STELLA PASSAGE DEVELOPMENT

PUBLIC HEALTH
JOINT WITNESS CONFERENCING JOINT WITNESS STATEMENT

Introduction

1. This joint witness statement (**JWS**) relates to expert conferencing on the topic of Public Health.
2. The expert conferencing was held on 15,16 and 20 July 2026.
   Venue: Online
   Independent Facilitator: Sharon Dines
   Admin Support: Portia Sutherland

Code of Conduct

3. This joint statement is prepared in accordance with section 9.4 of the Environment Court Practice Note 2023.
4. We confirm that we have read the Environment Court Practice Note 2023 and agree to abide by it.

Purpose and scope of conferencing

5. The questions posed are attached as Schedule 1. **Schedule 1** sets out the relevant background to the conference and the specific questions to be answered.

Witness Conference Participants

6. Witness conferencing participants and their expertise are listed in **Schedule 2**:

Experts' positions

7. **Schedule 3** sets out the experts' positions on the items of the agenda.

General statement regarding questions

8. The experts note that many of the questions set out in Schedule 1 relate to existing air quality from all sources in the Mount Maunganui airshed and natural sources such as salt spray, including existing Port activities, as reflected in the measured air quality at the monitoring stations. They do not directly address the potential air quality or health impacts from the Project which is being considered by the Panel and therefore the responses need to be considered in this light.
9. Dr Denison has undertaken her own calculations on the attributable health effects from the Project based on the predicted incremental contributions of $PM_{2.5}$ and NO_2 at the Whareroa Marae from the Air Quality Assessment. These are summarised in Schedule

4, Attachment B. Based on this assessment, Dr Denison has concluded that the health effects of the Project are minimal.

10. Professor Hales does not consider that he has reliable incremental contributions of $PM_{2.5}$ and NO_2 at the Whareroa Marae from the Project to undertake his own assessment.

Amendments to Professor Hales' statement of evidence

11. This statement is based on corrections Professor Hales intends to make to his original evidence (30 April 2026) to provide:
    - Clarification that all references to air pollution exposure based on differences in annual average levels by wind direction include all sources in the airshed, including the port and associated activities, industrial activity unrelated to the port, transport emissions and sea salt.
    - Revision of his best estimate and addition of the range of mortality estimates attributable to all air pollution sources in Mount Maunganui, accounting for statistical uncertainty and the proportion of total mortality from natural causes in adults aged over 30.

Date: 20 July 2026

Ms Jenny Simpson, Tonkin & Taylor

Dr Lynette Denison, LD Environmental

Professor Simon Hales, University of Otago

Schedule 1

(a) The relevant standards to assess levels of NO_2 and $PM_{2.5}$.

(b) Differences between the World Health Organisation's 2021 global air quality guidelines and NZ standards.

(c) Whether a change in the annual average $PM_{2.5}$ concentration of 0.1 $\mu g/m^3$ is measurable and whether it is relevant to the Project.

(d) Whether a change in the annual average concentration of NO_2 of 4 $\mu g/m^3$ is measurable and whether it is relevant to Ngāti Kuku hapū, Whareroa Marae and the Project.

(e) The Port of Tauranga's contribution, if any, to annual average NO_2 and $PM_{2.5}$ concentrations at local monitoring stations, including Rata Street, Ranch Road, and Whareroa Marae in 2025.

(f) The relevance of northerly and southerly winds at Whareroa Marae to annual averages of SO_2, PM_{10}, NO_2, and $PM_{2.5}$ concentrations at local monitoring stations.

(g) The relevance of the observed differences in pollution concentrations by wind direction to Ngāti Kuku hapū, Whareroa Marae and the Project.

(h) Certainty of estimates of SO_2, NO_2 and $PM_{2.5}$ emissions and ambient concentrations contributed by Port of Tauranga activities.

(i) Whether the current (2025) level of air quality at Whareroa is 'acceptable' in terms of the New Zealand Ambient Air Quality Guidelines.

(j) Whether there are practical mitigation measures that could reduce air pollution exposure and associated health impacts described by Professor Hales.

(k) Whether there are limitations in the Air Quality Assessment.

(l) The accuracy of Professor Hales' evidence on increased mortality rates, both observed and estimated, including;

  (i) Is the general principle of estimating health impacts of pollutants by combining information on observed health status, exposure and "dose response" scientifically accepted?

  (ii) Whether the increased mortality rates are representative of the effects on Ngāti Kuku hapū and at Whareroa Marae as opposed to the Mount Maunganui area more generally; and

  (iii) Whether the observed increased mortality rates are attributable to historical air pollution exposure from Port activities.

  (iv) Whether the mortality rates described by Professor Hales are attributable to the Project.

(m) Whether epidemiological studies are required to assess any health impact of air pollution arising from the Project.

(n) Whether or not the epidemiological studies recommended by Professor Hales are scientifically feasible, given appropriate resources.

Schedule 2

EXPERTS NAME, ORGANISATION AND EXPERTISE	PARTY	NOTES
Jennifer Mary Simpson *Tonkin & Taylor Ltd* Air quality and hazardous substances management	Port of Tauranga Limited (POTL)	Statement of Evidence of Jennifer Mary Simpson (7 May 2026) at [1 – 5]
Dr Lynette Susan Denison *Director and Principal of LD Environmental* Human health risk assessments	Port of Tauranga Limited (POTL)	Statement of Evidence of Dr Lynette Susan Denison (7 May 2026) at [1 – 13]
Dr Simon Hales *Department of Public Health – University of Otago, Wellington* Medical epidemiologist	Ngāti Kuku for Ngāti Kuku Hapū Trust and Whareroa Marae	Statement of Evidence of Professor Simon Edward Paul Hales (30 April 2026) at [1 – 7]

Ms Simpson notes that as an air quality specialist her contribution to the discussions in relation to question (l), (m) and (n) is limited to the population exposure estimates used in the calculations.

