## 8.2 ANNUAL AIR QUALITY REPORT

**Information Only - No Decision Required**

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|---|---|
| **Report To:** | Regulatory Committee |
| **Meeting Date:** | 26 November 2020 |
| **Report Author:** | Diana Worthy, Policy Planner - Natural Resources; Anna MacKenzie, Resource Scientist – Contaminants, Environment & Planning; Jane Stuart, Compliance and Investigations Officer |
| **Report Number:** | RRC20-11-2 |

## 1 Summary


1.1 This report outlines the winter 2020 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). It also summarises the wider air quality work programme undertaken this year including compliance and enforcement, environmental policy planning and education.

1.2 The Council monitors air quality in Tasman and has a fixed monitoring station within the Richmond Airshed. Over the monitoring period for this report (1 September 2019 – 31 August 2020), the Air Quality NES had a requirement to ensure that there were no more than three exceedances in any 12-month period for $PM_{10}$ (particulate matter). Since 1 September 2020, the Air Quality NES only allows one permissible exceedance per year for $PM_{10}$.

1.3 The Air Quality NES is under review and staff are actively engaging in that process. The Ministry for the Environment (MfE) released a consultation document earlier this year and feedback closed on 31 July 2020, with the Council providing a submission. The aim of the amendments is to better control the release of fine particles into the air by monitoring and managing $PM_{2.5}$, with a focus on home heating. The review has the potential to have significant implications for the management of Tasman's air resource, as the proposal only allows for three exceedances of the daily $PM_{2.5}$ standard in a 12-month period. The requirement to monitor and manage $PM_{2.5}$ sources could result in the establishment and targeted management of new Airsheds. Additionally, there will be implications for the management of the Richmond Airshed, particularly given that it remains polluted under a $PM_{10}$ monitoring regime. 0The proposed Air Quality NES amendments also include controls on mercury emissions to help New Zealand meet its obligations under the Minamata Convention on Mercury.

1.4 The Richmond Airshed had three exceedances of the daily standard for $PM_{10}$ over winter 2020, primarily associated with wood burning (home heating and outdoor rural burning).

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Since 2012, daily $PM_{10}$ concentrations have fluctuated with no overall declining trend as anticipated. A fourth exceedance was recorded in December 2019, attributed to the Australian bush fires and associated dust storms, however under these exceptional circumstances the exceedance can be ignored under Regulation 16(A) of the Air Quality NES. A period of improved air quality was observed during the Covid-19 Level 4 lockdown. Monitoring of $PM_{2.5}$ was also undertaken and the data shows the Airshed exceeded the current World Health Organisation's daily guideline value of 25 µg/$m^3$ a total of 25 times.

1.5 Temporary monitoring of $PM_{10}$ was undertaken in Motueka Township over winter 2020 and one exceedance was recorded. There were 22 days when the measured $PM_{10}$ concentrations were above 25 µg/$m^3$. Based on modelling the ratio of $PM_{2.5}/PM_{10}$, this would give rise to approximately eight exceedances of the proposed daily $PM_{2.5}$ standard in Motueka. It is anticipated that temporary monitoring in Motueka will continue over winter 2021 to gather more baseline data to enable a better understanding of air quality in this area. Staff would also like to undertake further monitoring of air quality in Riwakā next winter, subject to budget and staff resourcing.

1.6 There were 338 air quality complaints between 1 April to 30 September 2020. Of these, 262 complaints related to smoke, 71 related to odours, three related to dust and two related to pesticide/herbicide use.

1.7 The development of the Aorere ki uta, Aorere ki tai – Tasman Environment Plan (Tasman Environment Plan), our second generation resource management plan, is underway including review of the discharges to air section. Staff have been implementing a work programme to develop an evidence base through monitoring and research to inform plan review. This work is being completed alongside education initiatives.

1.8 If the timeframes for Tasman Environment Plan rule drafting and release of an amended Air Quality NES do not align, the Council will need to consider its options (e.g. delay reviewing the home heating rules, or continue with rule review). While timelines for the Air Quality NES are unclear, it is expected that MfE will continue to work with iwi, councils and stakeholders next year. This potential timeframe issue will be discussed further with the Council as part of the Tasman Environment Plan 'issues and options' phase of work which is programmed for 2021.

## 2 Draft Resolution

**That the Regulatory Committee receives the Annual Air Quality Report.**

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## 3 Purpose of Report

3.1 This report outlines the winter 2020 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). It also summarises the wider air quality work programme undertaken this year including compliance and enforcement, environmental policy and education programmes.

## 4 Background and Discussion

### Legislative Requirements

4.1 Good air quality is important for people's health and wellbeing and for the environment. Air quality in the Richmond Airshed is monitored for fine particles called particulate matter (PM). The tiny particles can cause a range of human health effects from minor irritation through to disease and premature death. Health impacts are experienced mostly by the young and the old and those with pre-existing medical conditions. Poor air quality also causes amenity and nuisance effects to the community.

4.2 The National Environmental Standards for Air Quality (Air Quality NES) are regulations made under the Resource Management Act 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 $PM_{10}$ (particles with a diameter less than 10 micron) for outdoor air quality, being 50 $\mu g/m^3$ (micrograms per cubic metre) over a 24-hour average. Airsheds are only allowed one permissible exceedance of 50 $\mu g/m^3$ over 24-hours, in any 12-month period. Note, that prior to 1 September 2020, councils were allowed three exceedances for polluted Airsheds (which included the Richmond Airshed). The Air Quality NES does not apply to indoor air quality.

4.3 In order to achieve the Air Quality NES requirements, the Council regulates the use of solid fuel burners and outdoor burning through its Resource Management Act 1991 and Building Act 2004 functions. The Council also undertakes education and uses enforcement action (illegal and objectionable discharges) as necessary.

### Air Quality NES Review

4.4 The Air Quality NES has been under review for the last couple of years and staff are actively engaging in that process. MfE released a consultation document "*Proposed Amendments to the National Environmental Standards for Air Quality*" earlier this year and feedback closed on 31 July 2020. The aim of the amendments is to better control the release of fine particles into our air by monitoring and managing $PM_{2.5}$. This is to align the Air Quality NES with recent scientific findings on health impacts of fine particulate pollution and international best practice.

4.5 The review focuses on home heating which is the primary source of $PM_{2.5}$ in New Zealand. The consultation document proposes further regulations regarding the installation of new

wood burners (emissions limits and thermal efficiency) and widens the scope to include all new domestic solid-fuel burners (e.g. coal burners, multi-fuel burners, pellet burners, open fires, cookers, and water boilers). The proposed amendments also include controls on mercury emissions to help New Zealand meet its obligations under the Minamata Convention on Mercury. The Council's response to this engagement was discussed at the Regulatory Committee in July (refer to report RRCN20-07-5), noting that there will be significant implications for monitoring and management of Tasman's air quality under a $PM_{2.5}$ regime.

4.6 Following the close of the engagement process, MfE advises that a summary of submissions report will be prepared. It is anticipated that over 2021, MfE staff will continue working with iwi partners, councils and key stakeholders to refine the proposed amendments based on feedback and advice received.

**Air Quality Monitoring and Assessment**

4.7 Particulate matter has been monitored in the Richmond Airshed since 2000 and the Air Quality NES standard for PM has been exceeded every winter (where results are available). Particulate matter consists of solid and liquid particles suspended in the air and is usually measured in two sizes:

- $PM_{10}$ 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 $PM_{10}$.

Concentrations of $PM_{2.5}$ have been measured in Richmond since October 2015.

