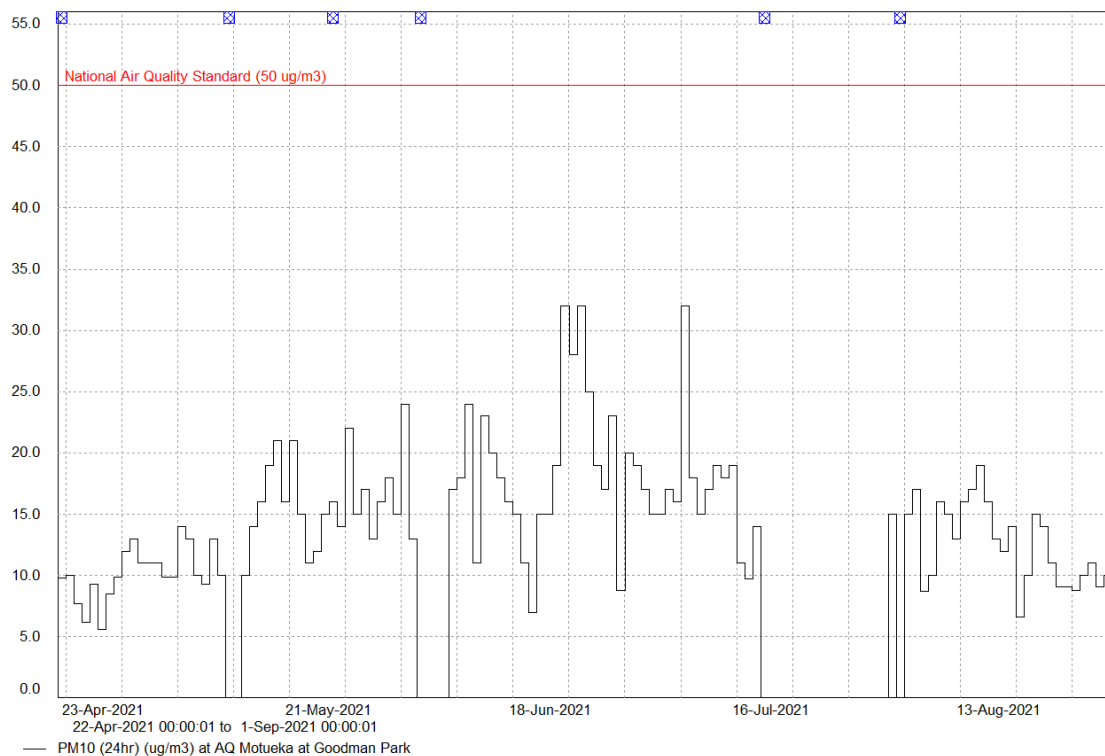


Figure 7: Daily average PM₁₀ concentrations measured in Motueka (22 April 2021 – 31 Aug 2021)

4.4.2 Table 5 (over page) summarises the Motueka PM₁₀ daily average data. The 2021 winter (May-August) average PM₁₀ concentration for Motueka is 15 µg/m³, with the highest value being 32 µg/m³.

Table 5: Daily Average PM₁₀ measured in Motueka in winter 2021

Motueka at Goodman Park				
01/05/2021 to 31/08/2021				
PM ₁₀ daily average				
Method:	Partisol			
Valid Data:	81.3%			
Data Capture Rate:	81.3%			
	May	Jun	Jul	Aug
Minimum	9	7	9	7
Mean	14	19	17	13
Maximum	22	32	32	19
Lowest				7
Highest		32		
Exceedances	0	0	0	0
Winter Mean	15			

4.4.3 Previous short-term air quality sampling undertaken in Motueka in 2006, 2014, 2018, 2019 and 2020 have recorded one exceedances of the 24-hour daily PM₁₀ standard (Figure 8) during 2020. However, the previous 2020 result should be treated with caution given its outlier status and irregularities with lab results throughout the season.

