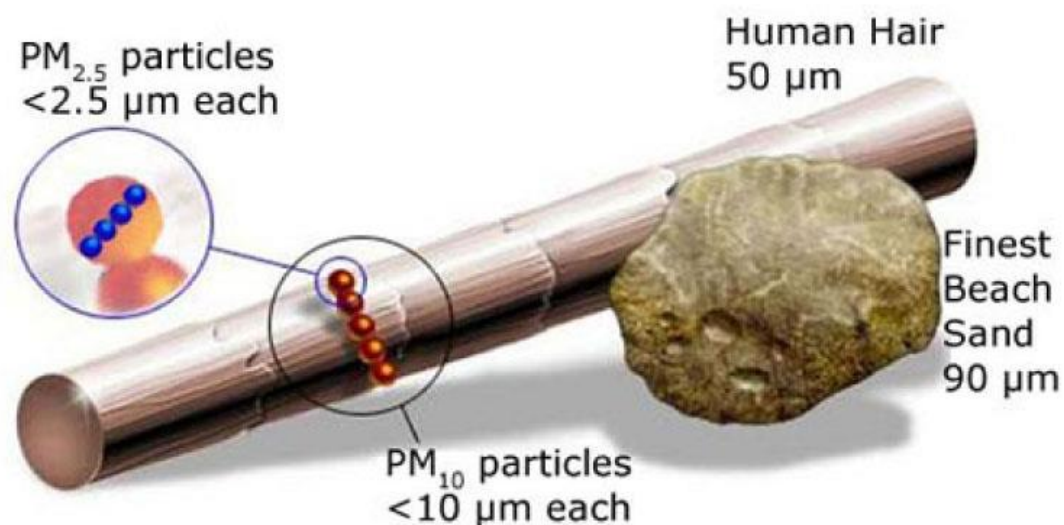


2023 Annual Air Quality Report for Blenheim



National Environmental Standard for Air Quality (NESAQ)



- The main contaminant of concern for New Zealand is particulate matter (PM).
- The NES currently focuses on PM₁₀ with a standard of 50 µg/m³ 24 hr average (1 allowable exceedance per year) and an annual average of 20 µg/m³.
- However, the smaller fraction of PM₁₀ particles, those less than 2.5 microns in diameter (PM_{2.5}), are a stronger indicator of health impacts.
- In Blenheim during the winter the majority of PM₁₀ is comprised of PM_{2.5} reflecting the residential domestic heating source.

Potential changes to the NES

- In 2020 the Ministry for the Environment (MfE) proposed amending to the NES to move the focus to PM_{2.5}.
 - PM_{2.5} 24 hr average standard of 25 µg/m³ (3 allowable exceedances per year).
 - Annual average PM_{2.5} standard of 10 µg/m³.
- Several reports released since may significantly change the proposed standards.
 - Revised WHO Air Quality Health Guidelines 2021 - significantly lower standards.
 - Updated Health and Air Pollution in New Zealand study (HAPINZ 3.0) 2022 showed significant costs to population morbidity and health from particulate matter especially PM_{2.5}.
- MfE have currently not given any further updates to either the standards proposed considering the above reports, nor a time frame for any amendments.
- The new coalition Government's RM reform will also affect any amendments timeline.



Volume 1 – Findings and implications

Prepared for
Ministry for the Environment
Ministry of Health
Te Manatū Waka Ministry of Transport
Waka Kotahi NZ Transport Agency

