31 March 2023
Job No: 1018258.0000

Allied Asphalt Limited
54 Aerodome Road
Mount Maunganui 3116

Attention: Brian Palmer

Dear Brian

Response to s92(1) request – Discharges to Air
Allied Asphalt Manufacturing Plant

1 Introduction

Allied Asphalt Limited (Allied) lodged an application with the Bay of Plenty Regional Council (BoPRC) for resource consent in December 2022, for activities associated with its asphalt plant located at 54 Aerodrome Road, Mt Maunganui.

Tonkin & Taylor Limited (T+T) prepared the Air Quality Assessment[1] (AQA) in support of the application. BoPRC has requested further information in relation to the various aspects of the proposal, detailed in its letter:

- Resource consent application RM22-0649 – to discharge contaminants to air, disturb contaminated land, undertake earthworks and discharge stormwater – Request for further information, 08 February 2023

The purpose of this letter report is to respond to the information requested by the BoPRC regarding the Air Discharge matters. The information requested is presented in the shaded boxes, followed by our response. The numbering corresponds to the numbering set out in the further information request.

This letter has been prepared in accordance with our variation order dated 16 February 2023 and our Letter of Engagement dated 19 November 2021.

2 Response to Section 92(1) request

Air quality

1	Can the applicant provide more information around the details of the recycled dust suppression (sprinkler) system used to reduce entrained dust around aggregate storage and handling areas.

[1] Tonkin & Taylor Limited, Air Quality Assessment – Proposed asphalt plant, Mt Maunganui, December 2022

Allied has provided a plan of sprinkler head locations at the existing site, which is provided in **Figure 2.1**. Rainwater is collected from the roof of the covered aggregate bays on the site's western boundary and stored on site in a 30,000 L tank. An additional 30,000 L tank is proposed to be installed at the upgraded site. Allied will have the capability to refill these tanks with mains water in the event of extended dry spells.

The final sprinkler layout for the yard is still being finalised, but will be designed to provide sprinkler cover for all areas that will be subject to aggregate handling activities and will include dampening for the fine aggregates in the covered storage.