4.8 Table 1 presents the current air quality standards and guidelines for PM concentrations. The PM standard under the Air Quality NES is a concentration limit set to protect human health and incorporate a number of allowable exceedances, and is based on the World Health Organisation's (WHO) guideline. The WHO guidelines include both short term (daily) and long-term (annual) averages of pollutant concentrations. There are currently no national standards for $PM_{2.5}$, therefore the WHO guidelines are used for assessing the $PM_{2.5}$ results. It is proposed that under the Air Quality NES amendments, a new standard for $PM_{2.5}$ will be introduced.

**Table 1: Particulate Matter Standards and Guidelines**

| Particle Size | Averaging Period | WHO Air Quality Guideline | Ambient Air Quality Guideline | National Environmental Standard | Permissible Exceedances per Year |
|---|---|---|---|---|---|
| $PM_{10}$ | 24-hour | 50 µg/m$^3$ | 50 µg/m$^3$ | 50 µg/m$^3$ | 3 by 2016<br>1 by 2020 |
| $PM_{10}$ | Annual | 20 µg/m$^3$ | 20 µg/m$^3$ | | |
| $PM_{2.5}$ | 24-hour | 25 µg/m$^3$ | | | 3 |
| $PM_{2.5}$ | Annual | 10 µg/m$^3$ | | | |

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*Note: µg/m$^3$ = micrograms per cubic meter. For example, 50 µg/m$^3$ refers to the weight of the particles in micrograms contained in one cubic meter of air.*

## Monitoring Instruments

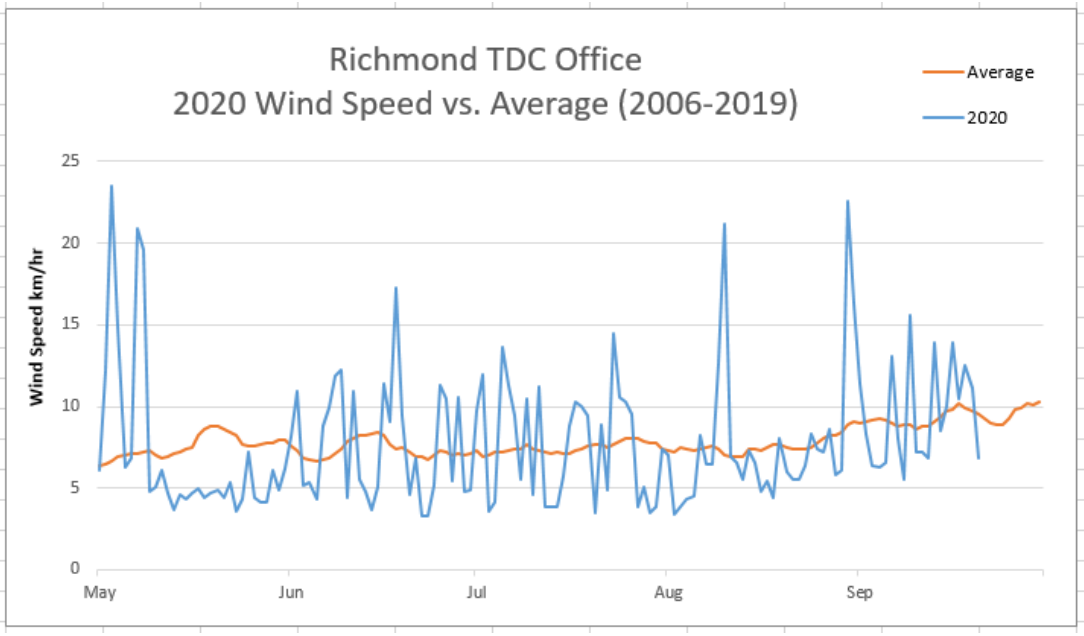
4.9 The Richmond air quality monitoring equipment is located at the Plunket Rooms at 56 Oxford Street, central Richmond. There are three instruments currently used to measure $PM_{10}$ and $PM_{2.5}$ in Richmond. A temporary winter air quality monitoring site was also established in Motueka, at Goodman Ledger Park, with one instrument set up for $PM_{10}$. It is noted that there were some data collection issues with the laboratory and one Partisol instrument at Richmond. Further details of the instruments, monitoring regime, and data collection issues are outlined in **Attachment 1**.

## Analysis of Richmond $PM_{10}$ Results and Meteorology

4.10 Based on the weather records from the Tasman District Council, 189 Queen Street meteorological monitoring site, the winter of 2020 had above average temperatures for May to August, with the monthly temperatures for August being the warmest on record, and there has been below average rainfall in Richmond.

4.11 There were some notable periods of sustained low wind speeds in late May (see Figure 1). The low wind speed at the end of May also coincided with the Covid-19 Level 2 lockdown and combined with rural burning led to a period of poor air quality (see Paragraphs 4.29 – 4.32). The calm wind speed leads to conditions that enable particulates to accumulate and worsen the air quality, as there is a buildup of air pollution and less dispersion during settled weather.

**Figure 1: Daily average wind speed (km/hr) measured in Richmond (Winter 2019)**




4.12 Daily 24-hour average $PM_{10}$ concentrations measured using the BAM monitoring instrument in Richmond over the monitoring year period (1 September 2019 to 31 August 2020) are shown in Figure 2. The data for winter 2020 shows a peak PM concentrations,

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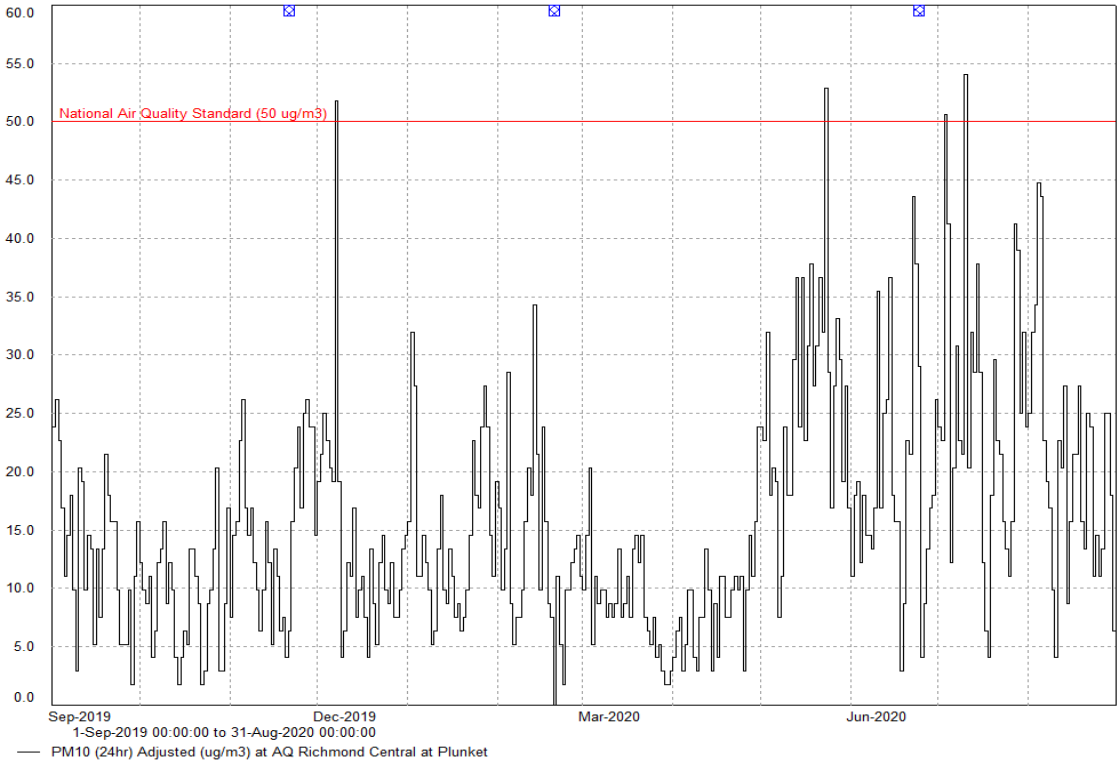
breaching the standard, occurring during the end of May and in July, and is mainly associated with biomass combustion (wood smoke) from outdoor burning and the use of wood burners for home heating, and cool calm conditions not dispersing the smoke. A summer peak of $PM_{10}$ in December 2020 attributed to the dust storm as a result of the Australian bush fires was observed in Richmond. This summer exceedance was under exceptional circumstances and is to be ignored under Air Quality NES Regulation 16(A) (see Paragraphs 4.26 – 4.28). A period of improved air quality was also seen over the Covid-19 Level 4 lockdown (see Paragraphs 4.29 – 4.32).

