LARA SUBDIVISION AND REZONING

Acoustic Report

For

LARA FARMS PTY LTD

DOC. REF: V798-01-P ACOUSTIC REPORT (R4)
24 JANUARY 2024

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Project	Lara Subdivision and Rezoning
Subject	Acoustic Report
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1 Introduction & Scope

Enfield Acoustics has been engaged by Lara Farms Pty Ltd (Land Developer) to assess potential noise impacts relating to the proposed rezoning for the Subject Land described below.

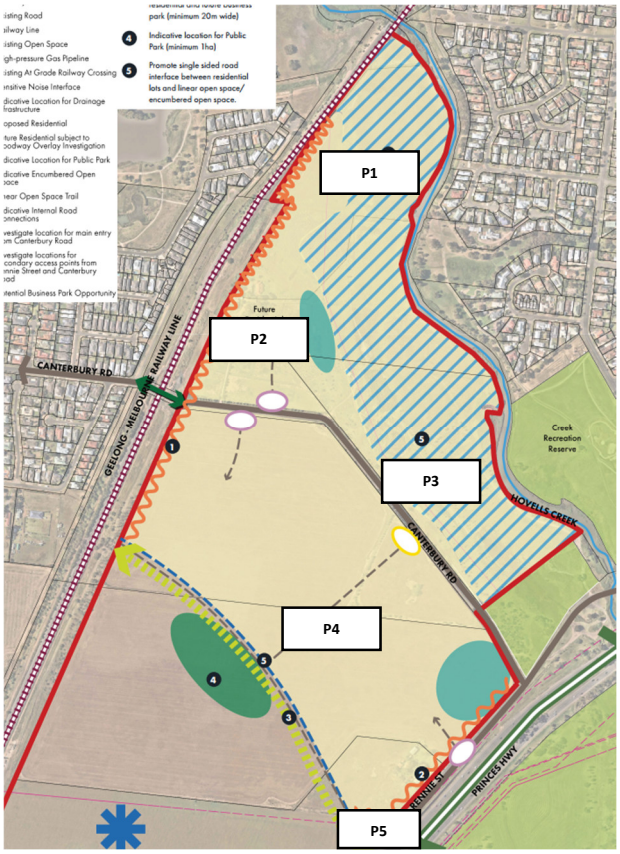
Two potential noise sources exist adjacent to the land that typically require planning controls or restrictive covenants on lots to be considered, being:

- Princess Highway to the East
- A rail corridor (V/line) to the West

The proposed parcels are described below, with specific noise sources relevant in the assessment:

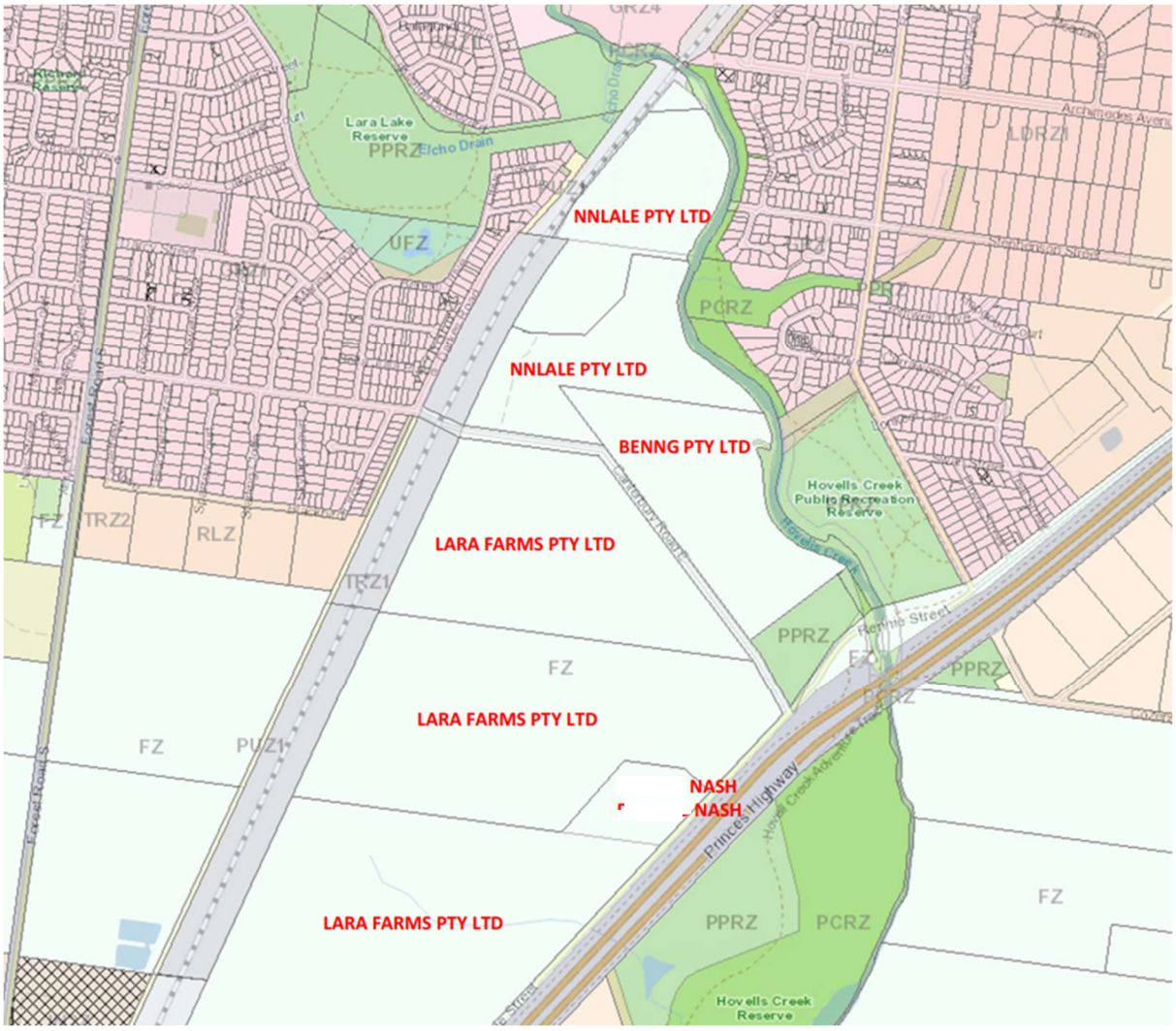
Designation	Address & Parcel No	Relevant Noise Sources
Parcel P1	99 Canterbury Road East (Parcel 1\TP161420)	Rail noise only
Parcel P2	95 Canterbury Road East (Parcel 1\TP182698)	Rail noise only
Parcel P3	101-145 Canterbury Road East (Parcel 3B~15B\PP5452)	Road noise only
Parcel P4	76-156 Canterbury Road East (Parcel 3C~15B\PP5452) 785-805 Princes Highway (Parcel 1\TP156147)	Road and Rail Noise
Parcel P5 (separate land holding)	705-765 Princes Highway (Parcel 1\TP191059)	Road noise only

Approximate locations of the designated areas are shown below:



It is noted that a significant portion of Parcels P1 & P3 are subject to Floodway Overlay Investigation (where hatched in blue above), so it is uncertain at this stage where residential dwellings can be sited.

Please refer below for a map showing the land ownership of the above parcels:



This document has been prepared as a feasibility study in the event that the following Referral Authorities require acoustic performance requirements to be met on the site:

- Department of Transport (DoT) / VicRoads
- Council

To this end, Enfield Acoustics has:

1. Visited the Subject Land to survey existing conditions, including measurements of existing noise barrier heights along the Princes Highway / Rennie Street alignment;
2. Conducted long-term unattended noise monitoring to establish existing road traffic noise levels and to calibrate future noise modelling;
3. Conducted attended train noise measurements to establish rail noise impacts;
4. Conducted 3D acoustic noise modelling to predict future traffic noise impacts;

5. Based on the results of our assessment, recommended potential acoustic treatment and/or controls to ensure that the noise amenity of future residents is protected.

This report has been prepared in reference to Plans prepared by Tract dated 20 May 2022.

