

**BEFORE THE ENVIRONMENT COURT  
I MUA I TE KOOTI TAIAO O AOTEAROA**

**ENV-2023-AKL-000160**

**AT AUCKLAND**

**UNDER** the Resource Management Act 1991 (the Act)

**IN THE MATTER** of a direct referral under section 87G of the Act of applications for resource consents by Allied Asphalt Ltd associated with the construction and operation of an asphalt plant

**BETWEEN** **ALLIED ASPHALT LIMITED**

Applicant

**AND** **BAY OF PLENTY REGIONAL COUNCIL**

Consent Authority

**AND** **TAURANGA CITY COUNCIL**

Consent Authority

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**STATEMENT OF EVIDENCE OF ROBERT JAMES MURRAY ON BEHALF  
OF BAY OF PLENTY REGIONAL COUNCIL – AIR QUALITY**

**DATE: 21 MARCH 2024**

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## INTRODUCTION

1. My name is Robert James Murray.
2. I am an Occupational Hygienist / Environmental Scientist and Director at Air Matters Limited (**Air Matters**). Air Matters is one of New Zealand's main providers of occupational hygiene and environmental air quality testing services.
3. My role involves carrying out resource consent work for discharges to air including air dispersion modelling and ambient air monitoring for various industries.
4. I have been involved in a number of resource consent applications in the Mount Maunganui Airshed (**MMA**) including HR Cement, Higgins, Waste Management and Genera.
5. I am involved in ambient PM<sub>10</sub> monitoring in the MMA. My role involves locating and servicing these monitoring stations to ensure that they are providing accurate data.
6. I have the following qualifications:
  - (a) Bachelor of Science–Environmental Science (Conjoint). University of Auckland;
  - (b) Bachelor of Arts–Geography (Conjoint). University of Auckland;
  - (c) Health & Safety Association New Zealand (HASANZ) Registered Professional;
  - (d) Full member of the New Zealand Occupational Hygiene Society (NZOHS).
7. I have worked as an Air Emissions Technician at Scientifics in the United Kingdom carrying out stack emission testing for compliance purposes from 2004-2006.
8. I worked for the Scottish Environment Protection Agency from 2006-2008 where I was involved in air quality management including ambient air

quality monitoring, stack emission testing, soil testing and waste sampling. In this role I became a fully qualified Team Leader under the Environment Agency's Monitoring Certification Scheme and qualified as an International Quality Management System Auditor.

9. I have worked as an Environmental Scientist / Occupational Hygienist at Air Matters for the past 13 years and in 2022 became a Director of the company.
10. Over this time, I have also been on the Council for the New Zealand Occupational Hygiene Society 2019 to 2021 and for a time served as the Secretary (2021). I have been actively involved in reviewing Workplace Exposure Standards on behalf of the NZOHS (2019-2021). I work as a Technical Assessor for International Accreditation New Zealand (IANZ).
11. I am familiar with the location of the subject site and have undertaken a site visit on 13 March 2024.
12. I have read the Expert Witness Code of Conduct set out in the Environment Court's Practice Note 2023 and I agree to comply with it. I confirm that the issues addressed in this statement of evidence are within my area of expertise, except where I state I am relying on the specified evidence of another person. I have not omitted to consider material facts known to me that might alter or detract from my expressed opinion.

#### **SCOPE OF EVIDENCE**

13. I have been engaged by the Bay of Plenty Regional Council (**Regional Council**) to provide a technical review of the Assessment of Environmental Effects submitted by the Applicant in relation to air quality (including odour) and now to provide expert air quality advice and evidence in these direct referral proceedings.
14. I have reviewed the evidence of Jennifer Simpson (Air Quality) and Dr Denison (Health Risk Assessment) together with key aspects of the applicant's evidence to enable me to obtain a full understanding of the proposal, relevant to my area of expertise. My area of expertise does not extend to health risk assessment which will be covered by Dr Wilton.

15. It is my understanding that the air quality experts will be caucusing subsequent to the filing of this evidence to refine matters further, particularly the wording of conditions.
16. In this evidence I will focus mainly on the assessment provided by the applicant in relation to Air Quality rather than the health effects which will be covered by health experts. I will cover the following issues:
  - (a) Modelling;
  - (b) Meteorological data used for the modelling assessment;
  - (c) Emission rates of nitrogen dioxide;
  - (d) Benzene and dioxin assessment;
  - (e) Odour;
  - (f) National Environmental Standards for Air Quality;
  - (g) Fugitive emissions from site;
  - (h) Background NO<sub>2</sub> concentrations for the Mount Maunganui area.