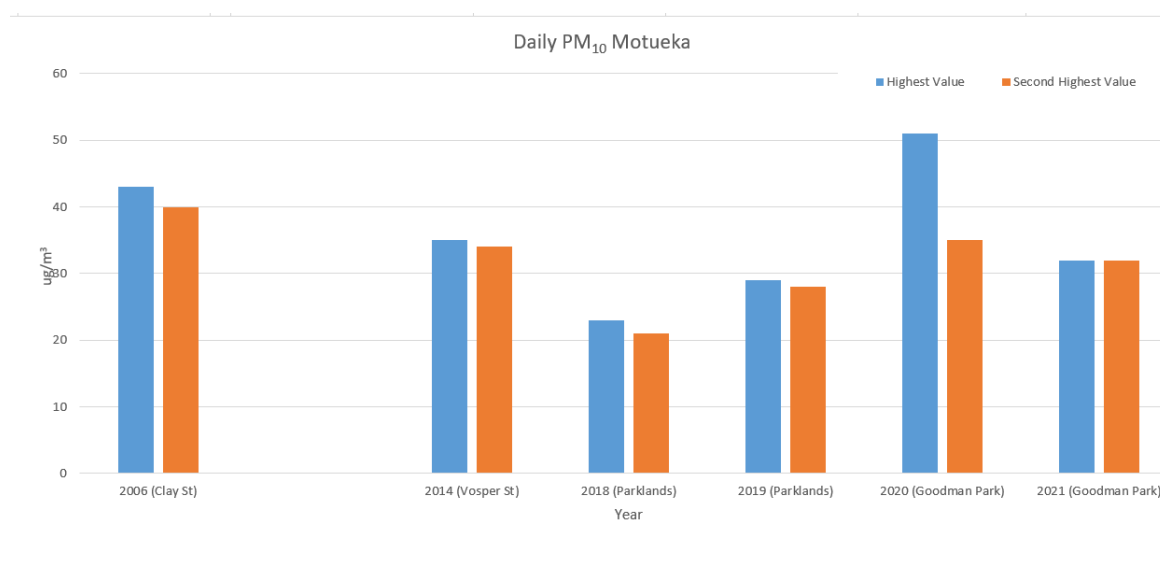


Figure 8: Winter daily PM₁₀ for Motueka (2006 to 2021)

4.5 Our Air 2021: preliminary data release

4.5.1 In mid-October 'Our air 2021: preliminary data release' was published which is the latest in a series of environmental reports produced by the MfE and Stats NZ. This report presents the latest data on the state of New Zealand's air quality. The report shows that nationally air quality has generally improved at most sites and across many of the indicators used. However,

there are many New Zealand urban areas that continue to experience poor air quality at times and this is often in cooler months or where there is heavy traffic¹¹.

4.5.2 The preliminary data release compares each pollutant (where applicable) to New Zealand’s Air Quality NES and the 2005 World Health Organisation’s (WHO) air quality guidelines. However, MfE and Stats NZ are currently working to revise the Our Air 2021 report, proposed to be released on 10 December 2021, to include:

- analysis of the WHO 2021 air quality guidelines
- references to the impacts of COVID-19 lockdowns on air quality¹²

4.5.3 The preliminary data release report is a high-level snapshot of air quality and there is no explicit mention of the Richmond Airshed. However, staff expect that the reviewed report will provide much more detail including how the management of the Richmond Airshed is tracking in comparison to other airsheds nationally.

5 Complaints and Enforcement

During the six-month period from 1 April to 30 September 2021, the Council received 164 air quality related complaints, 28 of these related to odour; 5 were dust related; 9 were discharge of pesticide/herbicide complaints and 122 complaints related to smoke. This total number of complaints is significantly down on previous years, where Council received 338 total air related complaints in 2020, and 208 complaints in 2019. Notable decreases are the number of odour complaints received in relation to Talleys’ factory site in Motueka (nil received down from 71) and smoke related complaints down from 262 in 2020.

5.1 Odour

5.1.1 Odour complaints can be broken down into different odour sources as follows:

- Wastewater/sewerage: 14
- Industrial: 7
- Rural: 6
- Food: 1

5.2 Smoke

5.2.1 116 complaints related to smoke and the cross-boundary effect of smoke, with an additional 6 being of a general nature. The cross-boundary complaints can be broken down by area:

Golden Bay	<ul style="list-style-type: none"> • 8 rural outdoor burn • 3 smokey chimney • 2 urban outdoor
Murchison	<ul style="list-style-type: none"> • 2 rural outdoor burn
Motueka, Lower Moutere and Riwaka	<ul style="list-style-type: none"> • 35 rural outdoor burning • 9 urban outdoor burning
Waimea, Wakefield, Upper Moutere, Māpua	<ul style="list-style-type: none"> • 21 rural outdoor burn

¹¹ Ministry for the Environment & Stats NZ (2021). New Zealand’s Environmental Reporting Series: Our air 2021: preliminary data release. Retrieved from environment.govt.nz.

