SUSTAINABLE
PROJECT MANAGEMENT

Warrnambool Asphalt Batch Plant
Fulton Hogan

Response to Council RFI

Planning Permit Application # PP2022-0016

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Document Status

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1. Introduction

This document responds to the Warrnambool City Council's (Council) request for information (RFI) associated with Fulton Hogan's Planning Permit Application PP2022-0016 for a proposed asphalt batch plant at 86 Rodgers Road Warrnambool.

2. Request for Information

Council requested further information, via email, on 25 May 2022; as follows:

"It was generally felt that all three reports did not make enough effort to describe the specific/localized environment in question, which is essential in showing that the distances between sensitive uses can be mitigated. Specifically:

- *The odour report makes reference to another plant in Dandenong and therefore doesn't address specific local meteorological conditions. This would be essential in providing assurance that the use is appropriate at this particular site. Local prevailing wind patterns and the specific orientation of the site itself need to be understood.*
- *Although acknowledged that you can't provide for all future eventualities, all reports fail to consider land identified for future residential as per the structure plan.*
- *The acoustic report analyses areas further out (140 Boiling Down, 21 Veal at 600-700m), but fails to make mention of the existing RLZ at 400m, or the potential GRZ at 325m.*
- *The air quality report also fails to acknowledge the possible GRZ.*
- *Both the air quality and acoustic reports fail to use specific sensitive receivers which would be essential in understanding how this particular context will meet the various requirements under the planning scheme. In order to prove that the proposal can meet the objectives in its specific context, it needs justification from all three reports using the sensitive receivers that exist in context, and analysed with the localized conditions that will influence the outcome. "*

3. Potential Residential Area

As per advice from Council, we understand that there are two structure plans which contemplate potential residential zoning in the vicinity of the proposed site. These are as follows:

- Eastern Activity Centre Structure Plan. This plan has been adopted by Council and is a background document of the Warrnambool City Planning Scheme (Planning Scheme) under Clause 72.08.
- East of Aberline Precinct Structure Plan which is currently being prepared. The residential subdivision has not been completed.

Figure 1 presents the potential residential areas that have been derived and interpreted from mapping within the Eastern Activity Structure Plan and East of Aberline Structure Plan boundary. The distance from the proposed site to this potential residential area is approximately 325 m at its nearest point (equidistant to each of the structure plan residential areas; refer to Figure 1).

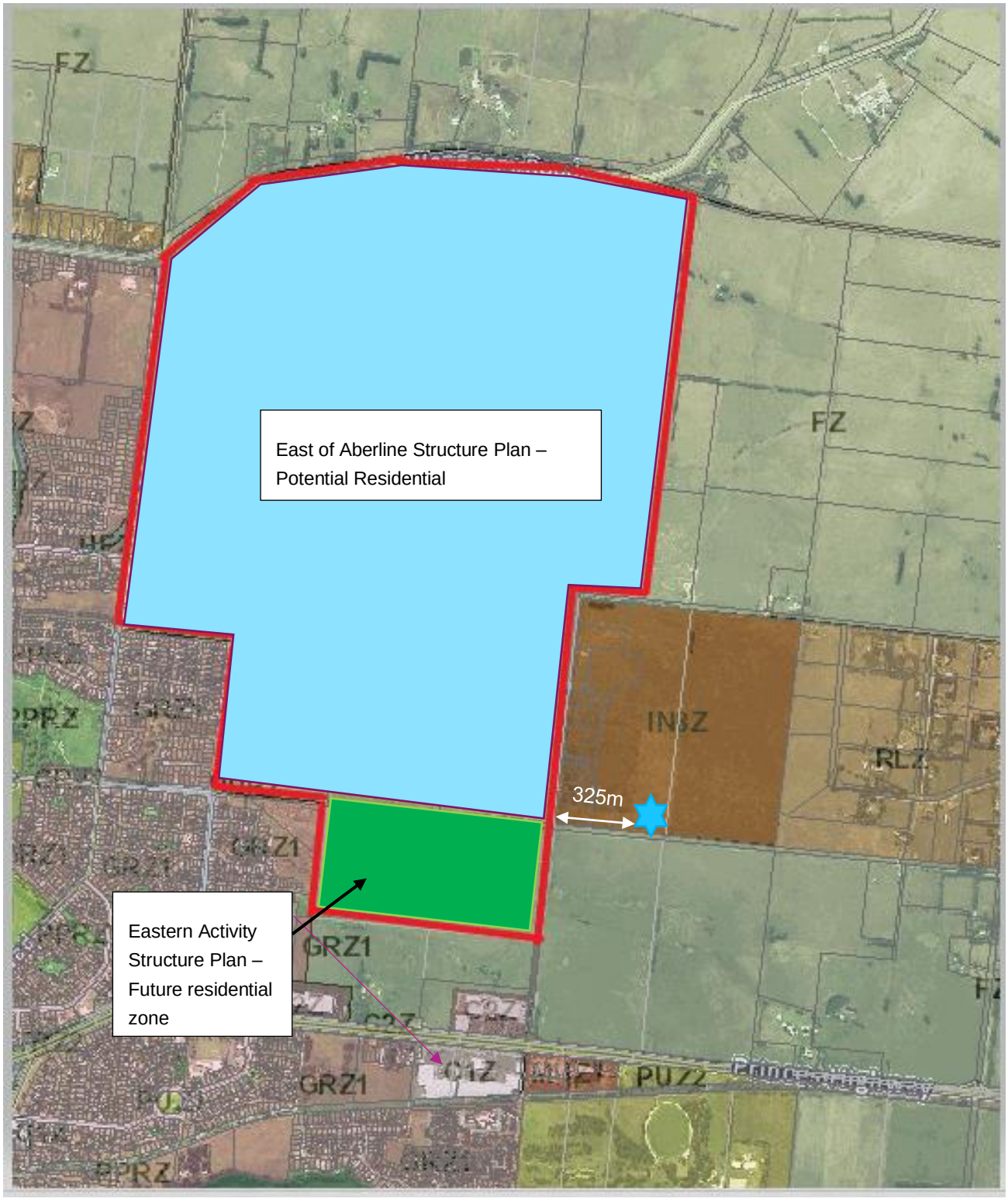

Figure 1 Potential residential areas (interpreted from Council structure plans). Blue star indicates approximate site location.

4. Response to RFI

4.1. Assessment of residential zones (existing and proposed)

The section responds to the following council comments:

- *Although acknowledged that you can't provide for all future eventualities, all reports fail to consider land identified for future residential as per the structure plan.*
- *The acoustic report analyses areas further out (140 Boiling Down, 21 Veal at 600-700m), but fails to make mention of the existing RLZ at 400m, or the potential GRZ at 325m.*
- *The air quality report also fails to acknowledge the possible GRZ.*

We note that the reports that Council refers to in their above comments were technical assessments that were undertaken to support an application to the Victorian EPA for a Development Licence (DLA) (Application No. APP010981). These reports were intended to be read in conjunction with that application. It is not clear whether Council reviewed the DLA in conjunction with the reports. The reports were written to address EPA as the audience and therefore made some assumptions regarding the readers level of knowledge around EPA preferred assessment methodologies and various EPA guidance documents. These reports were not intended to be read in isolation from the DLA. It was assumed that Council would refer the planning permit application to EPA for assessment and comment regarding potential human health and environmental impacts (and in-turn be guided by EPA feedback). I

In order to address Council's specific queries around the existing RLZ and the potential GRZ, updated / additional reports are provided

4.1.1. Air Quality Report

The original air quality impact assessment for the DLA was undertaken by Airlabs Environmental Pty Ltd (Airlabs). It demonstrated compliance with relevant air quality criteria at 45 sensitive receivers, including multiple sensitive receivers within 200 m west and north-west of the site (considerably closer than the RLZ and GRZ). Unfortunately, Airlabs were not available to provide specific comment to Council's request to confirm compliance with relevant criteria at the RLZ and GRZ. SPM therefore sought advice from Abhi Aitharaju (Principal Engineer – Air Quality & Sustainability at ViridIFC), who peer reviewed the original Airlabs report. This response, in the form of a memo, is provided at Attachment A and clearly confirms that the proposal will conform with relevant air quality criteria at the boundaries of the existing RLZ and the potential GRZ (400 m and 325 m from the site, respectively).

4.1.2. Noise Report

The environmental noise assessment for the DLA was undertaken by Audiometric and Acoustic Services (AAS) and demonstrated compliance at the two closest residential receivers, 650 m and 700 m from the proposed site (with compliance at more distant receivers being implied due to attenuation of sound over distance). As the RLZ and GRZ (400 m and 325 m from the site, respectively) are closer to the site than the two residences assessed in the AAS report, the model has been re-interrogated, and the assessment revisited to confirm that there will be no exceedances of relevant noise limits (at any time of day) from the proposal (refer Attachment B).

It is noted that the updated modelling also included review of model input parameters and subsequent revision of the ground absorption input to more accurately reflect existing (and best estimate of future) ground types in the study area. Ground type was changed from 50% hard (concrete / asphalt) (an extremely unlikely and overly conservative assumption) to 25% hard, which is still considered very conservative given that the vast majority of modelled area is soft ground paddocks (i.e. grass). This has reduced expected noise levels at all receptors assessed.

4.1.3. Odour Report:

The odour assessment undertaken by Jim Demetriou (of AOC Specialist) to support the DLA was a plume assessment at a reference site (a Fulton Hogan asphalt plant in Dandenong) with sensitive receptors as close as 370 from the reference site. Risk assessment outcomes described in the report, which classified risk with distance from the site, were then used to assess odour risk from the proposal in the DLA. Rationale and further discussion regarding this approach is provided at Section 4.2.

It is important to note that as per EPA Publication 1883 (*Guidance for Assessing Odour – familiarisation draft; EPA 2021*), proposals that are determined as being low risk via a Level 2 assessment (as was the case for the proposal) do not require further detailed assessment. Regardless, AOC undertook a more detailed assessment (effectively in accordance with a Level 3 assessment described in Publication 1883) to determine the odour risk associated with the proposal.

To address Council's request for consideration of the RLZ and the GRZ, AOC Specialist has provided a report (Attachment C) which notes that:

- There is low risk of odour impact at the existing RLZ at 400m from the proposed site.
- With respect to the potential GRZ, there is potential for odour impacts up to 350 from the site. Therefore, odour impacts from the proposed plant may be experienced, yet are unlikely, near the boundary of the potential GRZ at 325 m from the proposed site.

4.2. Consideration of local conditions and sensitive receptors

This section responds to the following Council comments:

- *it was generally felt that all three reports did not make enough effort to describe the specific/localized environment in question, which is essential in showing that the distances between sensitive uses can be mitigated'* and,
- *Both the air quality and acoustic reports fail to use specific sensitive receivers which would be essential in understanding how this particular context will meet the various requirements under the planning scheme.*

Given the reports do account for the local environment and specifically assess impacts at sensitive receivers we do not agree with the above comments from Council. In fact, the aim of the noise report is stated as *'to establish noise limits for the proposed asphalt batching plant at the nearest noise sensitive receivers, determine predicted effective noise levels at those receivers and compare them with the Noise Protocol limits.*

Sections of the reports that address these aspects specifically, include (but are not limited to):

Air Quality Report

- As stated in Section 3.2 of this report: '*To predict air quality impacts from the proposed facility, a mix of sensitive receptors representing residential dwellings and industrial developments were identified. Impacts from the facility's' operations were predicted at these sensitive receptors. Sensitive receptors identified for this assessment are summarised in Table 1 and are visually illustrated, with context to the subject site in Figure 5';*
- In total 45 sensitive receptors in the vicinity of the site were specifically assessed.
- Impacts from the proposed development were predicted by Airlabs using the AERMOD regulatory dispersion model as per EPA guidelines. One of the key components of AERMOD is to develop site-representative meteorology which governs the dispersion of pollutants from the source to the receiver. AERMOD ready meteorological modelling were produced and took into account the local terrain of the study area along with the prevalent land uses. As-such, it can be inferred that modelling takes into account the local prevailing conditions and these have been factored in the assessment of impacts from the facility on the receiving environment. Details for the of construction of the meteorological files are presented in Appendix B of the report and include:
    - Five (5) consecutive years of meteorological input files, 2016 through to 2020;
    - The 2018 year was selected for AERMOD dispersion modelling;
    - Use of 30m resolution digital elevation model (SRTM) terrain data in developing the model;
    - The impact of building wake effects on plume dispersion has been included in the modelling for buildings and structures located around the incinerator stack. The heights and locations of these structures were entered into the Building Profile Input Program (BPIP) utility. The wind direction specific building dimensions calculated by BPIP for the tower unit at their corresponding heights were then entered into the AERMOD model.
- Impacts from all the modelled pollutants were predicted at each of the 45 receptors and compared against the relevant assessment criteria to assess compliance. As per Section 8 of the report: '*The maximum predicted incremental concentrations, as well as the cumulative concentrations (including background) are presented in Table 14 and Table 15 respectively. To present the dispersion modelling results at the receptors in a concise manner, rather than presenting results for each receptor, only the three highest values (1st, 2nd and 3rd ranked) across the 45 sensitive receptors are presented. To readily compare the predicted levels against the air quality objectives, the highest predicted concentration has also been presented as percentage of the respective air quality objective. To understand the impact of the pollutant background levels on cumulative concentrations, a background level value is also presented in Table 15*.'

Noise report

- As per Section 4.1 of the noise report, a site assessment was undertaken that included multi-day recording of noise levels to measure background noise levels and establish noise limits for the nearest sensitive receivers.
- The report specifically assesses compliance with the Noise protocol at the nearest two sensitive receivers (residences), with the implication being compliance at sensitive receivers beyond these points due to attenuation of sound over distance.
- The modelling calculated with all receivers downwind as this is a requirement of the relevant ISO standard and represents worst case conditions.
- Model inputs included ground type and terrain.

Odour

- As stated earlier, the odour assessment report described a plume assessment at a reference site. This report was not intended to be specific to the proposed Warrnambool site and makes no mention of the proposal, rather it supports the assessment in Section 7 of the DLA which assesses odour risk of the proposal.

- As described in Attachment C, the method aims to determine the extent of detectable and recognisable odours from a specific source using direct observation in the field, under specific meteorological and operational conditions, by an assessor trained in accordance with AS/NZS: 4323.3. The odour plume assessment method reflects actual conditions in the field relative to the odour emissions and impacts from the source. This approach is EPA Victoria's recommended method as it has been demonstrated to more representative of in-field conditions and impacts when compared to predictor models.
- Given that a modelling study was not undertaken, the use of site-specific wind conditions were not required to be considered. The local terrain was considered in so far as it being of low complexity and thereby similar to the reference site such that the use of the selected refence site is appropriate.
- We note that Jim Demetriou who authored both reports and undertook the plume assessment at the reference site, is highly regarded in Australia with respect to assessing odour and his CV is available on request.

4.3. Assessing impacts against possible zoning changes

Whilst the preceding section and attached reports demonstrate that there is low risk of impacts at the potential GRZ, we note the following:

- Section 5.1 of the Warrnambool Eastern Activity structure plan states that there is a requirement for an appropriate transition between land uses. We understand that Land Use Designations in the structure plan are high level and that refined planning is required at the transition of Land Uses; for example buffers, or less sensitive transitional uses, which would effect impact assessment outcomes in these areas.
- As per EPA guidance 1518, '*it should be the responsibility of the 'agent of change' to provide evidence to the planning authority or other responsible authorities that a variation from the recommended separation distances is appropriate. The 'agent of change' is the proponent of the land use that will give rise to the consideration of separation distances*. In this case, as the Industrial Zone exists and the GRZ is proposed, then it is the subdivision to any future residential zone that would be the 'agent of change' and development needs to accommodate the industrial zone.

5. Conclusion

Additional assessment has been undertaken with regards to risks from air, noise and odour and demonstrate that these risks are acceptable at the sensitive receivers originally assessed as part of the DLA and are acceptable in the context of the existing RLZ and the potential GRZ.

It is also concluded that all assessments have appropriately considered the local environment and have assessed relevant risks at specific sensitive receptors.

The risks to the existing RLZ and the potential GRZ are summarized, as follows:

Air Quality – Negligible to low risk based on proposed best available technologies and techniques (BATT)

Noise – negligible risk given low noise emitted from the proposal

Odour – low risk based on low likelihood of odorous plume transecting residential zones.

ATTACHMENT A – Air Quality Memo (ViridIFC)

07 July 2022
Statement of Air Quality Impacts – Proposed Asphalt Batch Plant
Sustainable Project Management
13 Banksia Cl, Torquay VIC 3228

Attention: Jeremy Clifford

Addressing Air Quality Comments – Proposed Asphalt Batch Plant - Warrnambool

Dear Jeremy

Virid IFC has been engaged by Sustainable Project Management to provide a statement in response to an Information Request issued in May 2022 by the Warrnambool City Council ('the Council') in relation to air quality matters associated with a proposed Asphalt Batch Plant located at Lot 58, 86 Rodgers Road, Warrnambool, Victoria ('the proposed development').

An Air Quality Assessment for the proposed development was initially conducted by Airlabs Environmental Pty Ltd (Airlabs) and an assessment report (Airlabs Report Ref: OCT21143.2) (hereafter 'the Airlabs Report') was issued on 01 February 2022. The report was authored by Mr. Neil Page from Airlabs Environmental and externally reviewed by Mr. Abhi Aitharaju, who is currently working as a Principal Air Quality & Sustainability Consultant at Virid IFC. Upon submission of the air quality assessment report and other specialist reports, the Council issued an information request in May 2022 and sought response to the matters raised in the Information Request.

This memo (V22-104.04) issued by Virid IFC provides a response to air quality matters identified in the Information Request.

The following concerns were raised by the Council:

- *Although acknowledged that you can't provide for all future eventualities, all reports fail to consider land identified for future residential as per the structure plan,*
- *The air quality report fails to acknowledge the possible GRZ, and*
- *Both the air quality and acoustic reports fail to use specific sensitive receivers which would be essential in understanding how this particular context will meet the various requirements under the planning scheme. In order to prove that the proposal can meet the objectives in its specific context, it needs justification from all three reports using the sensitive receivers that exist in context and analysed with the localised conditions that will influence the outcome.*

This memo (V22-104.04) is to be read in conjunction with the Airlabs Report.

A discussion of air quality impacts resulting from the proposed development on the land-use zones of interest - the existing rural residential zone (hereafter 'the existing RLZ') and the potential general residential zone (hereafter 'the potential GRZ') is presented in this memo. The location of these residential zones with respect to the proposed development (indicated by the blue circle) is produced in **Figure 1**. The blue circle in **Figure 1** is indicative of the location / size of the site.

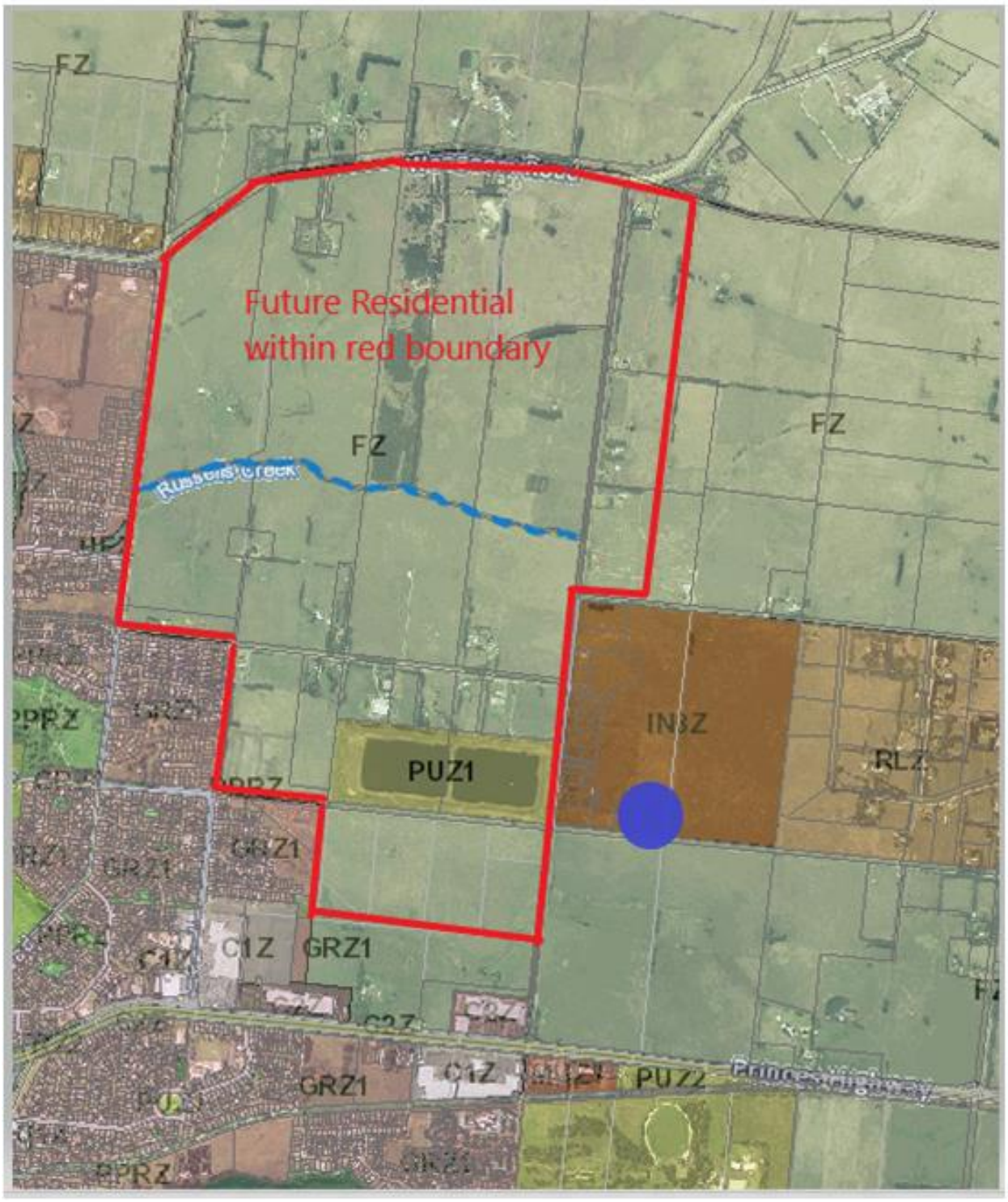

Figure 1: Existing RLZ (light brown square plot labelled RLZ to the right) and Potential GRZ (highlighted red boundary to the left) Land Parcels with respect to the Proposed Development Site (indicated by the Blue Circle)

Source: Sustainable Project Management

Council's concerns with respect to impacts from the proposed development on the existing RLZ and potential GRZ land-use zones have been addressed by overlaying pollutant concentration isopleths for the modelled pollutants on the existing RLZ and potential GRZ land parcels in addition to the forty-five (45) sensitive receptors which have been previously identified in the Airlabs Report.

Concentration isopleths for a selection of the modelled pollutants overlaid on the existing RLZ and potential GRZ have been presented in **Figure 2** through to **Figure 11**. It is to be noted that concentration isopleths have been presented as incremental impacts (i.e. impacts from the proposed development only).