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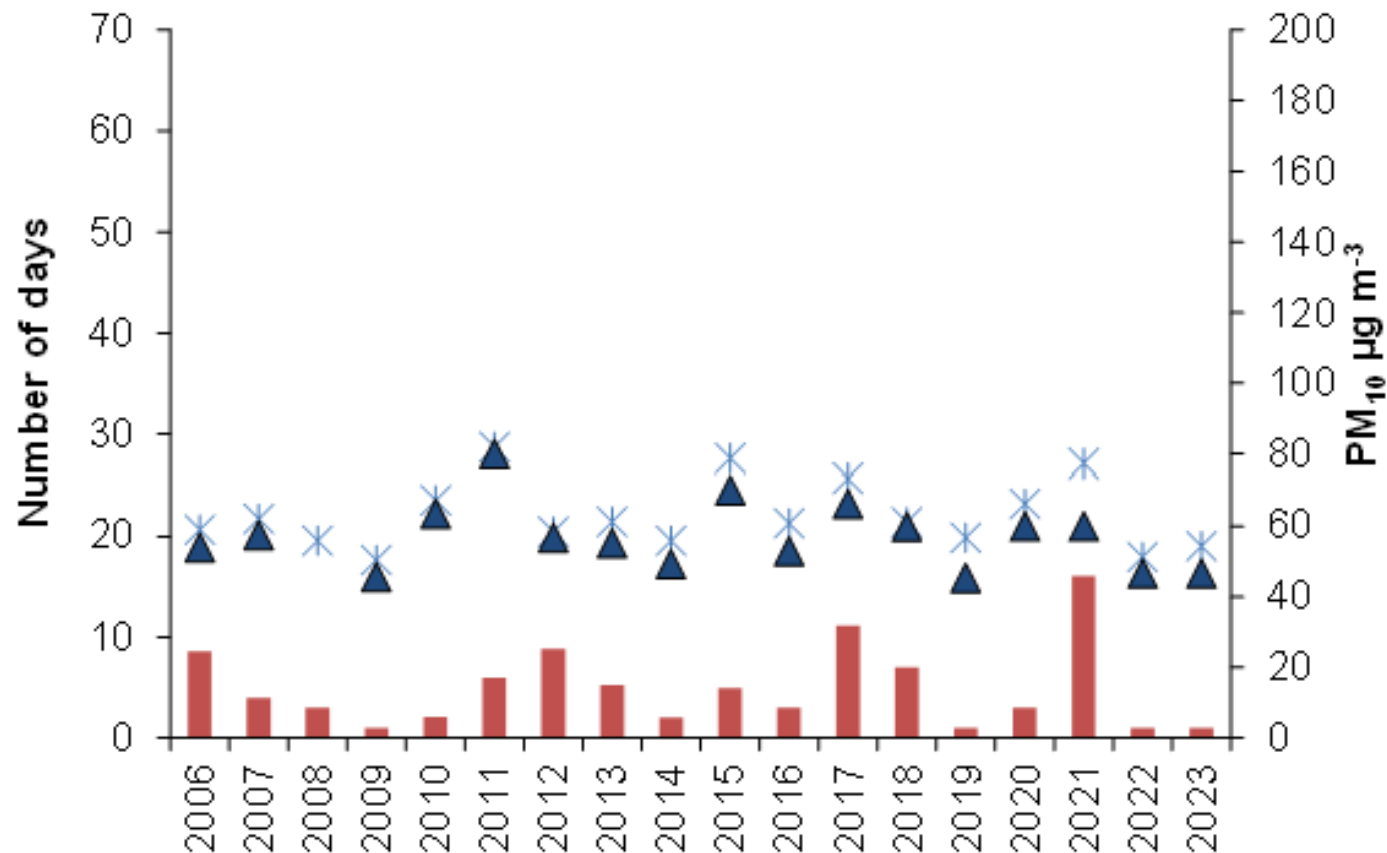
Blenheim Monitoring Station

- Both PM_{10} and $\text{PM}_{2.5}$ are monitored at the Redwoodtown Bowling Club site.
- Blenheim was required to be compliant with the NES by September 2016.
- Historically Blenheim has been non-compliant with the NES for PM_{10} .