It is noted that subdivision masterplans have not been provided, except for Parcel P4 and P5 where a preliminary masterplan has been developed. To this end, our assessment is preliminary only to determine:

- The likely severity of noise impacts and the extent of mitigation or controls likely to be required
- The suitability of the rezoning the Subject Land for residential use

2 Traffic Noise Assessment

It is noted that VicRoads has now been integrated into the Department of Transport, however this document will refer to the referral authority as 'VicRoads' to be consistent with the current noise guidelines and policies.

2.1 Traffic Noise Criteria

There are no specific planning requirements and/or controls that apply to new residential developments when assessing traffic noise impacts. However, VicRoads as a referral authority may be requested by Council to suggest requirements on residential developers seeking planning approvals for land adjacent to major arterial roads.

Where new residential subdivisions are proposed along existing major arterial roads, the VicRoads document *Requirements of Developers – Noise Sensitive Uses* provides guidance as to noise criteria and/or requirements in new residential subdivisions.

The objectives of the document are as follows:

- The developer shall attenuate traffic noise from a freeway to a level of 63dB(A) $L_{10\text{-}18hr}$ or less at the most exposed façade of a noise-sensitive building
- The adopted noise attenuation requirements will be met for 10 years after finalization of the development or, where relevant, for each stage of the development.

Where the developer decides, in consultation with VicRoads and Council that it is not desirable to erect high noise barriers, then the following should be considered:

- Noise sensitive uses shall be designed to meet the acoustic standards set out in *AS2107:2000 – Acoustics – Recommended Design Sound Levels and Reverberation Times for Building Interiors* (AS2107)

Based on the VicRoads guideline, target noise objectives can be summarised as follows:

Location	Target Criteria	Method of treatment
Where Noise Barriers are feasible and/or practical		
Most exposed façade (between 6am to 12am)	**≤ 63 dB(A) $L_{10\text{-}18hr}$** (façade corrected)	Mitigate via noise barriers
Where Attenuation Cannot Be Feasibly Attained via Noise Barriers		
Living Rooms (Internal)^ (between 6am to 10pm)	**≤ 40dB(A) $L_{eq\text{-}16hr}$** – Day	Mitigate via architectural treatment
Bedrooms (Internal)^ (between 10pm to 6am	**≤ 35dB(A) $L_{eq\text{-}8hr}$** – Night	Mitigate via architectural treatment
Notes:	^ Target criteria derived from the middle of satisfactory and maximum ranges of AS2107	

While AS2107 does not specifically nominate day/night periods, it is common practice that bedrooms and living rooms are treated separately (corresponding to day/night periods), noting that this is consistent with the *Better Apartments Design Standards* (BADS) and *Clause 55.07* of the Planning Scheme, which nominates internal noise criteria for road traffic noise.

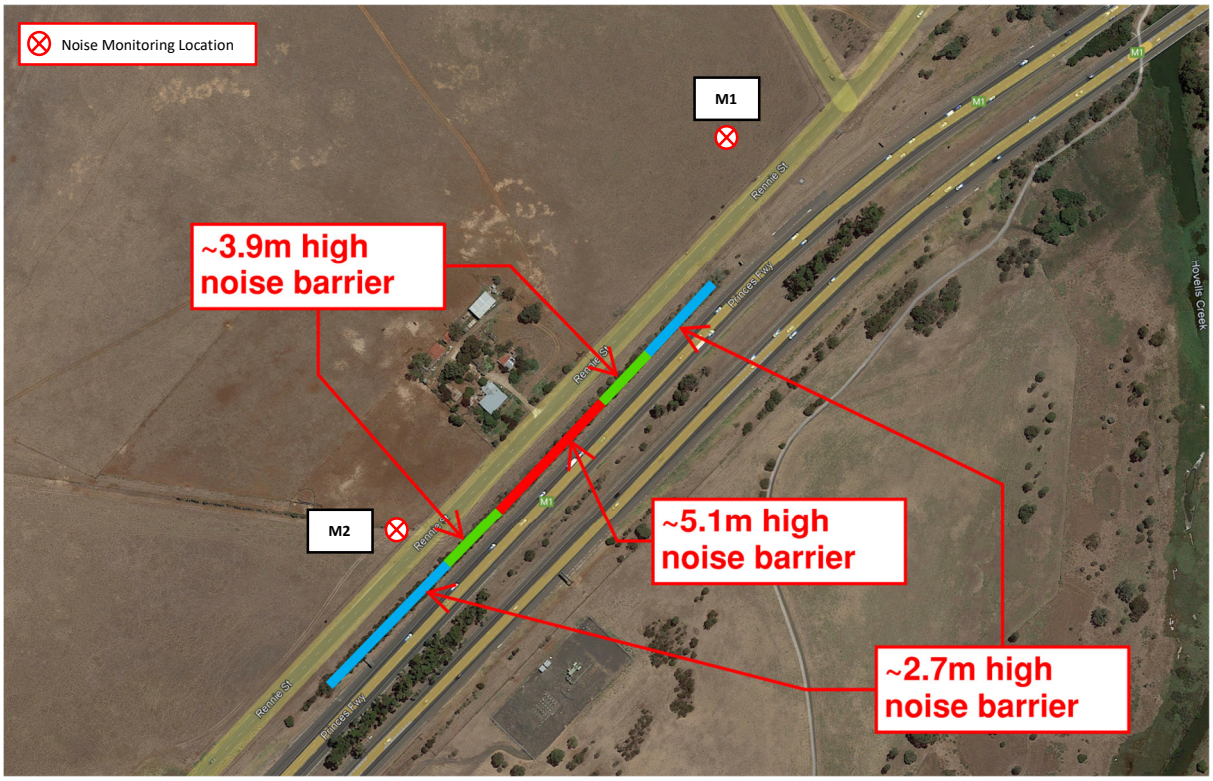
To that end, it is worth noting that the internal target criteria above are also consistent with both BADS and Clause 55.07 of the Planning Scheme.