¹² <https://environment.govt.nz/publications/our-air-2021/> (viewed on 08/11/2021).

Richmond	<ul style="list-style-type: none"> • 5 household smokey chimney • 8 urban outdoor burning • 18 rural outdoor burning • 5 industrial smoke complaints
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5.2.2 Compliance staff were advised in April 2021 that orchardists were struggling to source replacement apple tree stock. The flow on effect of this situation was that less orchard trees were removed for replacement and therefore less outdoor burns were undertaken. Anecdotal evidence from Council staff was that it ‘felt’ like there were less rural fires during winter particularly on the Waimea Plains and Riwaka.

5.2.3 Staff undertook some limited Richmond Airshed smoke patrols over winter 2021 and followed up on smokey chimney complaints. Educational advice was provided about best practice wood burner use, wood moisture levels and storage of wood. Property owners generally took this positively as they did not wish to annoy neighbours or contribute unduly to the overall smoke in Richmond. The suggestion that they physically check their chimney to ensure they were ‘doing it right’ gave them some ownership of the positive changes they could make with their woodburner use. A common practice is that the older wood burner models can be ‘bank down’ overnight. However, national information and tests have shown that it does not add to the warmth of a house but greatly increases air pollution.

5.3 Enforcement (smoke related)

- 5.3.1 Staff were required to undertake the following enforcement action during the year:
- 2 abatement notices were issued requiring compliance with Tasman Resource Management Plan (TRMP) smoke discharge rules.
 - 2 Abatement Notices issued to cease the burning of prohibited items.
 - 1 Abatement Notice issued to remove and dispose of the contaminated ash and topsoil to landfill.
 - 6 Infringement notices issued for breach of the TRMP outdoor burning rules.
 - 11 warnings were given.
 - 3 outdoor burns which resulted in serious breaches of the TRMP rules are currently under further investigation
 - Education and best practice advice, links to outdoor burn trial method and results; information on effect of air quality and health impact of smoke given in most instances where a burn was confirmed

The photos over page are examples of two outdoor fires that resulted in enforcement action this year.

Image 1: Examples of non-compliant outdoor fires attended by Council staff in 2021



5.4 Richmond Airshed

- 5.4.1 The Richmond airshed contains a total of 6,501 properties. Of these properties, Council records identify that there are a total of 5,259 properties that have either a compliant wood burner; a compliant wood pellet burner; a cooker; or an alternative heating source. These figures are based on current available information (at November 2021).
- 5.4.2 Within the airshed, 229 properties are currently known to be subject to our TRMP Rule 36.3.7.5. This means the property has on-sold since January 2007 and the owners are required to upgrade their wood burner if they have a non-compliant model and wish to use it. Of these properties, a total of 115 property owners have advised Council staff that they do not use their wood burner and have alternative heating (however they do wish to keep the option of wood burner replacement open).
- 5.4.3 That leaves 114 properties that Council believe are potentially using non-compliant wood burners within the Richmond Airshed. Due to Covid-19 pandemic, the planned enforcement action against these property owners was scaled back this year, and complaints relating to smokey chimneys and the use of non-compliant wood burners resulted in education and advice to property owners to ensure the wood burner was being used correctly and burning compliant dry wood. All property owners with non-compliant wood burners were notified pre-winter of their wood burner status and advised of the need to upgrade their wood burner or use an alternative heat source.
- 5.4.4 There are 266 properties within the Airshed which the Council does not have heating details for ('unknown' heating source). These properties have not sold since 2007 and we believe the majority have removed their wood burner, however work will be ongoing over this summer to further identify these properties with a physical check. Any identified with a non-compliant wood burner will be contacted and advised that they are unable to use their wood burner. Staff will again target these non-compliant properties to enable the owners sufficient time to remediate their situation prior to the 2022 winter. Within the Richmond Airshed there are approximately 713 older style burners (16+ years old) and cookers which are legally allowed to operate under the TRMP rules (as the property has not sold). These burners do not meet the

Air Quality NES emission and efficiency standards. Education is required with these property owners around efficient use of these old burners, utilising best practice methods and dry wood to minimise smoke discharge.

6 Research

The Council has an ongoing air quality research work programme to help assist our understanding and management of air quality in the Tasman District. This section sets out details of research work that has been undertaken this year and the outputs will be used to help inform the development of the 'discharges to air' section of the Aorere ki uta, Aorere ki tai – Tasman Environment Plan.