**Figure 2: Richmond daily $PM_{10}$ concentrations in µg/m$^3$ (1 Sep 2019 – 31 Aug 2020)**




4.13 Table 2 shows the $PM_{10}$ daily average data for the year, starting 1 September 2019. The summary of annual average $PM_{10}$ concentrations for Richmond for 2019/2020 is 16 µg/m$^3$, which meets the annual ambient air quality guideline value of 20 µg/m$^3$. The winter (May-Aug) average was 23 µg/m$^3$ and the average for the non-winter months (Sept – April) was 12 µg/m$^3$. The maximum $PM_{10}$ was 54 µg/m$^3$.

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**Table 2: Richmond Daily Average $PM_{10}$ concentrations in µg/m$^3$ in 2019/2020**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Richmond at Plunket Rooms | | | | | | | | | | | | |
| 01-09-2019 to 31-08-2020 | | | | | | | | | | | | |
| $PM_{10}$ daily average | | | | | | | | | | | | |
| Method: | FH62 BAM | | | | | | | | | | | |
| Valid Data: | 99.5% | | | | | | | | | | | |
| Data Capture Rate: | 100% | | | | | | | | | | | |
| Units | µg/m$^3$ | | | | | | | | | | | |
| | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug |
| Minimum | 2 | 2 | 4 | 4 | 5 | 2 | 2 | 3 | 8 | 3 | 4 | 4 |
| Mean | 13 | 9 | 15 | 14 | 15 | 13 | 9 | 9 | 26 | 19 | 25 | 20 |
| Maximum | 26 | 20 | 26 | 52 | 32 | 34 | 20 | 24 | 53 | 44 | 54 | 45 |
| Lowest | | | | | | | 2 | | | | | |
| Highest | | | | | | | | | | | 54 | |
| Exceedances (>50 µg/m3 ) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 |
| Annual Mean | 16 | | | | | | | | | | | |
| Note: Year starts in September | | | | | | | | | | | | |

4.14 In Richmond, there were three exceedance days of the daily Air Quality NES concentration of 50 µg/m3 (24-hour average) in the 12-month period (1 September 2019 to 31 August 2020) as shown in Table 2. Table 3 shows the differences in concentrations from the Richmond co-located gravimetric and continuous PM methods. There was also one exceedance recorded in Motueka from the winter monitoring trial. The exceedances were publicly notified in the local paper (Newsline) and on the Council's website. The Air Quality NES for $PM_{10}$ allows three or fewer permissible exceedances per 12-month period until 31 August 2020. From 1 September 2020, only one exceedance of the standard is permissible. The exceedances in $PM_{10}$ have occurred under cool, calm settled conditions with 24-hour average wind speed of around 1.0 m/s. The evening temperature in May was warm at around 10 degrees, with July having cooler evening temperatures of around five degrees (ºC).

**Table 3: Exceedances of 24-hour PM10 in Richmond in 2020.**

| Date | FH62 BAM 24-hour $PM_{10}$ adjusted µg /m$^3$ | Partisol 24-hour $PM_{10}$ µg /m$^3$ | 5028i BAM 24-hour PM10 µg /m$^3$ | Public Notification Result | 4-hour Temp (8pm-12pm) ºC |
|---|---|---|---|---|---|
| 23 May 2020 | 50 | 53 | 50 | 53 | 9.7 |
| 3 July 2020 | 44 | | 51 | 51 | 5.2 |
| 10 July 2020 | 43 | 45 | 54 | 54 | 5.5 |

4.15 The number of $PM_{10}$ exceedances of the daily standard has reduced from 44 in 2000 to three in 2020 and is less than the four recorded in Richmond in 2019, and 12 in 2018 (see Figure 3). The second highest PM value trend indicates an improvement, however little difference over the last five years, which suggests predicted reductions in $PM_{10}$ concentrations are not occurring. The data gaps (Figure 3) relate to when the air quality monitoring was undertaken historically at different locations and using different instruments. In addition, no air quality monitoring for $PM_{10}$ was undertaken over the period 2001 and 2002.

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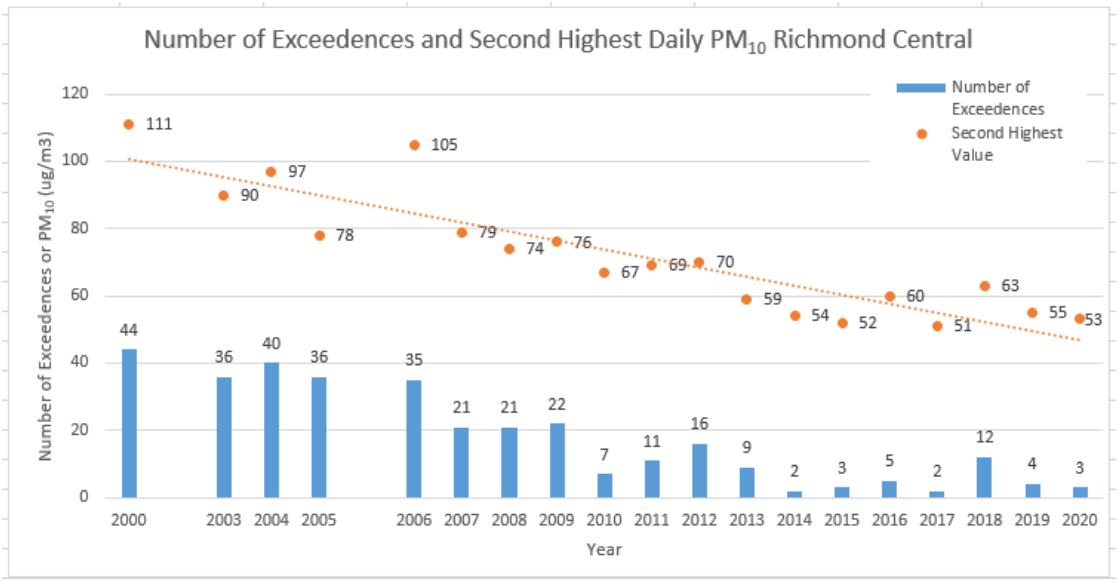
**Figure 3: Number of Exceedances of 24-Hour $PM_{10}$ for Richmond (2000 to 2020)**




*Note: $PM_{10}$ was not monitored in 2001 and 2002, and the gaps between the three data sets indicate monitoring was undertaken using different instruments and/or monitoring locations.*

4.16 Figure 4 shows the changes in $PM_{10}$ concentrations for the period 2000-2020 for median and upper quartile (75$^{th}$ percentile) $PM_{10}$ data, which has been adjusted for the impact of meteorological conditions. The normalisation is based on the past data from 2000-2009 and accounts for 24-hour average wind speed and average temperature between 8pm and midnight. High pollution potential days are defined as the 24-hour period when the weather conditions fall within the criteria of high pollution nodes 1-5. These nodes are defined in the NIWA Envirolink report TSDC60 “Assessing long-term trends in $PM_{10}$ concentrations in Richmond” and include 24-hour wind speed of less than 3.8 m/s and 5m/s and four-hour average evening temperature of less than 6.8 degrees C. Additional high pollution criteria include wind speeds of between 5-7 m/s and temperatures of less than 5.7 degrees C.