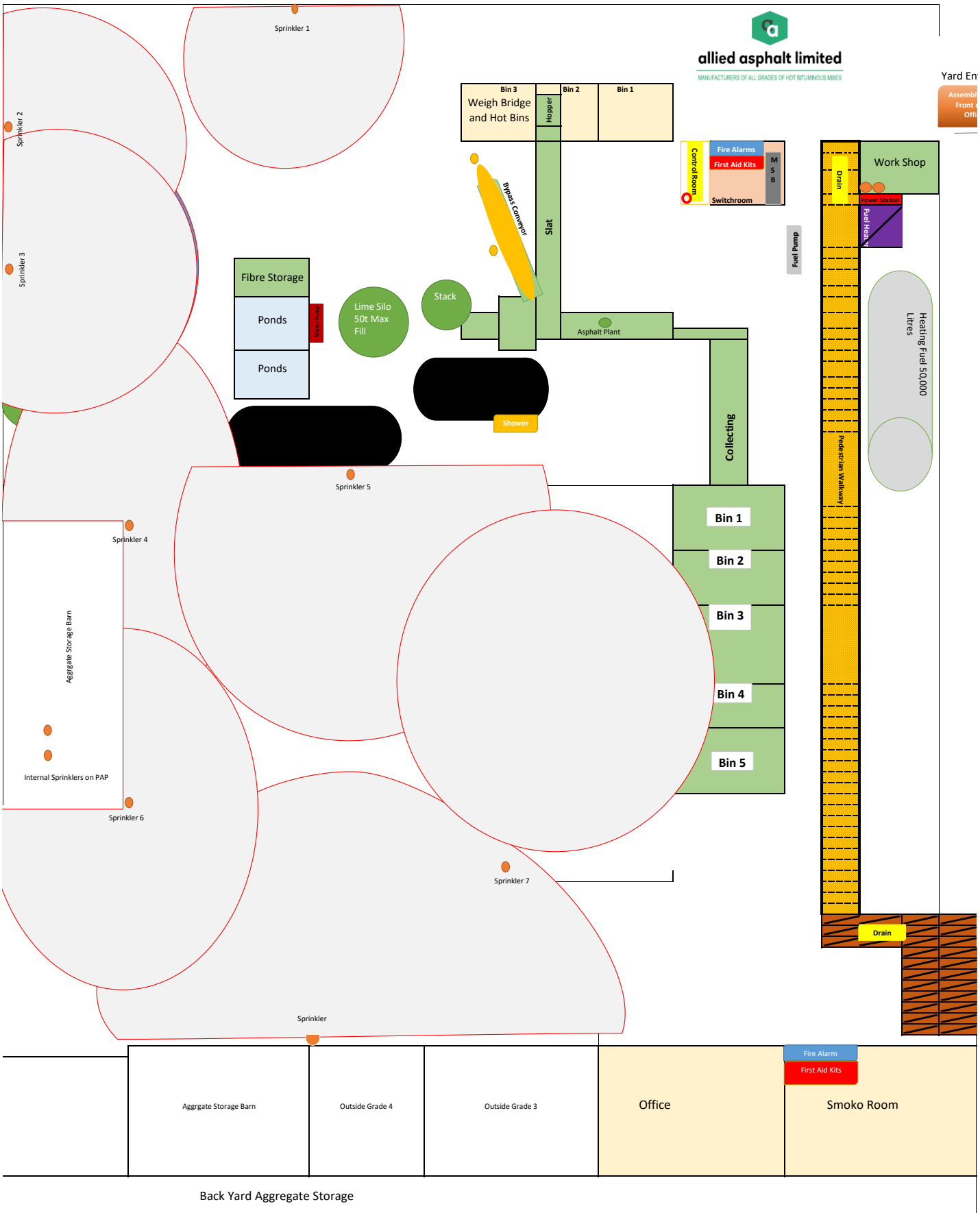

Figure 2.1: Sprinkler location plan, existing site (Source: Allied)

2	Please provide more information around the effectiveness of the water bath system used to remove odour.

Allied has referred to examples of water bath systems used at similar plants operated in Australia and New Zealand, an example of which is illustrated in **Figure 2.2** and **Figure 2.3**.

The heating of bitumen in the storage tank releases a small amount of semi-volatile organic compounds from the light end hydrocarbons. These cool when emitted to the atmosphere and condense to form the characteristic 'blue smoke'. The proposed water bath system is used to cool the displaced airstream from the bitumen tack vents and retains the condensate and light oils before the air is emitted.

Allied report that these systems are widely used in the industry as effective and easy to maintain odour management measures.

Figure 2.2: Bitumen tank venting waterbath system in place at the Laverton, Australia site
Source: Fulton Hogan