2.2 Noise Monitoring

Enfield Acoustics visited the site on 19 October 2021 to install unattended long term noise monitors. The noise monitor was retrieved on 27 October 2021.

Noise monitoring was conducted at the locations shown in the following Figure.

A noise barrier exists adjacent to Parcel P4 and P5, presumably to mitigate noise to an existing dwelling on the land. The heights and extents of the existing noise barrier were obtained during one of our site inspections, which has been incorporated into our noise model discussed later.



The results of our unattended noise monitoring are as follows:

Location M1

Date	Traffic Noise Levels $L_{10\text{-}18hr}$, dB(A)	$L_{eq\text{-}16hr}$, dB(A)	$L_{eq\text{-}8,hr}$ dB(A)
19 October 2021 - Tuesday	Incomplete	Incomplete	61
20 October 2021 – Wednesday	67	65	60
21 October 2021 – Thursday	65	63	58
22 October 2021 – Friday	66	64	57
23 October 2021 – Saturday	-	-	-
24 October 2021 – Sunday	-	-	-
25 October 2021 – Monday	67	65	59
26 October 2021 – Tuesday	66	64	62
Average	66 (free-field) 69 (façade-corrected)	64	60

Location M2

Date	Traffic Noise Levels $L_{10\text{-}18hr}$, dB(A)	$L_{eq\text{-}16hr}$, dB(A)	$L_{eq\text{-}8,hr}$ dB(A)
19 October 2021 - Tuesday	Incomplete	Incomplete	59
20 October 2021 – Wednesday	65	63	56
21 October 2021 – Thursday	62	60	57
22 October 2021 – Friday	64	62	57
23 October 2021 – Saturday	-	-	-
24 October 2021 – Sunday	-	-	-

25 October 2021 – Monday	65	64	57
26 October 2021 – Tuesday	Incomplete	61	Incomplete
Average	64 (free-field) 67 (façade-corrected)	62	57

No adverse weather events were observed during our monitoring.

A façade correction of +2.5 was added to the free-field monitoring results for consistency with VicRoads road traffic criteria.

2.3 Noise Model Calibration

A 3D computational noise model has been generated using the software package CadnaA to assess noise impacts across the site and calibrated to existing conditions using the *Calculation of Road Traffic Noise* (CoRTN) algorithm. Screening effects from the existing noise barrier has been included in the model.

Based on data publicly available on the Department of Transports *Open Data Hub*, it is predicted that the adjacent section of the Princes Highway is expected to grow by approximately 3.4% per annum, with a two-way traffic volume (AADT) of 70,000 for the year 2020 (estimate).

Applying a growth rate of 3.4%, the expected traffic volumes for the year 2021 (coinciding with the year of monitoring) is expected to be 72,380 AADT.