4.17 The normalised $PM_{10}$ data allows the trends over time of $PM_{10}$ concentrations to be evaluated with the effects of year-to-year variations in temperature and wind speed minimised. The trend evaluation suggests a downward trend for second highest $PM_{10}$ values. In Richmond, there were 77 high pollution potential days in winter 2020 and three exceedances of the standard, which is 4% of the high pollution potential days that resulted in an exceedance. This is comparable to the three-year period 2014-2016, which had an average of 6% proportion of the high pollution potential days that resulted in an NES exceedance. In 2007-2009, there were NES breaches in 33% of the high pollution days.

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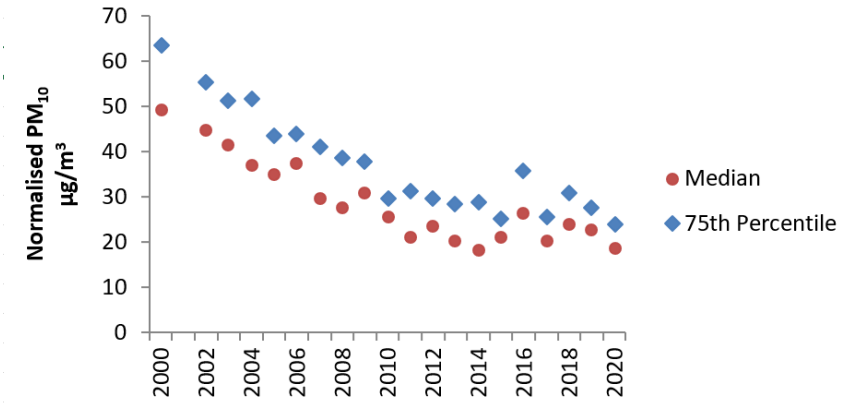
**Figure 4: Richmond Winter $PM_{10}$ normalised for meteorological conditions (2000 to 2020)**

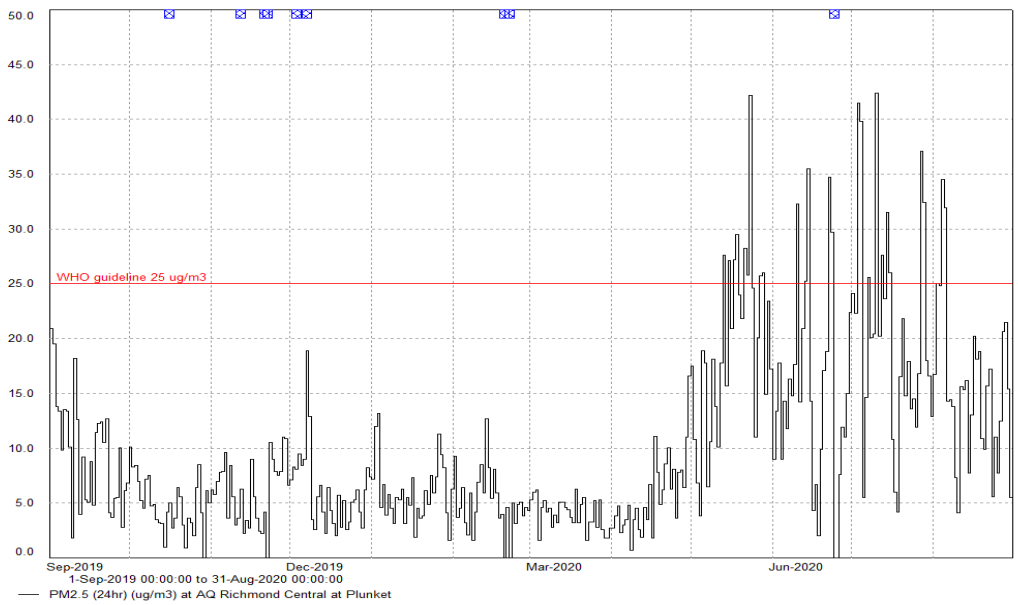



## Analysis of Richmond $PM_{2.5}$ Results

4.18 Over the 2019/20 season, $PM_{2.5}$ concentration was measured in Richmond using two instruments. From September 2019, a one day in six sampling regime was resumed using the gravimetric method (Partisol 2000 Hub), and was increased to one day in four over the winter. The second instrument used is the new dual BAM (5028i) which commenced in October 13, 2018. Based on the comparison of the data between the two methods (113 samples), no adjustment factors have been applied to the data.

4.19 The daily 24-hour average $PM_{2.5}$ concentrations available for Richmond from the continuous BAM is shown in Figure 5. The data shows $PM_{2.5}$ breached the current WHO daily guideline value of 25 µg/m$^3$ 25 times, over the winter period from May to August 2020. The data for winter 2020 shows the typical seasonal pattern, with peak PM concentrations occurring in winter and is associated with the use of wood for home heating.

**Figure 5: Richmond Daily $PM_{2.5}$ concentrations in µg/m$^3$ (1 Sep 2019 – 31 Aug 2020)**



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4.20 Table 4 summarises the $PM_{2.5}$ daily average data for the year, starting 1 September 2019. The annual average $PM_{2.5}$ concentrations for Richmond for 2019/2020 is 10 µg/m$^3$, which meets the WHO annual air quality guideline value of 10 µg/m$^3$. The winter (May-Aug) average was 18 µg/m$^3$ and the average for the non-winter months (Sept – April) was 6 µg/m$^3$. The months of May and July both had the most exceedances (nine per month) of the WHO daily guideline value of 25 µg/m$^3$. The May exceedances may be attributed to increased rural burning observed in May (refer to Paragraphs 4.29 – 4.32), given that there was only one exceedance observed in May 2019.

**Table 4: Daily Average $PM_{2.5}$ measured in Richmond in 2019/2020**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Richmond at Plunket Rooms | | | | | | | | | | | | |
| 01-09-2019 to 31-08-2020 | | | | | | | | | | | | |
| $PM_{2.5}$ daily average | | | | | | | | | | | | |
| Method: | 5028i BAM | | | | | | | | | | | |
| Valid Data: | 98.6% | | | | | | | | | | | |
| Data Capture Rate: | 99.7% | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug |
| Minimum | 1.8 | 0.0 | 2.2 | 2.0 | 1.6 | 1.6 | 1.6 | 0.7 | 3.8 | 2.0 | 4.2 | 4.0 |
| Mean | 9.6 | 4.8 | 6.3 | 6.1 | 6.0 | 5.4 | 4.0 | 5.7 | 19.5 | 16.3 | 21.0 | 15.1 |
| Maximum | 20.9 | 10.1 | 11.0 | 18.9 | 13.2 | 12.7 | 6.3 | 16.6 | 42.2 | 35.5 | 42.4 | 34.5 |
| Lowest | | 0.0 | | | | | | | | | | |
| Highest | | | | | | | | | | | 42.4 | |
| Exceedances (>25) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 5 | 9 | 2 |
| Annual Mean | 10.0 | | | | | | | | | | | |

4.21 The maximum daily $PM_{2.5}$ concentration measured in Richmond was 42 µg/m$^3$ on 23 May 2020, which is on the same date as the $PM_{10}$ exceedance in May. The $PM_{2.5}$ data is similar to the last few years where there were between 24-25 breaches of the WHO daily $PM_{2.5}$ guideline of 25 µg/m3 over the winter in 2017 and 2019.