## **BACKGROUND**

17. Allied Asphalt are seeking a consent to discharge contaminants to air from the production of asphalt. The application specifies that the current plant will operate for a period of 2 years until a new plant is commissioned. The new plant will have greater production but will incorporate better discharge control technologies and will run on natural gas or diesel rather than used lubricating oil. Allied Asphalt operates in Mount Maunganui which is classified as a polluted airshed in relation to PM<sub>10</sub>.

## **Modelling**

18. The Applicant has used the CALMET/CALPUFF non-steady state dispersion model. The initial assessment used AERMOD which is a Gaussian dispersion model. CALMET/CALPUFF is better suited to this application.
19. Meteorological data used in the modelling is a dataset provided by the Regional Council for the years 2014-2016. This is discussed further at paragraphs 22-28 of my evidence.

20. Modelling has been carried out assuming continuous operation at the maximum operating rate for both the current and proposed plants. In reality the plants will not operate continuously and the applicant has put forward an annual production cap of 300,000T for the proposed plant. Therefore, the effects of emissions for longer term averages are considered conservative. This approach does allow for a comparison of the effects from both plants.
21. The Applicant has assessed averaging periods of 24-hours or longer only at locations where people may be present continuously over this time period i.e. not the industrial zone surrounding the Allied site. However, the areas where people are known to be living in the industrial zone (e.g. De Havilland Way), pre-schools and Whareroa Marae are included in the longer term assessments. There may be other locations where people are living in the industrial zone that are not as easily identified.

#### **Meteorological Data**

22. Wind is an important factor in relation to the direction and distance that a plume discharged from a stack travels. However, windspeed is only one factor that is taken into account by the dispersion model when assessing how the plume from a stack will disperse in the environment. The effect of windspeed is taken into account by the model and is linked to atmospheric stability classes.
23. Generally, unstable conditions are associated with daytime ground level heating which results in thermal turbulence. Stable conditions are mostly associated with night time cooling which results in the suppression of the turbulence levels and temperature inversion at lower levels. Neutral conditions are mostly associated with high wind speeds and cloudy conditions.
24. It is noted in the MfE Good Practice Guide for Atmospheric Dispersion Modelling that peak ground level concentrations from a point source usually occur in:
  - (i) Highly unstable conditions;
  - (ii) In stable, light wind night-time conditions; or
  - (iii) During the transition from night to morning when fumigation may occur.

25. The meteorological file that was used in this assessment was provided by the Regional Council and covers the years 2014-2016. The Applicant states that the highest ground level concentrations are predicted by the model when the windspeed is in the range of 1.5 - 4.0 m/s and that windspeeds greater than 5 m/s are generally associated with better dispersion of contaminants (Tonkin & Taylor, Updated Air Quality Assessment, Jan 2024).
26. A basic assessment of the windspeeds used in the model (Regional Council 2014-2016) and the Tauranga Airport (AWS) in 2023 has been carried out by the applicant (Tonkin & Taylor, Updated Air Quality Assessment, Jan 2024). I have also carried out a basic assessment of the windspeeds in an updated meteorological dataset (Regional Council 2021) and data from the Tauranga Airport (AWS) from 2022. The combined assessment is detailed in Table 1.

Table 1 – Windspeed Comparisons

		TGA Airport AWS 2023	TGA Airport AWS 2022	CALMET Dataset 2014- 2016	CALMET Dataset 2021
Average Windspeed		4.58	4.22	4.62	3.43
Frequency (%)					
Windspeed	Calms	0.01	0.00	0.39	0.5
	0.5-1.5	5.8	5.8	5.1	12.3
	1.5-4.0	39.8	40.1	35.7	52.8
	4.0-5.0	15.2	14.5	17.6	16.1
	5.0-7.0	22.6	19.9	26.4	14.9
	7.0-10	13.7	9.1	13.0	3.4
	<10	2.7	1.2	1.8	0.1

27. In relation to windspeeds in the range of 1.5-4.0 m/s, Table 1 shows that there is a closer agreement between the data from the Tauranga Airport and the Regional Council dataset for 2014-2016 indicating that the meteorological conditions used in the model resemble actual conditions. The latest dataset provided by the Regional Council for 2021 provides the most conservative results and appears to be different to the other data.
28. It is noted by the Applicant that the meteorological station at the Tauranga Airport was relocated to a more open area in 2023. I do not know the reason for this relocation i.e. whether it was that the previous location was not representative of meteorological conditions.