The model was calibrated based on the following assumptions:

- 18-hour traffic flow volumes based on 95% of AADT
- 9.6% heavy vehicles
- Road pavement assumed as Dense Graded Asphalt (DGA)
- Façade correction of +2.5dB has been included in the model

The results of the calibration are as follows:

Location M1

Item	Traffic Noise Levels $L_{10\text{-}18hr}$, dB(A)^
Measured results	69
Modelled results	69
Difference	-
Notes:	^ Façade corrected noise levels

Location M2

Item	Traffic Noise Levels $L_{10\text{-}18hr}$, dB(A)^
Measured results	67
Modelled results	66
Difference	1
Notes:	^ Façade corrected noise levels

A map of the noise model calibration is presented in Appendix A.

The results above indicate a satisfactory correlation between measured and modelled results, indicating that future traffic noise modelling can be relied on and as such is suitable for use in our assessment.

The results of the modelling also indicate that the impact from reduced traffic flows due to 'Covid-19' restrictions are likely to be negligible at the time of monitoring. This is consistent with our experience as the easing of restrictions towards the end of 2021 were likely to result in traffic conditions returning to normal.

To derive the $L_{Aeq\text{-}16hr}$ and $L_{Aeq\text{-}8hr}$ metrics in the noise model, the following corrections have been applied (based on the measured difference from the unattended monitoring):

- $L_{Aeq\text{-}16hr\ (free\text{-}field)}$ = $L_{A10\text{-}18hr(façade)}$ – 5dB(A)
- $L_{Aeq\text{-}8hr\ (free\text{-}field)}$ = $L_{A10\text{-}18hr(façade)}$ – 9dB(A)

2.4 Future Traffic Noise Increase

VicRoads guidelines recommend that potential traffic noise increase over a 10-year horizon (after construction of dwellings) be considered in any mitigation design. Because the exact date of commencement is not yet known, we have conservatively assessed traffic noise increase over a 15-year horizon (Year 2039).

Based on data publicly available on the Department of Transports *Open Data Hub*, it is predicted that the adjacent section of the Princes Highway is expected to grow by approximately 3.4% per annum, with a two-way traffic volume (AADT) of 70,000 for the year 2020.

Based on the traffic growth estimate data, the traffic volume for the year 2039 is expected to be approximately 123,600 AADT, which translates to approximately 2.5dB(A) increase in overall noise levels from the reference year of our monitoring (2021) to the design year (2039).

2.5 Noise Modelling and Recommendations (Parcel P4)

To assess future noise impacts (2039), a +2.5dB(A) correction for future traffic volume increase has been applied to the noise model. The noise model also includes a +2.5dB(A) façade correction to all $L_{10\text{-}18hr}$ results to be consistent with VicRoads external traffic noise criteria.

Our model assumes that townhouses up to two storeys could potentially be constructed on the site.

The results of the noise model are presented in Appendix B, as follows:

- Map 2 – $L_{A10\text{-}18hr}$ 1.5m above ground / 2039 / Do Nothing
- Map 3 – $L_{A10\text{-}18hr}$ 1.5m above ground / 2039 / Townhouse Construction

It is predicted that VicRoads external traffic noise criteria are exceeded by up to 6dB(A) at the worst-affected lot on Parcel P4. The noise criterion is exceeded by a lesser degree for areas

directly behind the existing noise barrier (Parcel P5) on the road reservation along the Princes Freeway.

It is noted that Parcel P5 is assessed separately (See Section 2.6), noting that this land is under a different land holding and there is uncertainty regarding future development outcomes and timing. The assessment and noise modelling in this section is to confirm that that the development of Parcel P4 can commence (inclusive of any mitigation/controls) independent of the development of Parcel P5.

Alternative Mitigation via Townhouse Construction

We have been instructed by the Land Developer to consider an alternative approach from standard noise barriers, which includes the construction of townhouses that interface with the Princes Highway. The concept behind this proposal is such that a continuous row of double-storey townhouses would replace the need for off-site noise barriers.

The concept was presented to DoT in a meeting held on 5 December 2022 and a technical memorandum had been prepared to further inform DoT of the Applicant's proposal and to determine whether this can be supported to a degree where an acceptable amenity outcome can be achieved on all proposed residential lots.