**Air Quality Monitoring in Motueka $PM_{10}$ Results 2020**

4.22 Over the winter 2020 season, daily $PM_{10}$ concentration was measured in Motueka over the winter period (May to August) at a temporary site at Ledger Goodman Park. The gravimetric monitor was moved from the centre of town at Parklands School to the current location on the northeastern side of Motueka. This site was selected as a temporary residential monitoring location in line with NIWA recommendations from their 2019 ODIN study (refer to Paragraph 4.45 for more information). The daily 24-hour average $PM_{10}$ concentrations for Motueka from the winter sampling is shown in Figure 6.

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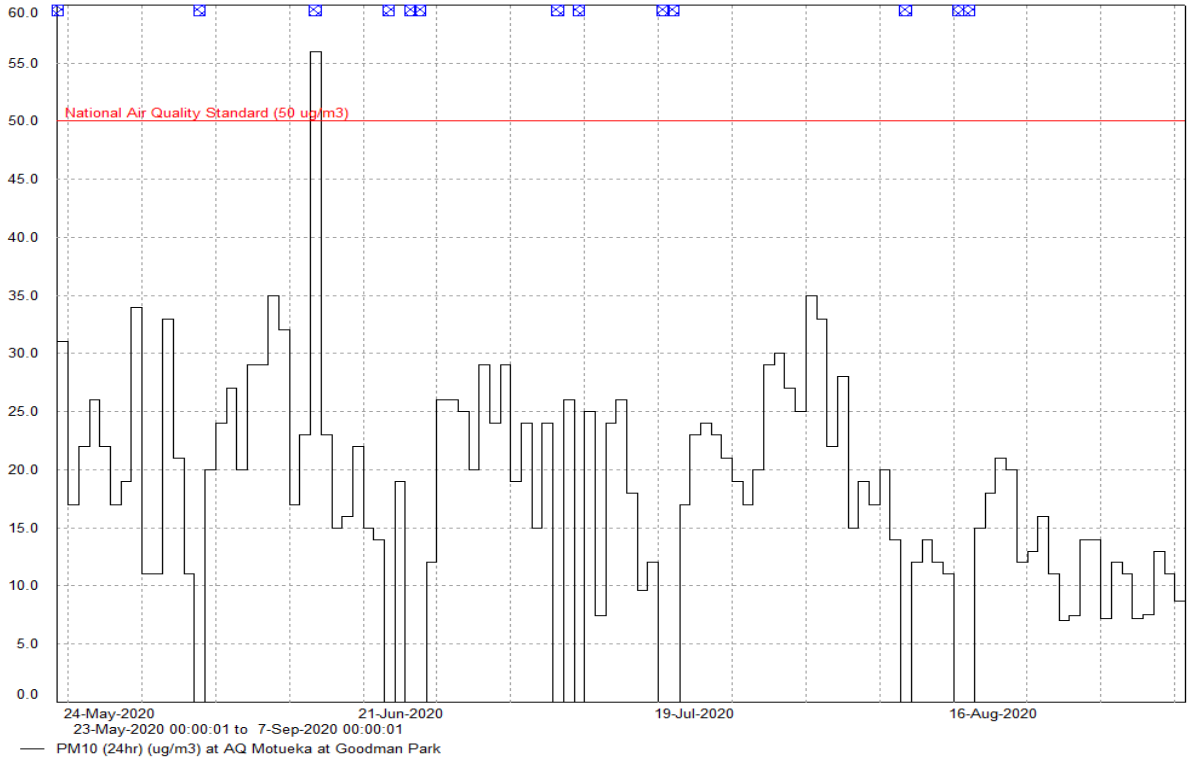
**Figure 6: Motueka $PM_{10}$ concentrations in µg/m$^3$ (24 May 2020 – 31 Aug 2020)**




4.23 A review of the available $PM_{10}$ data collected using the Partisol instrument at Ledger Goodman Park, Motueka has shown that there was one exceedance of the Air Quality NES (24-hour average) standard of 50 µg/m$^3$ during winter. The maximum $PM_{10}$ recorded was 56 µg/m$^3$ on 16 June 2020. The reason for the exceedance is unknown, however it was noted there were unusual smoke conditions on the evening of 15 June. On 16 June, the weather was not particularly cold (average temperature 12 degrees, overnight low 9.5) nor particularly still (average wind speed 5.7 km/hr), however wind direction was from the east. There were no smoke complaints on this date and the camera for Motueka did not identify any significant rural burns. The value on 16 June 2020 appears to be an outlier, being 60% above the next highest value recorded this winter. The sampling process was investigated and the sample post weight repeated, however the results should be treated with caution given its outlier status and irregularities with lab results throughout the season.

4.24 Table 5 summarises the Motueka $PM_{10}$ daily average data. The winter (May-August) average $PM_{10}$ concentration for Motueka 2020 is 20 µg/m$^3$, with the second highest value of 35 µg/m$^3$. Previous short-term air quality sampling undertaken in Motueka in 2006, 2014, 2018 and 2019 have not recorded exceedances of the 24-hour daily $PM_{10}$ standard.

4.25 In winter 2020, there were 22 days when the measured $PM_{10}$ concentrations were above 25 µg/m$^3$. Given the same ratio of $PM_{2.5}/PM_{10}$ as has been measured in the Richmond Airshed, this would give rise to approximately eight exceedances of the proposed daily $PM_{2.5}$ standard in Motueka. Note that the actual exceedances may be higher or lower, based on actual meteorological conditions and typical emissions. Further monitoring for

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$PM_{2.5}$ will likely be required for Motueka when the revised NES comes into force under the proposed $PM_{2.5}$ monitoring regime.

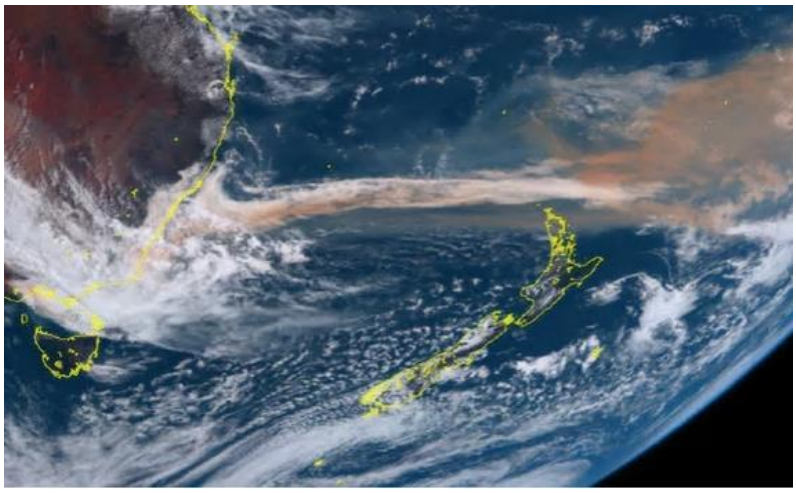
**Table 5: Daily Average $PM_{10}$ concentrations in µg/m$^3$ measured in Motueka**

| | | | | |
|---|---|---|---|---|
| Motueka at Goodman Park | | | | |
| 24-05-2020 to 31-08-2020 | | | | |
| $PM_{10}$ daily average | | | | |
| Method: | Partisol | | | |
| Valid Data: | 89.0% | | | |
| Data Capture Rate: | 90.0% | | | |
| | | | | |
| | | | | |
| | May | Jun | Jul | Aug |
| Minimum | 11 | 11 | 7 | 7 |
| Mean | 21 | 23 | 22 | 17 |
| Maximum | 34 | 56 | 30 | 35 |
| Lowest | | | 7 | |
| Highest | | 56 | | |
| Exceedances (>50) | 0 | 1 | 0 | 0 |
| Winter Mean | 20 | | | |

## Air Quality impacts from the Australian Dust Storms and Bush Fires

4.26 Over summer 2019/2020, northwesterly winds blew plumes of particulate matter from the Australian dust storms and bushfires over to New Zealand (see Figure 7). This caused a haze over New Zealand skies that lingered for several weeks at a time, including within the District.