Dr Denison notes that with respect to questions (f) – (h) her contribution is limited to how the estimates have been used in the population exposure estimates. She has not provided comment on the details of the air dispersion modelling, emissions estimations or approaches to approximate emissions from differing wind directions as these issues are outside her expertise.

Schedule 3

Agenda item	General discussion	Agreed position	Disagreements or reservations, with reasons
(a) The relevant standards to assess levels of NO_2 and $PM_{2.5}$.	The relevant assessment criteria for NO_2 and $PM_{2.5}$ are the NZ ambient air quality standards and guidelines. The monitoring guideline values for $PM_{2.5}$ have been used in the Air Quality Assessment as assessment criteria.	We understand that the current New Zealand air quality standards are the legally applicable standards.	
(b) Differences between the World Health Organisation's 2021 global air quality guidelines and NZ standards.	The WHO 2021 guidelines are intended as guidance on the health impacts of exposure to air pollutants that governments can consider when developing their own air quality standards and policies. However, they do not take into account other factors that would be considered by a government in developing national air quality standards, such as the health, social and economic costs and benefits, technical constraints and achievability. The NZ standards do not include annual average standards for NO_2 or $PM_{2.5}$, which are included in the WHO 2021 guidelines. However, there are NZ ambient air quality guidelines which address both short-term and long-term averages and cover a broader suite of contaminants and averaging periods than the NZ standards. These guidelines have been adopted in the Air Quality Assessment as assessment criteria, including	The WHO guidelines are more protective of human health as they are based on more recent scientific evidence than the NZ standards. Refer to Table 6.1 of the Air Quality Assessment for the NZ standards and guidelines and Table 6.2 for WHO 2021 guideline levels. The NZ standards and guidelines have been formally adopted by the NZ government, whereas neither the WHO 2021 guideline levels or the interim targets presented in the WHO guideline document have been formally reviewed or adopted by the NZ government. To the knowledge of the experts, no	It is Professor Hales' opinion that the fact that the existing air quality approaches or exceeds the WHO guidelines implies that there will already be substantial health effects in the population and that therefore further emissions should not be permitted, unless mitigation measures (such as electrification of transportation) can prevent the increase in air pollution exposure. Although Dr Denison agrees that there will be health effects associated with any exposure to air pollution, the quantum of the health effects, whether it is substantial or otherwise, will

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	the 24-hour and annual monitoring criteria for $PM_{2.5}$ (which have been proposed for adoption as NZ standards, but formal adoption has not progressed). The WHO definitions of air quality guidelines, guideline levels and air quality standards are provided at the end of Schedule 1 to explain the key differences. Ms Simpson notes that: • For $PM_{2.5}$, the available New Zealand monitoring data (including at Ranch Road) indicates that, because of the high sea salt contribution, the WHO guideline level is unlikely to be achievable in many coastal towns and cities in New Zealand without substantial changes to the vehicle fleet and the use of solid fuels for domestic heating. • For NO_2, Stats NZ reports that between 2020 and 2023, of the 10 sites that could be assessed against the WHO guidelines level, five sites were above the guideline at least once.[1] Therefore, Ms Simpson considers that, similar to the situation with $PM_{2.5}$, the annual NO_2 guideline is unlikely to be achievable at many locations in New Zealand without changes to the vehicle fleet.	country has adopted the WHO 2021 guidelines as air quality standards. The experts agree it is unlikely that the annual average WHO 2021 guideline levels for $PM_{2.5}$ and NO_2 will be adopted in New Zealand in the foreseeable future due to the large, unmanageable, contribution of marine aerosol to $PM_{2.5}$ in coastal locations and the low degree of electrification in the current New Zealand vehicle fleet. It is possible that New Zealand may adopt some of the interim targets suggested by WHO in the future. It is agreed that there will be health effects attributable to air pollution even if air quality standards and guidelines, including the WHO 2021 guidelines are met. This is not specific to Mount Maunganui and	depend on the actual air pollution concentrations. Ms Simpson and Dr Denison consider that the implication of Professor Hales opinion is that no further developments involving emissions of NO_2 or $PM_{2.5}$ from industrial or domestic sources should occur in many urban areas (and coastal areas) of New Zealand. Dr Denison and Ms Simpson consider that the contribution of emissions from the Project will not add to the existing health effects due to air pollution across Mount Maunganui. It is also important to note that the small increment predicted from the Project at Whareroa Marae will not extend across the whole of Mount Maunganui.

[1] https://www.stats.govt.nz/indicators/nitrogen-dioxide-concentrations-data-to-2023/

Agenda item	General discussion	Agreed position	Disagreements or reservations, with reasons
		will be similar in other parts of New Zealand that have similar levels of air pollution.	
(c) Whether a change in the annual average $PM_{2.5}$ concentration of 0.1 µg/m^3 is measurable and whether it is relevant to the Project.	While modern continuous $PM_{2.5}$ monitors can display results to a resolution of 0.1 µg/m^3, it is important not to confuse the display resolution with the precision of the instrument. The recommended reporting format for particulate matter is the nearest whole number (GPG, 2009 p 75) to reflect the accuracy of these monitors.	This incremental change in $PM_{2.5}$ concentrations is relevant to the Project as it is the modelled impact of the Project at the Marae (Table 10-12 in the Air Quality Assessment). It does not apply to the whole of Mount Maunganui.	<u>Measurability</u> Professor Hales states that his understanding (based on his discussions with other air quality experts) is that an incremental change of 0.1 µg/m^3 of $PM_{2.5}$ on an annual average basis can be measured. Ms Simpson and Dr Denison disagree and do not think a change in $PM_{2.5}$ concentrations of 0.1 µg/m^3 could be confirmed by air quality monitoring based on the recommendations in the good practice guidance. <u>Relevance</u> Ms Simpson and Dr Denison consider that the value of 0.1 µg/m^3 of $PM_{2.5}$ in the Air Quality Assessment represents the best estimate of the impacts of the Project on $PM_{2.5}$ concentrations at Whareroa Marae and can be