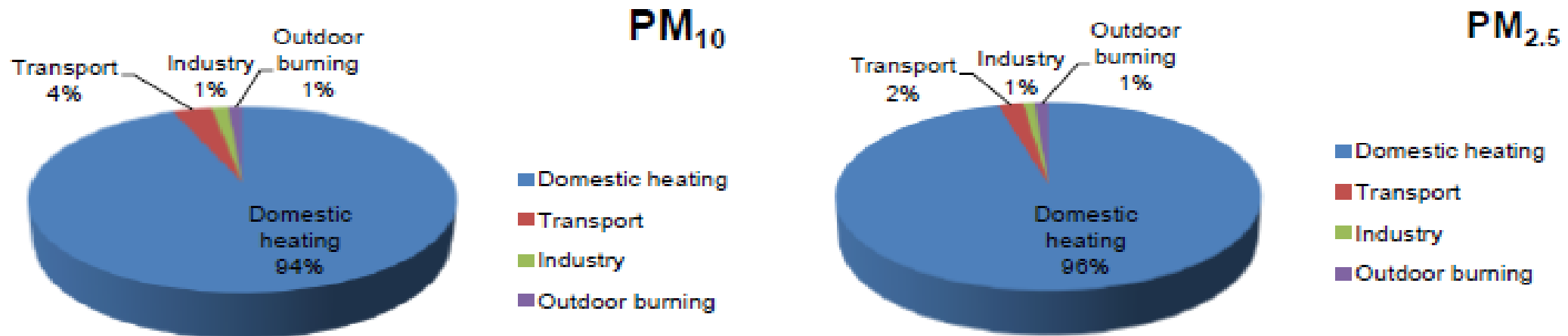
Number of days when 50 $\mu\text{g m}^{-3}$ was exceeded, the maximum concentration and the second highest concentration from 2006 to 2023

■ Number greater than 50 $\mu\text{g m}^{-3}$ * Maximum concentration ▲ Second highest concentration



Where is the PM coming from?

- Air Emission Inventories are used to determine the source proportion of air pollutants. These are carried out every five years.
- Blenheim's most recent Air Emission Inventory was completed in 2022.
- Domestic heating was found to be the main source of daily winter PM emissions, accounting for 94% of the daily winter PM₁₀ and 96% of the daily winter PM_{2.5}.
- Industrial, transport and outdoor burning sources make up the remaining percentages.