**Figure 7: Satellite imagery of dust and smoke over the Pacific during summer 2019/2020**



(Source: https://www.nzherald.co.nz/world/massive-plume-of-australian-bushfire-smoke-moves-from-new-zealand-to-chile/NWX7OA7AENMO2JF4GE5JZHB5RA/ )

4.27 On 7 December 2019, the Richmond Airshed had an exceedance of 52 µg/m$^3$ for $PM_{10}$, which was attributed to the Australian dust and smoke plumes. Air quality monitoring stations in Nelson also had elevated levels of $PM_{10}$ on this day, but were below the standard of 50 µg/m$^3$. Three regional councils in the North Island (Auckland, Waikato and

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Bay of Plenty) had exceedances the previous day on 6 December 2019, which shows the plume drifted down over the country during this period.

4.28 The Air Quality NES allows councils to apply to MfE where a breach of the standards is the result of exceptional circumstances beyond the reasonable control of the council. The four regional councils took a coordinated approach in preparing their applications, which were subsequently approved by MfE. This means that the 7 December 2019 exceedance in the Richmond Airshed is to be ignored as per Regulation 16(A) of the Air Quality NES.

**Air Quality during the Covid-19 Pandemic 'Lockdown'**

4.29 In 2020, the global Covid-19 pandemic caused unintended yet significant global improvements to air quality in countries where the health response included a national 'lockdown'. Much of these air quality improvements were in relation to significant reductions in emissions from vehicles and industry and this was reflected both nationally and locally.

4.30 While New Zealand was in Level 4 lockdown, an outdoor fire ban remained in place over the Tasman District (over March and April) to reduce the infection risk for firefighters (rather than there being an excessive fire danger). Once the fire ban was lifted on 29 April 2020, a number of land managers undertook burning of green waste. These fires were the typical yearly horticultural burns at the end of the season's pick, coinciding with life style blocks and rural properties burning vegetation after carrying out property maintenance during the lockdown period. The cumulative effect of these fires during calm weather conditions created a noticeable haze over the District, at a time when air quality generally over the lockdown had improved.

4.31 Figure 8 illustrates $PM_{10}$ in the Richmond Airshed between March and June 2020, and compares the 2020 results against the previous four-year average (2015-2019). There was a significant increase in $PM_{10}$ in the Richmond Airshed during the second half of May 2020 in comparison to the 2015-2019 average. Given that the weather was quite mild during May, staff attribute the $PM_{10}$ increase to the number of outdoor rural burns in the wider Richmond area and on the Waimea Plains over this time influencing air quality in the Airshed, rather than home heating sources.

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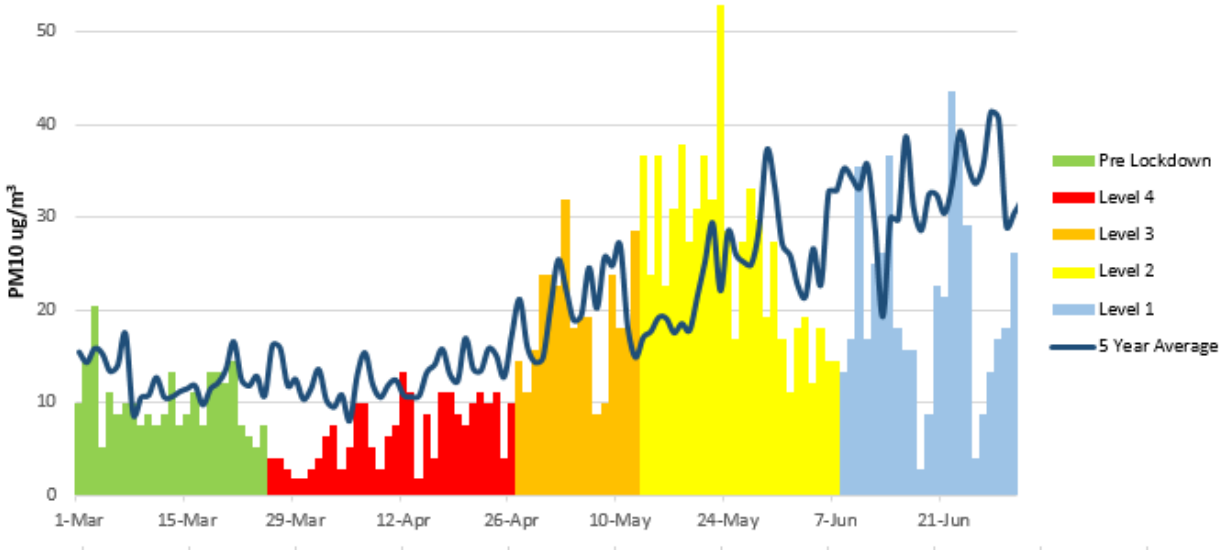
**Figure 8: Comparison of PM10 in the Richmond Airshed during 2020 Covid-19 Pandemic Lockdown and the 2015-2019 average**




4.32 It is recognised that the lockdown period created exceptional circumstances and the number of outdoor fires during autumn (once the fire ban was lifted) was not a reflection of a typical year. The Council's compliance team received 81 complaints about air pollution due to outdoor burns in the Waimea Plains and Motueka areas over a 20 day period in late April and May. Council staff pushed education and key best practice burning tips via media channels (social media, local newspapers) in addition to compliance measures. Compliance complaints are discussed further under the next section.

**Compliance and Investigations**

4.33 During the six-month period from 1 April to 30 September 2020, the Council received 338 air quality related complaints, 71 of these related to odour; three were dust related; two were discharge of pesticide/herbicide complaints and 262 complaints related to smoke.

**Odour**

4.34 Forty of the odour complaints related to a strong fish/cooked fish offal smell in the Trewavas Street and eastern Motueka area. Staff believe this is directly related to the Talley's Group Ltd fishmeal plant operating at Port Motueka. Talley's were granted a new suite of resource consents on 21 February 2019, the consents allow for some fairly extensive upgrades to production and waste systems at the factory. Council staff have been working alongside Talley's with the associated issues and complaints while they 'bed' in the upgrades and new consents. Talley's have engaged odour experts and installed temporary odour mitigation in the form of a Waylex spray to mask the current odour. A specialized bio-filter was to be installed in April however this was delayed due to Covid-19, with the new installation date of October 2020.

4.35 Twelve odour complaints were received in the Richmond area, 11 of these related to sewerage odour from the Bells Island waste water plant and ponds. Eight complaints were of a 'housed chicken odour' and chicken effluent odour originating from Ewing's Poultry

farm in Quail Valley with the remaining odour complaints being of a general nature, compost and chemical related.