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			used in human health risk assessments to estimate potential health impacts of $PM_{2.5}$ attributable to the Project. Professor Hales disagrees that $PM_{2.5}$ concentration of 0.1 $\mu g/m^3$ is an accurate estimate of the impact of the Project at the Marae for the reasons set out in his response to (k).
(d) Whether a change in the annual average concentration of NO_2 of 4 $\mu g/m^3$ is measurable and whether it is relevant to Ngāti Kuku hapū, Whareroa Marae and the Project.	The 4 $\mu g/m^3$ figure was derived by Professor Hales by comparing northerly vs southerly wind direction concentrations at Whareroa Marae. This estimate should not be confused with the Project's predicted incremental effect on annual average NO_2 at Whareroa Marae (Table 10-18 in the Air Quality Assessment) which is 0.5 $\mu g/m^3$.	A change in NO_2 concentration of 4 $\mu g/m^3$ (annual average) is measurable. This represents about 40% of the 2024/25 average background NO_2 concentration of at Whareroa Marae of 9.9 $\mu g/m^3$ (average of 10.2 and 9.6 $\mu g/m^3$). Professor Hales has estimated (using a time weighted average calculation) that the contribution of all sources of NO_2 in the Mount Maunganui Airshed, which include shipping emissions, road traffic (commuter traffic and heavy and light vehicles) and industrial processes (combustion sources),	Professor Hales states that 1.6 $\mu g/m^3$ (annual average) of NO_2 is his best proxy estimate of the effects of emissions from the airshed on air quality in Mount Maunganui. Ms Simpson and Dr Denison consider that while Professor Hales' methodology is reasonable to estimate the contribution of the sources listed in the 'Agreed' column at the Whareroa Marae, it is not reasonable to treat these contributions as being uniform across all of Mount Maunganui

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		in the measured NO_2 concentrations at Whareroa Marae is 1.6 µg/m^3. While there are other sources of NO_2 in the northerly wind arc that are outside the Mount Maunganui Airshed, including road traffic emissions and domestic heating in the residential areas of Mount Maunganui, their impact at Whareroa Marae will be relatively small. The value calculated by Professor Hales is relevant to the effects of the Project to the extent that the contribution of the Project must be considered in the context of the existing receiving environment (noting that the background air concentration of NO_2 at Whareroa Marae used in the Air Quality Assessment was 10.2 µg/m^3 not 4 µg/m^3).	and that this would significantly overstate population exposure. The most robust evidence to support this is the source apportionment study of particulate matter conducted by Earth Sciences New Zealand, which shows marked differences in source contributions to measured particulate concentrations at Ranch Road and the Mount Maunganui Library. This general finding of spatial variability in source contributions to $PM_{2.5}$ will also apply to NO_2.
(e) The Port of Tauranga's contribution, if any, to annual average NO_2 and	$\underline{PM_{2.5}}$ • At [57 - 61] of her evidence, Ms Simpson estimates the contribution of shipping	Indicative estimates of $PM_{2.5}$ contributions from shipping based	

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$PM_{2.5}$ concentrations at local monitoring stations, including Rata Street, Ranch Road, and Whareroa Marae in 2025.	emissions to annual average $PM_{2.5}$ at Whareroa Marae to be approximately 0.3 $\mu g/m^3$. • She considers the shipping contribution to $PM_{2.5}$ measured at the Mount Maunganui Library (0.7 $\mu g/m^3$) is likely to be broadly representative of the contribution at Rata Street, although there is some uncertainty in this estimate • The shipping contribution to $PM_{2.5}$ at Ranch Road was so low it could not be detected in the source apportionment study (para [52] of Ms Simpson's evidence). Based on this she estimates the contribution is less than 1 to 2%. <u>NO_2</u> • NO_2 is monitored at Ranch Road and Whareroa Marae but not at Rata Street. The relative contribution of different source types to NO_2 concentrations is more difficult to accurately quantify than for $PM_{2.5}$ because there is no equivalent source apportionment method. • At [47 - 50] of her evidence, Ms Simpson explains why she considers the dominant contribution to NO_2 at Ranch Road to be road transport. Given the absence of a measurable contribution from shipping $PM_{2.5}$ concentrations, she considers it likely contribution of shipping on measured NO_2 concentrations will be very small.	on source apportionment data are: • 6% (0.3 $\mu g/m^3$) of measured $PM_{2.5}$ of 5 $\mu g/m^3$ at Whareroa Marae. • 12% (0.7 $\mu g/m^3$) of measured $PM_{2.5}$ of 6 $\mu g/m^3$ at Rata Street. • Estimated 1 to 2 % (of measured $PM_{2.5}$ concentration of 6 $\mu g/m^3$ at Ranch Road. Indicative estimates of NO_2 contributions from shipping are: • Less than 11% (less than 1.1 $\mu g/m^3$) of measured NO_2 of approximately 10 $\mu g/m^3$ at Whareroa Marae. The relative contribution of shipping and transport emissions within this combined concentration cannot be differentiated based on the currently available data. • Not able to be quantified for Ranch Road but likely to be negligible.	