6.1 Richmond Airshed Katabatic Winds Study 2021

- 6.1.1 Using a MBIE Envirolink Small Advice Grant, the Council commissioned the University of Canterbury to research the influence of 'katabatic winds' on dispersion of PM₁₀ in the Richmond Airshed¹³. Katabatic winds are cold air that drain down from high elevations of mountain/hill slopes to the valley or plain below under the influence of gravity, as cold air is less buoyant than warm air. The dispersion of smoke within the Richmond Airshed (from home heating and outdoor rural burning in the wider area) is complex due to the local topography of the Richmond Ranges and climatic conditions. The study used a combination of data analysis and meteorological and dispersion modelling.
- 6.1.2 As part of the study, examination of local wind direction (wind roses) indicated that there is a tendency for nocturnal south-westerly katabatic flows. These flows have a potential to (re)circulate polluted air at night, when shallow temperature inversion layers can trap particulate matter near the ground exacerbating air quality.
- 6.1.3 Using meteorology datasets from 2018 and 2020, dispersion modelling (using The Air Pollution Model (TAPM)) was undertaken to study the impact of simulated point source emissions (e.g outdoor rural burn piles) from the Waimea Plains on the Airshed. The modelling used a grid of four different coloured 'tracer' zones of point sources located on the wider Waimea Plains (Figure 9). Two scenarios were modelled, being a 24-hour continuous emissions scenario and a day-time 10am–4pm emissions scenario.
- 6.1.4 The combination of data analysis and particulate matter dispersion modelling with TAPM concluded that:
- Katabatic winds can occur after sunset and advect (horizontally transport) pollutants towards Richmond, the spatial nature of the katabatic flow has been shown by TAPM, but it is generally an extensive flow system.
 - The point sources as simulated in the modelling have the potential to contribute to particulate matter loading of the air over Richmond, this potential decreases the further the point source zone is from Richmond.
 - Dispersion results shows that over a 24-hour period, the time of day when emissions has the least impact on the Richmond Airshed is between 11am and 4pm, as a result of

¹³ Zawar-Reza, Peyman. (2021). The influence of katabatic winds on dispersion of PM₁₀ in the Richmond Airshed. University of Canterbury. MBIE Envirolink Project 2102-TSDC171.

daytime winds and the greater ability of the atmosphere to disperse particulate matter (see Figure 10 over page).

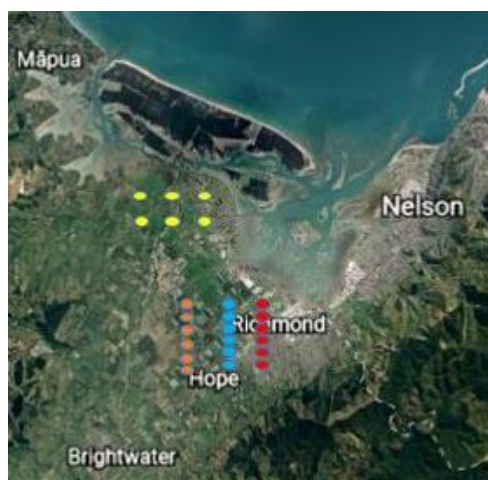


Figure 9: Dispersion modelling configuration and placement of point sources; Tracer 1 (RED), Tracer 2 (Blue), Tracer 3 (Orange), and Tracer 4 (Yellow)

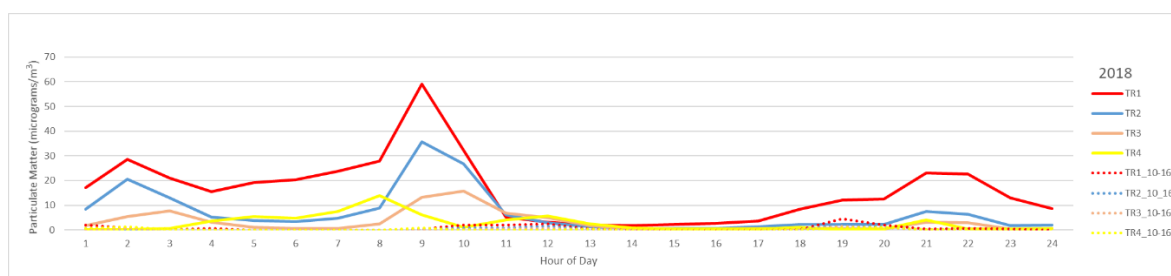


Figure 10: Hourly-averaged simulated PM concentrations over Richmond for 2018 dispersion model runs. Colouring of tracers as in Figure 9, solid lines for 24-hour emission profile, dashed lines for emission of PM from 10:00 till 16:00.