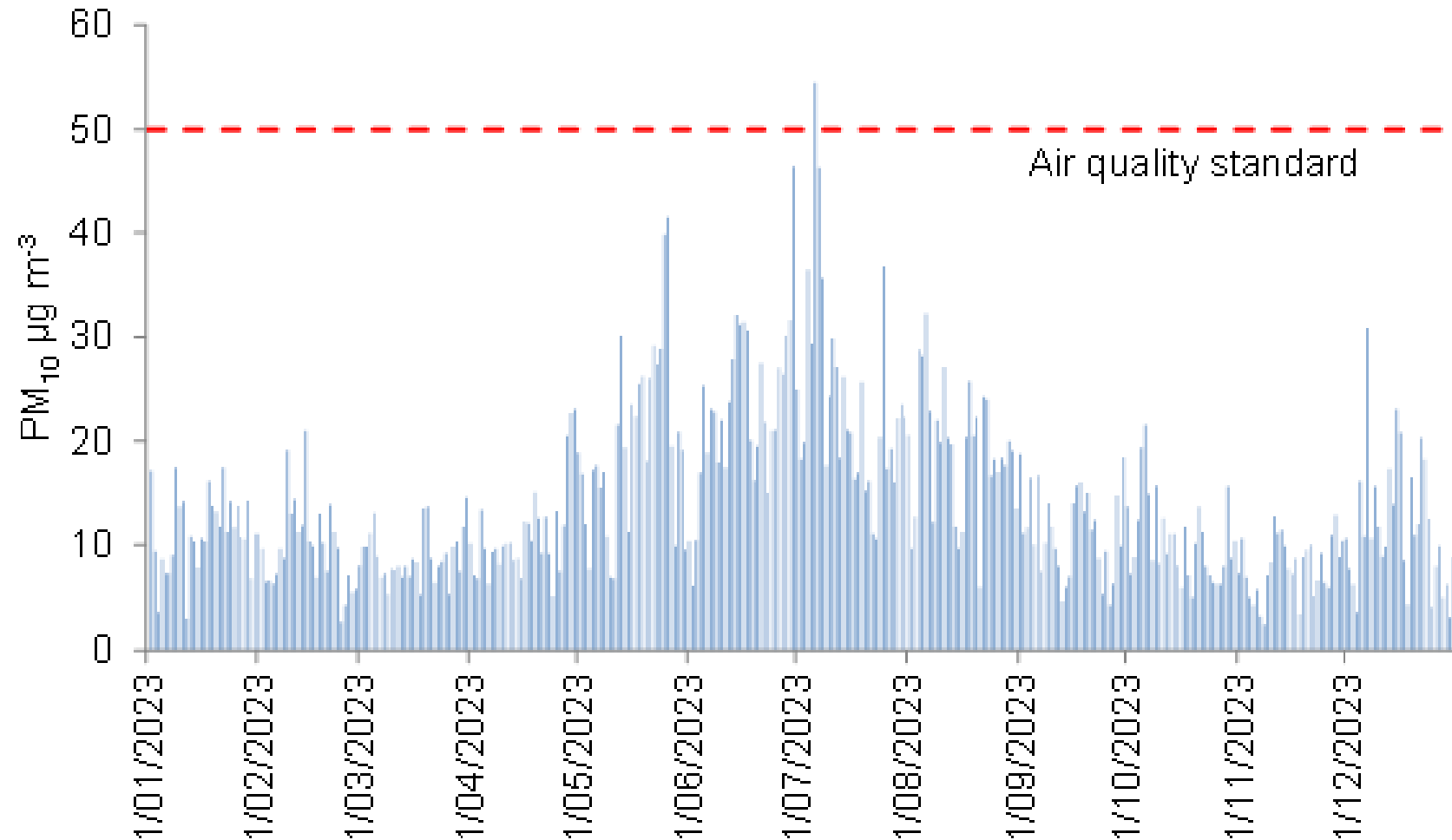


Result for 2023 – PM₁₀

- There was 1 exceedance of the 50 µg/m³ PM₁₀ standard on 5 July 2022 – Max concentration of 54.5µg/m³.
- The NES allows for one exceedance per year, however this year **does** constitute a breach of the NES as it occurred less than a year after the previous exceedance, which occurred on the 7 July 2022.
- The annual average PM₁₀ concentration was 14 µg/m³ - lowest annual average recorded at this site.

Year	No. of PM ₁₀ exceedances	No of breaches of the NES	Maximum PM ₁₀ µg/m ³	Annual average PM ₁₀ µg/m ³
2017	11	10	74	20
2018	7	6	61	19
2019	1	0	54	18
2020	3	2	66	18
2021	16	15	78	19
2022	1	0	51	15
2023	1	1	54.5	14