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	• Ms Simpson considers an indicative estimate of the contribution of shipping emissions at Whareroa Marae can be made based on the difference between annual NO_2 concentrations at Ranch Rd and Whareroa Marae, which was 1.1 µg/m^3 in 2025 (8.5 µg/m^3 and 9.6 µg/m^3, respectively). She considers this difference will be largely attributable to higher NO_2 contributions at Whareroa Marae from road transport (heavy and light vehicles and commuter traffic) and shipping emissions, compared to Ranch Rd. Therefore, the contribution of shipping emissions is estimated to be less than 1.1 µg/m^3 but cannot be quantified more accurately.		
(f) The relevance of northerly and southerly winds at Whareroa Marae to annual averages of SO_2, PM_{10}, NO_2, and $PM_{2.5}$ concentrations at local monitoring stations.	We have interpreted this question as meaning that 'northerly winds' refers to the northern wind arc, i.e. winds coming from between 09:00 to 03:00 on a clockface (in a clockwise direction) and 'southerly winds' (southern wind arc) refers to winds coming from between 03:00 to 09:00 on a clockface (in a clockwise direction). The concentrations of pollutants recorded under different wind directions at Whareroa Marae (or other monitoring stations) can provide information about the relative contributions of sources in different upwind directions.	The difference in concentrations recorded at Whareroa Marae between the northern and southern wind arc approximates the difference in contribution of all the sources located in each of those arcs. These differences are not directly translatable to other monitoring stations in Mount Maunganui. In other words, the relative contributions of sources in the Mount Maunganui Airshed to measured air quality will be	Professor Hales uses the differences in pollutant concentrations by wind direction at the Marae as a proxy for the population averaged exposure attributable to all sources in the Mount Maunganui Airshed. He accepts that this is approximate, as it inevitably includes an unknown contribution from other sources such as sea salt and motor vehicles (Hales [49]). Dr Denison and Ms Simpson consider that the pollutant

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	The selection of wind arcs must be specific to the relative locations of sources and the monitoring station being considered. The northern wind arc selected by Professor Hales captures all sources of $PM_{2.5}$ and NO_2 emissions in the Mount Maunganui Airshed. He states this was intended. Ms Simpson notes that this wind arc also captures a significant contribution from sea salt and the Ballance Fertiliser plant located approximately 180 m north of the Marae monitor. The estimate of SO_2 contribution (Hales, Table 2) from the Mount Maunganui Airshed reflects the historical contribution sources in the northern wind arc prior to cessation of manufacturing at the Fertiliser plant.	different at each of the monitoring stations.	concentrations are not the same as population averaged exposure and that the use of measured concentrations at Whareroa Marae are likely to overestimate exposure across all of Mount Maunganui. Ms Simpson considers that Professor Hales approach to estimating population exposure will result in a significant overestimate of pollutant exposure attributable to sources in the Mount Maunganui Airshed.
(g) The relevance of the observed differences in pollution concentrations by wind direction to Ngāti Kuku hapū, Whareroa Marae and the Project.	The source apportionment study conducted by Earth Sciences New Zealand[2] (Ms Simpson's evidence at [57 – 59] and Attachment A) is relevant to Professor Hales opinion that the Port and industrial areas being responsible for a substantial proportion of air pollution exposure amongst the population of Mount Maunganui.	The wind contribution analysis undertaken by Professor Hales is not relevant to the conclusions of the Air Quality Assessment in relation to the effects of the Project on the Whareroa Marae (which is understood to include	

[2] Davy PK, Trompetter WJ. 2025. Composition and sources of airborne particles at Mount Maunganui, Tauranga. Earth Sciences New Zealand Limited Report 2025/43

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	The dominant contributions to measured $PM_{2.5}$ residential monitoring site at Ranch Road were biomass combustion (32%), marine aerosol (25%) and secondary sulphate (25%). The peak secondary sulphate concentrations were observed arriving from the northeast (from the ocean), and the report authors concluded that the dominant source is likely to be volcanic SO_2 emissions from Whakaari / White Island (and that shipping emissions were a small contributor).	Ngāti Kuku hapū). The Air Quality Assessment considers the cumulative effects of the Project with the total background concentration (not the subset of the background contributed by sources to the north of the Whareroa Marae). These measured differences in pollution concentrations could be relevant to Ngati Kuku hapu/Whareroa Marae if they wanted to understand the combined effects of sources north of the Marae and compare that to the combined effects of sources south of the Marae.	
(h) Certainty of estimates of SO_2, NO_2 and $PM_{2.5}$ emissions and ambient concentrations contributed by Port of Tauranga activities.	With the amendments to Professor Hales evidence described above at [9], neither the Air Quality Assessment nor Professor Hales evidence include explicit estimates of ambient concentrations attributable to Port of Tauranga activities. As discussed above, they are estimates of ambient concentrations at Whareroa Marae attributable to all sources in the Mount Maunganui Airshed and natural sources such as sea salt.	We do not need to rely on estimates of emissions and ambient concentrations to understand existing air quality because of the availability of good quality monitoring data. Professor Hales and Ms Simpson agree that the method used by Professor Hales to estimate the	Professor Hales considers that the contribution to emissions and ambient concentrations from activities in the Mount Maunganui Airshed (and natural sources within a northern wind arc) is relevant to the assessment of effects of the Project because of the