Upon examining the concentration isopleths presented in **Figure 2** through to **Figure 11,** it is observed that the isopleths show relatively consistent reduction in pollutant concentrations with distance from site implying that receptors further from the site will experience lower concentrations than those closer to the site. Now as per the Airlabs report, all sensitive receptors many of which were much closer to the site than the existing RLZ and potential GRZ were compliant with the criteria and therefore the implication is that the existing RLZ and potential GRZ land parcel too are compliant. It is acknowledged that the concentration isopleths overlaid on the existing RLZ and potential GRZ land parcels are incremental impacts (i.e. contribution from the proposed development only) and not the cumulative impacts (incremental + background). However, examination of the modelling results presented in the Airlabs Report clearly shows that cumulative ground level concentrations for all the modelled pollutants comply with the relevant assessment criteria across all of the 45 sensitive receptors and also that the background concentrations are the main contributor for the cumulative concentrations, which indicate the limited contribution expected from the proposed development. Therefore, isopleths have been presented only for the incremental impacts to understand the proposed development's expected impacts on the existing RLZ and potential GRZ land parcels.

As per the modelling results presented in the Airlabs Report, it is clearly evident that ground level concentrations predicted for all the modelled pollutants are well below their relevant assessment criteria across all of the 45 sensitive receptors and as noted above, the background concentrations are the main contributor for the cumulative concentrations.

It is worth noting that multiple sensitive receptors identified in the Airlabs Report (e.g. Receptors 28, 33, 34, 35 etc.) are a lot closer to the site boundary of the proposed development as opposed to the boundaries of the existing RLZ and potential GRZ land parcels. As modelling demonstrates compliance at those near-field receptors, it is expected that the concentrations on the land parcels will be considerably lower than what has been predicted at those near-field receptors as the land parcels of interest are further away from the proposed development site.

Therefore, based on the above discussions and the concentration isopleths presented in **Figure 2** through to **Figure 11**, it is clearly evident that the proposed development activities would be compliant with the air quality criteria at the existing RLZ and potential GRZ land parcels.

Another concern raised by the Council was that the air quality report produced by Airlabs (Ref: OCT21143.2) failed to identify specific sensitive receivers which would be essential in understanding the impacts from the proposed development on the receiving environment. The air quality assessment report produced by Airlabs identified a total of 45 sensitive receptors – both residential and non-residential, and impacts from all the modelled pollutants have been predicted at each of these receptors and compared against the relevant

assessment criteria to assess compliance. Modelling conducted by Airlabs clearly demonstrated that concentrations predicted for all the modelled pollutants across all of the sensitive receptors are below their respective assessment criteria and as mentioned above, results clearly show limited impacts expected from the proposed development. Table 14 and Table 15 of the Airlabs Report (Ref: OCT21143.2) respectively summarise the incremental and cumulative concentrations predicted at the three (3) worst-impacted receptors amongst the 45 receptors selected for the assessment. An examination of the concentrations predicted at those worst-impacted receptors clearly show compliance being achieved for all the modelled pollutants and the limited contribution expected from the activities at the proposed development site.

Impacts from the proposed development were predicted by Airlabs using the AERMOD regulatory dispersion model. AERMOD is the regulatory air dispersion model as per the Vic-EPA guidelines. One of the key components of AERMOD is to develop site-representative meteorology which governs the dispersion of pollutants from the source to the receiver. AERMOD ready meteorological modelling files (SFC and PFL) were produced by pDs Consultancy (details of which are presented in Appendix B of the Airlabs Report). Development of the meteorological modelling files takes into account the local terrain of the study area along with the prevalent land uses. As-such, it can be inferred that modelling takes into account the local prevailing conditions and these have been factored in the assessment of impacts from the facility on the receiving environment.

Closure

Based on the above discussions, it can be concluded that the proposed development is not expected to significantly alter the local air quality levels and that the proposed development is expected to be compliant with the relevant assessment criteria – including at the existing RLZ and potential GRZ land parcels.

If there are any concerns regarding information presented in the memo, please do not hesitate to contact the undersigned.

Yours Sincerely

Abhi Aitharaju

Principal Engineer – Air Quality & Sustainability

T: 0423 892 607 | E: abhi.aitharaju@viridifc.com.au

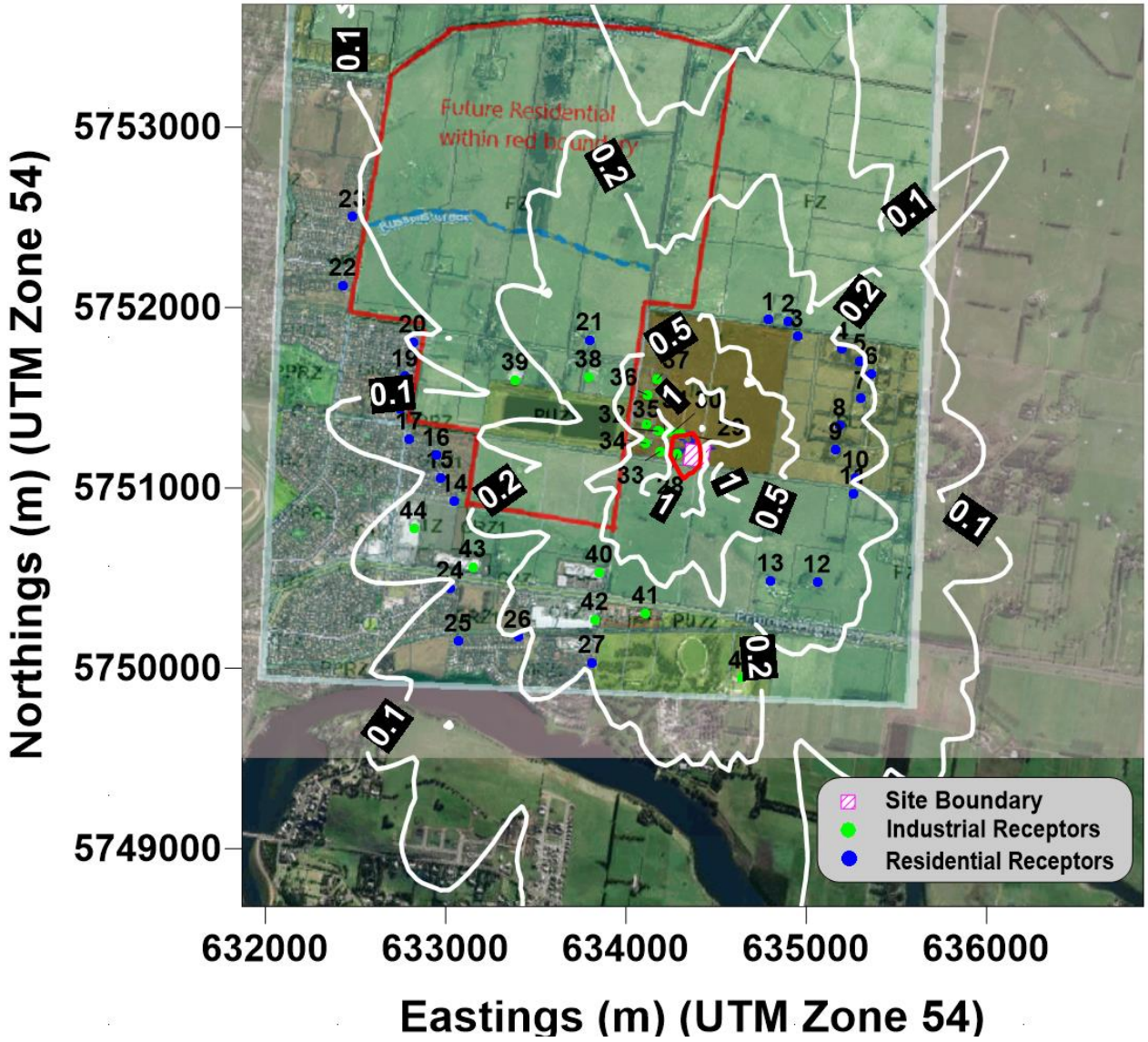

Figure 2: Predicted Incremental 24-hour Average PM_{10} Concentration (ug/m^3) overlaid on Existing RLZ and Potential GRZ Land-Use Zones

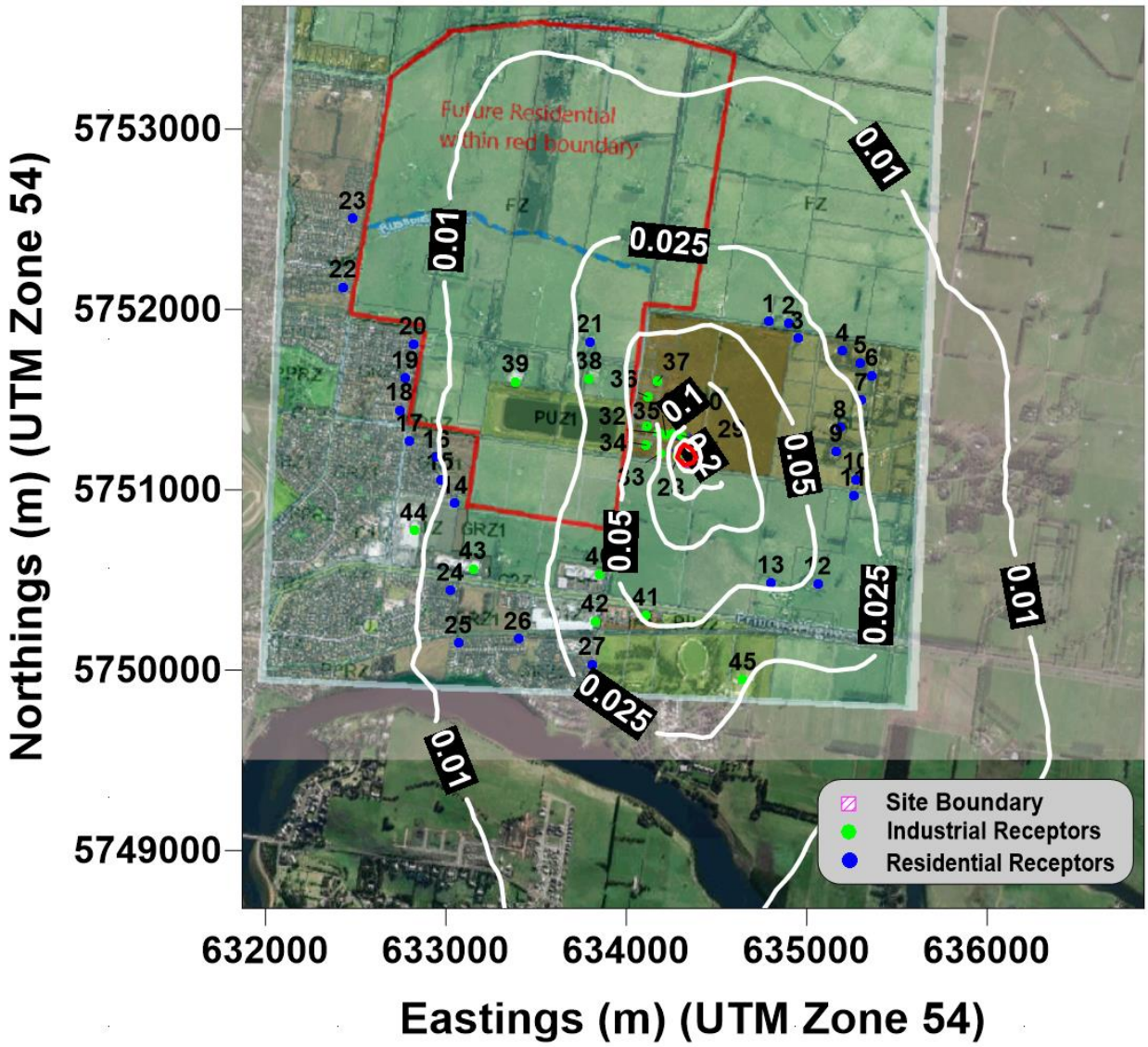

Figure 3: Predicted Incremental Annual Average PM_{10} Concentration (ug/m^3) overlaid on Existing RLZ and Potential GRZ Land-Use Zones

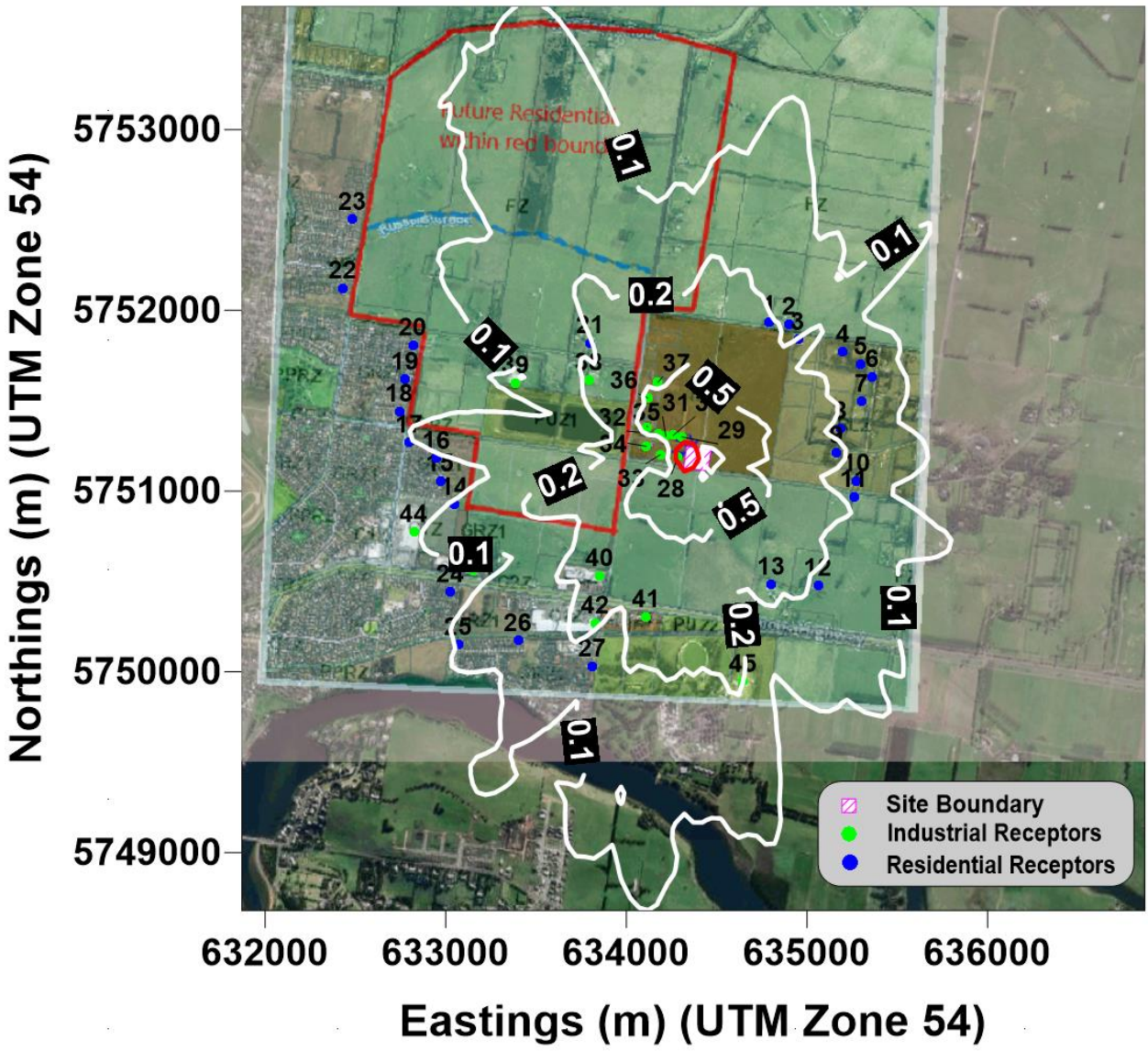

Figure 4: Predicted Incremental 24-hour Average $PM_{2.5}$ Concentration (ug/m^3) overlaid on Existing RLZ and Potential GRZ Land-Use Zones

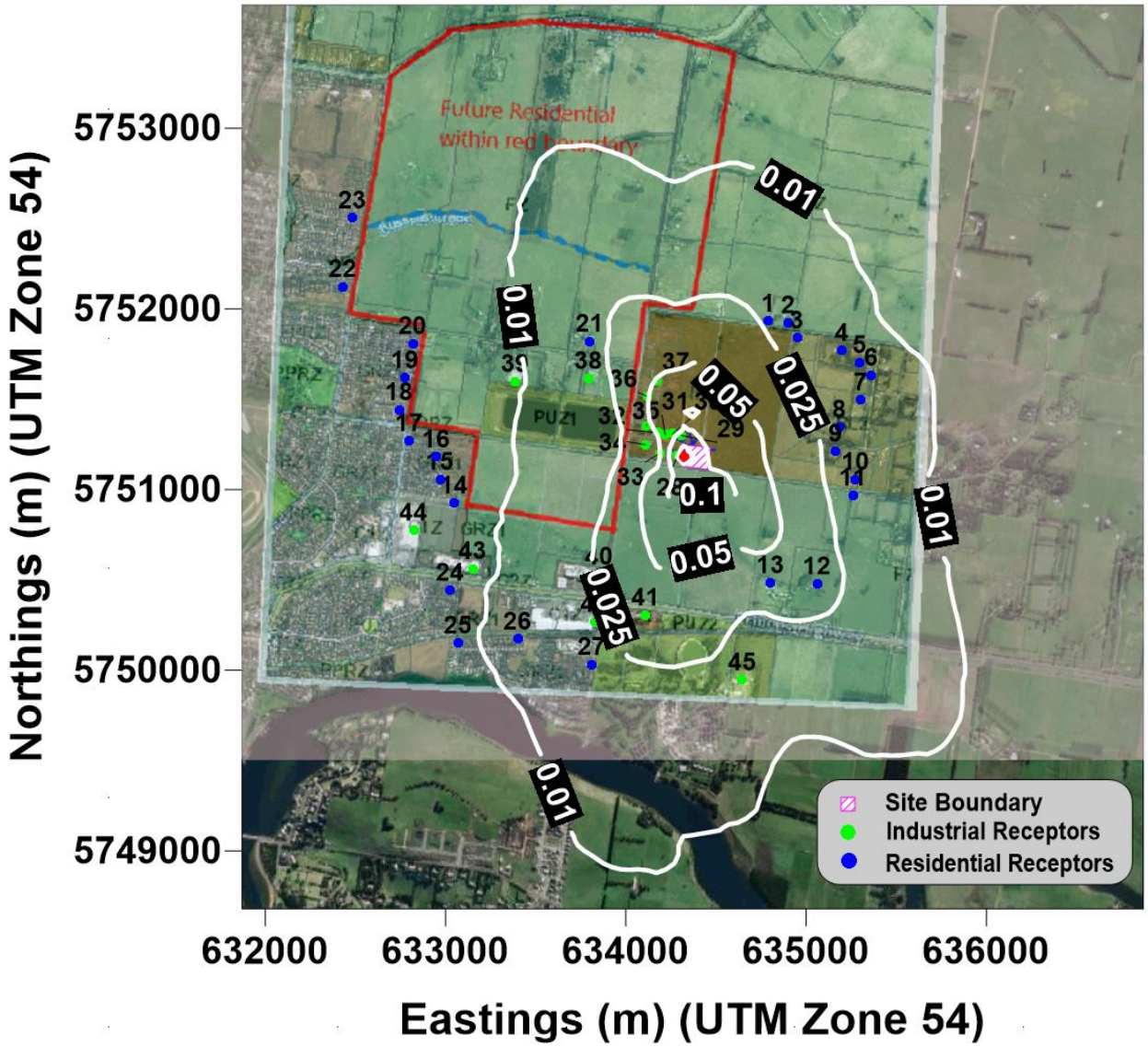

Figure 5: Predicted Incremental Annual Average $PM_{2.5}$ Concentration (ug/m^3) overlaid on Existing RLZ and Potential GRZ Land-Use Zones

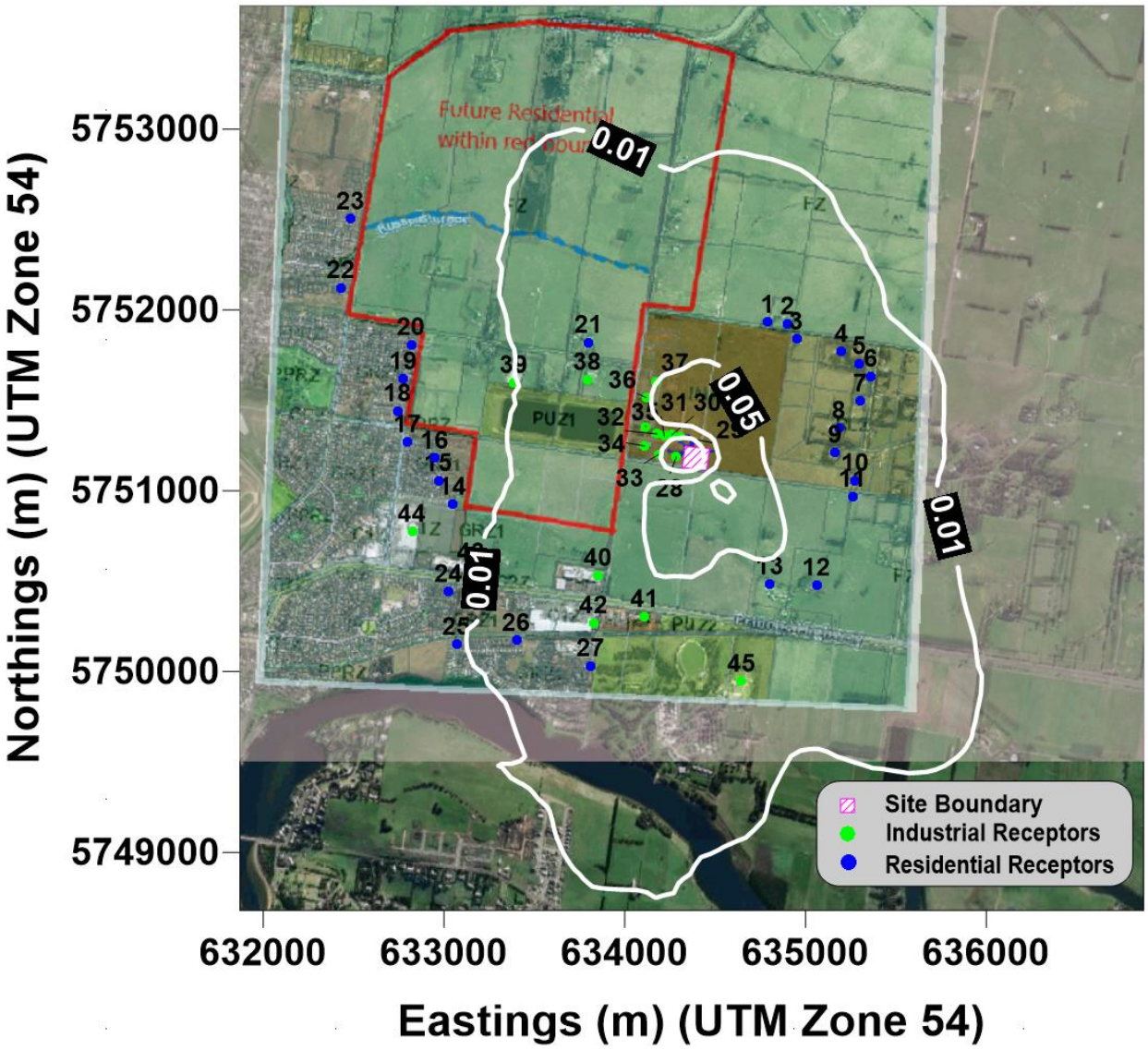

Figure 6: Predicted Incremental 1-hour Average SO_2 Concentration (ug/m^3) overlaid on Existing RLZ and Potential GRZ Land-Use Zones