29. I believe that using the 2014-2016 dataset may underestimate ground level concentrations in relation to alternative meteorological data that is available. I intend to find out more around these variations and bring the findings to the caucusing for further discussion.

### **Emission Rates**

30. Emission rates used in the model have been based on:
- (a) the proposed consent limit for PM<sub>10</sub>;
  - (b) stack testing data from the current plant and from other plants similar to the proposed plant for odour;
  - (c) emission factors for other contaminants.
31. Using stack emission testing data is preferential to emission factors where available.
32. Stack emission testing data for NO<sub>x</sub> has been sourced from similar asphalt plants in Australia to determine the accuracy of the emission factors used in the dispersion model. The data indicates that when using diesel the emission factor is conservative and when using natural gas the emission factor may underestimate the emission rate.
33. There is some uncertainty around the natural gas testing result. I believe a condition requiring testing of NO<sub>x</sub> for this plant should be incorporated into the conditions of consent (if consent is granted). I have reviewed the proposed condition recommended by Ms Petricevich to address this issue (Condition 23A) and have some suggested amendments which I address at paragraph 56(c).
34. I'm unsure whether the applicant uses resin in its asphalt mixes. I suggest this matter is clarified by the applicant. If resin is used, it would be useful to discuss the implications at caucusing.

### **Benzene and Dioxin Assessment**

35. An assessment of benzene and dioxins was included in the application and updated in the Applicant's evidence (Tonkin & Taylor, Updated Air Quality Assessment, Jan 2024). It is acknowledged that there is no robust ambient air quality monitoring data available for benzene or dioxins in the Mount Maunganui area. Background levels of benzene have been

assumed to be 14.7 ug/m<sup>3</sup> for 1 hour, based on data collected from 2013-2014 in Khyber Pass, Auckland. Annual background levels are based on default values provided by the Ministry for the Environment in the Good Practice Guide for Assessing Discharges to Air from Industry at 1 ug/m<sup>3</sup>. Background levels in Mount Maunganui may be higher than this due to the fuel bulk storage facilities and port activities which are not present at Khyber Pass.

36. There are no background levels proposed for dioxins.
37. There is an increase in the emission rates of benzene and dioxins from the proposed plant in comparison to the current plant, which is a result of the proposed plant's greater operating capacity. This also corresponds to an increase in offsite ground level concentrations. The Applicant's assessment (Tonkin & Taylor, Updated Air Quality Assessment, Jan 2024 and the Statement of Evidence of Jennifer Simpson) indicates that ground level concentrations are below the AAQG and OEHHA Acute/Chronic RELs for benzene and below the Ontario AAQC and WHO TEQ for dioxins. I believe a condition requiring testing of benzene and dioxins for this plant should be incorporated into the conditions of consent (if consent is granted). I have not had an opportunity to canvas this suggestion with Ms Petricevich but anticipate it could be discussed further at caucusing.
38. Further comment in relation to the health effects associated with the discharge of benzene and dioxins is best suited to Dr Wilton.

### **Odour**

39. Odour modelling and complaints relating to the current plant confirm that there are offsite effects from odour in the surrounding area. This will continue under the proposed 2-year consent for the current plant.
40. The proposed plant, due to a different manufacturing technique and additional odour controls, will significantly reduce offsite odour concentrations. However, an assessment of odour concentration under unstable conditions has not been included in the application and no explanation has been provided for this. I intend to raise this point at the caucusing.
41. There is some uncertainty around the manufacturing of Reclaimed Asphalt Paving (RAP) in relation to odour. Data from stack emission testing on an



asphalt plant in Australia (when using 10% and 20% RAP) indicates that the odour emission rate could increase by more than 3 times than when not using RAP in the manufacturing process, although modelling at this rate still indicates that the odour guidelines will be met. To ensure that odour is not a problem when using RAP, a condition may be included to control the amount of RAP used in the manufacturing process if consent is granted.