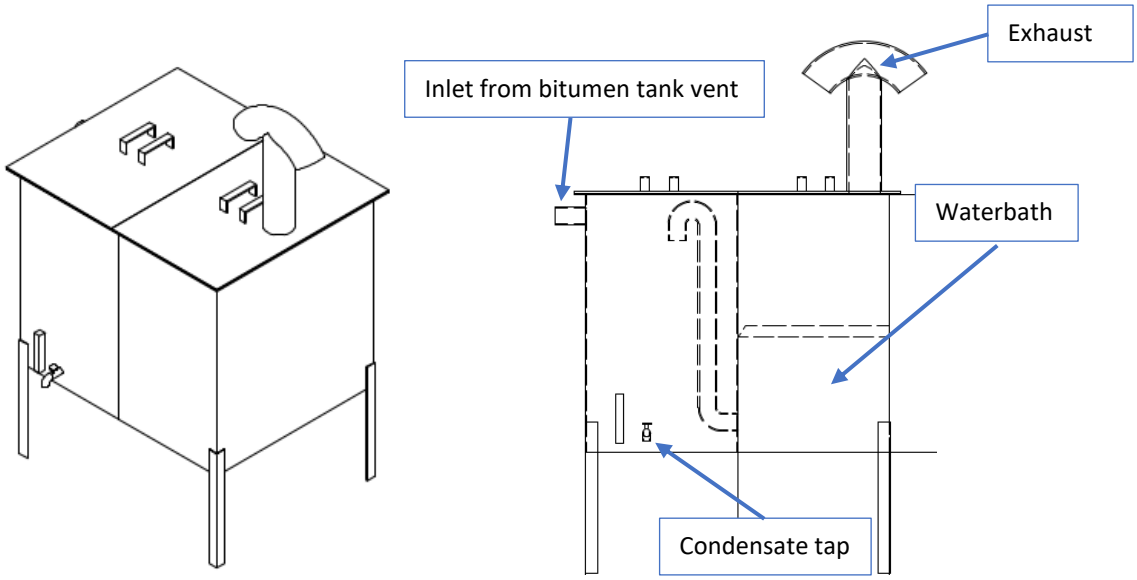

Figure 2.3: Bitumen tank venting waterbath system engineering drawings *Source: Fulton Hogan*

3	Please provide further details on the blue smoke aerosol filter will be used to remove oils and semi volatile organics, such as principle of operation, efficiency etc.

We're continuing to seek this information from the supplier and will provide it as soon as it is available. However, we consider that the absence of this information does not affect the conclusions of the assessment of odour. The assessment of odour impacts off site were based on dispersion modelling using the measured stack concentration of odour from a similar model of vertical batching plant in Australia and odour monitoring surveys for an asphalt plant using similar technology in Auckland, plus commentary from Auckland Council on the results of its own odour investigation for the same plant.

4	Provide a comparison of the different NOx emission factors for waste oil in drum mix and batch mix plants. Appendix D (D2.3.3).

As noted in this question, a full discussion of the available NO_X emission factors for drum-mix and batch mix plant is provided in Appendix D2.3.3 of the AQA, and reproduced as follows in Section 4.2.2:

> *The AP-42 NO_X emission factors for drum mix and batch mix asphalt plants are similar for use of natural gas as a fuel, however they are significantly higher for batch mix plants using used oil as a fuel. NO_X emissions largely arise from combustion and therefore there is no obvious reason for this difference, and review of the background data shows that the batch mix plant emission factor was based on only two tests (compared to 11 for the drum mix factor). On this basis, we have used the same NO_X emission factor for each type of plant based on fuel type.*

In Appendix D2.3.3. it is stated that the drum mix plant emission factor is used, however the NO_X emission rate presented in **Appendix D Table 6** was calculated using the higher (more conservative, but less reliable) batch mix plant factor for both plants. A comparison of the emission rates for each plant using the different NO_X emission factors for used oil fuel are presented in **Table 2.1** below.

Table 2.1: NO_X Emission Factors for used oil in drum mix and batch mix plants

		NO_X emission rate (kg/hour)	
Plant type	**NO_X emission factor (kg/Mg)**	**Existing asphalt plant (at 80 t/hour)**	**Proposed asphalt plant (at 200 t/hour)**
Drum mix plants	0.028	2.2	5.6
Batch mix plants	0.058	4.6	11.6

Revised modelling results for the existing and proposed plants using the drum mix plant emission factor are summarised in **Table 2.2** and **Table 2.3** below (these tables update **Appendix D Table 16** and **Appendix D Table 17** of the AQA). The revised model predicted ground level concentrations presented in **Table 2.2** and **Table 2.3** are approximately half those previously presented in **Appendix D.**

Table 2.2: Predicted MGLC of NO_2 from the proposed asphalt plant

Averaging period	Assessment criterion (µg/m³)	Plant contribution only – Direct NO_2		Plant contribution + estimated background concentration	
		Worst case MGLC (µg/m³)[A]	% of assessment criterion	Cumulative worst-case MGLC (µg/m³)	% of assessment criterion
1-hour[B]	200 (NESAQ)	~~6.8~~ 3.3	~~3.4%~~ 1.6%	~~119.8~~ 116.3[C]	~~60%~~ 58%
24-hour	100 (AAQG)	~~1.1~~ 0.6	~~1.1%~~ 0.6%	~~76.1~~75.6[D]	76%

A = Primary emitted NO_2 only.