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	The effects of emissions from existing activities have not been modelled as part of the Air Quality Assessment conducted for the Project as they are included in the measured ambient concentrations at Whareroa Marae. Professor Hales notes that there is an emissions inventory for the airshed which shows that the Port is a significant source of emissions, especially total NOx (72%) (refer to the Mount Maunganui Airshed Emissions Inventory 2022). It is NO_2 (a subset of NOx) that is related to adverse health effects. The emissions inventory has not been used in Professor Hales' estimates of the contribution of existing Port activities to measured concentrations. Paras [44 – 45] of Ms Simpsons evidence explain why the relative effects of different sources on ground level concentrations cannot be assumed to be proportional to relative emission quantities estimated in the Emissions Inventory. Ms Simpson's evidence includes estimates of the ambient concentrations contributed by shipping and these are summarised in the response to (e).	combined effects of all sources in the Mount Maunganui Airshed and natural sources on measured concentrations at Whareroa Marae is reasonable. Dr Denison makes no comment on this matter as it is outside her area of expertise. In the Air Quality Assessment, the impacts of the Project are considered cumulatively with existing air quality. The relative contribution of different sources to that existing air quality is not relevant to the conclusions of the Air Quality Assessment.	implications for existing health status. Dr Denison is of the opinion that any impact of existing air pollution on the health status of Mount Maunganui is reflected in the current mortality and morbidity rates. Statistics NZ data shows that life expectancy in Tauranga City, which includes Mount Maunganui, is longer than the life expectancy of NZ as a whole. Statistics NZ advises that this demonstrates that the mortality rates in Tauranga City and Mount Maunganui are lower than the national rate. Professor Hales states that the mortality statistic he used in his original evidence for calculation of health effects is the count of deaths from all causes and all ages in Mount Maunganui (that is, an average of 220 deaths per year in 2023 to 2025). As stated in his evidence, the "correct"

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	The values presented in the second row of the table in response to question (e) (0.3 µg/m^3 $PM_{2.5}$ and < 1.1 µg/m^3 NO_2) could be used as inputs to estimate existing "port attributable" health impacts at Whareroa Marae. This would overstate impacts related to NO_2 as the value includes non-Port land transport sources. These values cannot be used to characterise existing "port attributable" exposure at other, more distant, locations from the Port, as illustrated by the negligible impact of shipping emissions at Ranch Road.		statistic is the mortality in adults aged over 30 years, form natural causes only. This is needed to match the results of the HAPiNZ epidemiological study on which he bases his estimates. However, the publicly available data do not allow the appropriate count to be calculated for SA3 areas such as Mount Maunganui. Data on mortality by age group and by cause are available at national scale for 2022. In that year, 92% of deaths were from natural causes in adults. If it is assumed that the proportion of deaths from natural causes in adults in Mount Maunganui is the same as that at national scale, the mortality count is reduced from 220 to approximately 200 deaths, leading to a reduction in the estimated mortality associated with air pollution. Dr Denison believes that the approach and the input data

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			used by Professor Hales leads to an overestimate of the health effects attributable to air pollution. Professor Hales has used years in his calculations where there are higher death counts, but air pollution data is unavailable and Dr Denison notes that the mortality data used by Professor Hales covers 3 years (2023-2025), however he has only used air pollution data for 2024-2025. The mortality data for 2023 is higher than that for 2024 and 2025 which drives the average up. Dr Denison is of the opinion that if the analysis is to attribute health effects to air pollution that it is important that the air pollution data match the years for the mortality data so that more accurate assessments of the attributable health effects can be made.
(i) Whether the current (2025) level of air quality at Whareroa is 'acceptable' in terms of the New	Interpreted as whether it complies with the New Zealand Ambient Air Quality Standards set in the National Environmental Standard for Air Quality	Yes	

Agenda item	General discussion	Agreed position	Disagreements or reservations, with reasons
Zealand Ambient Air Quality Guidelines.	and the New Zealand Ambient Air Quality Guidelines or not.		
(j) Whether there are practical mitigation measures that could reduce air pollution exposure and associated health impacts described by Professor Hales.	The air pollution and health impacts described by Professor Hales represent the combined effects all sources in the Mount Maunganui Airshed and natural sources. The practical mitigation measures to reduce air pollution exposure to these sources will be specific to the activity and therefore it is not possible to provide a generic response. A non-exhaustive list of the methods to manage these sources include a combination of national regulation (e.g. road transport fuel regulations and vehicle emissions standards), the planning framework, including requirements for resource consents for industrial discharges, and voluntary initiatives such as the Mount Maunganui Industry Accord.	This question appears to relate to measures to manage existing air pollution and does not relate to the potential impacts of the Project which is being considered by the Panel. If the Panel is asking if there are practical mitigation measures to reduce emissions from the Project, there are available measures such as shore power for shipping when docked avoiding the need for diesel engines to be run. However, this has been proven impractical in other projects that have been assessed in New Zealand. Ms Simpson presented evidence on this matter at the Environment Court hearing on the Stella Passage project (Simpson Supplementary Statement dated 30 September 2022, paras [17-22]). This evidence included discussion of a detailed feasibility study	Professor Hales considers that the health co benefits of air pollution mitigation measures, such as shore power, should be included in any cost benefit assessment. Ms Simpson notes that the type of cost benefit analysis contemplated by Professor Hales is different to the evaluation of 'Best Practicable Option' under the RMA.

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		undertaken by the Port of Auckland. In summary, no currently technical feasible and financially viable options for mitigating shipping emissions have been established for New Zealand ports.	
(k) Whether there are limitations in the Air Quality Assessment.	<u>Scope of the Air Quality Assessment</u> The Air Quality Assessment was conducted to assess the incremental and cumulative impacts of the Project on air quality. The scope of the Air Quality Assessment was informed by the planning framework, which includes: • The matters of discretion for the restricted discretionary activity consents being sought, which include effects on "site specific historical or cultural values under s 6(e) or 7(a) of the RMA". This is why the assessment focuses on potential effects at Whareroa Marae. • That the normal emissions from ships are expressly permitted under the NES (Marine Pollution) Regulations and therefore no consent can be required for	The scope of the Air Quality Assessment was designed to address the relevant matter of discretion for the resource consent applications. There are uncertainties in all modelling studies. The good practice guidance includes recommended methods to address these uncertainties, including the use of conservative assumptions so that the overall bias is towards over-predicting potential effects. In summary: • The assessment methodology is consistent with good practice guidance for	Professor Hales considers that indirect effects of the Project on air quality should also be considered. The purpose of the Project is to increase port capacity, which will inevitably lead to increased ship movements, additional handling of logs and bulk solid materials, and road traffic leading to further emissions. Ms Simpson notes that the reasons for not including indirect effects of the Project on air quality are set out in Section 4 of the Air Quality Assessment.