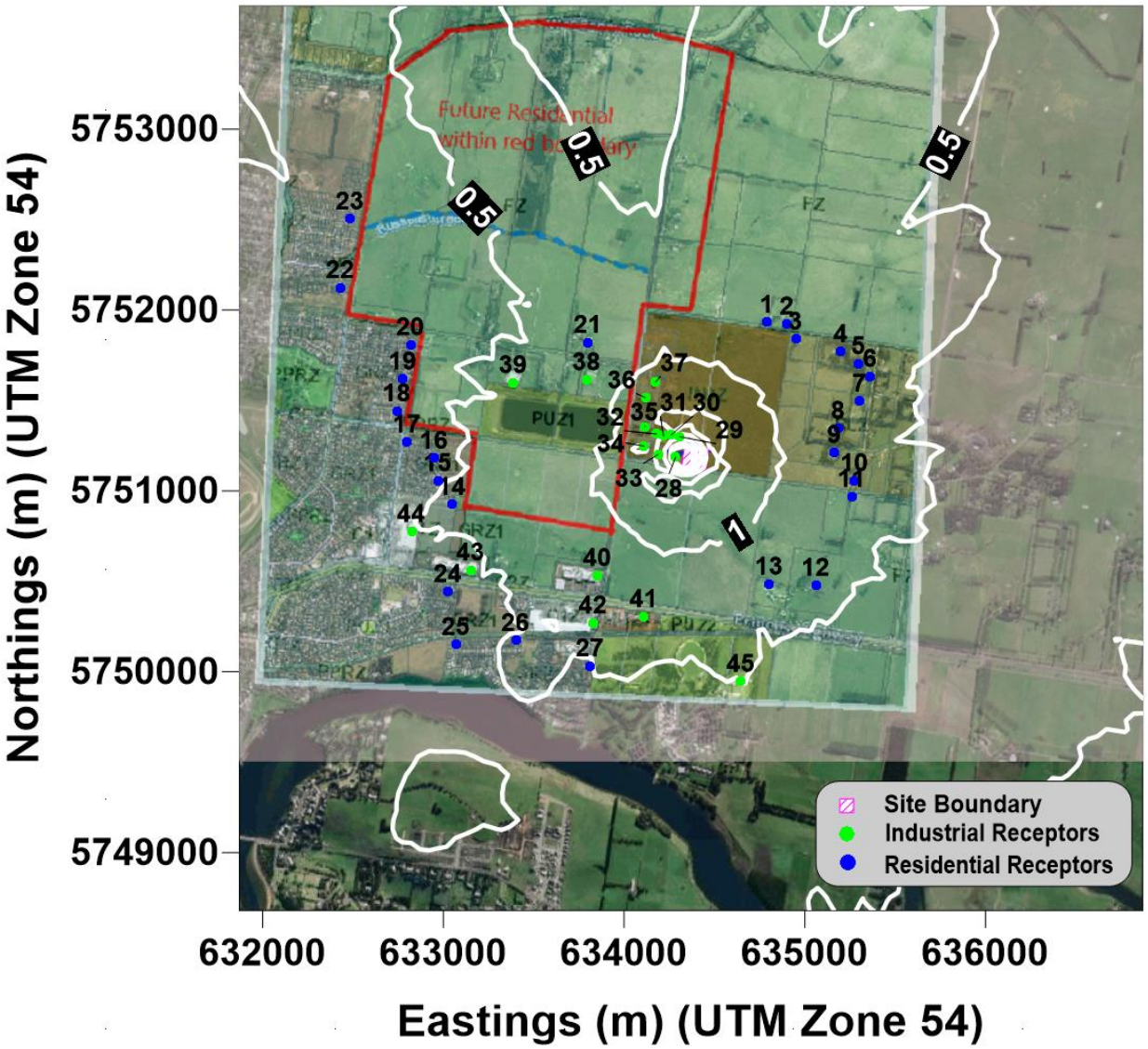

Figure 7: Predicted Incremental 24-hour Average SO_2 Concentration (ug/m^3) overlaid on Existing RLZ and Potential GRZ Land-Use Zones

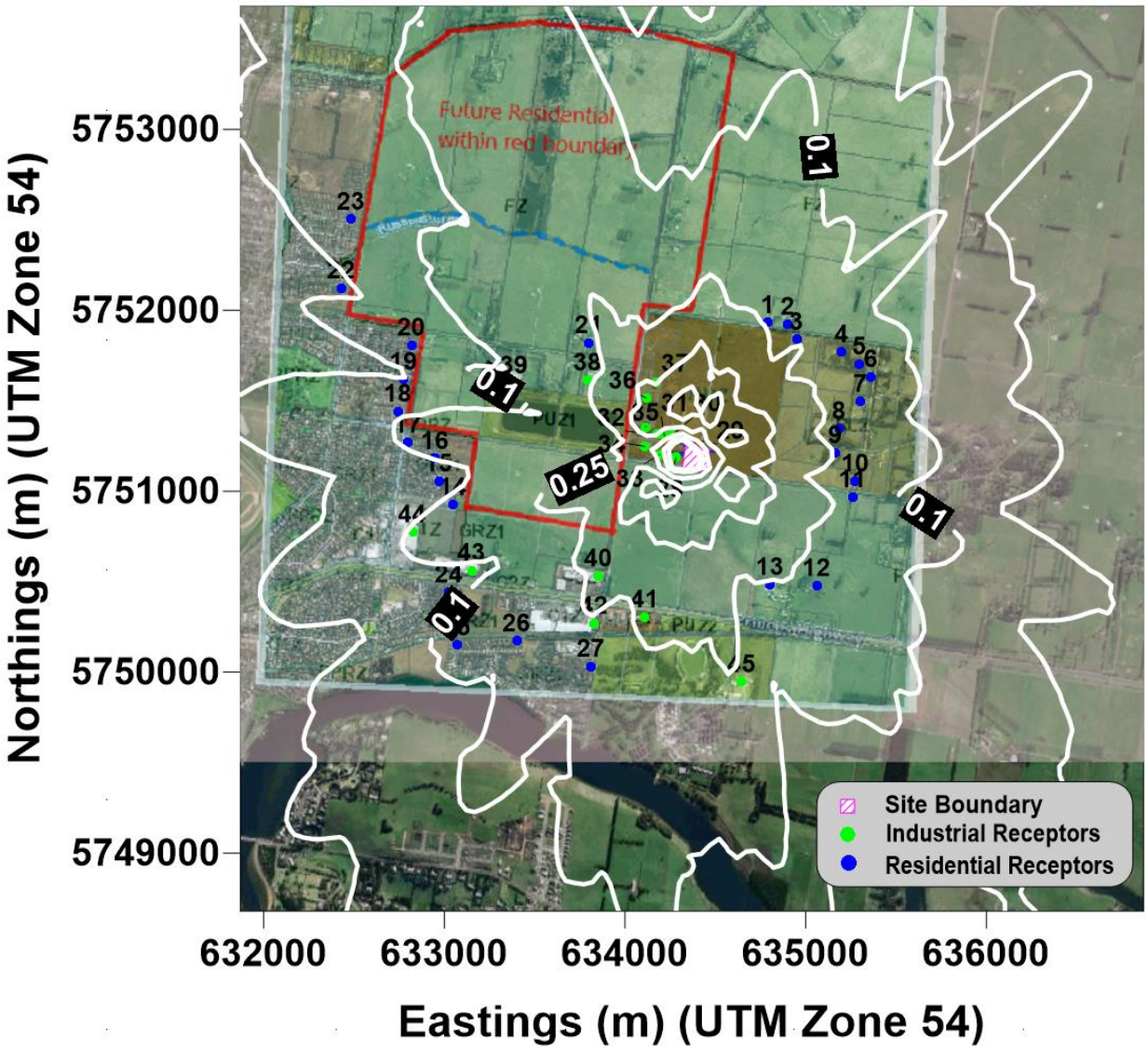

Figure 8: Predicted Incremental Annual Average SO_2 Concentration (ug/m^3) overlaid on Existing RLZ and Potential GRZ Land-Use Zones

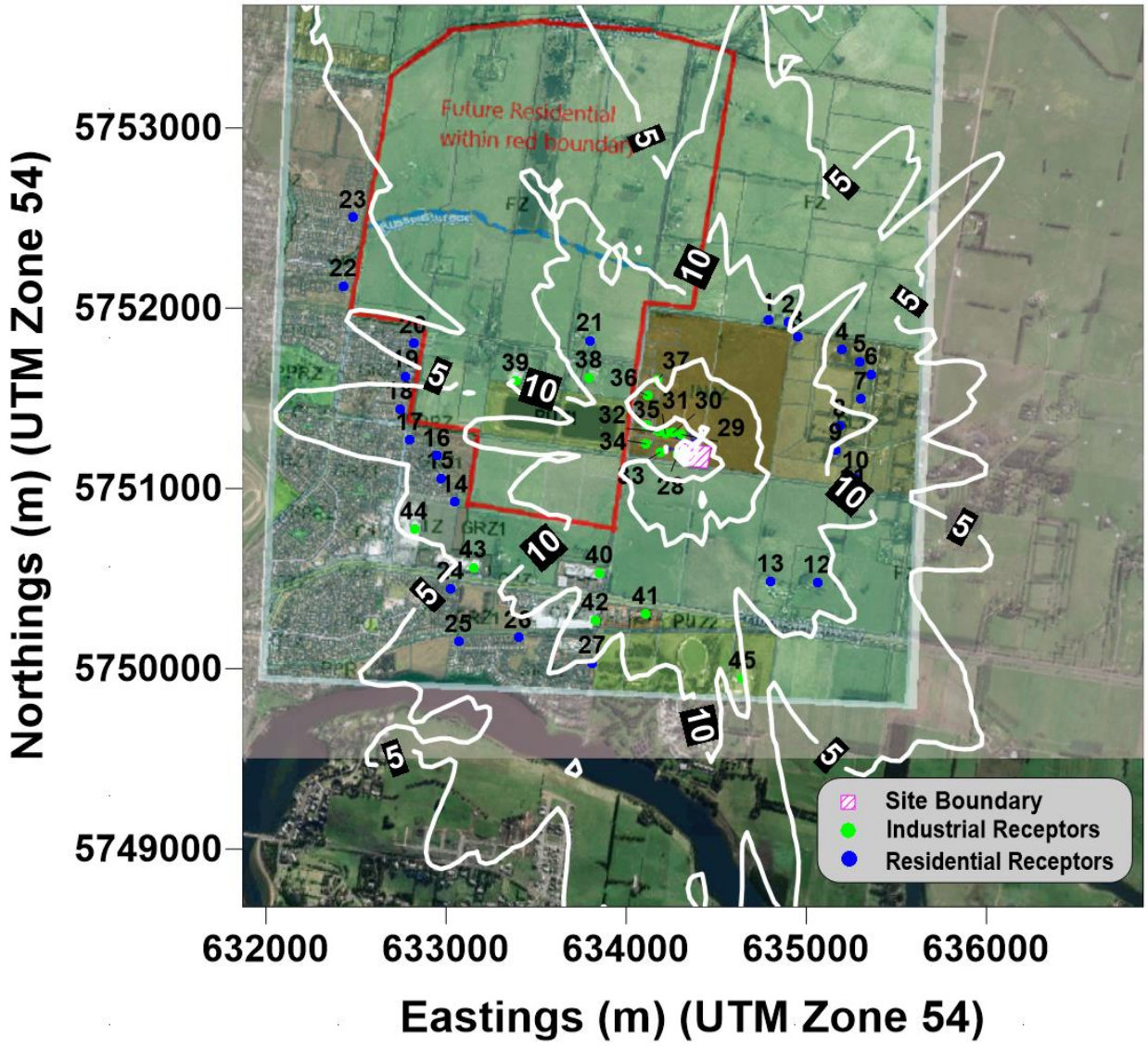

Figure 9: Predicted Incremental 8-hour Average CO Concentration (ug/m^3) overlaid on Existing RLZ and Potential GRZ Land-Use Zones

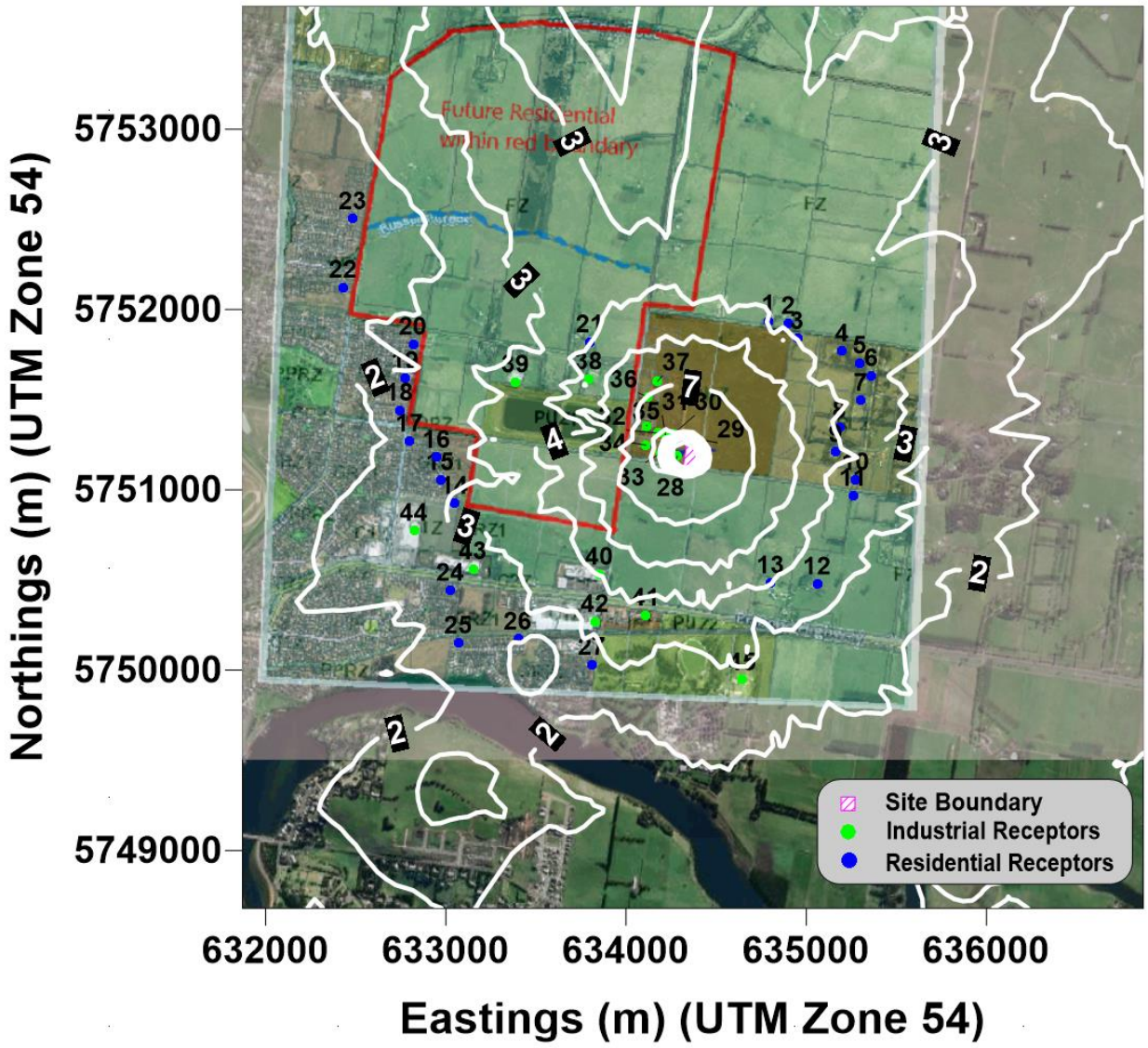

Figure 10: Predicted Incremental 1-hour Average NO_2 Concentration (ug/m^3) overlaid on Existing RLZ and Potential GRZ Land-Use Zones

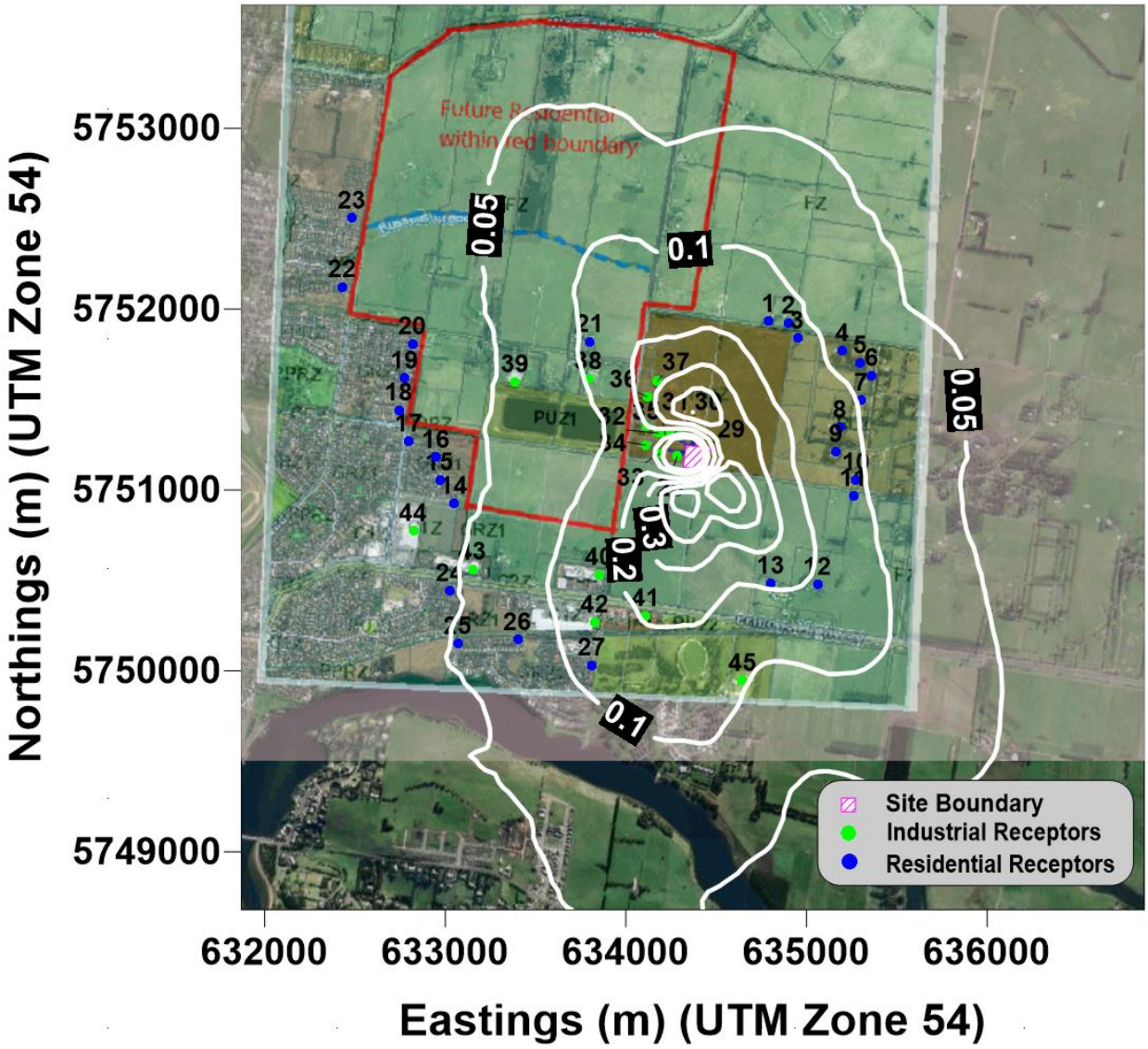

Figure 11: Predicted Incremental Annual Average NO_2 Concentration (ug/m^3) overlaid on Existing RLZ and Potential GRZ Land-Use Zones

ATTACHMENT B – Noise Assessment Report – updated (AAS)

HEAR DATA PTY LTD ABN 39 006 317 924 Trading as
AUDIOMETRIC & ACOUSTIC SERVICES
Telephone: (03) 9817 5517 28 Hilda Street, Balwyn, Victoria, 3103 Facsimile: (03) 9817 5411
Email: noiseconsult@bigpond.com

22nd June 2022 **Rep. No 21098.4**

Title: **Environmental Noise Assessment of a proposed Fulton Hogan asphalt batching operation located at 58 – 58A Dales Road, Warrnambool as per the Noise Protocol, VIC EPA Publication 1826.4, July 2021, and the Warrnambool City Council request for the assessment at 325 m and 400 m distance from the proposed industrial site**

Brief: **Assess environmental noise impact of a proposed asphalt batching operation which includes determination of background noise, noise limits and predicted effective noise levels at noise sensitive receivers as per the EPA's Noise Protocol, and the Warrnambool City Council request for the assessment at 325 m nominal south-west (a nearest point of a proposed General Residential Zone) and at 400 m nominal east from the proposed industrial site, respectively.**

Client: **Sustainable Project Management**

Contact: **Mr Jeremy Clifford**
Phone: 0406 696 202
Email: jeremy@sustainablepm.com.au

Executive summary

This updated version of this report responds to request from Warrnambool City Council for this report to assess noise from the proposal received at the existing Rural Living Zone (RLZ) and a potential General Residential Zone, at 325 m and at 400 m from the site's nearest point, respectively.

Audiometric & Acoustic Services were commissioned to undertake a verification of compliance with the VIC EPA Publication 1826.4, Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues, also known as the Noise Protocol with respect to possible noise from a proposed asphalt batch plant at 58-58A Dales, Warrnambool.

Warrnambool is within a major urban area outside of Melbourne metropolitan area as per the Noise Protocol determination.