**Smoke**

4.36 Two hundred and fifty two (252) complaints related to smoke and the cross boundary effect of smoke, with an additional ten being of a general nature. The cross boundary complaints can be broken down by area:

| | |
|---|---|
| **Golden Bay** | • 4 rural outdoor burning<br>• 1 smoky chimney |
| **Murchison** | • 4 rural outdoor burning<br>• 1 urban outdoor burning |
| **Motueka, Lower Moutere and Riwakā** | • 11 urban outdoor burning and smoky chimneys<br>• 85 rural outdoor burning<br>• 3 smoky chimneys<br>• 2 industrial |
| **Waimeas, Wakefield, Upper Moutere, Mapuā** | • 54 urban outdoor burning<br>• 62 rural outdoor burning |
| **Richmond** | • 12 household smoky chimney<br>• 10 urban outdoor burning<br>• 7 outdoor burning<br>• 7 industrial smoke complaints<br>• 35 rural outdoor burning |

4.37 The issues regarding the effects of smoke on air quality from poor outdoor burning practices and wood burner use are well documented nationally and internationally. A summary of the outdoor burning issues within the Tasman District and how it relates to the current Tasman Resource Management Plan rule framework are summarised under report REP18-11-01.

**Enforcement (smoke related)**

4.38 Staff were required to undertake the following enforcement action during the year:

- Five abatement notices were issued requiring compliance with TRMP smoke discharge rules
- Three abatement notices to cease the burning of prohibited items
- One abatement notice to remove and dispose of the contaminated ash and topsoil to landfill
- Eight infringement notices were served for breach of our outdoor burning rules
- Four formal warnings were given
- Twenty two (22) letters were sent out in an educational capacity advising of our rules and expectations

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- Numerous verbal warnings, best practice advice and communications around Council expectations in relation to both wood burner and outdoor burning were given.

**Richmond Airshed**

4.39 The Richmond Airshed contains 6230 properties. Of these properties, the Council records identify that there are 4066 properties that have either a compliant wood burner, a compliant wood pellet burner or an alternative heating source. These figures are based on current information.

4.40 Within the Airshed, 524 properties are currently known to be subject to our TRMP Rule 36.3.7.5. This means the property has sold since January 2007 and the owners are required to upgrade their wood burner if they have a non-compliant model. Staff have undertaken significant work on updating our Richmond Airshed database information and focusing on these properties in the past year. It has been accurately identified that 179 of these properties have non-compliant wood burners on site, with 95 of these property owners advising they do not use their wood burner and have alternative heating (however, they do wish to keep the option of wood burner replacement open). Staff have reduced the number of properties with an 'unknown' heating source to 335; this was achieved by physically viewing the property from the street and identifying if it has a chimney along with background checks on our GIS mapping system and the use of sale and rental listings. Investigations have found that a high percentage of these 'unknowns' no longer have wood burners as many have been replaced with heat pumps and owners are not required to advise the Council when they remove their wood burner.

4.41 There are 84 properties that Council staff believe are using non-compliant wood burners within the Richmond Airshed. Due to the Covid-19 pandemic, the planned enforcement action against these property owners was scaled back. Complaints relating to smoky chimneys and the use of non-compliant wood burners resulted in education 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. Staff will again target these properties early to enable the property owners' sufficient time to remediate their situation prior to the 2021 winter. There will then be targeted enforcement of those property owners that continue to operate a non-compliant wood burner next year.

4.42 Work will be ongoing over this summer to further reduce the number of properties with an 'unknown' heating source, and the owners of any identified with a non-compliant wood burner will be contacted and advised that they are unable to use their wood burner.

4.43 It is acknowledged that there are still gaps in our information regarding home heating at a property level within the Airshed (approximately 1,162 properties). This has come about because building consents for wood burners were only required in 1998 and Council records of wood burners prior to this date is not easily accessible or nonexistent. Some of the older style burners (15+ years old) are legally allowed to operate within the Airshed, however they do not meet the Air Quality NES emission and efficiency standards. Targeting replacement of these old burners in the Airshed through the development of the

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Tasman Environment Plan (or possibly via an amended Air Quality NES) is one option that would ultimately help to improve Richmond's air quality. Staff are keen to get a better handle on property specific home heating information and this work is being undertaken when time permits as it is over and above 'business as usual activities'. There will be significant benefits to completing this work as a full and accurate dataset will enable Council staff to target compliance, particularly if the Council is required to enforce a phase-out of old non-compliant wood burners.

**Air Quality Work Programme**

4.44 Staff continue to take an active management approach to our air quality resource, however this is limited by staff resourcing and budget. The Covid-19 pandemic has also delayed projects planned for this year, as outlined below.

**Monitoring and research**

- **Motueka air quality study**

4.45 A temporary monitoring site was set up on the eastern side of Motueka town (at Ledger Goodman Park) to monitor $PM_{10}$ over winter 2020. This was to build a baseline of information, following on from the NIWA commissioned study in 2019 for wintertime particulate matter monitoring in the Riwakā, Brooklyn and Motueka area (refer to report ROCCCC20-02-05). The 2019 NIWA study identified that Motueka does appear to have an air quality issue with some locations having smoke concentrations in excess of current Air Quality NES guidelines ($PM_{10}$) and anticipated future legislation ($PM_{2.5}$). Paragraphs 4.22 – 4.25 detail the monitoring results of the 2020 winter, and it is anticipated that temporary monitoring in Motueka will continue over winter 2021. Additionally, staff would like to undertake further monitoring of air quality in Riwakā next winter, subject to budget and staff resourcing.

- **Riwakā/Motueka webcam**

4.46 A webcam was installed above Riwakā at the end of 2019 to enable observations of outdoor burning and nuisance smoke in the Riwakā/Brooklyn/Motueka area. The webcam has been insightful and has enabled staff to better understand weather conditions and burning practices in this area, and compliments the existing Richmond webcams.

- **Horticultural burning and canker**

4.47 Building on the success of the outdoor burning trial in 2019, staff have done some initial scoping work for a project to investigate if bad outdoor burning practices spread European canker spores through smoky fires and ash. In August 2020, staff met with Riwakā-based representatives of Plant and Food Research Ltd who have expertise in diseases in woody plants. Their knowledge of the lifecycle of canker and how it can spread was invaluable and this contact will be helpful as staff progress the development of the Tasman Environment Plan. This canker project is currently on hold due to staff resourcing issues.

- **Richmond katabatic winds study**

4.48 Staff were successful in applying for an Envirolink Small Advice Grant to enable a University of Canterbury student to study the effect of 'katabatic winds' on the dispersion of

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smoke in the Richmond Airshed. This research was scheduled to take place over winter 2020 but the Covid-19 pandemic national lockdown prevented the setup of monitoring equipment in time before winter. Staff were successful in reapplying for the grant and the research will now take place in winter 2021.

## Education and Advocacy

- **Good Wood Scheme**

4.49 The Council continues to implement the Good Wood Scheme in partnership with Nelson City Council. The scheme requires participating wood merchants to supply dry firewood according to best practice guidelines. A meeting of wood merchants, wood burner retailers and the Home Heating Association took place in 18 February 2020 and this is always an informative session.

- **Best Little Woodshed Competition**

4.50 In January 2020, the Council launched the Best Little Woodshed competition for a second year running, in tandem with Nelson City Council (who have run this competition for several years). The competition was for entries showing great examples of wood storage ideas that residents have come up with to keep their wood 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.

4.51 Eight entries were received and Councillors judged Brad Watts's (Redwood Valley) entry as the overall winner and David MacInnes (Takaka) won the People's Choice Award for his Scandinavian-inspired round wood stacks (Photo 1).

**Photo 1: Best Little Woodshed Entries: "Judges Choice Award" overall winner (left) and "People's Choice Award" (right)**

- **Home heating education programme (autumn/winter 2020)**

4.52 Staff worked with a local behaviour change consultant to develop a home heating education programme for implementation in autumn/winter 2020. A key output was to deliver a pilot project in the Richmond Airshed. However, this was cancelled due to the Covid-19 pandemic national lockdown. Staff will re-assess if the pilot can be undertaken in

winter 2021. As part of this work, staff had discussions with a local representative of the Home Heating Association to utilise their expertise.