Our office has coordinated with the Land Developer to prepare in-principal plans that include rows of double-storey townhouses at immediate lots facing the Princes Highway. The design of the townhouses has been developed such that the external VicRoads criteria of 63dB(A) $L_{10\text{-}18hr}$ can be achieved for the balance land where detached dwellings are proposed.

It is understood that the concept has been accepted in principle by DoT over email correspondence received on 13 January 2023.

Based on updated noise modelling on the current development plans, it has been identified that the following areas on Parcel P4 below require townhouse construction:

Given that VicRoads external amenity targets will be exceeded at the townhouses, we see it appropriate that the following design principles are adopted such that a reasonable amenity outcome can be achieved, as follows:

Internal Layout Design

1. Non-sensitive spaces such as garages, stairs, storage etc shall be sited interfacing with or orientated to the Princes Highway
2. Bedrooms shall be sited facing away from the Princes Highway (towards the rear of the townhouses)
3. Where the above is not feasible due to lot constraints and/or specific orientation requirements, habitable spaces shall be designed to meet the following internal noise levels:
    a. No greater than 40dB(A) $L_{eq\text{-}16hr}$ in living rooms; and
    b. No greater than 35dB(A) $L_{eq\text{-}8hr}$ in bedrooms

Private Outdoor Spaces

- Private outdoor spaces should be positioned where shielded by the built form of townhouses (towards the rear)
- Balconies and outdoor terraces shall not be constructed where exposed (within line-of-sight) to the Princes Highway
- Where the above is not achievable due to space constraints and lot orientation (e.g. for corner lots), the following shall be provided:
    - 1.8m boundary acoustic fencing shall be installed to ground floor private open spaces, where deemed acceptable by council; **OR**
    - An alternative private outdoor space must be provided that is shielded (not within line-of-sight) to the Princes Highway

Inclusive of the proposed design principles above, we consider the proposal to be reasonable in ensuring that an acceptable internal and external amenity outcome can be achieved for the overall Subject Land.

Refer to Map 3 in Appendix A for noise mapping showing the screening effect of townhouses, where VicRoads external criteria is achieved for all of the balance land.

It is worth noting that a noise barrier already exists adjacent to the Subject Land, meaning that the worst-affected of townhouses already benefit from a reasonable degree of mitigation.

Based on the results of the noise modelling, we predict that the highest noise levels incident on the upper-floor levels of townhouses (representative of 'worst-case' impacts) are as follows:

- Up to 64 dB(A) $L_{eq\text{-}16hr}$
- Up to 60 dB(A) $L_{eq\text{-}8hr}$

We estimate that minimum forms of glazing (R_w>30, 6mm float glass or any double-glazed unit) will achieve the internal noise criteria stated above. The above is indicative only as a sensitivity analysis, actual requirements would likely depend on the extent of glazing and façade orientation.

Standard forms of façade construction such as masonry or lightweight cladding with standard bulk insulation within cavities would comfortably surpass the performance requirements of the windows and doors.

To mitigate any risk of non-compliance, the design and performance requirements above can be incorporated through a planning instrument or restrictive covenant on the title of the lots indicated above.

With regards to Parcel P3, no further assessment is required as residential lots are not proposed within areas exceeding VicRoads external noise criteria.

2.6 Parcel P5 Assessment

While specific mitigation has not been identified for Parcel P5, we are satisfied that the application to rezone that parcel can be approved, noting that noise mitigation/controls similar to that discussed in Section 2.5 above will also be effective in mitigating road traffic noise on this parcel of the land, which is under a separate land holding.

Based on the noise modelling results, it is expected that rows of townhouses along the south and west interfaces will resolve any exceedances for the balance of Parcel P5 land.

It is also worth noting that Parcel P5 which is sited directly behind the existing noise barrier is impacted by road traffic noise to a lesser extent than Parcel P4. This infers that where noise impacts can be reasonably mitigated for Parcel P4, it can also be reasonably mitigated for Parcel P5.

The extents of noise mitigation, including potential townhouse areas can be confirmed at a later stage, subject to further site-specific investigations and review of the P5 masterplan, which can be conducted if or when a planning permit is sought for residential development on parcel P5.