The Protocol's noise limits are applicable to the nearest noise sensitive receivers, 140 Boiling Down Road, at nominal north-west, approximately 650m from the proposed development, 21 Veal Rd at nominal north-east approximately 700m from as well as at 325 m nominal south-west and at 400 m nominal east of the proposed development, and are presented in the table below:

NSR 1 – 140 Boiling Down Road	**Time period**	**Noise limit, dB(A)**
Day period	07:00 – 18:00	56 dB(A)
Evening period	18:00 – 22:00	49 dB(A)
Night period	22:00 – 07:00	44 dB(A)

NSR 2 – 21 Veal Road	**Time period**	**Noise limit, dB(A)**
Day period	07:00 – 18:00	50 dB(A)
Evening period	18:00 – 22:00	44 dB(A)
Night period	22:00 – 07:00	40 dB(A)

At 325 m – proposed GRZ	**Time period**	**Noise limit, dB(A)**
Day period	07:00 – 18:00	50 dB(A)
Evening period	18:00 – 22:00	44 dB(A)
Night period	22:00 – 07:00	40 dB(A)

At 400 m	**Time period**	**Noise limit, dB(A)**
Day period	07:00 – 18:00	54 dB(A)
Evening period	18:00 – 22:00	48 dB(A)
Night period	22:00 – 07:00	43 dB(A)

We have understood that proposed operation consists of the following:

- Crushing operation twice per week from 07:00 am until 15:00 pm
  - Glass and Reclaimed Asphalt Pavement (RAP) crushing operations once a week (on average) each from 07:00 am until 18:00 pm
- Asphalt manufacturing and deliveries (trucks movements) 24 hours seven days per week

As per proposed operation schedule we have calculated predicted noise levels and compared with the Protocol's noise limits. For the noise modelling purposes we have assumed that the ground consists of 25% hard (asphalt & concrete) / 75% soft (grass, farming land), to simulate as close as possible real condition.

Crusher, asphalt manufacturing and deliveries – represents a full operation, day period only

In the following table the crusher, asphalt manufacturing and deliveries (a full operation) predicted noise level for day period is compared with the Protocol's noise limits at noise sensitive receivers:

NSR 1	**Period of FH operation / glass crusher**	**Predicted Effective noise level, dB(A)**	**Noise limit, dB(A)**	**Compliance Yes /No**
Day period*	07:00 – 18:00	44	56	**Yes**
Evening period	N/A	N/A	49	**N/A**
Night period*	N/A	N/A	44	**N/A**

NSR 2	**Period of FH operation / glass crusher**	**Predicted Effective noise level, dB(A)**	**Noise limit, dB(A)**	**Compliance Yes /No**
Day period*	07:00 – 18:00	43	50	**Yes**
Evening period	N/A	N/A	44	**N/A**
Night period*	N/A	N/A	40	**N/A**

At 325 m - a proposed GRZ	**Period of FH operation / glass crusher**	**Predicted Effective noise level, dB(A)**	**Noise limit, dB(A)**	**Compliance Yes /No**
Day period*	07:00 – 18:00	48	50	**Yes**
Evening period	N/A	N/A	44	**N/A**
Night period*	N/A	N/A	40	**N/A**

At 400 m	**Period of FH operation / glass crusher**	**Predicted Effective noise level, dB(A)**	**Noise limit, dB(A)**	**Compliance Yes /No**
Day period*	07:00 – 18:00	47	54	**Yes**
Evening period	N/A	N/A	48	**N/A**
Night period*	N/A	N/A	43	**N/A**

*The crushing operation does not start before 07:00 am and finishes by 18:00 pm, Monday to Friday.

Asphalt manufacturing and deliveries – no glass crusher operation

In the table below the predicted effective noise levels are compared with the Protocol's noise limits for day, evening and night for asphalt manufacturing and deliveries operation at noise sensitive receivers with no glass crushing.

NSR 1 / NSR 2	Time period	Predicted Effective noise level, dB(A)	Noise limit, dB(A)		Compliance Yes /No
			NSR 1	NSR 2	
Day period	07:00 – 18:00	37 / 36	56	50	**Yes**
Evening period	18:00 – 22:00	37 / 36	49	44	**Yes**
Night period	22:00 – 07:00	37 / 36	44	40	**Yes**

325 m / 400 m	Time period	Predicted Effective noise level, dB(A)	Noise limit, dB(A)		Compliance Yes /No
			325 m	400 m	
Day period	07:00 – 18:00	40 / 40	50	54	**Yes**
Evening period	18:00 – 22:00	40 / 40	44	48	**Yes**
Night period	22:00 – 07:00	40 / 40	40	43	**Yes**

Noise generated by the proposed asphalt batching plant for asphalt manufacturing and deliveries comprising glass crushing and reclaimed asphalt pavement (RAP) operation is expected to be compliant at noise sensitive receivers, including at 400 m and at the proposed GRZ at 325 m, with the Protocol's noise limits for the day, evening and night period, respectively.

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1.0 Introduction

Audiometric & Acoustic Services were commissioned to undertake a verification of compliance with the VIC EPA Publication 1824.6, also known as Noise Protocol in respect to possible noise from a proposed Fulton Hogan asphalt batching operation at 58-58A Dales Road.

Details of the proposed plant are supplied in supporting documentations for environmental noise assessment listed in the Reference section of this report.

The site is in the Industrial 3 Zone (IN3Z) of Warrnambool planning scheme. Warrnambool is a major urban area as per the Noise Protocol.

Part I, A1 of the Noise Protocol requires that the appropriate method for setting noise limits in a major urban area is the Urban area method.

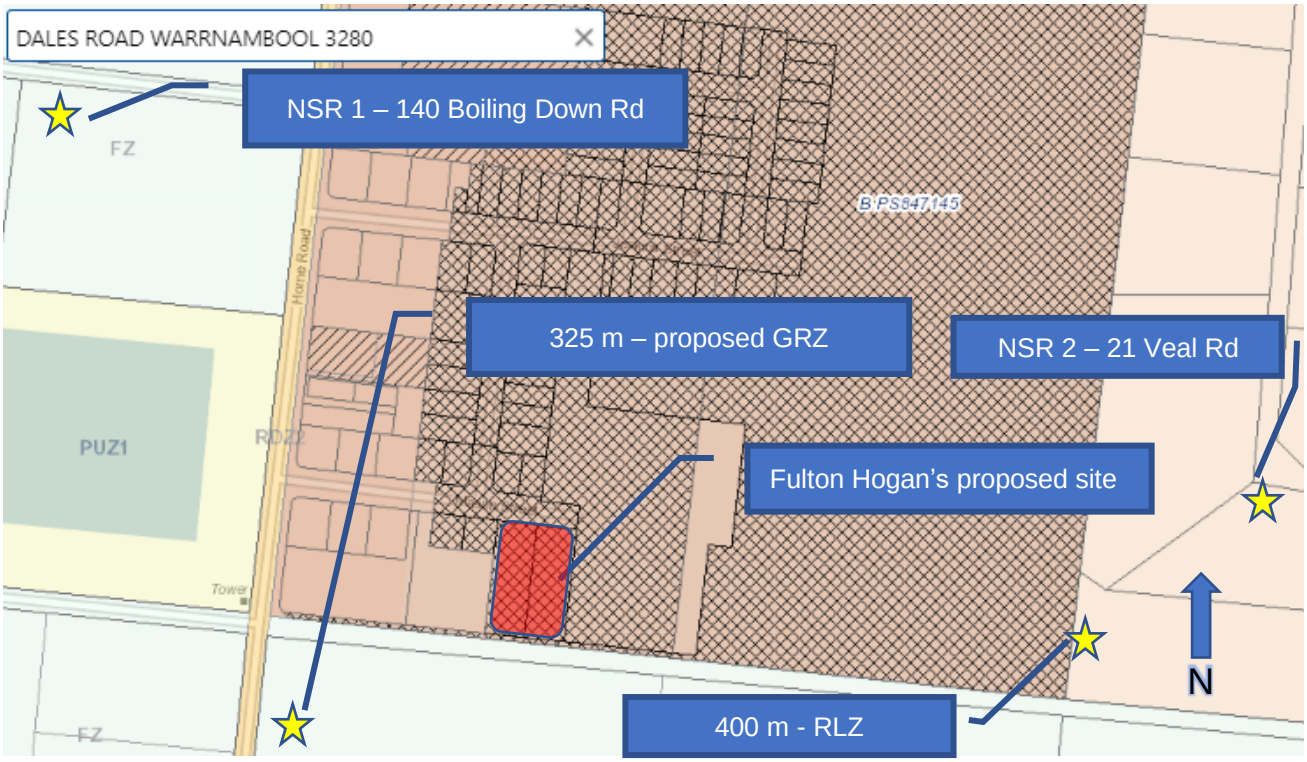
The aim of the assessment is to establish noise limits for the proposed asphalt batching plant at the nearest noise sensitive receivers, determine predicted effective noise levels at those receivers and compare them with the Noise Protocol limits.

This updated version of the report responds to a request from Warrnambool City Council to assess noise from the proposal received at the existing Rural Living Zone (RLZ) and a potential General Residential Zone, 400 m and 325 m from the site at their nearest point, respectively.

2.0 Existing Environment

The proposed site is in the Industrial 3 Zone (IN3Z) of the Warrnambool planning scheme with the sensitive nearest noise receivers identified in the Farming Zone (FZ) at 140 Boiling Down Road, Warrnambool, approximately 650 m, and in the Rural Living Zone at 21 Veal Road, Warrnambool, approximately 700 m from the proposed site as per Figure 1 below. A proposed General Residential Zone and an existing Rural Living Zone are at 325 m and at 400 m from the site at their nearest points, respectively.

Figure 1: Fulton Hogan's proposed site, distances to planning zones and noise sensitive receivers (NSRs)



There are no activities in the Industrial 3 Zone in proximity of the development site during the night except occasional traffic movements on the Horne Road and the Boiling Down Road.

The Warrnambool Caravans Repairs sales and repair shop which is approximately 200 m north-west of the site is occupied during the day hours between 7am and 6pm, Monday to Friday.

The area is affected by the operation of light industry such as the above-mentioned caravan repairs shop, timber and door sales and similar shops / manufacturers.

3.0 Noise Protocol & Fulton Hogan Warrnambool's asphalt batching plant operational hours

The document that is applicable for the noise assessment is the VIC EPA Publication 1826.4, - Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues July 2021; Part I, section A, Noise Limits – Urban area method.

3.1 The Protocol

The goal of the Noise Protocol or just Protocol is to protect people from commercial, industrial or trade noise that may affect the beneficial uses made of noise sensitive areas.

The Protocol prescribes different levels for different times of the day and can be defined as follows:

Monday to Saturday:

Day	0700 – 1800 hours
Evening	1800 – 2200 hours
Night	2200 – 0700 hours

The Protocol also prescribes different levels for different times of day for Sunday and Public Holiday:

Evening	0700 – 2200 hours (Sunday and Public Holidays)
Night	2200 – 0700 hours (Sunday and Public Holidays)

3.2 Proposed Operational Hours of the asphalt batching plant – Fulton Hogan Warrnambool

We have taken that the following operation hours would apply to the proposed operation:

Glass crusher operation and Reclaimed Asphalt Pavement (RAP)

- Crushing operation twice per week from 07:00 am until 15:00 pm
    - Glass and Reclaimed Asphalt Pavement (RAP) crushing operations once a week (on average) each from 07:00 am until 18:00 pm
- Asphalt manufacturing and deliveries (trucks movements) 24 hours seven days per week

Asphalt manufacturing and deliveries – no glass crushing

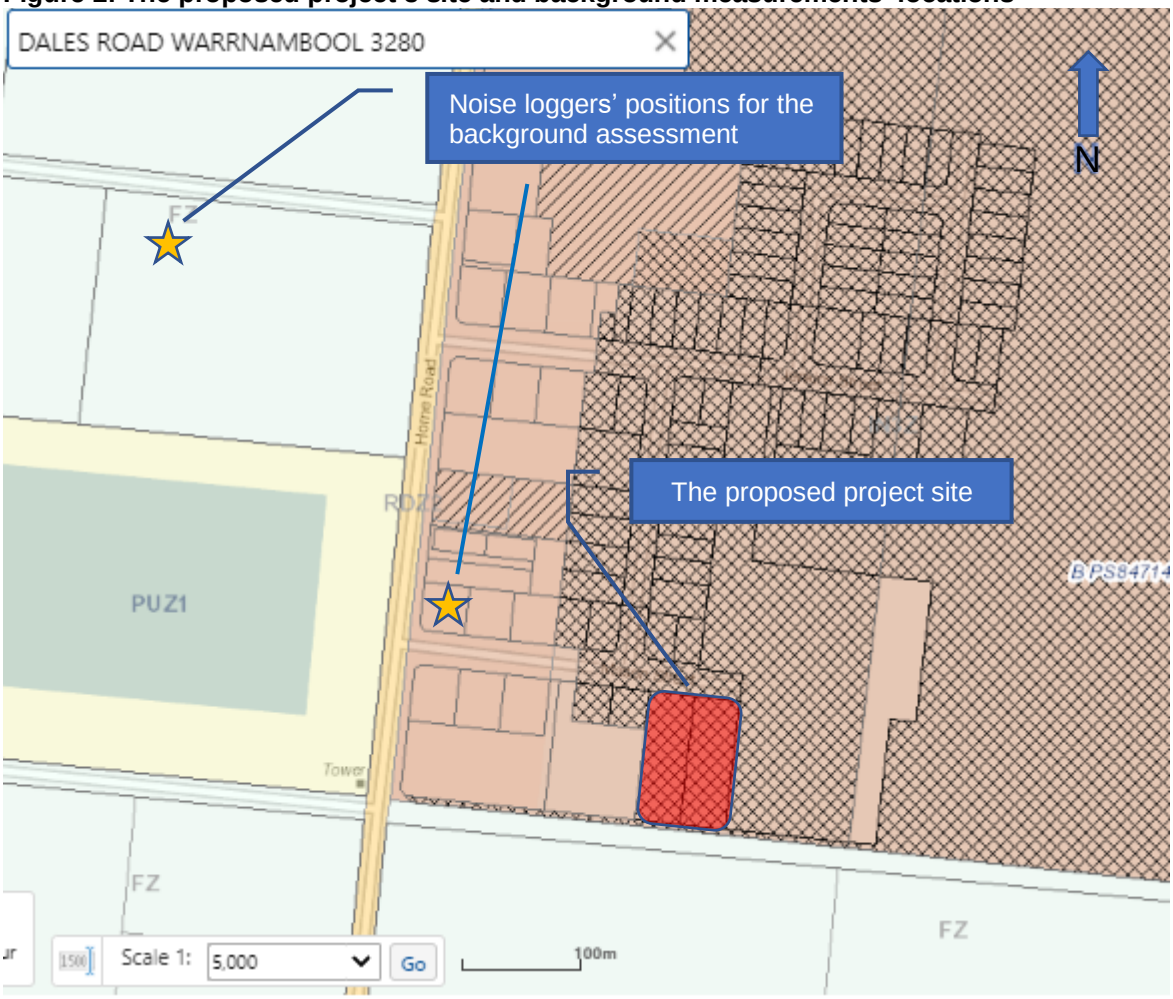
- a 24-hour operation seven days per week

4.0 Proposed site's assessment for determination of noise limits as per the Protocol's methodology – Urban Area Method

4.1 Site Assessment

The assessment has been undertaken with a noise logger, Type 1 from Wednesday, 29th September to Monday, 11th October 2021.

Figure 2: The proposed project's site and background measurements' locations



Unfavourable weather conditions prevailed throughout of the assessment period; however, the weather on the 6th October was suitable for background determination.

Please refer to Appendix III for weather conditions.

4.2 Assessment method – the Protocol's noise limits – Urban area method

The Warrnambool area falls under the major urban area outside of Melbourne and therefore the determination of noise limits should be undertaken as per the Protocol's Urban area method.

4.2.1 Zoning level

Determination of zoning level for the noise receiver in the Farming Zone (Noise Sensitive Receiver 1 NSR 1), the residential premise at 140 Boiling Down Road, is presented in Figure 3, below.

Figure 3: NSR 1 - Farming Zone – type 2 category for calculation of zoning level

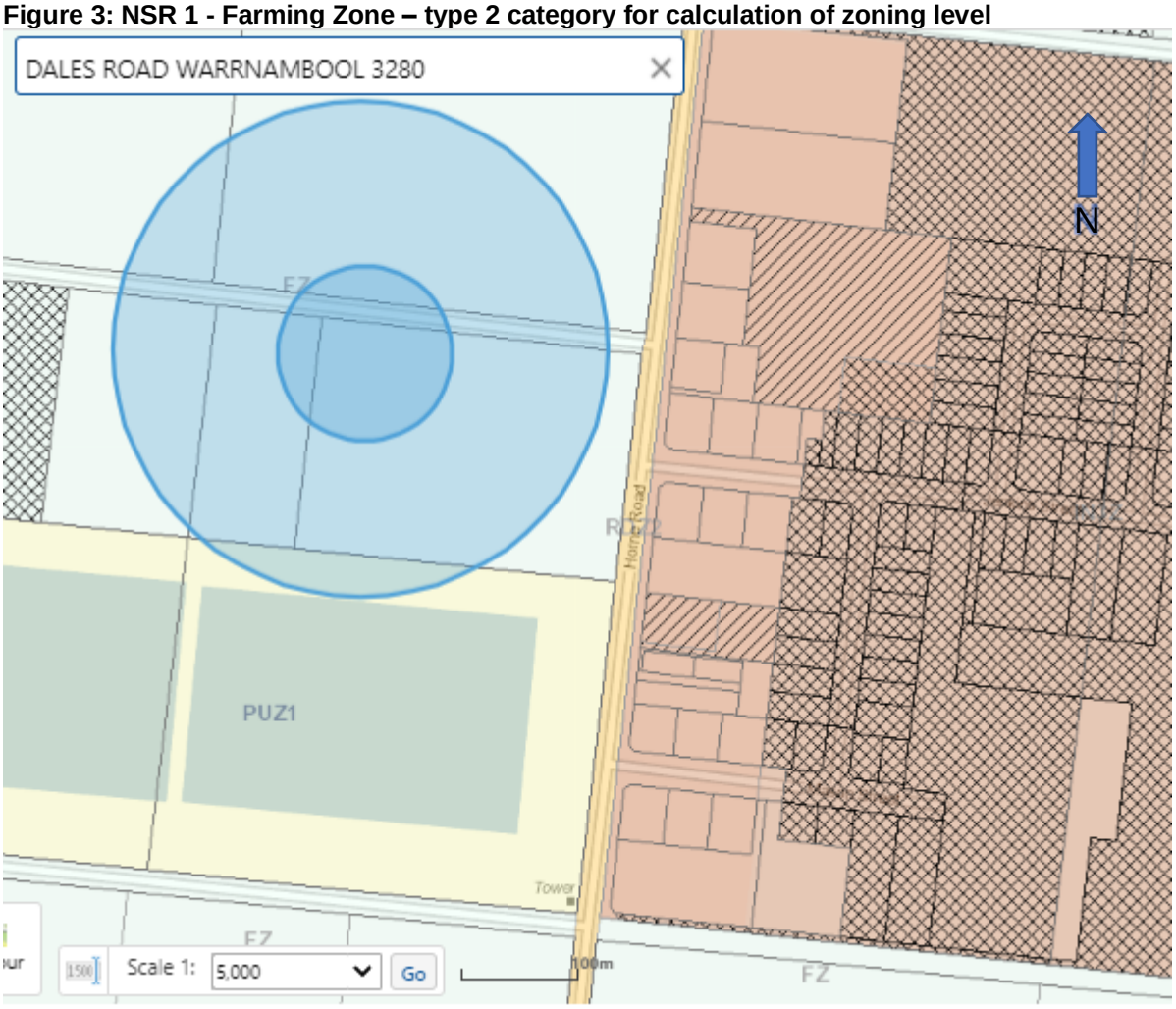


Table 1: Calculation of zoning levels – NSR 1

140 Boiling Down Road - NSR 1		IF	Zoning level
Day period	07:00 - 18:00	0.50	**59**
Evening period	18:00 - 22:00	0.50	**53**
Saturday	07:00 - 18:00	0.50	**59**
Sunday	07:00 - 22:00	0.50	**48**
Night period	22:00 - 07:00	0.50	**48**

Area	400 m		Total
Type 1	Type 2	Type 3	
0	125581	0	125581
Area	140 m		Total
Type 1	Type 2	Type 3	
0	15364	0	15364
IF	**0.50**		

Table 1 above presents calculation of the influencing factor (IF) of zoning levels for NSR 1. Since the Farming Zone is type 2 category, and there is no other overlapping zone, the whole area of both circles is calculated producing the influencing factor which is IF = 0.50 for NSR 1.

Determination of zoning level for the noise sensitive receiver identified in the Rural Living Zone, the residential premise at 21 Veal Road (NSR 2) is outlined in the Figure 4 below.

Figure 4: NSR 2 - Rural Living Zone – the type 1 category for the calculation of zoning level

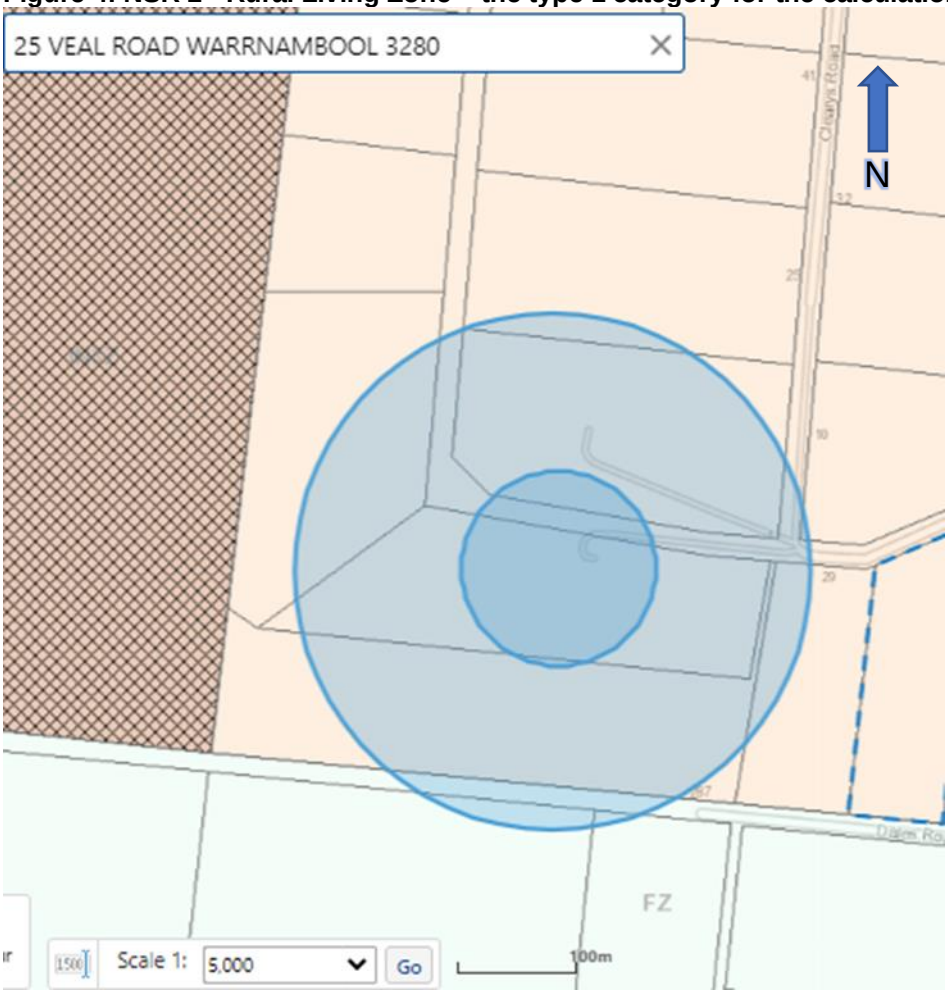


Table 2: Calculation of zoning levels - NSR 2

21 Veal Road – NSR 2		IF	Zoning level
Day period	07:00 - 18:00	0.01	**50**
Evening period	18:00 - 22:00	0.01	**44**
Saturday	07:00 - 18:00	0.01	**50**
Sunday	07:00 - 22:00	0.01	**39**
Night period	22:00 - 07:00	0.01	**39**

Area	400 m		Total
Type 1	Type 2	Type 3	
0	3050		125581
Area	140 m		Total
Type 1	Type 2	Type 3	
0	0	0	15364
IF	**0.01**		

The Rural Living Zone is a type 1 zone category, and Farming Zone is the type 2 zone category.