B= 99.9th percentile concentration.

C = Assumes a proxy concentration of 95 µg/m³.

D = Assumes a proxy NO_2 concentration of 75 µg/m³.

E = Assumes all NO is converted to NO_2.

Table 2.3: Predicted MGLC of NO_2 from the existing asphalt plant

Averaging period	Assessment criterion (µg/m³)	Plant contribution only – Direct NO_2		Plant contribution + estimated background concentration	
		Worst case MGLC (µg/m³)[A]	% of assessment criterion	Cumulative worst-case MGLC (µg/m³)	% of assessment criterion
1-hour[B]	200 (NESAQ)	~~22.6~~ 10.9	~~11.3%~~ 5.5%	~~135.6~~ 123.9[C]	~~68%~~ 62%
24-hour	100 (AAQG)	~~0.6~~ 0.3	~~0.6%~~ 0.3%	~~75.6~~- 75.3[D]	~~76%~~ 75%

A = Primary emitted NO_2 only.

B= 99.9th percentile concentration.

C = Assumes a proxy concentration of 95 µg/m³.

D = Assumes a proxy NO_2 concentration of 75 µg/m³.

A comparison of the revised predicted concentrations with the values in the World Health Organisation's global air quality guidelines (WHO 2021) is presented in **Table** 2.4 below (this updates **Table 6.3** of the AQA).

Table 2.4: Predicted peak concentrations and comparison with the 2021 WHO guidelines

Contaminant	Averaging period	2021 WHO criterion (µg/m³)	Background	Proposed plant		Proposed plant and background	
				Worst case MGLC (µg/m³)	% of assessment criterion	Worst case MGLC (µg/m³)	% of assessment criterion
NO_2	24-hour	25 [A]	43	~~0.88~~ 0.43[B]	~~3.5%~~ 1.7%	~~75.9~~ 75.4[C]	~~304%~~ 302%
	Annual	10	16	~~1.9~~ 0.9[D]	~~19.0%~~ 9.0%	~~17.9~~ 16.9	~~179%~~ 169%

Table Notes:

A = 99th percentile (i.e., 3-4 exceedances allowed in a 12-month period)

B = 4th highest concentration of primary emitted NO_2 only.

C = Assumes a proxy NO_2 concentration of 75 µg/m³.

D = Assumes all NO is converted to NO_2.

As illustrated in the tables above, using the more reliable drum plant NO_X emission factor reduces the reported predictions for both the current and proposed plants against the assessment criteria. Therefore, there are no changes to the conclusions of the AQA, which are that the proposed plant will have a lesser effect on 1-hour, but a slightly greater effect on 24-hour, NO_2 air quality compared to the existing plant when operating continuously at maximum capacity. The modelled cumulative concentrations are well below the NESAQ and AAQG.

5	The applicant needs to confirm how particulate (and other contaminants) has been assessed. It is stated that the maximum ground level concentrations for 24 hour and annual averages are taken from outside of the industrial zone where sensitive receptors are located. Short-term averages such as 8 hour and 1-hour averages include maximum ground level concentrations within the industrial zone. Clarification around this approach is needed and assurance that concentrations offsite (but within the industrial zone) do not exceed any Assessment Criteria. Appendix D (D3.2.1).

Guidance on the applicability of ambient air quality criteria for assessment purposes is provided in Table 3 of the Ministry for the Environment Good Practice Guide for Assessing Discharges to Air form Industry (MfE, 2016), reproduced in **Table 2.5** below.