42. Proposed odour controls at loadout include the use of extraction and filtration through a bluesmoke aerosol treatment system. In principle, the filter looks appropriate for this application. I have concerns that if the loadout is not enclosed then there will be an increase in fugitive emissions. Enclosed loadouts have been used at an asphalt plant in Auckland. I recommend that this option is explored in more detail by the applicant, preferably prior to the hearing to enable this option to be considered by the Court. If that is not possible it may be prudent to include an adaptive management type condition enabling this option to be imposed by the Council if there is a material increase in fugitive emissions. Where it cannot be fully enclosed it should be at least partially enclosed to ensure that the fume from loadout is captured.
43. The air that is extracted from the mixing unit and hot mix storage areas is vented back through the burner for the destruction of VOCs (which will include compounds that cause odour). This system is good in principle but it may 'upset' the combustion process in the dryer drum. No information has been provided around this process and how it is controlled.

### **National Environmental Standards for Air Quality**

44. Offsite ground level concentrations and the annual emissions of PM<sub>10</sub> into the airshed will decrease with the proposed asphalt plant. This is due to the implementation of a baghouse as the primary abatement system. The provisions of Regulation 17 are met in relation to the discharge from the proposed plant.
45. The amount of NO<sub>x</sub> discharged per tonne is lower for natural gas and diesel on the proposed plant. However, as this discharge is unabated and there is an increase in production, there is an overall increase in the amount of NO<sub>x</sub> discharged into the airshed on an annual basis. According to the MfE Good Practice Guide for Assessing Discharges to Air from

Industry the site would not be classified as a 'principal source' of NO<sub>2</sub> in the MMA. The discharges to air from the proposed plant are below the New Zealand NESAQ and AAQG.

46. VOCs (specifically benzene) have been raised as a contaminant of concern. Generally, the amount of VOC discharged annually will increase from the proposed plant due to the greater production capacity of the plant. However, there will be some reduction in the amount of VOC discharged (which is not quantified) due to the exhaust gases from the mixing unit and hot mix storage areas being vented back through the dryer drum burner where they are destroyed before being discharged to air.
47. The provisions of Regulation 20 for the discharge of CO, NO<sub>2</sub> and VOCs are met from the proposed plant. Further comment in relation to the health effects associated with the discharge of NO<sub>2</sub> and VOCs is best suited to Dr Wilton who is reviewing the health risk assessment.
48. SO<sub>2</sub> emissions from the proposed plant are much lower as both diesel and natural gas have a much lower sulphur content than used lubricating oil. The provisions of Regulation 21 are met in relation to the discharge from the proposed plant.