Only type 2 and type 3 zone categories are used for calculation of influencing factor.

The influencing factor is 0.01 for NSR 2.

Using the same methodology, we have determined noise limits for the distances at 325 m and 400 m off the proposed asphalt plant.

Figure 5: At 325 m

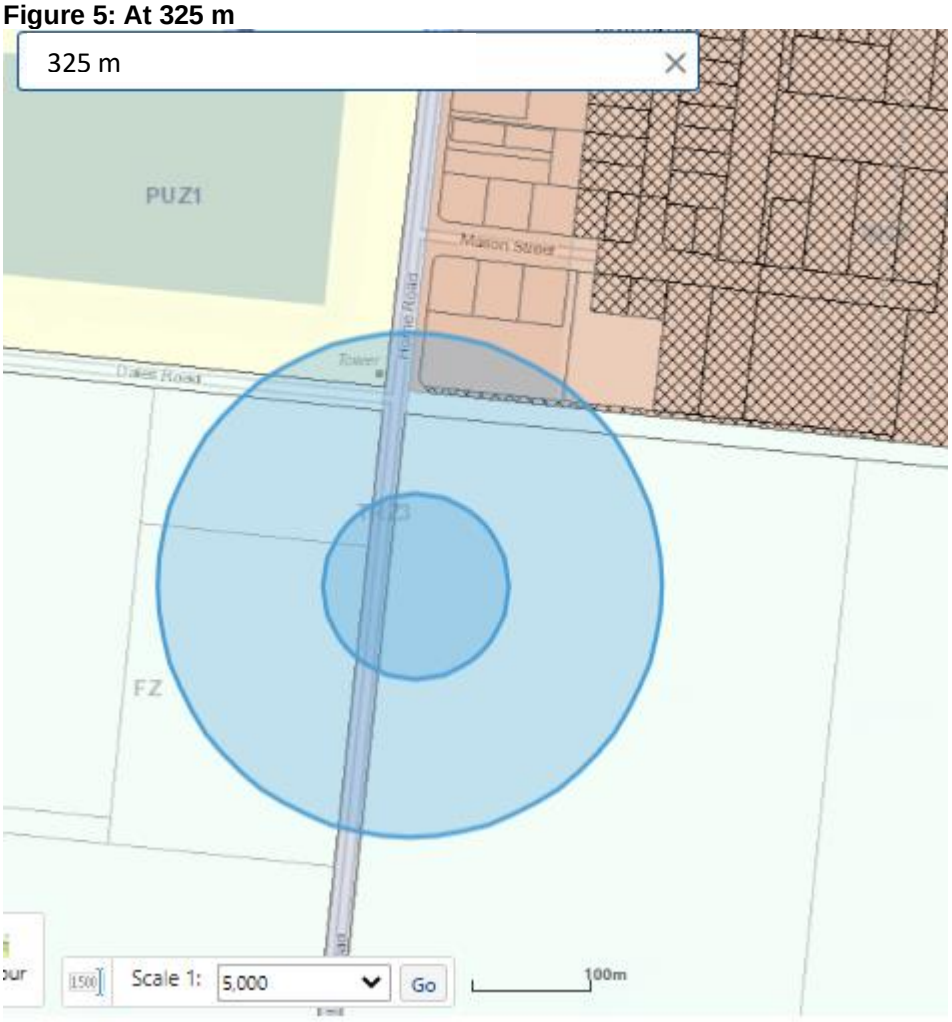


Table 3: Calculation of zoning levels at 325 m

325 m - proposed GRZ		**IF**	**Zoning level**
Day period	07:00 - 18:00	0.02	**50**
Evening period	18:00 - 22:00	0.02	**44**
Saturday	07:00 - 18:00	0.02	**50**
Sunday	07:00 - 22:00	0.02	**39**
Night period	22:00 - 07:00	0.02	**39**

Area	400 m		Total
Type 1	Type 2	Type 3	
0	8700	0	125581
Area	140 m		Total
Type 1	Type 2	Type 3	
0	0	0	15364
IF	**0.02**		

Figure 6: At 400 m

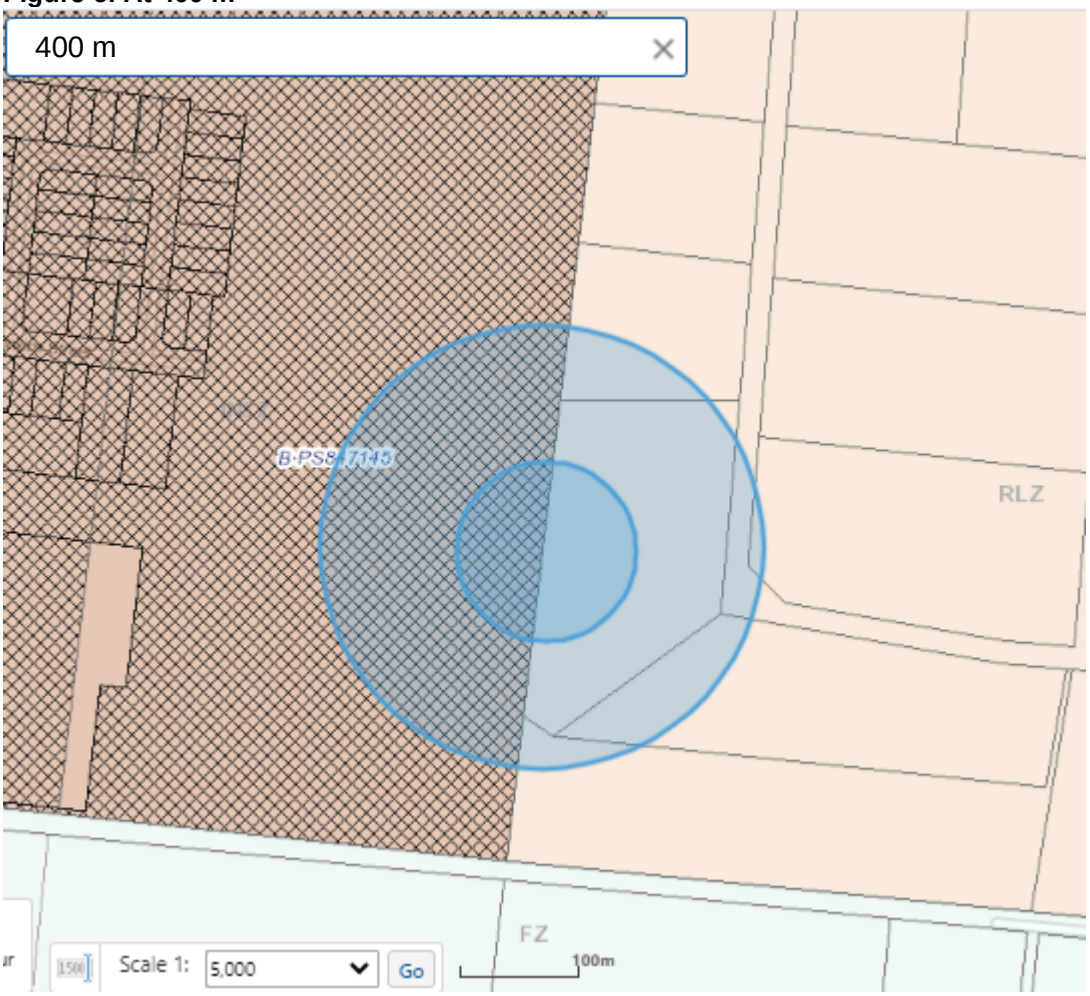


Table 4: Calculation of zoning levels at 400 m

400 m		IF	Zoning level
Day period	07:00 - 18:00	0.25	**54**
Evening period	18:00 - 22:00	0.25	**48**
Saturday	07:00 - 18:00	0.25	**54**
Sunday	07:00 - 22:00	0.25	**43**
Night period	22:00 - 07:00	0.25	**43**

Area	400 m		Total
Type 1	Type 2	Type 3	
0	62790	0	125581
Area	140 m		Total
Type 1	Type 2	Type 3	
0	7680	0	15364
IF	**0.25**		

4.2.2 Determination of noise limits

The determination of noise limits is influenced by background levels which can be neutral, high or low.

The Protocol states that the background is:

a. for the day period the background level is –
   i. neutral when it is at least 6 dB, and no more than 12 dB, below the zoning level;
   ii. high when the background level plus 6 dB exceeds its respective zoning level; and
   iii. low when the background level is 13 dB or more below the zoning level.
b. for the evening and night periods the background level is –
   i. neutral when it is at least 3 dB and no more than 9 dB below the zoning level;
   ii. high when the background level plus 3 dB exceeds the zoning level; and
   iii. low when the background level is 10 dB or more below the zoning level.

For the noise sensitive receiver at 140 Boiling Down Road, (NSR 1) the background is classified as per Table 5 below.

Table 5: The background level classification for NSR 1

Period	Zone level	Background	Classification
Day	59	43	Low
Evening	53	38	Low
Night	48	33	Low

For the noise sensitive receiver at 21 Veal Rd, (NSR 2) the background is classified as per Table 6 below.

Table 6: Background level classification – NSR 2

Period	Zone level	Background	Classification
Day	50	44	Neutral
Evening	44	39	Neutral
Night	39	37	High

For the noise sensitive receiver at 325 m the background is classified as per Table 7 below.

Table 7: Background level classification – at 325 m

Period	Zone level	Background	Classification
Day	50	44	Neutral
Evening	44	39	Neutral
Night	39	37	High

For the noise sensitive receiver at 400 m the background is classified as per Table 8 below.

Table 8: Background level classification – at 400 m

Period	Zone level	Background	Classification
Day	54	44	Neutral
Evening	48	39	Neutral
Night	43	37	Neutral

The noise limits are calculated as per the Protocol's methodology for the following noise sensitive receivers:

NSR 1

Day period = ½ (zoning level + background level) + 4.5 = ½ (59 + 43) + 4.5 = 56 dB(A)
Evening period = ½ (zoning level + background level) + 3 = ½ (53 + 38) + 3 = 49 dB(A)
Night period = ½ (zoning level + background level) + 3 = ½ (48 + 33) + 3 = 44 dB(A)

NSR 2

Day period = zoning level since the background is neutral = 50 dB(A)
Evening period = zoning level since the background is neutral = 44 dB(A)
Night period = added 3 dB to the background level since the background is high = 40 dB(A)

At 325 m – proposed GRZ (type 1 land category)

Day period = zoning level since the background is neutral = 50 dB(A)
Evening period = zoning level since the background is neutral = 44 dB(A)
Night period = added 3 dB to the background level (L_{90} 37 dB(A)) = 40 dB(A)

At 400 m

Day period = zoning level since the background is neutral = 54 dB(A)
Evening period = zoning level since the background is neutral = 48 dB(A)
Night period = zoning level since the background is neutral = 43 dB(A)

4.3 Noise limits at nearest noise sensitive receivers

The noise limits are outlined in the Table 9, for NSR 1, NSR 2 locations and for distances at 325 m and 400 m respectively.

Table 9: Noise limits

NSR 1 – 140 Boiling Down Road	**Time period**	**Noise limit, dB(A)**
Day period	07:00 – 18:00	56 dB(A)
Evening period	18:00 – 22:00	49 dB(A)
Night period	22:00 – 07:00	44 dB(A)

NSR 2 – 21 Veal Road	**Time period**	**Noise limit, dB(A)**
Day period	07:00 – 18:00	50 dB(A)
Evening period	18:00 – 22:00	44 dB(A)
Night period	22:00 – 07:00	40 dB(A)

Table 9 – continue

At 325 m – proposed GRZ	Time period	Noise limit, dB(A)
Day period	07:00 – 18:00	50 dB(A)
Evening period	18:00 – 22:00	44 dB(A)
Night period	22:00 – 07:00	40 dB(A)

At 400 m	Time period	Noise limit, dB(A)
Day period	07:00 – 18:00	54 dB(A)
Evening period	18:00 – 22:00	48 dB(A)
Night period	22:00 – 07:00	43 dB(A)

5.0 Predicted effective noise levels of the proposed asphalt operation – noise modelling

The proposed asphalt batch plant includes the following noise generating equipment and activities with sound power levels.

- Drum Kiln – corresponds to sound power of 101 dB
- Stack exhaust – corresponds to sound power 110 dB
- Vibrating screen – corresponds to sound power of 100 dB
- Truck loading under silos – corresponds to sound power of 90 dB
- Tower sources – combined sound power level corresponds to total sound power of 113 dB
    I. Tower elevator corresponds to sound power of 94 dB
    II. Tower pugmill corresponds to sound power of 95 dB
    III. Tower screen corresponds to sound power of 112.8 dB
- Crusher – combined sound power level corresponds to 116 dB
- Reclaimed Asphalt Pavement (RAP) operation corresponds to total sound power of 105 dB
    I. RAP bin corresponds to sound power of 94 dB
    II. RAP bin (2) corresponds to sound power of 94 dB
    III. RAP pulley corresponds to sound power of 99.8 dB
    IV. RAP tail corresponds to sound power of 99.8 dB
    V. RAP head corresponds to sound power of 90.3 dB
    VI. RAP conveyor corresponds to sound power of 90.3 dB
    VII. RAP screen corresponds to sound power of 96.6 dB
- Truck exiting site (accelerating) – corresponds to sound power of 86 dB

The total sound power level of the plant is 119 dB.

The terrain at the proposed sound propagation site is relatively flat, so minor adjustments to the terrain elevation has been made, which is approximately 2 m difference between the nearest noise sensitive receivers and the proposed development site.

The sound pressure prediction model, MAS Environmental 2021 (version 3.6 – professional) was used to predict sound pressure levels generated from the proposal. The model uses ISO 9613-1:1996 (barrier and air absorption), and ISO 9613-2:1996 (ground reflection and absorption) Standards for the calculation.

Assumptions used in modelling of sound pressure levels at noise sensitive receivers are as follows:

1. At a distance, the operation is assumed as one continuous source.
2. Ground is assumed 25 % hard and 75 % soft
3. Terrain is flat – adjustment +/- 2m elevation
4. Air temperature 20^0C
5. Humidity 70%
6. Octave band frequency analysis of sound power levels for noise modelling has been used from field measurements at Fulton Hogan site for truck movements, Dandenong South on 7th October 2021 and from the supplied documentation, Fulton Hogan - BF1800 Facility sound data; please see the Reference and Appendix V for more details.
7. Distances to the nearest noise sensitive receivers have been estimated as follows:
    a. NSR 1 – 140 Boiling Down Rd (Farming Zone) – approximately 650 m
    b. NSR 2 – 21 Veal Rd (Rural Living Zone) – approximately 700 m
    c. Nearest point of a proposed residential zone (GRZ) at 325 m nominal south - west
    d. Nearest point of the Rural Living Zone (RLZ) at 400 m nominal east
8. Open fence / wall around the site assumed at 3 m height
9. Model adjustment for the distance is +/-3dB

Average height of source and receiver	Distance between source and receiver	
	0 - 100m	100m - 1km
0 - 5m	+-3dB	+-3dB
5 - 30m	+-1dB	+-3dB

For the conservative purpose a 3 dB has been added to the calculation of effective noise levels in the Section 5.2 – Predicted effective noise levels of this report

5.1 – Noise modelling of the proposed asphalt batch plant at 58-58A Dales Road, Fulton Hogan Warrnambool

Figures 7 and 8 present the predicted sound pressure levels without any model adjustment at nearest noise sensitive receivers NSR 1 and NSR 2 and at 325 m and 400 m from the site, respectively.

Figure 7: Predicted noise levels at nearest noise sensitive receivers – crusher, asphalt manufacturing, RAP and deliveries operation

Figure 8: Predicted noise levels – no crusher operation, but asphalt manufacturing, RAP and deliveries are in operation

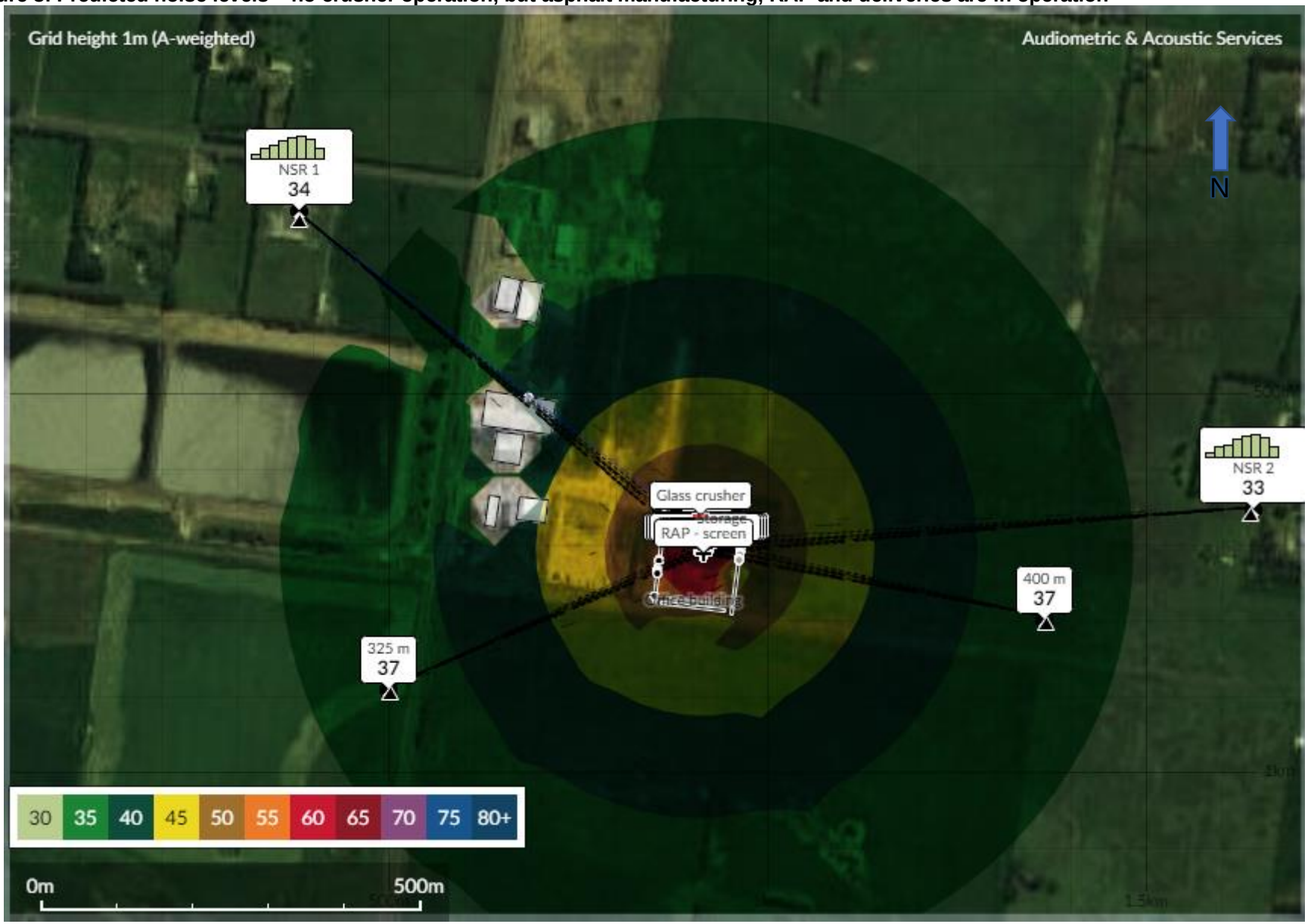


Figure 7 above and Table 10, show predicted noise levels at nearest sensitive receivers as calculated without model adjustments when the crushing, asphalt manufacturing, RAP and deliveries are in operation.

Table 10: Predicted noise levels at nearest noise sensitive receivers – full production

Noise sensitive location	Predicted sound pressure level, as per model calculation dB(A)
NSR 1	39 dB(A)
NSR 2	38 dB(A)
At 325 m	43 dB(A)
At 400 m	42 dB(A)

Figure 8 above and Table 11, show noise levels at the two nearest noise sensitive receivers as calculated without model adjustments when the crusher is not in operation while asphalt manufacturing, RAP and deliveries are in operation.

Table 11: Predicted noise levels when the glass crusher is not in operation

Noise sensitive location	Predicted sound pressure level, as per model calculation dB(A)
NSR 1	34 dB(A)
NSR 2	33 dB(A)
At 325 m	37 dB(A)
At 400 m	37 dB(A)

5.2 – Predicted effective noise levels

The predicted effective noise level from the proposed facility at nearest noise sensitive receivers is calculated as per the Noise Protocol methodology.

The Protocol dictates a cumulative adjustment to the L_{Aeq} shall be made, when required, for noise character, duration, and measurement position to determine the effective noise level according to the following formula: Effective noise level = $L_{Aeq} + A_{tone} + A_{dur} + A_{int} + A_{ref} + A_{ind} + A_{imp}$

Table 8 below presents predicted effective noise levels when all activities are considered, such as crushing, asphalt manufacturing and deliveries. Table 9 presents predicted effective noise level without glass crusher.