Table 2.5: Location and applicability of the ambient standards for assessment purposes (reproduced from Table 2, MfE (2016))

Averaging period	Locations where assessment against the ambient standards should apply	Locations where assessment against the ambient standards should not apply
1 hour	This includes any outdoor areas where the public might reasonably be expected to spend one hour or longer, including pavements in shopping streets, as well as accessible facades (eg, balconies, terraces).	Any industrial premises that have resource consents (for that pollutant).
8 hours	This includes all outdoor locations where members of the public are likely to be exposed for eight hours as well as the facades of residential properties, schools, hospitals, libraries, etc.	Any industrial premises that have resource consents (for that pollutant). Any location where people are not likely to be exposed for 8 hours – for example roads and footpaths.
24 hours	This includes all outdoor locations where members of the public might reasonably be exposed for 24 hours.	Any industrial premises that have resource consents for that pollutant. Any location where people are not likely to be exposed for 24 hours – for example roads, footpaths and industrial areas where residential use is not allowed.
All		In any enclosed space (ie, not in the open air), including: • indoors • inside tunnels • inside vehicles.

In accordance with recommended good practice, the modelled concentrations have been evaluated at the worst-impacted locations where people could be exposed for the relevant averaging period. Accordingly, the assessment of different averaging periods is applied as follows:

- 1- hour and 8-hour averages: All locations beyond the site boundary, including industrial areas were workers might reasonably be exposed for periods of 1-hour and 8-hours .
- 24-hour and annual average: At locations where people could reasonably be exposed continuously over these time periods. Most notably this applies to residential areas. For workers within the industrial areas, continuous exposure over a 24-hour or longer periods is very unlikely. This is with the exception of the worker accommodation at De Havilland Way. Therefore, modelled concentrations at the De Havilland Way worker accommodation have been evaluated against all assessment criteria, including 24-hour and annual average criteria.

6	Confirm that modelling of PM_{10} and $PM_{2.5}$ is based on an emission limit value of 30 mg/m^3 and other combustion gases and contaminants are based on waste oil as opposed to natural gas. Appendix D Table 11.

The particulate emission rates are based on the specification of the proposed baghouse, which provides for a total suspended particulate (TSP) discharge concentration of 30 mg/m^3. This is further scaled to 80% to derive PM_{10} emissions and 40% to derive $PM_{2.5}$ emissions (see Section 4.2.1 of the AQA). All other contaminants are based on the rate of combustion of fuels in the dryer. Both natural gas and waste oil emission rates were modelled, with waste oil giving rise to the higher emission rates and consequently higher ground level concentrations. The results for each fuel type are reported in **Appendix D Table 11** of the AQA. In some cases (such as for particulate and CO) the results for each fuel are the same because the emission rate specified in AP-42 is the same for both fuel types. Notwithstanding this, the worst-case maximum ground level concentration based on waste oil combustion is assessed in the AQA. In particular , we refer to **Table 6.1** of the AQA..

7	Regulation 17: a. The new plant will increase in PM_{10} by more than 2.5 µg/m³ in the airshed. The applicant needs to provide confirmation of the MGLC in the Airshed. b. Provide the contour map for the current plant for 24-hour average PM_{10}. c. Calculations in Table 7.1 (page 47) state an emission rate of 1kg/hr from the proposed plant, however, elsewhere an emission rate of 1.25kg/hr has been stated (which is equivalent to 30mg/m^3). Confirm which is to be used and recalculate where the incorrect emission rate has been used.

a. As stated in Section 7.1 of the AQA, the peak modelled off-site 24-hour average PM_{10} MGLC from the proposed new plant is 2.8 µg/m^3, which is predicted to occur southeast of the site boundary on the adjacent HR Cement site (over a bulk tank). The 2.5 µg/m^3 contour covers a portion of the HR Cement site and is not predicted to be exceeded on any other neighbouring properties, as shown on **Figure 2.4** below.

   The effect of the overall proposal, which is to cease operating the existing asphalt plant once the proposed plant is commissioned, is to reduce PM_{10} emissions into and concentrations within the airshed. This can be seen by comparing the predicted PM_{10} concentrations for the existing plant in **Figure 2.5** (addressing b. of this question) with that of the proposed plant in **Figure 2.4**.