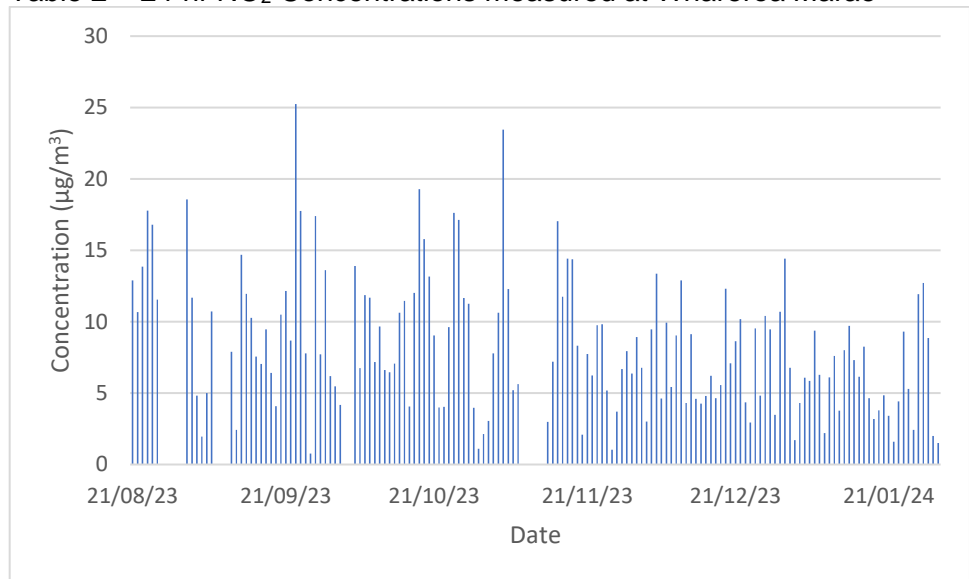
### **Fugitive Emissions**

49. Fugitive emission control is important for this site. Fugitive emissions have been recorded as being a significant contributor to the ambient levels of PM<sub>10</sub> in the MMA. Allied are applying for Resource Consent under Air Rule 15 which covers all components of the manufacture or processing on the site that produce emissions, including delivery and yard activities, bulk goods handling, and burning equipment. It was observed during the site visit on 13 March 2024 that fugitive dust emissions were visible around the yard and bulk storage product bays. Controls should include:
  - (a) Water sprinklers, with trigger points using sprinklers based on weather conditions including windspeed;
  - (b) All product to be stored in covered bays;
  - (c) Yard swept regularly;
  - (d) Site speed restrictions for vehicles.

**Background NO<sub>2</sub> Concentrations**

- 50. 24-hour and annual average background NO<sub>2</sub> concentrations have been estimated by the Applicant using various methods. There is limited NO<sub>2</sub> monitoring data available from the Bay of Plenty Regional Council Environmental Data Portal for the Whareroa Marae monitoring station. Both 10-minute average and 24-hour average concentrations are available for a period of just under 6 months from August 2023 to January 2024.
- 51. Although there are limitations with the data, it can be used to give an indication that the background concentrations used by the Applicant are in the correct order of magnitude. The average concentration of the sampling period was 8.5 ug/m<sup>3</sup> and the highest 24-hour average was 25 ug/m<sup>3</sup>. The Applicant has suggested a default annual average for the Omanu area of 6.5ug/m<sup>3</sup> (Waka Kotahi) and estimated a 24-hour average of 27.4 ug/m<sup>3</sup> (NIWA). Data from Whareroa Marae is displayed in Table 2.

Table 2 – 24-hr NO<sub>2</sub> Concentrations measured at Whareroa Marae



- 52. Waka Kotahi also carries out NO<sub>2</sub> monitoring using passive samplers. Waka Kotahi has been monitoring NO<sub>2</sub> on Maunganui Road (opposite 556 Maunganui Road) since 2007. Waka Kotahi calculates an annual average based on the 12 months data collected. The annual average measured in 2018 was 34 µg/m<sup>3</sup> (Environmental Science and Research, 2023, Air Pollution Health Risk Assessment: Mount Maunganui, Environmental

Science and Research). The monitoring method used by Waka Kotahi is not a reference method, however, it does provide some indication of NO<sub>2</sub> levels in this area.

53. This site is heavily influenced by traffic as it is just off State Highway 2 and on Maunganui Road. This sampling location is situated between the Allied site and Mount Maunganui Intermediate, Mount Maunganui College and the Omanu residential area. This data indicates that there are elevated levels of NO<sub>2</sub> in the Mount Maunganui area due to traffic.

### **Proposed Conditions**

54. I have the following comments in relation to the proposed conditions from an air quality perspective.
55. Air Discharge (Existing Plant)
- (a) Condition 3 can be removed which limits the operating hours to 7am – 5pm. The assessment has been based on continuous operation. As noted by Ms Petricevich in her evidence, an annual cap on production of 68,000T would ensure that there is no increase in the volume of emissions to the MMA on an annual basis.
56. Air Discharge (Proposed Plant)
- (a) Condition 3. Both plants should not operate simultaneously even during testing. No assessment has been provided around the effects of this scenario. I agree with Ms Petricevich's proposed amendment to remove the ability to test the new plant while the existing plant is operating.
  - (b) Condition 22. The consent holder should test for PM<sub>10</sub> annually with the addition of PM<sub>2.5</sub> testing every 5 years.
  - (c) Condition 23A. I believe testing for combustion gases (including NO<sub>x</sub>), benzene and dioxins should be included for comparison with the emission factors used. Where there is no discernible difference no further testing for these contaminants would be required. I do appreciate that testing for dioxins is complicated and may be difficult to do within New Zealand. I have not had a chance

to discuss this suggestion with Ms Petricevich but anticipate it could be considered further at caucusing.

### **Conclusion**

57. It is my view that the Air Quality assessment carried out by the Applicant has been carried appropriately. The proposed plant incorporates the current BPO for control technologies in terms of a baghouse and recirculation of asphalt odours through the dryer drum burner. The proposed conditions of consent are suitable to ensure the effects on air quality of discharges arising from the proposed asphalt plant are minimised.

**Robert Murray**

**21 March 2024**