6.2 Riwaka and Brooklyn Air Quality Monitoring 2021

- 6.2.1 As part of Council’s ongoing work programme to monitor air quality in the wider Motueka, Riwaka and Brooklyn area over winter months, Council staff commissioned Mote Limited to undertake a three month winter monitoring programme of PM_{2.5} in the Riwaka and Brooklyn. This is to further investigate if there is an air quality issue associated with outdoor rural burning which is used as a land management practice to dispose of vegetation waste.
- 6.2.2 Mote Ltd deployed four ‘dustmote’ sensors at locations in Riwaka and Brooklyn in mid-May 2021. An additional two dustmotes (monitoring PM₁₀ and PM_{2.5}) were co-located at Council’s monitoring site in Motueka alongside the Council’s Air Quality NES approved monitoring instrument. The ‘dustmote’ sensors are easily locatable, low-cost air quality monitoring devices which are suitable for research purposes.
- 6.2.3 At the time of writing, staff expect a final report detailing the study results during December 2021. This delay is because Auckland-based Mote Ltd staff were initially unable to travel to collect the sensors at the end of the study period due to Covid-19 lockdown restrictions. The sensors have now been collected and the report is being drafted. The final report will be

made available on Council’s website once available. The outputs of this study will help to identify if there is an air quality issue and if there is a need for ongoing monitoring and/or the use of policy tools (regulatory and/or non-regulatory methods).

6.3 Richmond Airshed Management Options

- 6.3.1 To support background work for the Air Issues and Options paper (see Section 8), the Council commissioned Environet Ltd to model management options to reduce particulate concentrations for the Richmond Airshed (using a MBIE Medium Advice Grant). The report evaluates the likely effectiveness of current air quality management strategies and potential alternative strategies to reduce PM₁₀ and PM_{2.5} concentrations and the likelihood of the latter strategies resulting in compliance with the Air Quality NES and potential future PM_{2.5} standards.
- 6.3.2 The report’s analysis updates previous assessments commissioned by Council to include the most recent science as well as mitigation options such as the introduction of ultra-low emission burners (ULEB) and other technologies not previously available. Results confirm previous evaluations that additional management measures would be required for ongoing compliance with the Air Quality NES for PM₁₀ in the Richmond Airshed.
- 6.3.3 The report considers a range of management options (and combinations of options) such as the status quo under the TRMP rules (including use of pellet fires for new discharges, ‘point of sale’ rule), allowing the installation of ULEBs, phase out of non-Air Quality NES approved burners, and behaviour change initiatives – an example of the modelling is shown in Figure 11.

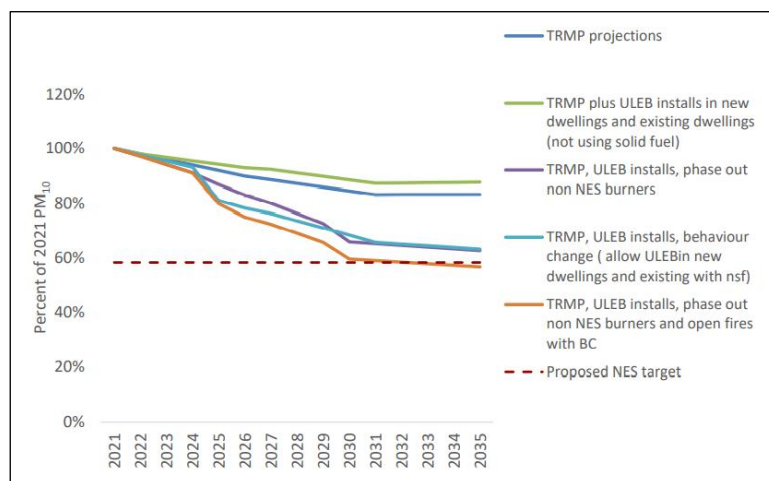


Figure 11: Projected daily winter PM_{2.5} for the current TRMP and a range of management measures targeting domestic home heating