   With regard to Regulation 17 of the NESAQ, Clause (2) provides an exemption for existing activities from Clause (1)[2] where three requirements are met. The requirements of Regulation 17(2) as they relate to this application are set out in **Table 2.6**. From this, it can be concluded that the requirements of Regulation 17(2) are met and therefore Regulation 17(1) does not apply to this application.

[2] Regulation 17 (1): A consent authority must decline an application for a resource consent (the proposed consent) to discharge PM_{10} if the discharge to be expressly allowed by the consent would be likely, at any time, to increase the concentration of PM_{10} (calculated as a 24-hour mean under Schedule 1) by more than 2.5 micrograms per cubic metre in any part of a polluted airshed other than the site on which the consent would be exercised.

Table 2.6: Evaluation against Regulation 17(2)

Regulation 17(2) However, subclause (1) does not apply if—	Applicability to this application
(a) the proposed consent is for the same activity on the same site as another resource consent (the existing consent) held by the applicant when the application was made; and	The proposed consent is for the same activity, i.e., the production of asphalt, and is to occur from the same site to which the existing consent applies.
(b) the amount and rate of PM10 discharge to be expressly allowed by the proposed consent are the same as or less than under the existing consent; and	PM_{10} discharges when the existing plant operates during commissioning of the new plant will be the same as authorised by the existing consent. The existing plant will not operate at the same time and the proposed plant during the commissioning of the proposed plant. PM_{10} from the proposed plant are substantially less than the existing plant. As noted in Section 4.3 of the AQA, the existing plant is estimated to have a PM_{10} emission rate of 3.36 kg/hr, whereas the proposed plant is estimated to have a PM_{10} emission rate of 1.0 kg/hr. Given the above, the PM_{10} discharges to be authorised are the 'same or less than under the existing consent'.
(c) discharges would occur under the proposed consent only when discharges no longer occur under the existing consent.	As this application is for the replacement of the existing air discharge permit, the discharges would occur under the proposed consent only when discharges no longer occur under the existing consent