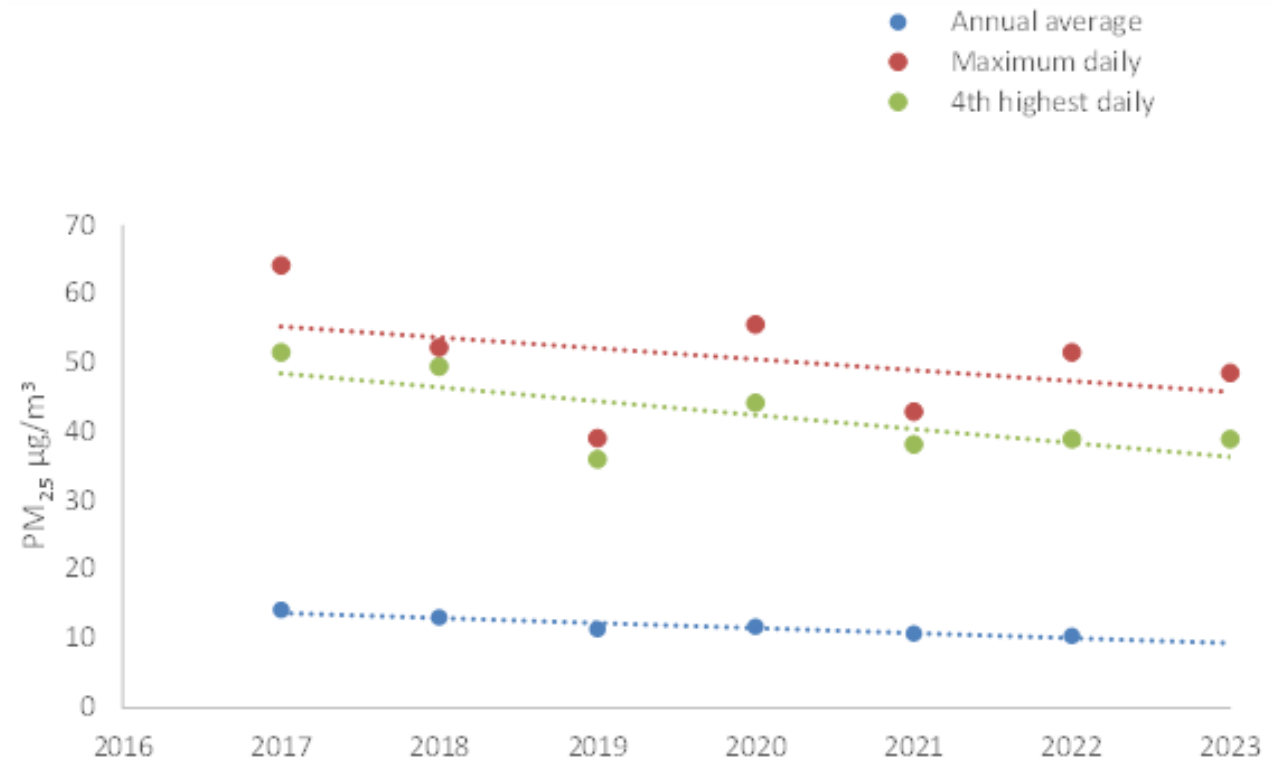
24-hour average PM₁₀ concentrations measured at the Redwoodtown – Bowling Club site during 2023