- 6.3.4 The report provides a number of recommendations. The requirement that all new burner installations meet the ULEB criteria appears one of the most effective strategies. When this measure is combined with the phase out of burners not compliant with the Air Quality NES design standard and behaviour change to improve the operation of existing burners, compliance with the Air Quality NES for PM₁₀ and an annual PM_{2.5} standard of 8 or 10 µg/m³ is anticipated. Adoption of management measures based on achieving compliance with the existing Air Quality NES for PM₁₀ with a buffer that allows for uncertainties in the analysis is recommended given uncertainties in the proposed Air Quality NES for PM_{2.5}. If a daily Air

Quality NES for PM_{2.5} is introduced at the level (25 µg/m³) proposed by the MfE (2020) additional management measures may be required to achieve compliance by 2035. These could include the phase out of pre-2010 wood burners for example and could be considered at a later date once there is more certainty around this standard.

- 6.3.5 It is important to note that the scope of this work is a technical report that analyses capacity of the airshed based on modelled home heating and behaviour change options. Further work needs to be completed to better understand each of the options/recommendations to inform policy planning development and future regulation under the Council's resource management plan. This work would include cost-benefit analysis, understanding iwi and community views, and the outcomes of national direction (see Section 8).

7 Non-Regulatory Programmes

This section sets out the Council's non-regulatory air work programme which includes the Good Wood scheme, and education via the Council's communications. Alongside implementation of the Tasman Resource Management Plan's discharges to air rules, these non-regulatory programmes can contribute to reduction of winter-time air pollution through a number of often simple actions undertaken by residents and land managers in our District.

7.1 Good Wood Scheme

- 7.1.1 The Council continues to implement the Good Wood Scheme in partnership with Nelson City Council (NCC). The voluntary scheme requires wood merchants to supply firewood according to specified best practice performance standards. Wood merchants are required to sign the Good Wood Supplier Agreement annually and adhere to a number of conditions. In return, both Councils promote these wood merchants as Good Wood suppliers on our websites and in Council communications (e.g. social media and advertisements in local newspapers).
- 7.1.2 Tasman District Council and NCC staff arranged a meeting of wood merchants, wood burner retailers and the Home Heating Association on 21 April 2021 however there was a poor turnout, likely due to the busy time of year. At the time of writing, staff are organising a follow up meeting for late November 2021 to meet with merchants during their off-season.
- 7.1.3 This winter a Mapua resident complained to Council staff in relation to the delivery of wood supplied by Quality Firewood, a Good Wood supplier. The wood included a larger proportion of unseasoned wood than what the customer was expecting. Council staff followed the complaints process, which is set out in the Good Wood Supplier Agreement, and this ultimately resulted in a warning letter being sent to Quality Firewood. Given there were no other complaints received against Quality Firewood this winter, Council continues to list Quality Firewood under our Good Wood scheme. If further customer complaints had been received, Council staff would have considered de-listing Quality Firewood from the scheme, which would be the next step in the complaints process. It is important to highlight that while both Councils operate this voluntary scheme, the Councils do not have direct involvement in the transaction process – this is an agreement between the individual wood merchant and the customer and is covered under the Consumer Guarantee Act 1993.

7.2 'Do You Stack Up?' Firewood Storage Competition

7.2.1 In early February 2021, the Council launched our firewood storage competition 'Do You Stack Up?' for a third year running (and was previously known as the 'Best Little Woodshed' competition). The competition was for entries showing innovative examples of wood storage to keep Tasman residents' firewood dry for winter. The competition promoted the principles of buying or collecting wood early (e.g. summer/early autumn) and storing it correctly to ensure that it is dry and will burn efficiently come winter.

7.2.2 A total of 14 entries were received and winning entries are shown below (Image 2). Jane Docherty (Photo A) and Steve Anderson (Photo B) were awarded first and second prizes for the Judges' Choice Award, judged by Tasman District councillors. Jane also won the People's Choice Award for the most number of 'likes' on Council's Facebook page, as voted by the public. Christie Sagar (Photo C) won the new Innovation Award, as judged by staff who were impressed by the use of space under her carport and house eaves for her wood storage.