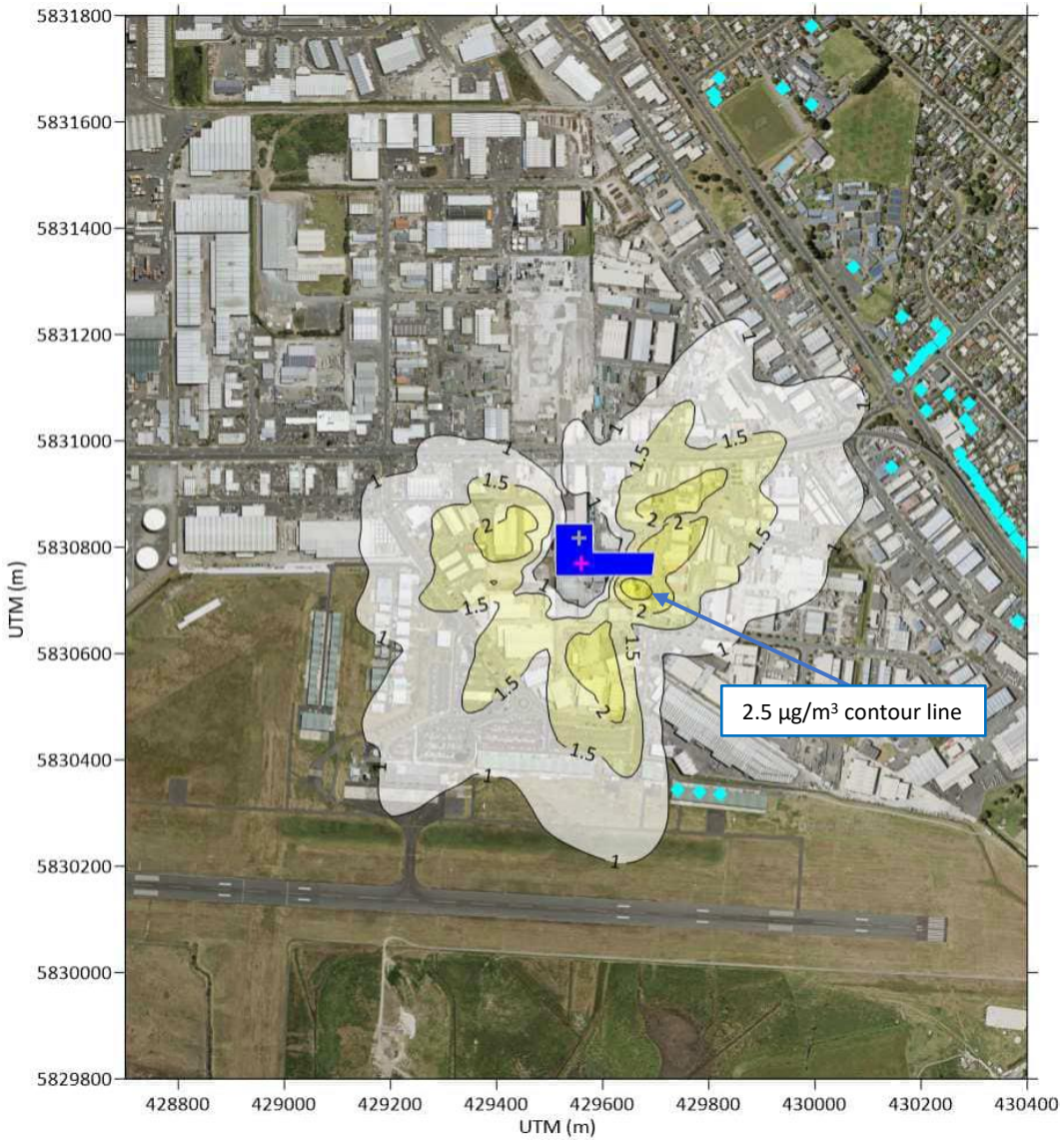

Figure 2.4: Maximum 24-hour average PM_{10} concentration contour plot for the proposed plant (pink cross indicates the proposed stack, light blue squares are sensitive receptors) Aerial imagery: Imagery was captured for BOPLASS Ltd by AAM NZ Limited