Table 12: Predicted effective noise level when the crusher is in operation

NSR 1 – 140 Boiling Down Rd		**Adjustment**	**Effective noise level, dB(A)**
Predicted (L_{Aeq})	39 dB(A)	39	
Tonality (A_{tone})	Operation	2	
Duration (A_{dur})	Continuous	0	
Intermittency (A_{int})	None	0	
Reflection (A_{ref})	>3 m	0	
Indoor (A_{ind})	Outside	0	
Model adjustment	<1000 m	3	
Predicted effective noise level (L_{Aeq})			**44**

NSR 2 – 21 Veal Road		**Adjustment**	**Effective noise level, dB(A)**
Predicted (L_{Aeq})	38 dB(A)	38	
Tonality (A_{tone})	Operation	2	
Duration (A_{dur})	Continuous	0	
Intermittency (A_{int})	None	0	
Reflection (A_{ref})	>3 m	0	
Indoor (A_{ind})	Outside	0	
Model adjustment	<1000m	3	
Predicted effective noise level (L_{Aeq})			**43**

At 325 m – proposed GRZ		**Adjustment**	**Effective noise level, dB(A)**
Predicted (L_{Aeq})	43 dB(A)	43	
Tonality (A_{tone})	Operation	2	
Duration (A_{dur})	Continuous	0	
Intermittency (A_{int})	None	0	
Reflection (A_{ref})	>3 m	0	
Indoor (A_{ind})	Outside	0	
Model adjustment	<1000 m	3	
Predicted effective noise level (L_{Aeq})			**48**

At 400 m – existing RLZ		Adjustment	Effective noise level, dB(A)
Predicted (L_{Aeq})	42 dB(A)	42	
Tonality (A_{tone})	Operation	2	
Duration (A_{dur})	Continuous	0	
Intermittency (A_{int})	None	0	
Reflection (A_{ref})	>3 m	0	
Indoor (A_{ind})	Outside	0	
Model adjustment	<1000 m	3	
Predicted effective noise level (L_{Aeq})			**47**

Table 13: Predicted effective noise level when glass crusher is not in operation

NSR 1 – 140 Boiling Down Rd		**Adjustment**	**Effective noise level, dB(A)**
Predicted (L_{Aeq})	34 dB(A)	34	
Tonality (A_{tone})	Operation	0	
Duration (A_{dur})	Continuous	0	
Intermittency (A_{int})	None	0	
Reflection (A_{ref})	>3 m	0	
Indoor (A_{ind})	Outside	0	
Model adjustment	<1000m	3	
Predicted effective noise level (L_{Aeq})			**37**

NSR 2 – 21 Veal Rd		**Adjustment**	**Effective noise level, dB(A)**
Predicted (L_{Aeq})	33 dB(A)	33	
Tonality (A_{tone})	Operation	0	
Duration (A_{dur})	Continuous	0	
Intermittency (A_{int})	None	0	
Reflection (A_{ref})	>3 m	0	
Indoor (A_{ind})	Outside	0	
Model adjustment	<1000m	3	
Predicted effective noise level (L_{Aeq})			**36**

At 325 m – proposed GRZ		**Adjustment**	**Effective noise level, dB(A)**
Predicted (L_{Aeq})	37 dB(A)	37	
Tonality (A_{tone})	Operation	0	
Duration (A_{dur})	Continuous	0	
Intermittency (A_{int})	None	0	
Reflection (A_{ref})	>3 m	0	
Indoor (A_{ind})	Outside	0	
Model adjustment	<1000 m	3	
Predicted effective noise level (L_{Aeq})			**40**

At 400 m – existing RLZ		**Adjustment**	**Effective noise level, dB(A)**
Predicted (L_{Aeq})	37 dB(A)	37	
Tonality (A_{tone})	Operation	0	
Duration (A_{dur})	Continuous	0	
Intermittency (A_{int})	None	0	
Reflection (A_{ref})	>3 m	0	
Indoor (A_{ind})	Outside	0	
Model adjustment	<1000 m	3	
Predicted effective noise level (L_{Aeq})			**40**

5.3 – Compliance with Noise Protocol

We have compared the predicted effective noise levels with the Protocol's limits for the day, evening, and night period of the proposed operation for different operation times for the crusher, asphalt manufacturing, RAP and deliveries.

Crusher, asphalt manufacturing, RAP and deliveries – full production, Protocol's day period only

Table 14: Compliance with the Noise Protocol's noise limit – full production

NSR 1	**Period of FH operation / glass crusher**	**Predicted Effective noise level, dB(A)**	**Noise limit, dB(A)**	**Compliance Yes /No**
Day period*	07:00 – 18:00	44	56	**Yes**
Evening period	N/A	N/A	49	**N/A**
Night period*	N/A	N/A	44	**N/A**

NSR 2	**Period of FH operation / glass crusher**	**Predicted Effective noise level, dB(A)**	**Noise limit, dB(A)**	**Compliance Yes /No**
Day period*	07:00 – 18:00	43	50	**Yes**
Evening period	N/A	N/A	44	**N/A**
Night period*	N/A	N/A	40	**N/A**

At 325 m – proposed GRZ	**Period of FH operation / glass crusher**	**Predicted Effective noise level, dB(A)**	**Noise limit, dB(A)**	**Compliance Yes /No**
Day period*	07:00 – 18:00	48	50	**Yes**
Evening period	N/A	N/A	44	**N/A**
Night period*	N/A	N/A	40	**N/A**

At 400 m	**Period of FH operation / glass crusher**	**Predicted Effective noise level, dB(A)**	**Noise limit, dB(A)**	**Compliance Yes /No**
Day period*	07:00 – 18:00	47	54	**Yes**
Evening period	N/A	N/A	48	**N/A**
Night period*	N/A	N/A	43	**N/A**

*The crusher operation is from 07:00 am unit 18:00 pm hours Monday to Saturday.

The proposed asphalt manufacturing plant complies with the Protocol's noise limit when is in full production including the glass crusher.

Asphalt manufacturing and deliveries – no crusher operation

In the Table 11 the predicted effective noise levels are compared with the Protocol's noise limits when the crusher is not in operation, but asphalt manufacturing and deliveries are.

Table 15: Fulton Hogan proposed asphalt batching plant without the glass crusher operation

NSR 1 / NSR 2	Time period	Predicted Effective noise level, dB(A)	Noise limit, dB(A)		Compliance Yes /No
			NSR 1	NSR 2	
Day period	07:00 – 18:00	37 / 36	56	50	**Yes**
Evening period	18:00 – 22:00	37 / 36	49	44	**Yes**
Night period	22:00 – 07:00	37 / 36	44	40	**Yes**

325 m / 400 m	Time period	Predicted Effective noise level, dB(A)	Noise limit, dB(A)		Compliance Yes /No
			325 m	400 m	
Day period	07:00 – 18:00	40 / 40	50	54	**Yes**
Evening period	18:00 – 22:00	40 / 40	44	48	**Yes**
Night period	22:00 – 07:00	40 / 40	40	43	**Yes**

We consider that the asphalt manufacturing operation complies with the day, evening and night period limits when the glass crusher is not in operation.

6.0 Discussion and recommendations

Audiometric & Acoustic Services has undertaken an environmental noise assessment including background measurements from Wednesday, 29th September to Monday, 11th October 2021 at the nearest residential noise sensitive receiver of the proposed development at 58-58A Dales Road, Warrnambool.

The site is surrounded by Farming Land and Rural Living Zone at nominal north-west and north-east respectively.

The proposed operation of the facility is 24 hours, seven days per week while a crusher operation have been proposed to run on average twice a week from 07:00am to 18:00pm.

The modelled sound power levels have been used from the supplied documentations as listed in the Reference section of this document, along with field noise measurements at the Fulton Hogan, 10-30 Dana Court, Dandenong South site.

We have calculated predicted sound pressure levels at the nearest noise sensitive receivers, identified at 140 Boiling Down Road, a residential premise within zoned Farming Land, a type 2 category at nominal north-west approximately 650m from the proposed development and 21 Veal Rd situated in the Rural Living Zone, a type 1 category land, approximately 700m from the development.

Also, we have calculated predicted sound levels at:

- a proposed General Living Zone at a distance of 325 m from the proposed asphalt plant at its nearest point.
- at the existing Rural Living Zone at a distance of 400 m from the proposed asphalt plant at its nearest point

We have used MAS Environmental 2021 (version 3.6 – professional) to predict sound pressure levels generated from the proposed operation. The noise prediction model uses ISO 9613-1:1996 (barrier and air absorption), and ISO 9613-2:1996 (ground reflection and absorption) Standards for calculation.

We have added 2dB to predicted noise levels to compensate for a tonal character of the proposed operation of the crushing facility which would be received at nearest noise sensitive receivers, and 3 dB for noise prediction model adjustment.

We have calculated the proposed operation as follows:

a. Crusher, asphalt manufacturing, RAP and deliveries – full production
b. Asphalt manufacturing, RAP and deliveries – no glass crushing

We recommend that the glass crushing operations do not start before 07:00 am, Monday to Saturday.

We understand that the crushing operations are not proposed on Sundays.

We consider that predicted effective noise levels at noise sensitive receivers are results of the worst-case scenario when the proposed asphalt plant will be in full production.

Based on the calculations and field measurements we conclude that the proposed asphalt plant at 58-58A Dales Road, Warrnambool will comply with the Protocol's noise limits at the nearest noise sensitive receivers including distances at 325 m, the nearest point of the proposed General Residential Zone and at 400 m , the nearest point of the existing Rural Living Zone .

Please feel free to contact us should any additional detail be required. This applies to any parties that have legitimate access to this report.

Respectfully,

Svetimir Ristic, BEng (Env), GradDiplEnvSc, Acoustic Consultant

Proofread by Scott Henderson, M.A.A.S on 27th January 2022

Attachments

Technical Appendix I
Technical Appendix II
Appendix III - Weather for Warrnambool
Appendix IV - Background noise data
Appendix V - Noise modelling input
Appendix VI - Noise assessment: Futon Hogan – Dandenong South site, No.10-30 Dana Court
Appendix VII – Noise impact at surrounding noise sensitive receivers

Reference:

VIC EPA Publication 1826.4 (the Protocol) – Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues (1st July 2021)

A&AS noise measurement, Wednesday, 29th September to Monday, 18th October 2021 – file 21098

A&AS noise measurement at Fulton Hogan Dandenong South site, Wednesday, 6th to Monday, 11th October 2021 – file 21098 Dandenong

Fulton Hogan documentation used for the environmental noise assessment as supplied:

31403 Fulton Hogan Koroit glass crusher 2020 dust noise report
BG1800 XL _Fulton Hogan Warrnambool
Plant data
FH62513-001-002 - Proposed Plant Components Map (for Noise Assessment)

FH62513-001-0013 - Warrnambool Depot - Proposed Site Layout 3_RevE
Fulton Hogan - BG1800 Facility sound data

TECHNICAL APPENDIX I

Definitions of Terminology

A-weighted means frequency weighted as specified in Australian Standard 1259-1982 - Sound Level Meters, published by the Standards Association of Australia.

Authority means the Environment Protection Authority constituted under the Act.

Background level for a day, evening or night period means the arithmetic average of the L_{A90} levels for each hour of that period for which the commercial, industrial or trade premises under investigation normally operates. The background level shall include all noise sources except noise from commercial, industrial or trade premises which appear to be intrusive at the point where the background level is measured.

Beneficial use means a use of the environment or any element or segment of the environment which is conducive to public benefit, welfare, safety or health and which requires protection from the effects of the emission of noise.

Commercial, industrial or trade premises means any premises except:
(a) residential premises as defined in section 48A of the Act;
(b) a street or road, including every carriageway, footpath, reservation and traffic island on any street or road;
(c) a tram, light rail or railway line not being a siding, marshalling yard or maintenance depot of any tram, light rail or railway line; and
(d) the premises situated at Lower Esplanade, St Kilda and known as “Luna Park” and being the whole of the land more particularly described in Certificate of Title Volume 1204 Folio 109.

Derived noise limit means the maximum effective noise level allowed at a derived point and is determined using the method set out in Schedule D.

Derived point means a point used as a substitute measurement point to facilitate the assessment of noise from commercial, industrial or trade premises.

Effective noise level means the level of noise emitted from the commercial, industrial or trade premises and adjusted if appropriate for character and duration.

Extraneous noise means any noise which is not part of the noise being measured from the premises under consideration. Extraneous noise includes the effect of wind on any vegetation and on the microphone diaphragm and noise from aircraft and trains. Noise from animals shall be classified as extraneous noise unless their presence on the premises is directly associated with the trade or business conducted on the premises.

Fast F means the time-weighting characteristic of a sound level meter as specified in Australian Standard 1259-1982 - Sound Level Meters, published by the Standards Association of Australia.

Habitable room means any room other than a kitchen, storage area, bathroom, laundry, toilet or pantry.

Impulse I	mean the time-weighting characteristic of a sound level meter as specified in Australian Standard 1259-1982 - Sound Level Meters, published by the Standards Association of Australia.
L_{Aeq}	means equivalent continuous A-weighted sound pressure level and is the value of the A-weighted sound pressure level of a continuous steady sound that has the same acoustic energy as a given time-varying A-weighted sound pressure level when determined over the same measurement time interval.
L_{A90}	means the A-weighted sound pressure level which is exceeded for 90 per cent of the time interval considered.
Major premises	means commercial, industrial or trade premises that are prescribed as schedule three premises by the Environment Protection (Scheduled Premises and Exemptions) Regulations 1996.
Measurement point	means a point at which the microphone is located to measure the effective noise level or the background level.
Minor premises	means commercial, industrial or trade premises not being a major premises.
Noise limit	means the maximum effective noise level allowed at a measurement point in a noise sensitive area.
Noise sensitive area	means: (a) that part of the land within the apparent boundaries of any piece of land which is within a distance of 10 metres outside the external walls of any of the following buildings - Dwelling (except Caretaker's House) Residential Building (b) that part of the land within the apparent boundaries of any piece of land on which is situated any of the following buildings which is within a distance of 10 meters outside the external walls of any dormitory, ward or bedroom of such buildings - Caretaker's House Hospital Hotel
Slow S	means the time-weighting characteristic of a sound level meter as specified in Australian Standard 1259-1982 - Sound Level Meters, published by the Standards Association of Australia.
$L_{A, max}$:	The A-weighted maximum sound pressure level, measured using the 'F' time response. The $L_{A, max}$ should not be confused with the 'recommended maximum noise levels' in this document, which are an adjusted LAeq (an energy average measurement).

Recommended level/Recommended maximum noise level:
The noise levels that should not be exceeded at noise-sensitive areas.

Noise-sensitive area: These are mainly homes, but can include, for example, motels and tourist establishments. They do not include schools. The noise is assessed in outdoor locations at these premises.

Metropolitan region: The SEPP N-1 area of application, as defined in SEPP N-1. It covers much of, but not all of the current greater Melbourne area. See map in Figure 2.

Background level: is the sound of the normal quiet state of the area without the presence of intrusive, man-made noise sources. Distant traffic is included in the background because it is so widespread. Background level assessments may need to be conducted early in project planning to determine the recommended levels. They are required in major urban areas, and may be applied in 'background-relevant areas'.

Octave-band levels: The pitch or frequency of sound, divided into octave bands for the purposes of design and assessment. Each octave band represents a frequency range, from low to high. A design based on octave-band criteria enables more targeted control of low-frequency noise.

TECHNICAL APPENDIX II

Equipment Used

SVAN 957	Type 1 Sound Analyser Serial No. 14578
Aco Pacific	Type 7052H Microphone Serial No. 40821
SVAN	Windshield

NATA Laboratory calibration due 13th September 2022

Bruel & Kjaer	Acoustic Calibrator Serial No. 1441408 Type 4230; 94dB @ 1000Hz

NATA Laboratory calibration due 13th September 2022

NOISE LOGGERS

Warrnambool site

140 Boiling Down Road

Data logging –
from 29th September to 4th October

Noise Sentry Type 1 Sound Analyser

Serial No. CnLcr%…8hRmD

from 4th October to 11th October

Noise Sentry Type 1 Sound Analyser

Serial No.CPFcr… yjxID

1 Mason Street

Data logging –
from 29th September to 4th October

Noise Sentry Type 1 Sound Analyser

Serial No. ANjW…8DZND

from 4th October to 11th October

Noise Sentry Type 1 Sound Analyser

Serial No.Cnh8…8JRFD

Fulton Hogan, 10-30 Dana Court, Dandenong South

Data logging –
from 6th October to 11th October

Logger 1

Noise Sentry Type 1 Sound Analyser

Serial No. CnLcr….8hRnD

Logger 2

Noise Sentry Type 1 Sound Analyser

Serial No. ANjW…8DZND

Logger 3

Noise Sentry Type 1 Sound Analyser

Serial No. CFt2…6jxnD

Field calibrated

29th September 2021 – offset – none

11th October 2021 – offset – 0.3dB

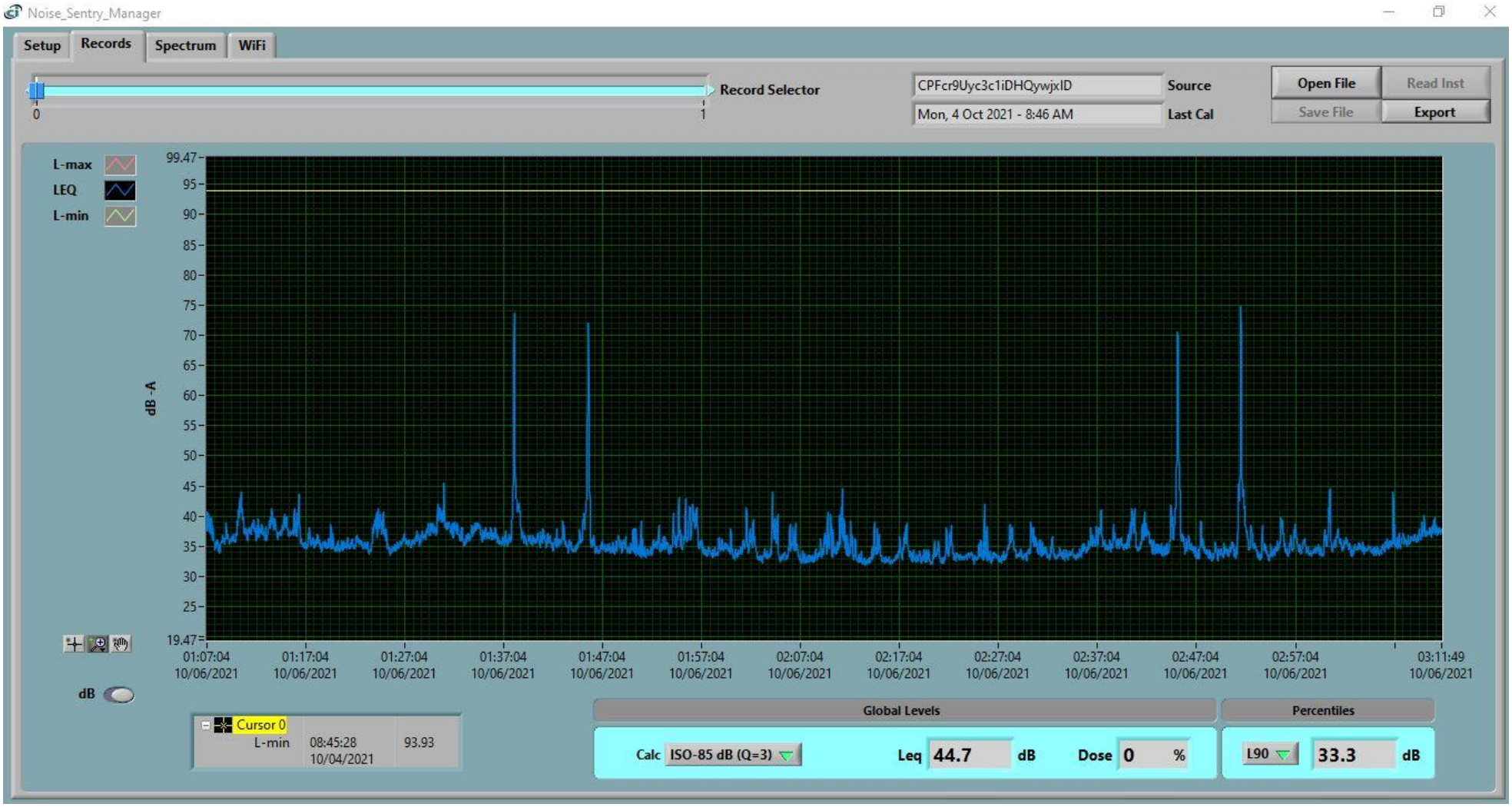
The sound level meter and loggers were calibrated before and after the measurements. No significant change was found to have occurred.

APPENDIX III – Warrnambool weather - October 2021

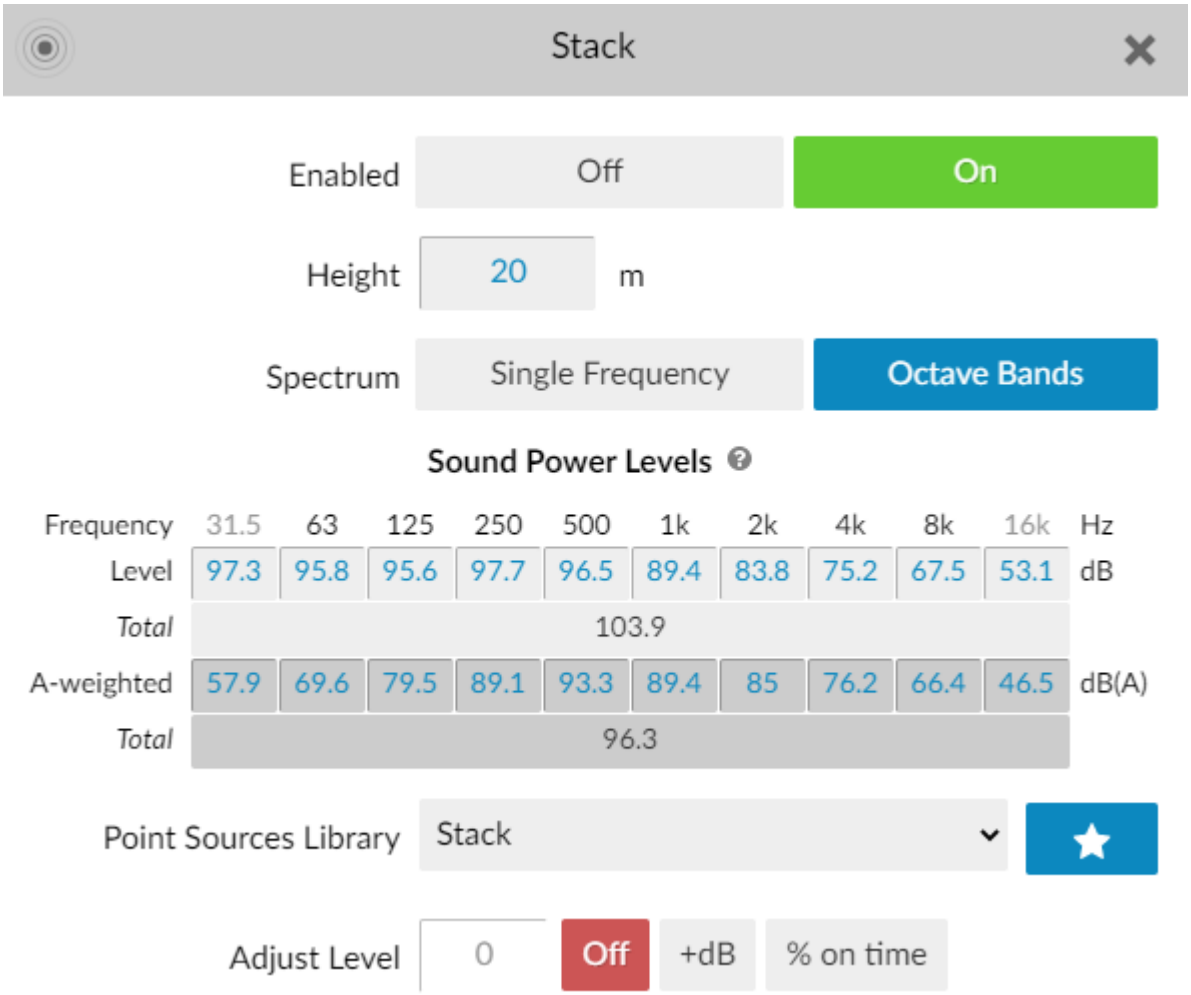
Warrnambool, Victoria
October 2021 Daily Weather Observations