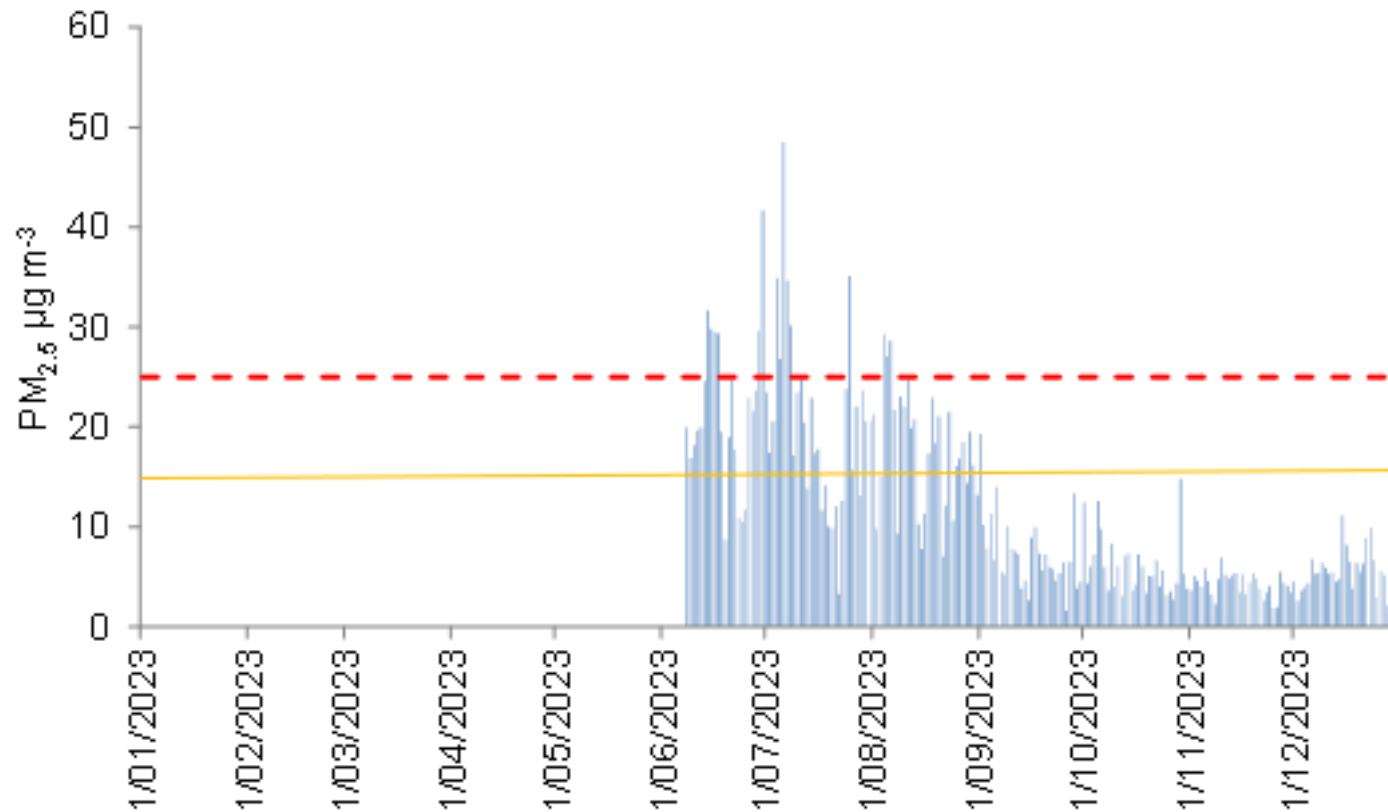
Result for 2023 – PM_{2.5}

- There is currently no NES PM_{2.5} standard however the proposed changes are a daily average of 25 µg/m³ and an annual average of 10 µg/m³.
- The daily average exceeded 25 µg/m³ on 15 occasions in 2023 (part record), with maximum measured concentration of 49 µg/m³ on the 5 July 2023.
- PM_{2.5} has been measured in Blenheim since 2017, with data suggesting as downward trend.

Year	No. of PM _{2.5} exceedances above 25µg/m ³	Annual average PM _{2.5} µg/m ³
2017	72	14
2018	61	13
2019	33	11.5
2020	45	11.8
2021	38	10.8
2022	27	10.5
2023	15*	11*