- **Warmer Healthier Homes Nelson Marlborough**

4.53 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 (90% funding) and local third-party funding (10% 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.

4.54 Through the 2020/21 Annual Plan, the Council has contributed $20,000 to WHH that will directly be used to retrofit insulation into qualifying households in the Tasman District. Leeson Baldey (WHH chair) provided a presentation to Councillors on 1 October 2020 to outline the work of the WHH and to acknowledge and thank the funding provided by the Council. The funding is being promoted through Newsline and our website, and WWH are doing their own media communications. It is estimated that there could be up to 2000 households that meet the qualifying criteria in our District. WHH are also seeking longer term funding through the Long Term Plan process and provided a submission to the pre-engagement consultation earlier this year.

**Discharges to Air Policy Planning**

4.55 Council staff have started development of the Tasman Environment Plan, our second generation Resource Management Plan. A S35 efficiency and effectiveness review of the TRMP was completed earlier this year and the review reports are publicly available on the Council's website. This S35 review included a review of Chapter 34 Discharges to Air and the assessment further confirmed some of the existing known issues with the discharges to air planning framework and rules.

4.56 Environmental Policy staff are currently undertaking community engagement to launch the plan review and to gather feedback from the community on high-level resource management issues and opportunities. At the time of writing, community drop in sessions are yet to take place in Motueka and Riwakā where it is expected that air quality issues will be raised. The community engagement will close on 5 December 2020 and this feedback will be used to help inform the drafting of issues and options over 2021.

**Tasman Environment Plan Development and Timing of Air Quality NES Review**

4.57 Given the steps to prepare the Tasman Environment Plan, it is hoped that the lead-in time and preparatory work (e.g. issues and options drafting) will give time to enable drafting of the discharges to air rules to coincide with release of an amended Air Quality NES. National environmental standards (NES) prevail over any plan rules unless an NES explicitly allows councils to have more stringent rules.

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4.58 If these timeframes do not align and an amended Air Quality NES is further delayed, the Council will be in a position to progress without the regulations, but will need to consider its options (e.g. delay reviewing the home heating rules, or continue with rule review). A number of other councils have been in a similar situation and have chosen to commence rule reviews in the absence of an amended Air Quality NES.

4.59 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.

4.60 It is likely that an amended Air Quality NES, based on the proposals in the consultation document, will have significant implications for the Richmond Airshed. The consultation document released earlier this year included the proposal that Airsheds would be allowed three or less exceedances of the daily average $PM_{2.5}$ standard (25 µg/m3) over a 12-month period. Given that the Richmond Airshed's $PM_{2.5}$ monitoring results indicate that in recent years the Airshed has approximately 25 exceedances per year, to meet such a regulation (under an amended NES) would require significant changes to the management of the Airshed including regulatory and non-regulatory tools.

4.61 Additionally, the current proposal focuses on installation of new burners and does not propose to regulate the use or phase out of older wood burners which can significantly contribute to air pollution. This approach would also have implications for the Richmond Airshed. The Richmond Airshed Emissions Inventory identifies that in 2019 around 238kg of $PM_{10}$ was estimated to be discharged into the Airshed on a typical winter's day from domestic home heating; and it is estimated that the largest portion (56%) of emissions was from pre-2006 wood burners. However, the consultation document proposes to enable the Council to continue to make rules or bylaws that are more stringent than this proposal.

4.62 If the timeframes for the Tasman Environment Plan rule drafting and release of an amended Air Quality NES do not align, the Council will need to consider its options (e.g. delay reviewing the home heating rules, or continue with rule review). While timelines for the Air Quality NES are unclear, it is expected that MfE will continue to work with iwi, councils and stakeholders next year on the NES review. This issue will be discussed further with the Council as staff progress an 'issues and options' report as part of plan development during 2021.

**2021 Work Programme**

4.63 In addition to the projects outlined above which are earmarked for 2021 implementation, staff will scope technical work to inform home heating management options for the Richmond Airshed, as part of the development of the Tasman Environment Plan. This work needs to take into consideration emerging proposals from the Air Quality NES and the existing rule framework, (e.g. the 'point of sale' rule, allowing new discharges to air in the Airshed, and technology improvements such as ultra-low emission burners).

## 5 Options

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5.1 There are no options considered as this is an information only report, however once the timeframe of the Air Quality NES review relative to the development of the Tasman Environment Plan is clear, staff will bring options to the Council to determine how to best progress review of the discharge to air rules.

## 6 Strategy and Risks

6.1 Tasman District Council has not achieved the current requirements of the Air Quality NES and there is uncertainty if the 2020 target can be achieved (no more than one exceedance in a 12-month period after 1 September 2020). Both human behaviour in relation to burning and weather conditions, influence the levels of air pollutants and in a worse case year, the targets are likely to be exceeded.

6.2 There are implications if the Council continues to exceed the Air Quality NES. These may include adverse reputational effects and the potential for legal challenge on any future proposed Tasman Environment Plan discharge to air rules by interested parties seeking more stringent or relaxed control of air quality. Tasman also has an ageing population so the proportion of population at greatest risk from poor air quality is increasing.

6.3 In addition, an investigation may be undertaken by MfE for non-complying councils and an Airshed action plan and/or a progress report to monitor whether councils are on track to meet the targets may be requested by the Minister.

## 7 Policy / Legal Requirements / Plan

7.1 This report provides the results of the air quality monitoring undertaken in Richmond over the winter of 2020, as required by the Air Quality NES and Section 35 of the Resource Management Act.

7.2 The Richmond Airshed is non-compliant with the Air Quality NES.

7.3 As previously noted, staff have been implementing a work programme to develop an evidence base through monitoring and research, which will ensure a robust review of the discharges to air rules as part of development of the Tasman Environment Plan. Further advice on this will be provided to the Council when preliminary background work has been completed and the results of the Air Quality NES review or MfE timeframe for progression are known.

## 8 Consideration of Financial or Budgetary Implications

8.1 The outcome of the Air Quality NES review may have implications on the air quality budget if additional monitoring for $PM_{2.5}$ is required for compliance purposes.

8.2 Aside from the Environmental Information budget for air quality monitoring, there are no specific budgets for air quality work. Staff have been undertaking a range of projects on

the basis that funding can be made available through either existing budgets or Envirolink funding administered by MBIE (if the criteria can be met).

8.3 Through the Long Term Plan process staff are seeking additional funding as part of a more strategic and proactive air quality work programme which will enable further research, monitoring and compliance to meet our requirements under the Air Quality NES.

## 9 Significance and Engagement

9.1 At this stage while there is high public interest in air quality, the receipt of this report is of low significance and no public consultation is required, although the monitoring results are publicly available.

## 10 Conclusion

10.1 There were three exceedances of the National Standard for daily $PM_{10}$ of 50 µg/m3 for particulate matter over the winter of 2020. The Richmond Airshed is non-compliant with the National Standard and is therefore classified as a 'polluted' Airshed. Since 2012, daily $PM_{10}$ concentrations have fluctuated with no overall declining trend as anticipated.

10.2 There has been approximately 338 air quality complaints for the winter of 2020, largely relating to smoke complaints.

10.3 The Air Quality NES is currently under review and staff have been engaging in this process. Staff have also been implementing a work programme to develop an evidence base through monitoring and research, which will ensure a robust review of the discharges to air rules as part of development of the Tasman Environment Plan. Staff will provide further advice as progress on the Air Quality NES is known and how this may align with plan review timeframes.

## 11 Attachments

1. Air Quality Monitoring Instruments at Richmond and Motueka