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9 am						3 pm					
		Min	Max				Dir	Spd	Time	Temp	RH	Cld	Dir	Spd	MSLP	Temp	RH	Cld	Dir	Spd	MSLP
		°C	°C	mm	mm	hours		km/h	local	°C	%	8th		km/h	hPa	°C	%	8th		km/h	hPa
1	Fr	12.2	16.9	4.6			SSE	52	00:48	13.8	100		SSE	24	1005.3	15.4	100		S	22	1004.8
2	Sa	11.9	16.3	0			SW	30	06:06	12.7	100		SSW	17	1008.8	14.3	100		SSW	24	1007.1
3	Su	9.9	17.8	0			NNW	54	11:48	10.7	100		NE	19	1003.2	15.9	100		N	20	999.3
4	Mo	9.0	14.4	2.4			NW	67	10:10	12.2	92		NW	37	996.9	10.2	96		WNW	39	997.8
5	Tu	8.7	15.1	10.0			W	67	01:45	11.2	77		W	37	1009.1	13.6	75		W	35	1012.6
6	We	3.4	18.2	0			WSW	61	22:04	10.1	98		N	20	1013.1	16.2	76		NW	11	1008.7
7	Th	6.3	14.6	4.6			WSW	50	11:44	10.4	92		WNW	17	1012.9	12.9	73		WSW	31	1015.0
8	Fr	5.8	18.4	0			NW	48	14:21	10.4	100		N	24	1015.8	17.8	63		NNW	31	1012.2
9	Sa	6.3	19.1	0			WSW	44	16:26	12.5	76		NNW	15	1011.3	15.2	87		SW	33	1010.3
10	Su	4.7	13.9	2.4			SW	48	14:20	10.7	82		SSW	19	1015.9	12.3	74		SW	30	1015.2
11	Mo	3.6	13.4	2.2			S	43	14:16	8.5	89		SSW	15	1021.0	12.7	70		S	20	1020.3
12	Tu	0.5	19.5	0			NNE	41	13:02	8.9	88		ESE	13	1017.8	18.2	55		NE	24	1012.6

APPENDIX IV – a snip from logger's background data – L_{90} dB(A) for the night of 6th October 2021 at NSR 1



APPENDIX V – noise modelling input



Drum Kiln

Enabled: Off | On

Height: 2 m

Spectrum: Single Frequency | Octave Bands

Sound Power Levels

Frequency	31.5	63	125	250	500	1k	2k	4k	8k	16k	Hz
Level	95.4	96.2	92	89.4	84.6	81.6	82.1	81.6	74.8	63.6	dB
Total	100.4										
A-weighted	56	70	75.9	80.8	81.4	81.6	83.3	82.6	73.7	57	dB(A)
Total	89.4										

Point Sources Library: Drum Kiln

Adjust Level: 0 | Off | +dB | % on time

Vibrating screen

Enabled: Off | On

Height: 1 m

Spectrum: Single Frequency | Octave Bands

Sound Power Levels

Frequency	31.5	63	125	250	500	1k	2k	4k	8k	16k	Hz
Level	87.8	87.9	84.9	83.7	84.3	82	80.7	78.5	79.7	77.1	dB
Total	94										
A-weighted	48.4	61.7	68.8	75.1	81.1	82	81.9	79.5	78.6	70.5	dB(A)
Total	88.2										

Point Sources Library: Vibrating screen

Adjust Level: 0 | Off | +dB | % on time

Truck Silo

Enabled: Off | On

Height: 2 m

Spectrum: Single Frequency | Octave Bands

Sound Power Levels

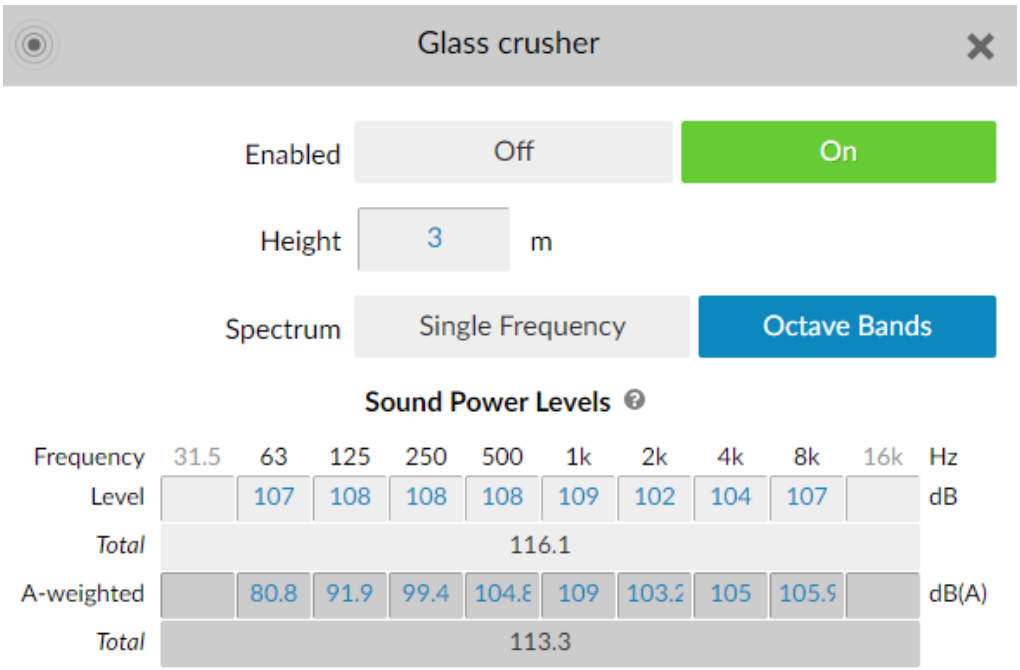
Frequency	31.5	63	125	250	500	1k	2k	4k	8k	16k	Hz
Level	87	83.4	74.7	72.5	72.7	73.6	74.8	71.2	68.4	63.3	dB
Total	89.4										
A-weighted	47.6	57.2	58.6	63.9	69.5	73.6	76	72.2	67.3	56.7	dB(A)
Total	79.9										

Point Sources Library: Truck Silo

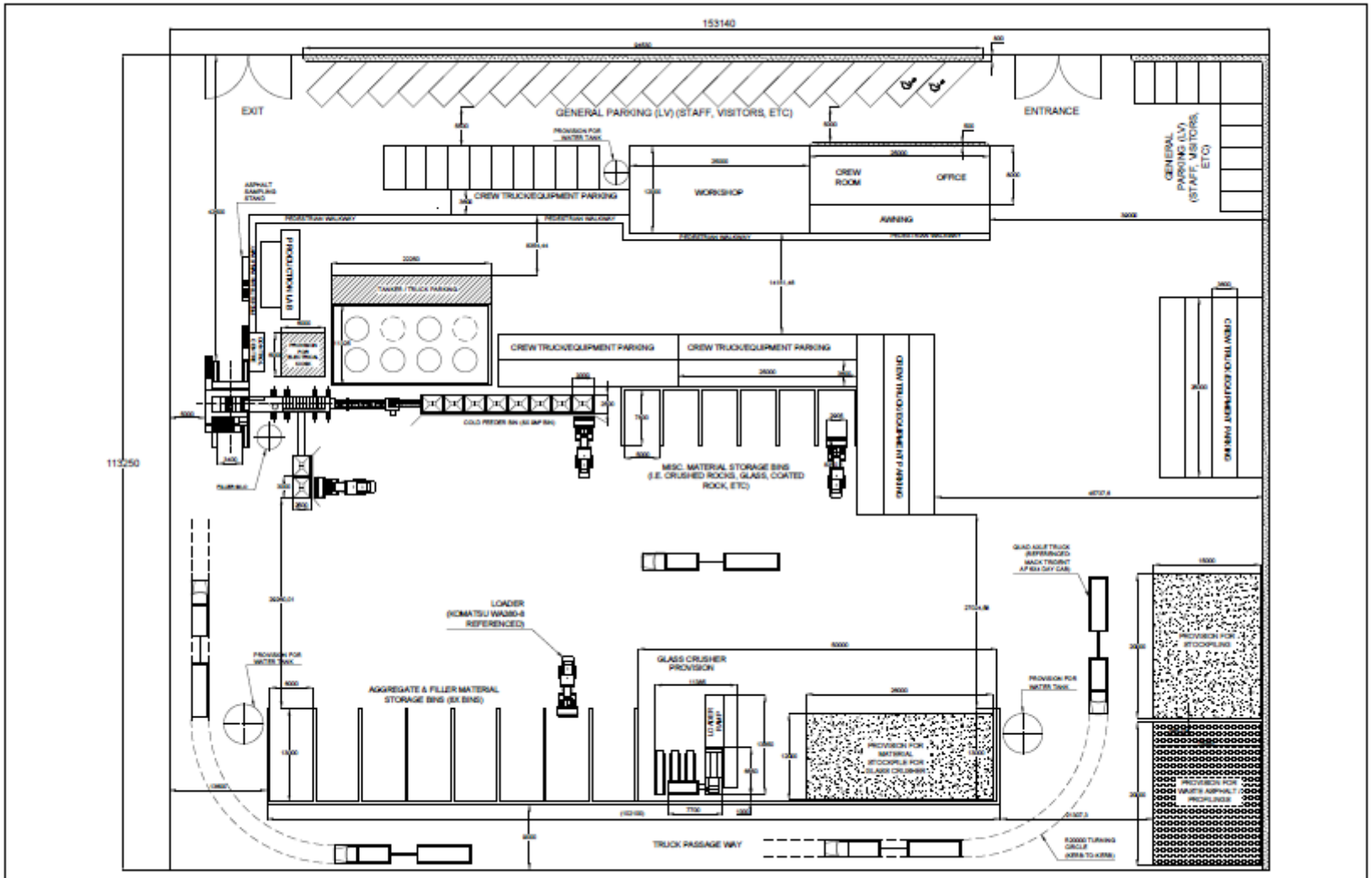
Adjust Level: 0 | Off | +dB | % on time

Octave Band	Tower Sources		
	Elevator Drive	Pugmill Drive	Tower Screen
Hz	dB	dB	dB
31.5			110
63	77	78	104
125	81	82	102
250	85	86	103
500	89	90	101
1000	89	90	99
2000	84	85	97
4000	81	82	94
8000	77	78	92
Overall dB	94	95	113
Overall dB(A)	92	93	104
Height (m)			
Item Quantity			1

Octave Band	Recycle Feed System Sources					
	RAP Bin Drive	Collecting Tail Pulley	Collecting Head Pulley	Incl Conv Tail Pulley	Incl Conv Head Pulley	RAP Screen
Hz	dB	dB	dB	dB	dB	dB
31.5	89	93	84	93	84	62
63	87	91	77	91	77	65
125	86	88	81	88	81	68
250	87	96	79	96	79	71
500	84	91	78	91	78	77
1000	80	86	75	86	75	90
2000	79	80	72	80	72	91
4000	75	73	68	73	68	90
8000	71	63	65	63	65	91
Overall dB	94	100	88	100	88	98
Overall dB(A)	87	92	80	92	80	97
Height (m)						
Item Quantity	2	1	1	1	1	1



Site layout for Warrnambool site as supplied by the Fulton Hogan, ref. FH62513-001-0013 - Warrnambool Depot - Proposed Site Layout 3_RevD



REVISION	DESCRIPTION	DATE
A	UPDATED PLANT LAYOUT, SITE LAYOU UPDATED TO SUIT NEW PLANT LAYOUT	19/08/2021
B	STORAGE BINS RE-ARRANGED TO SUIT PLANT LAYOUT AND TRAFFIC FLOW	25/08/2021
C	ADDED PROVISION FOR WATER TANKS, ADDED GARDEN BEDS	25/08/2021
D	ADDED 20M PROVISIONAL LAND AND UPDATED LAYOUT, UPDATED GLASS CRUSHER LAYOUT	25/08/2021

Fulton Hogan

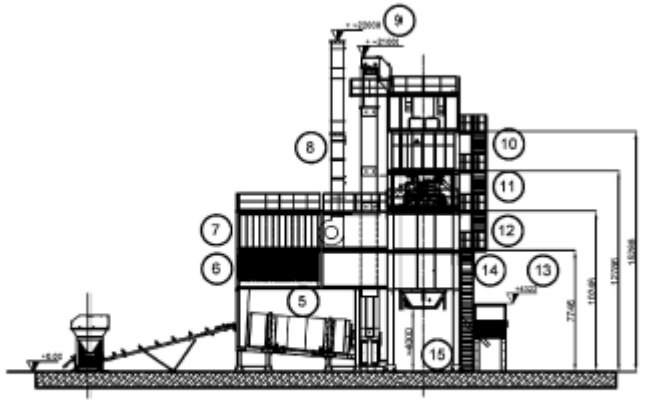
TITLE: NEW WARRNAMBOOL DEPOT PROPOSAL 3

MASON ST, WARRNAMBOOL VIC 3280

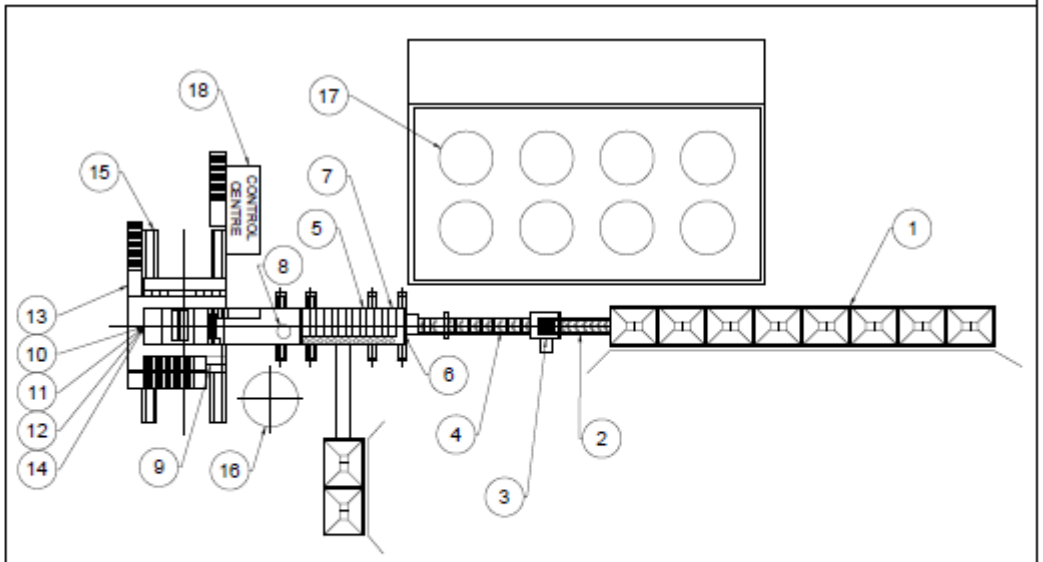
DRAWN: R. HA	SCALE: NTS	DATE: 17/08/2021
CHECKED: N. PATIL/S. OLIVA	SHEET NO: 1 OF 1	DWG NO: FH62513-001-0013

NOTE:

1. PLANT CONFIGURATION SUBJECT TO CHANGES AS PER MANUFACTURER'S REQUIREMENTS
2. SIDE ELEVATION VIEW AS PER MANUFACTURER'S STANDARD DRAWING. SIDE ELEVATION VIEW SUBJECT TO CHANGES AS PER MANUFACTURER'S REQUIREMENTS



ITEM	DESCRIPTION
1	COLD FEEDER
2	COLLECTING CONVEYOR
3	GRIZZLY FEEDER
4	CHARGING CONVEYOR
5	DRYER DRUM UNIT
6	HOPPER UNDER FILTER
7	BAG FILTER
8	CHIMNEY
9	HOT ELEVATOR
10	VIBRATING SCREEN
11	HOT MINERAL BIN
12	MIXING UNIT
13	ACCESS & PLATFORM
14	IN-LINE SILO
15	STEEL BASES
16	FILLER SILO
17	BITUMEN TANK FARM
18	CONTROL ROOM



Fulton Hogan

REVISION	DESCRIPTION	DATE
0	ORIGINAL ISSUE	01/10/2021

TITLE: PROPOSED PLANT COMPONENTS MAP

WARRNAMBOOL ASPHALT PLANT - MASON STREET, WARRNAMBOOL VIC 3280

DRAWN: R. HA	SCALE: NTS	DATE: 01/10/2021
CHECKED: N. PATIL/S. OLIVA	SHEET NO: 1 OF 1	DWG NO: FH525I3-001-002

APPENDIX VI – noise assessment at Futon Hogan – No.10-30 Dana Court, Dandenong South

The assessment of noise emissions at South Dandenong site has been carried out from 4th to 9th October 2021.

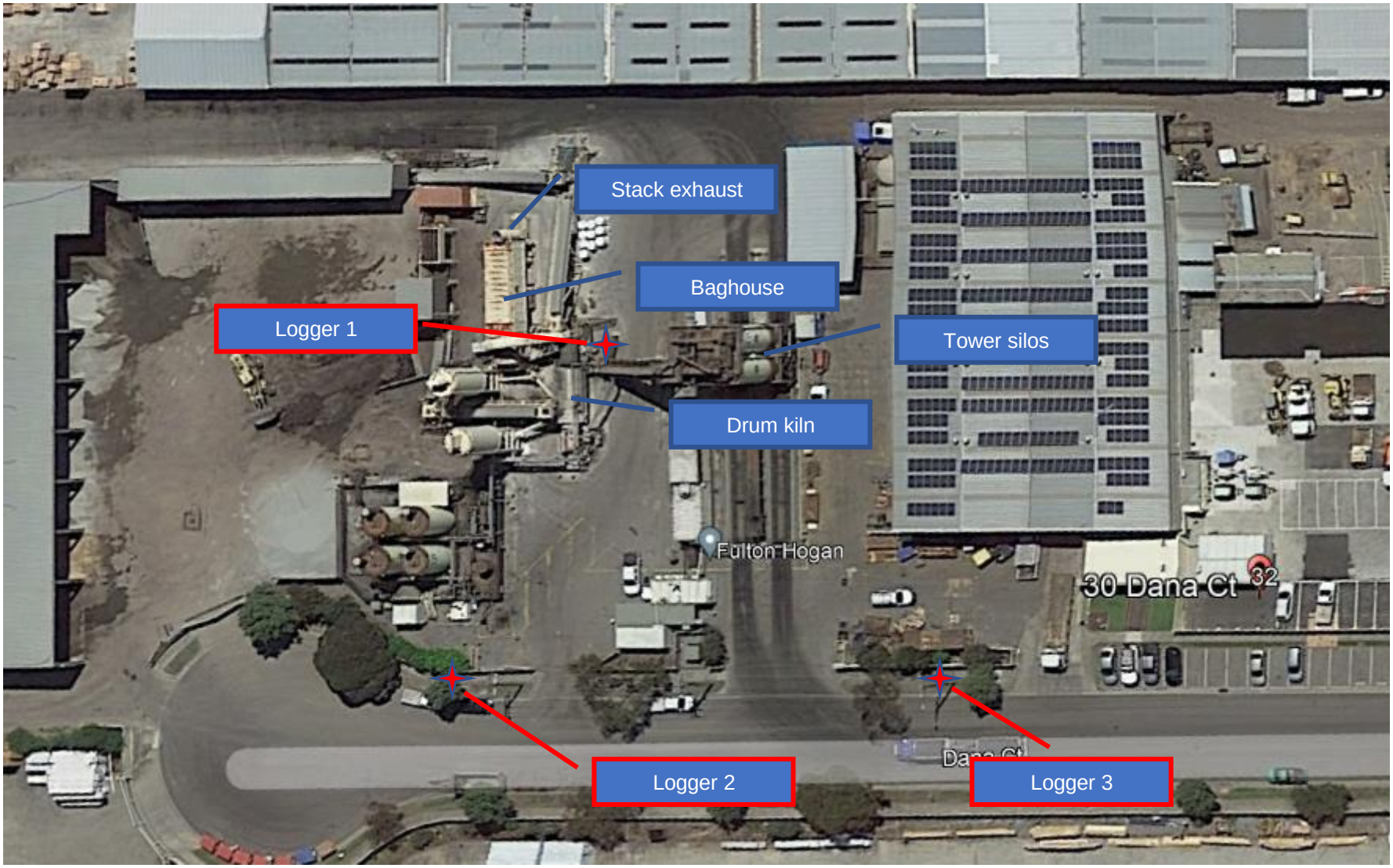
We have set three noise loggers as follows:

a. Logger 1 – inside of the asphalt plant –
b. Logger 2 – west boundary fence – trucks movement – entrance to the asphalt plant
c. Logger 3 – east boundary fence – trucks movement – exit of the asphalt plant

Position of the noise loggers is outlined in the Figure 6 overleaf.

We have considered Fulton Hogan asphalt batching plant at South Dandenong which is similar to the proposed Warrnambool plant with an exemption of the glass crusher.

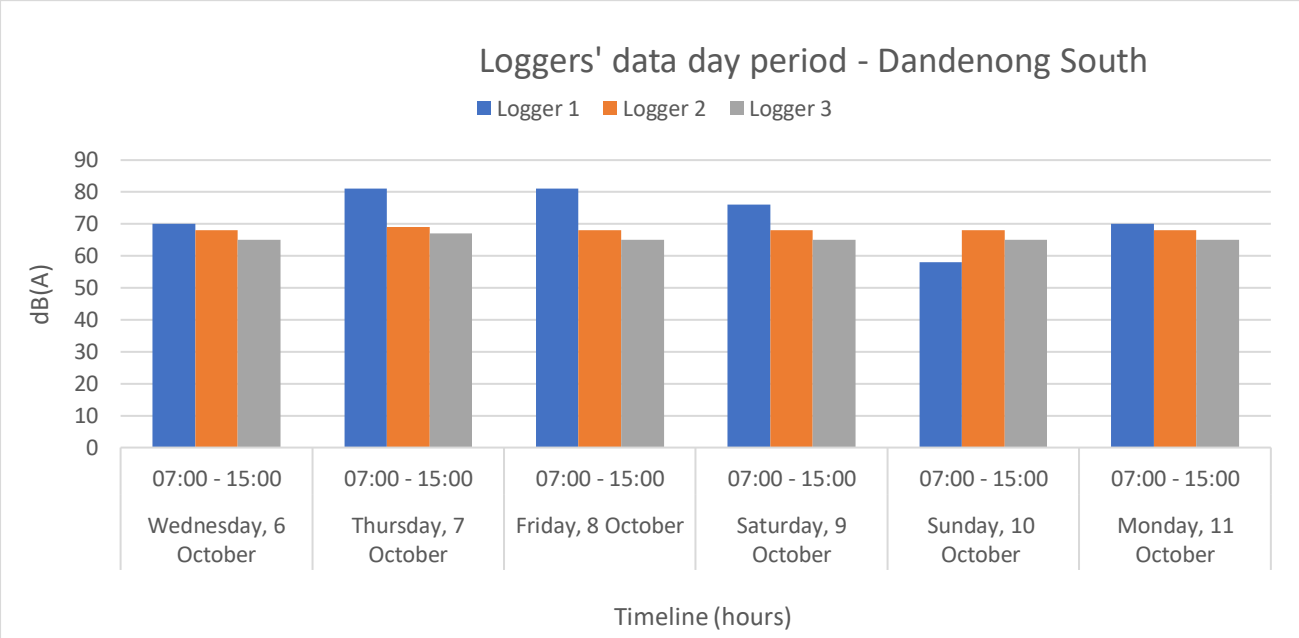
We have used this assessment as a cross check of our noise modelling, variation in the asphalt production process, and to examine truck noise impact at local environment when entering and exiting the plant.