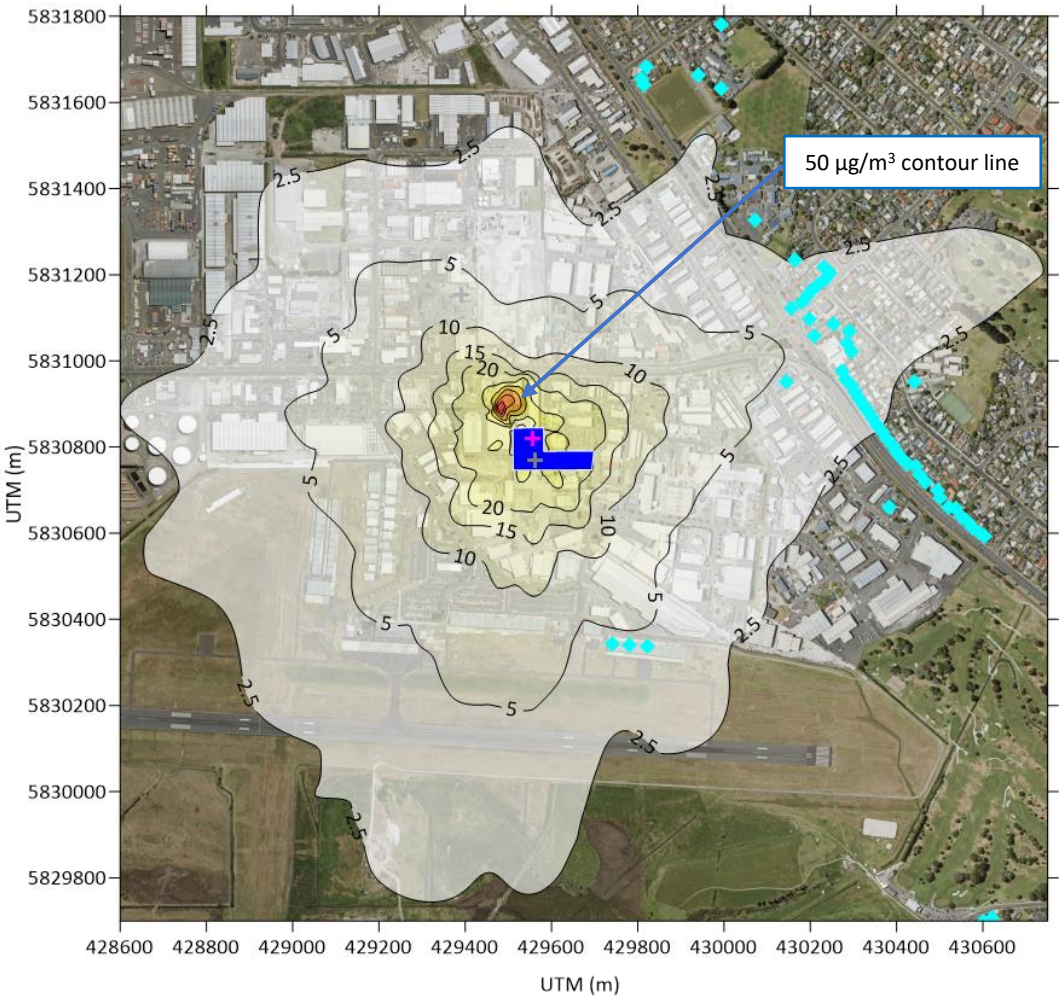

Figure 2.5: Maximum 24-hour average PM_{10} concentration contour plot for the existing plant (pink cross indicates the proposed stack, light blue squares are sensitive receptors) Aerial imagery: Imagery was captured for BOPLASS Ltd by AAM NZ Limited

c. The maximum **TSP** emission rate of 1.25 kg/hr is based on the maximum specified exhaust concentration from the baghouse (30 mg/m^3) and the maximum volumetric flowrate, as set out in Section 3.1 of the AQA. For clarity, in Table 4.1 the footnote "B" should also have been attributed to the TSP emission rate of 1.25 kg/hr, instead of just to the PM_{10} and $PM_{2.5}$ emission rates. The **PM_{10}** emission rate of 1.0 kg/hr was determined on the basis that 80% of the TSP is PM_{10}. This size fraction is based on test results from existing Fulton Hogan plants, as discussed in Section 4.2.1 of the AQA.

8	Please provide 99.9% odour concentrations (from both plants) for comparison against MfE guidance or give details as to why only the 99.5% has been provided. Appendix D Table 22.

As discussed in Section 5.3 of the AQA: *"The odour modelling guideline values are presented as 99.9th or 99.5th percentile values. The 99.9th percentile values are intended to be used for intermittent sources. Where this assessment has modelled the stack emissions as a continuous source (which is conservative), the 99.5th percentile model result is the relevant percentile for evaluating predicted concentrations."*

Both the 99.5th percentile and 99.9th percentile results are provided in the AQA as follows:

- 99.5th percentile results: Section 6.2.1 and **Figure 6.1** of the AQA for the continuous operation of both the existing and proposed plants.
- 99.9th percentile results: **Appendix D Table 23** of the AQA for the intermittent (limited operating hours) operation of the existing plant.

We trust that these responses satisfy the queries.

3 Applicability

This report has been prepared for the exclusive use of our client Allied Asphalt Limited, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

We understand and agree that our client will submit this report as part of an application for resource consent and that Bay of Plenty Regional Council as the consenting authority will use this report for the purpose of assessing that application.

Tonkin & Taylor Ltd

Report prepared by:	Authorised for Tonkin & Taylor Ltd by:
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Rose Turnwald Environmental Engineer	Jenny Simpson Project Director

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