Image 2: Winning Entries in the 2021 'Do You Stack Up?' Firewood Storage Competition



7.3 Warmer Healthier Homes Te Tau Ihu Charitable Trust

7.3.1 Since 2014, Warmer Healthier Homes Te Tau Ihu Charitable Trust (WHH) has operated across top of the south assisting homeowners and community members most in need to improve insulation measures, heating and overall efficiency by retrofitting into existing owner-occupied homes. WHH administers central government funding from the Energy Efficiency and Conservation Authority (currently at 80% funding) and local third-party funding (20% funding) to 100% subsidise home insulation to residents who meet the required criteria. The positive effects of improved insulation in homes are well documented – better insulation means a warmer, drier and healthier home that will be easier and cheaper to heat. This results in improved air quality outcomes as less wood is required to be burned for home heating, resulting in reduced levels of smoke.

7.3.2 Through the 2020/21 Annual Plan process, the Council contributed \$20,000 to WHH that will directly be used to retrofit insulation into qualifying households in the Tasman District. In May

2021 Council resolved to provide a further \$60,000 to WHH to be spent over the following three-year period (from the Council's climate change budget).

7.3.3 Over the 2020/2021 financial year, the Council's support along with other third-party funders has enabled the insulation of 228 houses in the Tasman District. This is in comparison to a total of 35 homes in the previous 2019/2020 financial year and represents a 651% increase of Tasman families now living in warmer, drier, healthier homes. The Council continues to promote the subsidy via communication channels and WHH also do their own publicity. It is estimated that there could be up to 2000 households that meet the qualifying criteria in our District.

7.4 Air Quality Education and Advice via Council Communications

7.4.1 Council staff have an ongoing work programme to educate and promote better burning to reduce air pollution over autumn and winter months. This year our communications focused on improving our social media presence, with a range of Facebook posts scheduled throughout the year to promote seasonal activities associated home heating and rural outdoor burning. For example, over late summer educational messages focused on early wood collection and correct wood storage in relation to home heating; during autumn and early winter the focus was on promoting best practice outdoor burning, chimney cleans, and the Good Wood suppliers; and winter focused on reducing air pollution through better burning practices. Although these are simple messages, they need to be promoted each year to improve wood burning behaviours.

7.4.2 A number of articles relating to air quality were included in publications of Newline throughout the year. This supplemented the wealth of information provided on the Council's air quality pages on the website, including best practice guides for home heating and outdoor burning.

8 Discharges to Air Policy Planning

8.1 Aorere ki uta, Aorere ki tai – Tasman Environment Plan: Air Issues and Options

8.1.1 Work is underway to develop the Aorere ki uta, Aorere ki tai – Tasman Environment Plan (TEP), which will replace the Tasman Resource Management Plan (TRMP). Following community engagement on the identification of high-level planning issues and opportunities in 2020, this year the Environmental Policy team have been working on topic-specific 'issues and options' papers. The issues identified for the 'discharges to air' topic include smoke from domestic home heating; outdoor rural burning; agrichemicals; odour, dust and other nuisances; large scale combustion; and greenhouse gas emissions. Over 2021/2022, staff are preparing these papers to workshop with Councillors to seek comment on draft recommendations, which in turn will be consulted on with iwi, stakeholders and the wider community in 2022. The Council's ongoing monitoring and research work programmes have been used to inform this work.

8.2 Tasman Environment Plan Development and Timing of National Direction

8.2.1 In general, the Council is currently in a good position in relation to our TEP work programme and the wider RMA 1991 reform. This is because our plan is in its early stages with the

development of background work relating to the identification of issues and options, and progressing technical work/research, which will all be used to inform the TEP over the next few years.

- 8.2.2 However, there remains some uncertainty for the discharges to air section of the plan given further delays with the Air Quality NES review, and the more recent release of the WHO air quality guidelines. It is anticipated that national direction will move towards the requirements to monitor and manage PM_{2.5} sources given the overwhelming international scientific research on health effects that supports this change. What is unknown is the extent of the regulatory framework that it will sit within, and whether that is determined through an updated Air Quality NES or forms part of the wider RMA 1991 reform and proposed National Planning Framework. It is anticipated that further details regarding the RMA 1991 reform and the shape and content of the new resource management plans will be known in 2022, and the Council will be able to respond through its work programme accordingly.
- 8.2.3 Where the Air Quality NES review lands has the potential to have significant implications for the management of Tasman's air resource. For example, the requirement to monitor and manage PM_{2.5} sources could result in the establishment and targeted management of new airsheds. Council staff are cognisant of the issues and have ensured that our air quality work programme considers the likelihood of a PM_{2.5} monitoring and management framework in the future. It is likely that such a new framework would have significant budget and staff resourcing implications for Council, linked to additional monitoring, compliance and behaviour change actions required to meet a more stringent regulatory framework.