Stack exhaust
Baghouse
Logger 1
Tower silos
Drum kiln
Fulton Hogan
30 Dana Ct
32
Logger 2
Logger 3

The following diagrams show variation in the asphalt batching process of a typical seven day period as recorded on noise loggers for day, evening and night periods.

Noise Protocol's Day period, $L_{A,eq}$

Record	Hours	Logger 1	Logger 2	Logger 3
Wednesday, 6 October	07:00 - 15:00	**70**	**68**	**65**
Thursday, 7 October	07:00 - 15:00	**81**	**69**	**67**
Friday, 8 October	07:00 - 15:00	**81**	**68**	**65**
Saturday, 9 October	07:00 - 15:00	**76**	**68**	**65**
Sunday, 10 October	07:00 - 15:00	**58**	**68**	**65**
Monday, 11 October	07:00 - 15:00	**70**	**68**	**65**
Average for the day, dB(A)		**71**	**68**	**65**

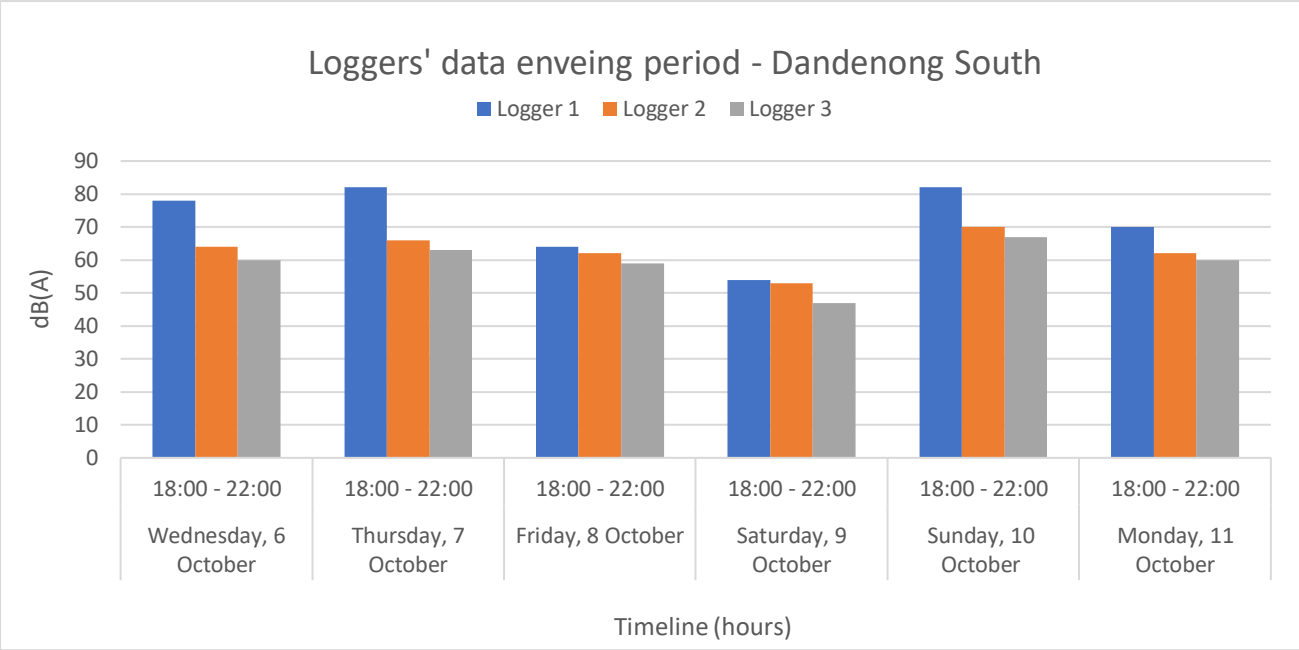


The asphalt plant was in full production on the 7th and 8th October 2021. The recorded sound pressure level was 81 dB(A) inside the premise, while Logger 2 and Logger 3 locations the sound pressure level was in the region $L_{A,eq}$ 68 dB(A) and $L_{A,eq}$ 65 dB(A) respectively, please see Table 12, above.

Logger 2 and Logger 3 were measuring sound pressure levels of trucks movements entering and exiting the premise.

Noise Protocol's Evening period, $L_{A,eq}$

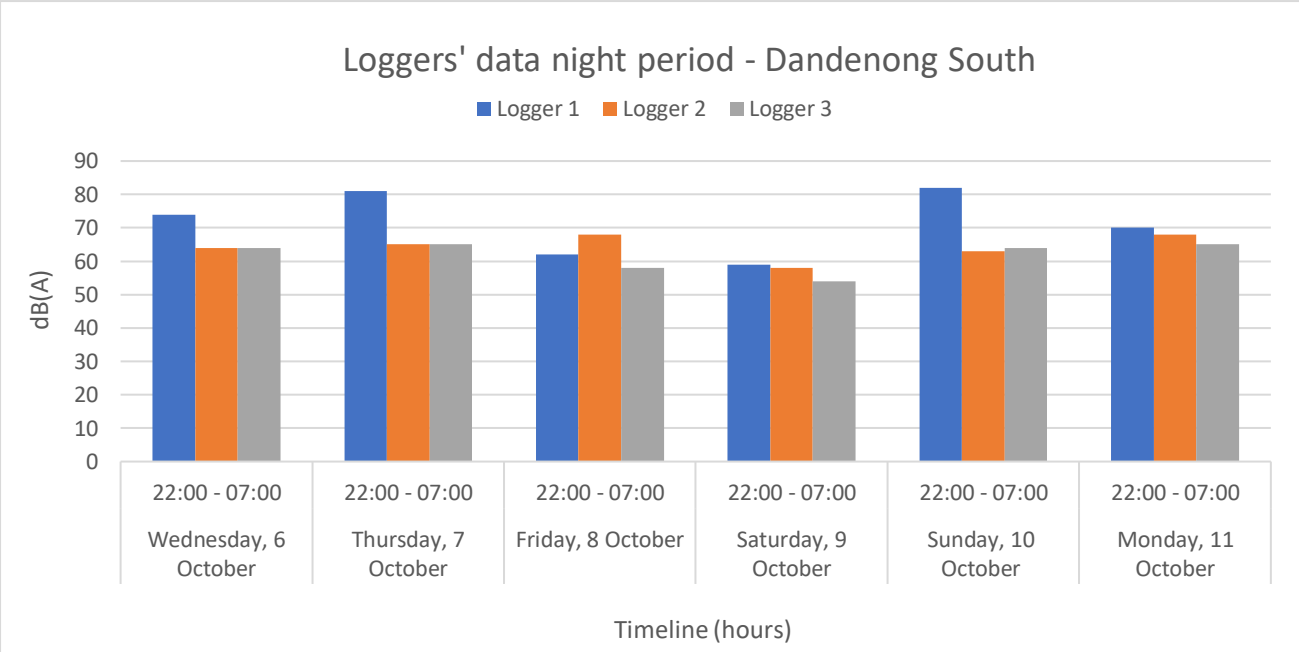
Record	Hours	Logger 1	Logger 2	Logger 3
Wednesday, 6 October	18:00 - 22:00	**78**	**64**	**60**
Thursday, 7 October	18:00 - 22:00	**82**	**66**	**63**
Friday, 8 October	18:00 - 22:00	**64**	**62**	**59**
Saturday, 9 October	18:00 - 22:00	**54**	**53**	**47**
Sunday, 10 October	18:00 - 22:00	**82**	**70**	**67**
Monday, 11 October	18:00 - 22:00	**70**	**62**	**60**
Average for the evening, dB(A)		**72**	**63**	**59**



During the evening period there was less activity at the asphalt plant when compared to during the day.

Noise Protocol's night period, $L_{A,eq}$

Record	Hours	Logger 1	Logger 2	Logger 3
Wednesday, 6 October	22:00 - 07:00	**74**	**64**	**64**
Thursday, 7 October	22:00 - 07:00	**81**	**65**	**65**
Friday, 8 October	22:00 - 07:00	**62**	**68**	**58**
Saturday, 9 October	22:00 - 07:00	**59**	**58**	**54**
Sunday, 10 October	22:00 - 07:00	**82**	**63**	**64**
Monday, 11 October	22:00 - 07:00	**70**	**68**	**65**
Average for the night, dB(A)		**68**	**64**	**60**



The main reason for noise assessment of the Dandenong Site was measurement of the asphalt manufacturing operation to produce a cross check with the Warrnambool's plant prediction model and have a better understanding of truck movements on the noise impact.

The loggers' data show similar results with the predicted noise levels and the accuracy of the noise prediction model, please see the table below, for comparison.

Loggers' position (Dandenong plant)	Nosie loggers' results, dB(A)	Predicted SPL in dB(A) for Warrnambool plant
Entrance (Logger 2)	69 dB(A) at 2m	69 dB(A) at 2m
Exit (Logger 3)	67 dB(A) at 2m	69 dB(A) at 2m
Premise (Logger 1)	82 dB(A)	81 dB(A)

We can assume that trucks exiting or entering the Warrnambool plant will not increase noise impact at nearest noise sensitive receivers above of acceptable levels.

The measurement at Dandenong South plant clearly shows that is the case

ATTACHMENT C – Odour Memo (AOC Specialist)

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Fulton Hogan Warrnambool - Batch Plant

Response to Warrnambool City Council re Odour Assessments

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1. Introduction

This report is intended to provide further information regarding off site odour risks from Fulton Hogans proposed asphalt batch plant (ABP) at 86 Rogers Road, Warrnambool (the site). Specifically, this report responds to particular issues pertaining to odour impact, raised by Warrnambool City Council in their email from 25 May 2022, in relation to an odour assessment report (AOC 2021); as follows:

- *The odour report makes reference to another plant in Dandenong and therefore doesn't address specific local meteorological conditions. This would be essential in providing assurance that the use is appropriate at this particular site. Local prevailing wind patterns and the specific orientation of the site itself need to be understood.*

- *Although acknowledged that you can't provide for all future eventualities, all reports fail to consider land identified for future residential as per the structure plan.*

- *In order to prove that the proposal can meet the objectives in its specific context, it needs justification from all three reports using the sensitive receivers that exist in context and analysed with the localized conditions that will influence the outcome.*

2. Odour assessment method rationale

This section provides an overview of the approach taken in AOC (2021) to assess odour and provides a rationale for the selection of the plume method to assess a reference facility (Fulton Hogan Dandenong asphalt plant).

2.1. EPA Publication 1883 – Guidance for Assessing Odour

Application of the odour assessment framework, using a Level 2 Assessment, in accordance with EPA Publication 1883 – *Guidance for Assessing Odour* (EPA 2021), demonstrates that the proposal is low risk. A Level 2 assessment considers level of hazard of the odour source, the effectiveness of the exposure pathway, and the sensitivity of the receiving environment.

As per Publication 1883, proposals that are determined as being low risk via a Level 2 assessment do not require further detailed assessment. Regardless, AOC (2021) undertook a more detailed assessment (effectively in accordance with a Level 3 assessment described in Publication 1883) to determine the odour risk associated with the proposal. This further assessment comprised a plume survey of a reference site as described in the following sections. The aim of the assessment was to determine the extent of the odour plume from a site with similar operations and odour controls in place.

2.2. Odour Plume Assessment at a Reference Site

An odour plume assessment was undertaken by AOC in November 2021 (AOC 2021) to support the development license application (DLA) for the proposal. The assessment applied the plume method in order to determine the extent of the odour plume from a reference site (Fulton Hogan asphalt plant at 10-30 Dana Court, Dandenong). The Dandenong site was selected as a similar site, but it is noted that it presents a worst-case scenario as it produces significantly larger volumes of asphalt that are proposed at the Warrnambool site. The use of a plume assessment of an existing and similar site is consistent with EPAs recommended approach for the assessment of proposed facilities (EPA 2021).

The method aims to determine the extent of detectable and recognisable odours from a specific source using

direct observation in the field, under specific meteorological and operational conditions, by an assessor trained in accordance with AS/NZS: 4323.3 . The odour plume assessment method reflects actual conditions in the field relative to the odour emissions and impacts from the source. This approach is EPA Victoria's recommended method as it has been demonstrated to more representative of in-field conditions and impacts when compared to predictor models.

Accordingly, AOC (2021), undertook four surveys under a variety of wind (strength and direction), temperature and weather conditions. The aim of the assessment was to capture all operational variations and products being produced that generate odorous emissions. These included:

- Venting of odorous emissions while filling storage tanks with A10 polymer bitumen
- Venting of odorous emissions while filling storage tanks with 310 polymer bitumen
- Asphalt production
- Loading trucks

With respect to the comments from Council (Section 1) that AOC (2021) does not '*address specific local meteorological conditions This would be essential in providing assurance that the use is appropriate at this particular site. Local prevailing wind patterns and the specific orientation of the site itself need to be understood*' we note that*:*

- The assessment undertaken was not a modelling assessment as described above.
- Unless the terrain around the proposed site (or the reference site) is complex such that odour plumes may funnel and concentrate to differing degree between subject and reference site, a modelling assessment is not necessary. The terrain of the proposed site was determined to be similar to the reference site and therefor was not considered as an influencing factor.
- As the topography around the existing Dandenong site and the proposed Warrnambool site are similar (low complexity, generally flat), there is no significant benefit in using a modelling approach. Undertaking a plume assessment at an existing similar site (i.e. a reference site) is the preferred approach in this situation.
- The plume assessment was undertaken to consider worst case conditions. It was undertaken downwind of the source under operational conditions that generate the highest emissions rather than normal operations. This data is then used to assess the distance at which there is risk of odour impacts. The assessment was undertaken under a variety of wind strengths and directions with the data indicating that medium strength gusting conditions allow the plume to travel the furthest for the site.
- The fact that gusting wind conditions influence the plume means that a predictor model can't accurately predict the distance of impact under these meteorological conditions.
- The modelling of the meteorological conditions will only provide additional information regarding the frequency of odour impact. This is generally only undertaken where a high risk of odour impact is identified, and this is not the case in this assessment.

In summary, the plume assessment provides an indication of likely maximum distances a plume from the proposed facility may travel from the site (under a variety of wind conditions); this therefore provides an assessment of the risks of odour impact, while modelling of the meteorological conditions provides the frequency of odour impacts. Although frequency of impact is valuable information in situations where sensitive receptors may be impacted by an odour plume, it is not relevant in these circumstances as the distance at which the odour impacts are likely to occur are less than where sensitive use areas are located.

With regard to Council's comment, '*Although acknowledged that you can't provide for all future eventualities, all reports fail to consider land identified for future residential as per the structure plan'.* While it is considered inappropriate to assess odour impacts at a receiver that does not exist, for the purposes of supporting our response (at Section 2.4.3) to Councils comment, the following initial assessment of prevailing wind conditions is provided:

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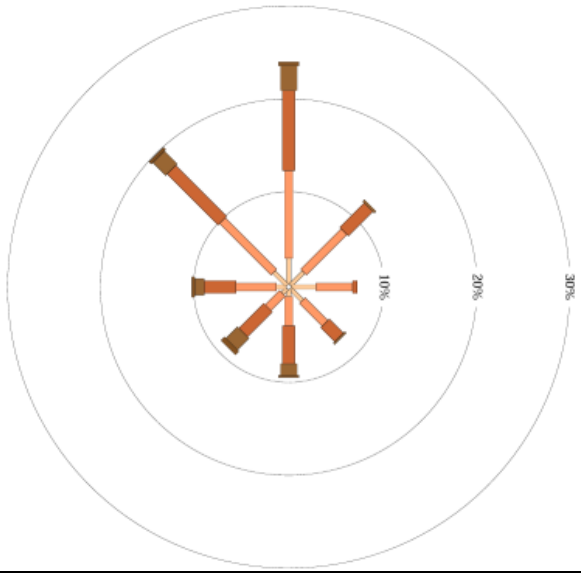
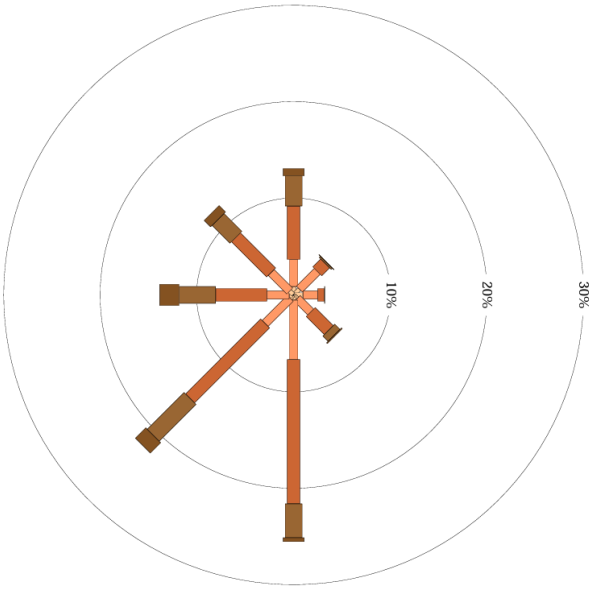
- Wind roses (from Warrnambool Airport for the period 1998 to 2021) sourced from Bureau of Meteorology, presented at Figure 1 below, indicate easterly winds occur at a very low frequency.
- Prevailing winds tend to be north / north-west at 9am (offshore morning winds) versus south / southwest winds at 3pm (afternoon onshore winds)
- Winds from due east (that would direct odour from the site toward the potential GRZ to the west) occur approximately 8% of the time at 9am and 3% of the time at 3pm.



9am Warrnambool Airport (average annual wind speed and direction for years 1998 to 2021)



3pm Warrnambool Airport (average annual wind speed and direction for years 1998 to 2021)

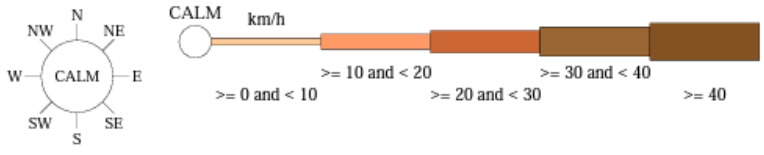


Figure 1 Wind Roses – BoM station Warrnambool Airport NDB (No 090186)

2.2.1. EP Publication 1518 – Recommended separation distances for industrial residual air emissions

EPA Publication 1518 - *Recommended separation distances for industrial residual air emissions* provides recommended separation distance between industrial land uses that emit odour or dust, and sensitive land uses. The following sections include consideration of recommended separation distances for asphalt plants (in EPA Publication 1518) between various existing (and potential) sensitive receivers and land uses.

2.3. Odour Assessment

2.3.1. Odour Plume Assessment – Outcome

AOC (2021), in summary, found that:

- Distinct odour, that was mainly transient, could be detected within 350m radius of the premises.
- No odour was detected between 370 and 600m from the premises.
- The risk of odour impacts on sensitive receptors between 350 m and 500 m from the site was considered medium to low.
- The risk of odour impacts on sensitive receptors beyond 500m from the site was considered as low.

The above risk assessment outcomes are:

- corroborated by a history of no odour complaints from the established sensitive receptors 370-400m from odorous activities undertaken on-site; and
- consistent with a recommended separation distance of 500m for asphalt plants with >100 tonnes per week production, as per EPA guidance 1518.

2.4. Application of reference site assessment to proposed Warrnambool site

2.4.1. Existing sensitive receivers – residences

The distance to the two nearest residences is approximately 650 m (140 Boiling Down Road, north-west of the site) and 700 m (21 Veal Road, east of the site). As per Section 2.3, the risk of odour impacts from the proposed site beyond 500 m, is low. There is therefore no significant risk of odour impacts expected at the existing residential receivers.

2.4.2. Existing Rural Living Zone (RLZ)

The existing RLZ is approximately 400 m east of the proposed site (at its nearest point). The nearest residence within the RLZ is 21 Veal Road (700 m from the site). As per Section 2.3, the risk of odour impacts from the proposed site on sensitive receptors beyond 500m from the site was considered low.

The recommended separation distance from the site to the RLZ, as determined via application of the rural method in EPA Guidance 1518, is taken as the distance from the proposed site boundary to the activity

boundary at the nearest sensitive receiver (not to the boundary of the zone); as above, this is measured at approximately 700 m.

While an assessment of odour risks to receivers at or near the boundary of the RLZ (and therefore outside the existing sensitive receiver activity boundaries) is inconsistent with the recommended approach, it is noted that given the transient nature of the plume observed at the reference site within 350 m and the medium to low risk to sensitive receptors between 350 and 500 m, the risk of significant odour impact to any receiver at or near the RLZ boundary that happens to be in the plume path, is considered low.

2.4.3. Potential GRZ

A potential GRZ is approximately 325 m west of the proposed site (at its nearest point). As per Section 2.3, ddistinct, transient odour could be detected within 350m radius of the Dandenong reference plant.

The separation distance, as determined via application of the urban method in EPA Guidance 1518 (i.e. 'method 1'; the appropriate method in the case of the GRZ), from the site to the GRZ, is taken as the distance from the proposed site boundary to the boundary at the nearest sensitive receiver; this is measured at approximately 325m.

Based on AOC (2021) report, there is potential for odour impacts, up to 350 from the site. The chosen reference facility has established sensitive receptors located 370-400m from the premises with no records of odour impact at these locations. This implies that odour impacts from the proposed plant may be experienced, yet are unlikely near the boundary of the potential GRZ. Beyond this distance and up to 500 m from the site (175 m beyond the potential GRZ boundary), the risk of odour impacts is considered medium to low. Beyond 500 m, odour risks are considered low.

As per Section 2.2, easterly winds that would direct odour from the site westerly toward the potential GRZ occur at a very low frequency which further reduces the frequency of an odour plume intersecting the GRZ boundary.

2.5. Conclusion

The use of a plume assessment to characterize the plume generated by a reference site is considered appropriate to confirm that odour risk from the proposed site is low, consistent with EPA Publications 1883 and 1518.

Risks to residential sensitive receivers (the two closest being 650 m and 700 m from the site) from off-site odour is considered low. Likewise, risks of odour impacts to receivers at or near the boundary of the RLZ are low.

With respect to the potential GRZ, this would require a variation from the recommended separation distance of 500 m (EPA guidance 1518). Considering that AOC 2021 included surveys of plumes generated by activities and materials that create more odour than what is proposed for Warrnambool, and that the reference site has a considerably higher throughput than the proposed facility, it is possible that impacts at the boundary of the potential GRZ will be low. Regardless, any odour plume within the potential GRZ would be transient. Prevailing winds are noted to be away from the GRZ and this would reduce the frequency of an odour plume intersecting the GRZ boundary.

3. References

AOC 2021, *Odour assessment to determine the extent of the odour plume from Fulton Hogan Asphalt Plant, 10-30 Dana Ct, Dandenong VIC 3175* AOC Specialist, Report to Fulton Hogan, November 2021.

EPA 2013, *Recommended separation distances for industrial residual air emissions Publication 1518* Victoria Environment Protection Authority March 2013.

EPA 2021, *Guidance for Assessing Odour, Publication 1883, 2021*, Victoria Environment Protection Authority. Familiarisation draft CASANZ 2021