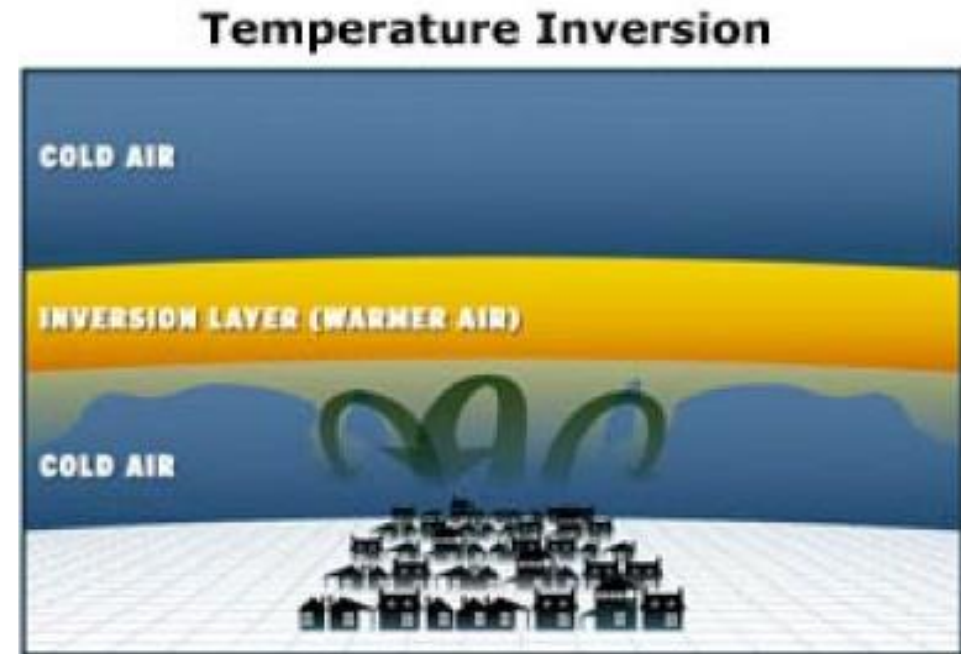
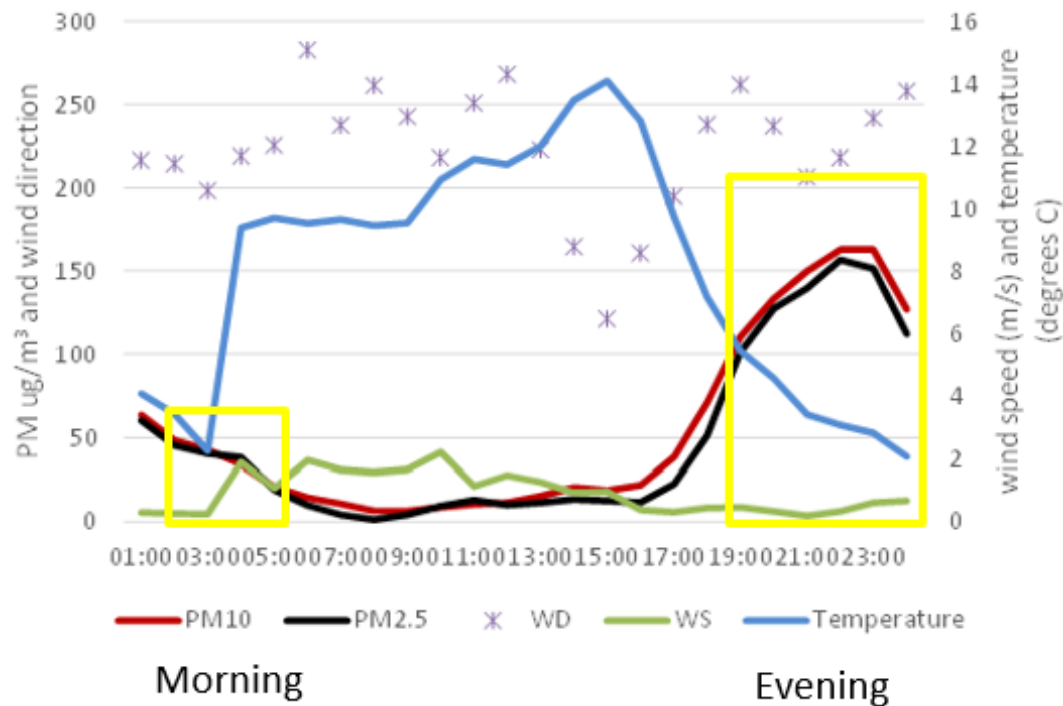
24-hour average PM_{2.5} concentrations measured at the Redwoodtown – Bowling Club site during 2023



- - - Dashed red line is the MfE 24-hour average proposed NES for PM_{2.5} – 15 Exceedances recorded
- Orange line is the WHO daily PM_{2.5} guideline – 63 Exceedances recorded (Both only part year record)