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	the emissions from ships visiting the Port of Tauranga The BOPRC has confirmed that they consider general air quality effects on the wider population are outside the matters of discretion for this consent. This regulatory context means the Air Quality Assessment was not intended to address cumulative air quality effects at residential locations in Mount Maunganui more broadly. It is acknowledged that matters of discretion prescribed by the planning framework could be considered a limitation by some parties. However, if air quality effects are acceptable at the Marae it can be inferred that effects will also be acceptable at residential receptors more distant from the Project where the incremental air quality effects will be lower. The scope of the Air Quality Assessment in terms of the focus on shipping emissions, rather than downstream or indirect effects is discussed in Section 4 of the Air Quality Assessment.	conducting air quality assessments in New Zealand, • The emissions estimates were developed following the accepted methodology for shipping emissions, used the best available data, and adopted conservative assumptions. • The dispersion modelling was conducted generally in accordance with the relevant good practice guidance, including using contemporaneous model predictions and background concentrations to estimate cumulative exposure, and adopted conservative assumption.	The Air Quality Assessment considered the effects of increased ship movements. She understands that the emissions from any additional handling of logs and bulk solid materials will be subject to a management regime including consent requirements that are not the subject of this application and would be required to be addressed under the BOPRC Regional Natural Resources Plan.
(l) The accuracy of Professor Hales' evidence on increased mortality rates,	As stated at para [68] in his evidence, Professor Hales states that observed mortality in adults from non-external causes should ideally be used	Professor Hales and Dr Denison agree that estimating health impacts using baseline health	Professor Hales has not attempted a precise estimate of mortality attributable to air

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both observed and estimated, including; (i) Is the general principle of estimating health impacts of pollutants by combining information on observed health status, exposure and "dose response" scientifically accepted?	in the calculations below. Age standardisation is not relevant to calculations based on observed mortality adopting the approach he has used. Dr Denison considers the age standardised rates are important if a different risk assessment approach is used.	data for a population, air pollution exposure data and dose response data are the accepted inputs to estimating health effects attributable to air pollution. The accuracy of the health effects estimated is dependent on the accuracy of the information used in those calculations. If the Panel requires, the details of the calculations undertaken by Dr Denison and Professor Hales can be provided.	pollution given the limited resources available to him. Rather, he considers that his estimates should be seen as indicative within +/- 50%. This range of estimates accounts for uncertainty in population exposure estimates, baseline mortality, including age groups and causes of death which are relevant, alternative dose-response estimates, and statistical uncertainty. Professor Hales has completed additional calculations which address some of these uncertainties, available at **Schedule 4, Attachment A**. Dr Denison, in her experience, believes different risk assessment methods can be used to utilise the input data in a risk assessment and that this can lead to different health estimates.

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			Dr Denison notes that the estimates by Professor Hales are significantly higher than those reported in the Toi te Ora report[3] that estimated the deaths due to air pollution in Mount Maunganui compared to Otumoetai. Dr Denison has also undertaken her own calculations, the results of which are summarised in **Schedule 4, Attachment B**. She notes that her estimates are lower than those calculated by Professor Hales.
The following questions use the statements "increased mortality rates" which Dr Denison considers implies that there are increased mortality rates in Mount Maunganui. Dr Denison does not agree that the existing mortality rates are high compared to the rest of NZ. The mortality rates used by Professor Hales are crude mortality rates which include all causes of death (accidents and suicides included) and have not been age adjusted. Statistics NZ and WHO age standardise death rates to account for differences in the age of the population as populations that are older have higher death rates due to age alone. Age standardising the mortality rates has a significant impact on the mortality rates - for NZ crude rate 7.1/1000 - age standardised is 3.1/1000. The Mount Maunganui population is significantly older than the NZ average so the differences in mortality rates could be accounted for by age alone. Statistics NZ has advised that they do not calculate death rates for SA3 populations as the counts are too low, so caution needs to be applied when deriving these numbers and drawing conclusions from them.			

[3] ESR. 2023. Air Pollution: Health Risk Assessment. Prepared for Toi te Ora Public Health

Agenda item	General discussion	Agreed position	Disagreements or reservations, with reasons
Dr Denison notes that the life expectancy in Tauranga is longer than NZ overall. This indicates, as per Statistics NZ lifetables, that the mortality rates would be lower in the Tauranga area, including Mount Maunganui, compared to NZ as a whole. Therefore, the assumption that there are increased mortality rates referred to in the following questions needs to be reassessed and/or treated with caution. Professor Hales agrees that basing the mortality rates on crude observed mortality in Mount Maunganui may overestimate the mortality in relation to the national mortality rate because of the lack of age standardisation. However, Professor Hales' estimates used in his evidence are not based on mortality rates but on observed counts of deaths, therefore no assumption is made about mortality rates for his estimates of mortality attributable to air pollution. In his original evidence, the number of deaths used by Professor Hales includes all ages and all causes of deaths which will overestimate the number of deaths that would be attributable to air pollution. The mortality studies investigating air pollution only include non-accidental/non-traumatic deaths in the population over the age of 30 years.			
(ii) Whether the increased mortality rates are representative of the effects on Ngāti Kuku hapū and at Whareroa Marae as opposed to the Mount Maunganui area more generally; and	The experts sought clarification on this question and understand that it was not intended that they treat Ngāti Kuku hapū/Whareroa Marae as separate communities or physical locations. We have interpreted the question as asking whether any impacts on the Whareroa Marae community would influence the mortality rates observed for the Mount Maunganui population (21,800) as a whole.	Given that the population of the Whareroa Marae is around 100, any increase in mortality within that population would not be distinguishable in the mortality rates for the entire Mount Maunganui population.	Professor Hales considers because the Ngāti Kuku hapū/Whareroa Marae are Māori ethnicity, their mortality rate is likely to be higher than that of Mount Maunganui overall. Māori people have higher overall mortality rates nationally by a factor of 1.7. A mortality rate attributed to air pollution in Ngāti Kuku hapū/Whareroa Marae based on Professor Hales' mortality counts is likely to be higher by approximately this factor, compared to that of Mount Maunganui as a whole.

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			The attributable fraction of all health impacts from air pollution may be higher than usual in this population due to prevalence of chronic conditions caused by previous exposure, some of which is due to existing Port of Tauranga activities. Dr Denison does not agree with the approach set out by Professor Hales above and believes that it will overestimate the mortality rates at Whareroa Marae. She is of the opinion that if you calculate the mortality rate for the Mount Maunganui Central SA2 area (which includes Whareroa Marae) based on Statistics NZ data, the mortality rate for that area is 4 in 1000 (based on three deaths averaged over 2023-2025). This is lower than calculated by Professor Hales for Mount Maunganui as a whole, therefore she is of the view that there is no evidence of increased mortality rates in the

Agenda item	General discussion	Agreed position	Disagreements or reservations, with reasons
			area that includes Whareroa Marae. Professor Hales states that this calculation is unreliable because it is based on too few deaths in a small population. Dr Denison states that the argument put forward by Professor Hales about the small population is also applicable to the Mount Maunganui counts. Advice from Statistics NZ[4] is that they do not calculate death rates at an SA3 level (Mount Maunganui, as used by Professor Hales in his calculations) due to small population numbers and death counts. An SA2 area is a smaller area than the SA3 area.
(iii) Whether the observed increased mortality rates are attributable to historical air		Professor Hales did not cover this in his evidence. He estimated the mortality attributable to the air pollution exposure from all	

[4] Email attached at **Schedule 4, Attachment C**.

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pollution exposure from Port activities.		sources in the airshed from 2024 to 2025.	
(iv) Whether the mortality rates described by Professor Hales are attributable to the Project.		As the Project has not been approved and is not operational, it is not possible for it to have affected the existing mortality rates. The assessment undertaken by Professor Hales was of the mortality attributable to all existing sources of air pollution exposure and did not consider any potential changes in mortality due to the Project.	
(m) Whether epidemiological studies are required to assess any health impact of air pollution arising from the Project.		Professor Hales and Dr Denison agree that an epidemiological study would not have the power to detect health impacts from the Project as the concentrations predicted by the Air Quality Assessment are too small for an effect to be picked up. Based on the predicted increment from the Project, there would no measurable increase in mortality rates in Mount Maunganui	

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		attributable to this. The predicted increment as well as being low is very localised and does not extend into the broader Mount Maunganui population.	
(n) Whether or not the epidemiological studies recommended by Professor Hales are scientifically feasible, given appropriate resources.	The epidemiological recommended by Professor Hales are not specific to the Project but would investigate the potential impact of air pollution in Tauranga City from all sources. They are not proposed to address the potential impact of the Project.	Any proposed studies should be preceded by consultation with the communities involved including the Whareroa Marae. Detailed study designs should be prepared that clearly state the aim of the study and show that there is sufficient data and study power to identify any statistically significant findings. The detailed study design should include consultation with air quality specialists to ensure that the level of granularity of exposure data required is achievable and to establish an appropriate methodology. Professor Hales estimates that these studies could cost upwards of $1 – 2 million dollars each (not	Professor Hales is of the opinion that there are potentially feasible studies that could be done, including descriptive, time series panel studies and a cohort study (like the national epidemiological study which underpinned the HAPiNZ study, but at smaller geographic scale). Dr Denison is of the view that it may not be possible to conduct certain types of studies, such as a time series study, as the population of Tauranga City is too small. Other study types may be possible, such as Panel studies, however it is important that any study that may be conducted is able to answer the question being raised by the community and/or regulators. In her opinion, apart from the

Agenda item	General discussion	Agreed position	Disagreements or reservations, with reasons
		including the cost of modelling exposure concentrations).	funding required to conduct any study, which is likely to be considerable higher than stated by Professor Hales, that the size of the population will be a significant barrier to conducting some types of studies.

World Health Organization Definitions

Air quality guidelines

A series of WHO publications that provide evidence-informed, non-binding recommendations for protecting public health from the adverse effects of air pollutants by eliminating or reducing exposure to hazardous air pollutants and by guiding national and local authorities in their risk management decisions. The current volume (WHO, 2021) is the latest issue of the series.

Air quality guideline level

A particular form of a guideline recommendation consisting of a numerical value expressed as a concentration of a pollutant in the air and linked to an averaging time. It is assumed that adverse health effects do not occur or are minimal below this concentration level. For the purposes of this document, a long-term air quality guideline level is defined as the lowest exposure level of an air pollutant above which the guideline development group is confident that there is an increase in adverse health effects; the short-term air quality guideline level is defined as a high percentile of the distribution of daily values, for example the 99th percentiles equivalent to three to four days a year exceeding this value.

Air quality standard

A given level of an air pollutant (for example, a concentration or deposition level) that is adopted by a regulatory authority as enforceable. Unlike an air quality guideline level, a number of elements in addition to the effect-based level and averaging time must be specified in the formulation of an air quality standard. These elements include:

- measurement technique and strategy
- data handling procedures (including quality assurance/quality control)
- statistics used to derive, from the measurements, the value to be compared with the standard.

The numerical value of a standard may also include a permitted number of exceedances of a certain numerical value in a given time period.