Daily Variations

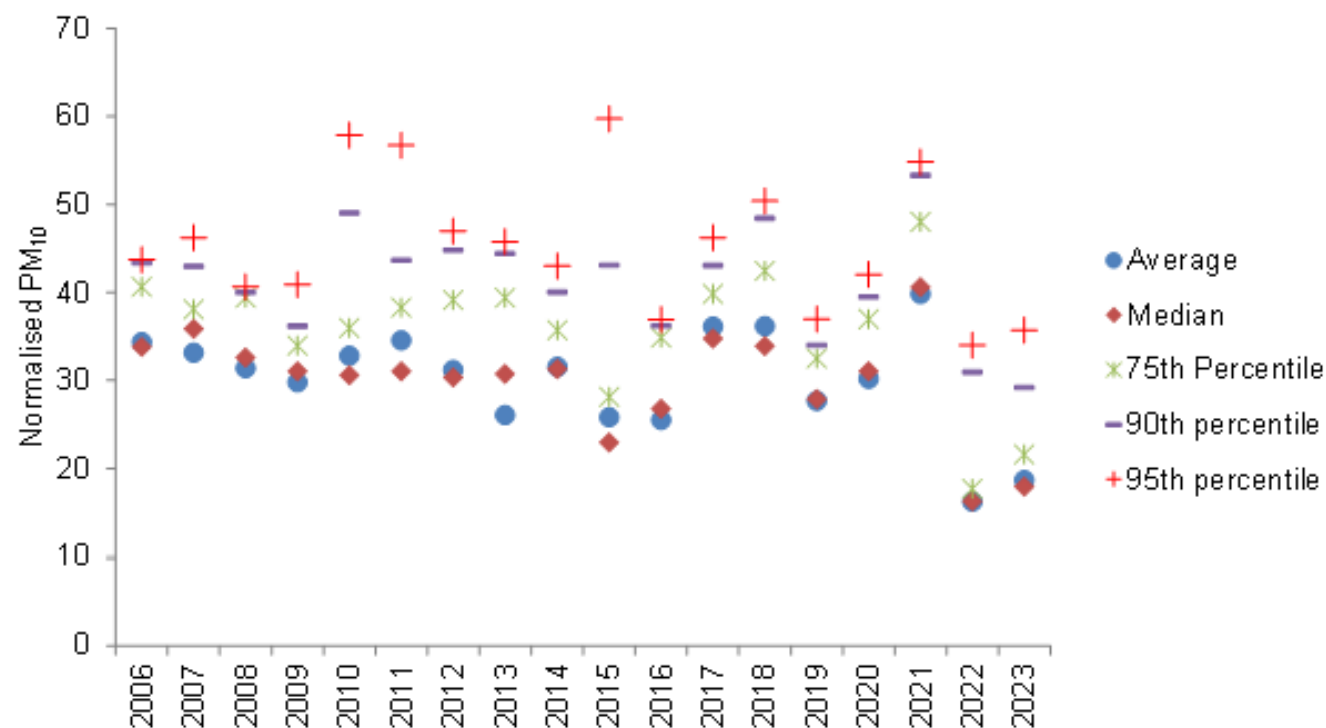
- Daily variations in PM₁₀ on high pollution / exceedance days generally show peak concentrations during the evening with a smaller peak occurring mid-morning.
- These days are associated with key meteorological conditions of low wind speeds and a south-westerly wind direction which result in an inversion layer over Blenheim.
- Due to the same source, domestic woodsmoke, PM_{2.5} and PM₁₀ show similar tracks both over time and generally concentrations with the bulk of PM₁₀ comprising PM_{2.5}.



PM₁₀ Trends

- 2023 was added to previous trend assessments of PM₁₀ concentrations for which variability resulting from meteorological conditions has been minimised.
- If results for 2021 are disregarded owing to a localised source contributing to PM₁₀ that year, the results are indicative of a downward trend in PM₁₀

Trends in PM₁₀ concentrations after adjusting for meteorological conditions



Summary

- In 2023, one exceedance of the NES PM₁₀ was recorded.
- While 1 exceedance is allowed, due to the timing being less than a year since the previous exceedance Blenheim did not comply with the NES for PM₁₀ for 2023.
- If results for 2021 are disregarded owing to a localised source contributing to PM₁₀ that year, the results are indicative of a downward trend in PM₁₀.
- Amendments to the NES are still possible, likely to become stricter to align with update of the WHO Air Quality guidelines and HAPINZ model. Timescales are unknown.
- While PM_{2.5} monitoring since 2017 shows a downward trend, Blenheim is unlikely to comply with any proposed changes to the NES.
- More stringent air quality management for Blenheim is likely to be required when amendments come into effect.

Thank
you

Questions?