Schedule 4

Attachment A – Professor Hales' calculations

The spreadsheets referred to here include the calculation of counts of mortality in Mount Maunganui SA3 area, 2023-2025, attributable to air pollution from all sources in the Mount Maunganui airshed, giving plausible ranges of deaths depending on assumptions.

There were 220 deaths per year reported on average in the SA3 area.

Up to 20 of these may have been in people under age 30, or from accidental/external causes that are not attributable to air pollution exposure.

Therefore, the results assume 200 deaths from natural causes in adults.

The estimates account for different "Relative Risks" (RR) derived from WHO and from the NZ HAPiNZ study, including the 95% confidence intervals (statistical uncertainty).

Based on WHO RRs:

	Count	Exposure
PM=	8 to 13	at 5 µg/m^3
NO2=	4 to 10	at 10 µg/m^3

Plausible range 12 to 23 deaths

Based on HAPiNZ RRs

	Count	Exposure
PM=	8 to 13	at 5 µg/m^3
NO2=	14 to 21	at 10 µg/m^3

Plausible range 23 to 38 deaths

Attachment B – Dr Denison's calculations

Attributable Health Effects due to Air Pollution

Calculations of the attributable health effects due to air pollution in Mount Maunganui have been undertaken using 2 different risk assessment approaches:

- Estimating health effects from changes in air pollution using baseline mortality rates per 100,000 population, air pollution concentrations, concentration response functions (CRF) (change in a health outcome per 1 $\mu g/m^3$ increase in pollutant concentration)) and the population data. This approach is used widely globally in calculating the health effects associated with exposure to air pollution, and
- The population attributable fraction approach as used by Professor Hales.

In both analyses the air pollution data monitored at the Whareroa Marae in 2025 has been used with the total population data for the Mount Maunganui SA3 area. Assuming that the air pollution data monitored at the Marae is representative of air pollution across the whole population of Mount Maunganui is a very conservative assumption.

In the analyses 2 CRFs have been used

- The CRF derived by the WHO as part of the development of the WHO Air Quality Guidelines (2021), and
- The CRF derived for New Zealand to inform the HAPINZ 3.0 project

For $PM_{2.5}$ the CRFs are very similar, however a much higher CRF for NO_2 was derived for the HAPINZ study than that derived by WHO. This means that the number of attributable deaths for NO_2 are much higher using the HAPINZ estimate.

The baseline mortality rate used was provided to Dr Denison for previous risk assessments conducted in Mount Maunganui by the Ministry of Health (TeWhatu Ora). The value is 303/100,000.

Table 1 summarises the number of deaths that would be attributable to existing air pollution as well as the estimates for the impact of the Project alone using the incremental increase in air pollution predicted in the Air Quality Assessment conducted for the Project.

		Estimated No of deaths existing AQ		Incremental Increase in no of deaths due to Project	
PM2.5		Risk estimate approach	PAF approach	Risk estimate approach	PAF approach
	WHO	2.6	10.9	0.1	0
	HAPINZ	3.3	10.9	0.1	0
NO2	WHO	1.3	7	0.1	0
	HAPINZ	6.6	18.4	0.3	0

Key Findings:

- The contribution from the Project is minimal which ever method is used and is zero using the PAF method. It should be noted that these estimates are an overestimate of the attributable health effects as it assumes that the increment predicted at the Marae for the Project extends across the Mount Maunganui population. It is more likely that the increment will be confined to the Mount Maunganui Central SA2 area.
- The estimates of attributable deaths shown in Table 1 are much lower than those estimated Professor Hales in his evidence even when using the same approach
- The estimates using the PAF approach are higher than those using the risk estimate approach. Dr Denison is of the view that this is due to the greater sensitivity of the risk estimate method compared to the PAF approach and the use of specific mortality rates rather than crude counts of deaths used in the PAF method.

Attachment C – Statistics NZ advice

From: Lyn Denison [redacted]
Sent: Thursday, 9 July 2026 3:26 pm
To: Info Mailin - Shared Mailbox [redacted]
Subject: Death rate data

Hi

I am undertaken a study in the Mount Maunganui area and need to access death rate data. I have accessed the crude death rates and age standardised rates for NZ as a whole from Infoshare. Is it possible to get the same type of data for the Mount Maunganui SA3 area and/or Tauranga as a whole?

Regards

Lyn

Dr Lyn Denison
Director and Principal

ENVIRONMENTAL
health risk assessment consultants

829 Sydney Road, Brunswick, 3056, Victoria

Phone: +61472519857

From: Kim Dunsta [redacted]
Sent: Thursday, 9 July 2026 2:48 PM
To: [redacted]
Cc: Population Estimates Projections and Coverage <[redacted] Info Mailin - Shared Mailbox [redacted]
Subject: RE: Death rate data

UNCLASSIFIED

Kia ora Lyn

SA3s are smaller than we usually derive rates of death for, as the annual death numbers are generally small for this geography, especially when disaggregated by age and sex.

As a start, I'd suggest the period life expectancies available for territorial authority areas (cities and districts) in Infoshare > Population > Demography Subnational Life Expectancy > Subnational life expectancy at birth, by sex. Tauranga city is included.

These life expectancies account for the different age-sex composition of TAs, so can be compared over time and between areas. The period life expectancy at birth is the average length of life of a population, if it experienced the age-specific death rates of that specific period throughout its lifetime.

Note also that Subnational life tables are based on where someone lived at the time of death, which may not necessarily be where they spent most of their life.

If you want to explore the numbers underlying the life expectancies:

- territorial authority deaths (although not by age) are published in Infoshare > Population > Deaths > Deaths by area, city/district councils
- territorial authority population estimates (by age and sex) are available in Aotearoa Data Explorer • Subnational population estimates (TALB, SA3, SA2), by age and sex, at 30 June 1996-2025 (2025 boundaries).

Kind regards
Kim

Kim Dunstan (pronouns: he/him/his)
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