3 Train Noise Assessment

3.1 Noise Measurements

Our office has conducted attended train noise measurements on 19 & 27 October 2021 to measure rail noise impacts from the corridor at the following location:

Attended noise measurements were conducted at a location representative of the worst-affected location (along the West boundary).

$L_{Aeq-8hr}$ (Night) Results

Using the data obtained from the attended noise monitoring, the Single Event Level (SEL) was calculated from an average of several train passby's (to and from the city), as follows:

Measurement	SEL, dB(A)	63Hz	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz
Train passby (SEL)	86	86	85	81	78	81	83	74

Using the SEL above, long-term average noise levels were calculated based on the total number of passby's during the Day (6am to 10pm) & Night period (10pm to 6am), obtained from timetables published on the Public Transport Victoria website.

The results of our assessment are as follows:

Measurement	Train Passby's	Noise Level
$L_{Aeq-8hr}$ based on current rail timetable (V/Line trains)	13	53 dB(A) $L_{Aeq,8hr}$
$L_{Aeq-16hr}$ based on current rail timetable (V/Line trains)	103	59 dB(A) $L_{Aeq-16hr}$

L_{Amax} Results

The following maximum noise levels (L_{Amax}) from train passby's was measured as follows:

Measurement	L_{Amax} dB(A)	63Hz	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz
Train passby (L_{Amax}) – Train Horns	98	75	72	59	61	97	88	83
Train passby (L_{Amax}) – Rail noise	83	77	81	79	74	76	80	71

3.2 Passenger Rail Infrastructure Noise Policy (PRINP)

It is noted that residential land use proposed on the Subject Land is supported by the Sunbury South Precinct Structure Plan (PSP), which was approved and gazetted on 17 January 2019. Advice from the Department of Transport (DoT) may be sought on whether the proposal constitutes as a land change use in this instance given that this is normally a matter which is dealt with during strategic planning investigations. This may the the case however, given that Council's RFI makes reference to the PRINP.

In the instance that DoT considers the proposal as a change in land use which has not previously been dealt with via Council's strategic planning assessment, the PRINP recommends investigation thresholds as follows:

Table B: Investigation thresholds for change in land use near an existing rail corridor

Time	Type of receiver	Investigation threshold(s)
Day (6am – 10pm) **dB(A) External**	> Residential dwellings and other buildings where people sleep including aged person homes, hospitals, motels and caravan parks > Noise sensitive community buildings including schools, kindergartens, libraries	65 L_{Aeq} **or** 85 L_{Amax}
Night (10pm – 6am) **dB(A) External**	> Residential dwellings and other buildings where people sleep including aged person homes, hospitals, motels and caravan parks	60 L_{Aeq} **or** 85 L_{Amax}

Where rail noise impacts are below the recommended investigation thresholds, the PRINP does not recommend any further mitigation or consideration with regards to acoustic amenity impacts.

It is generally accepted under the PRINP that train horns are excluded from assessments, meaning that the L_{Amax} metric relates to the maximum rail noise from a train passby.

Compliance with the investigation thresholds under the PRINP can be summarised as follows:

Metric	Measured Level	PRINP Investigation Threshold
$L_{Aeq\text{-}16hr}$	59 dB(A)	65 dB(A)
$L_{Aeq\text{-}8hr}$	53 dB(A)	60 dB(A)
L_{Amax} (excluding train horns)	83 dB(A)	85 dB(A)

The results above indicate that rail noise impacts are under the PRINP investigation thresholds at the worst-affected location on the land, indicating that no further acoustic treatment is required in the context of statutory policies.

3.3 Train Noise Criteria (Restriction Covenant)

There are no specific planning requirements and/or controls that apply to new residential subdivisions when assessing train noise impacts, as it is understood that the land has already been adopted for re-zoning and residential use in accordance with Council's strategic planning. However, noise requirements via land covenants may be imposed to ensure that the noise amenity of future Subdivision residents is protected.

Guidance for specific criteria can be sought from other land covenants applied to residential subdivisions along this rail corridor (servicing the same V/Line trains), as follows:

1. ANY BUILDINGS (AND ASSOCIATED WORKS) FOR ACCOMMODATION, A CHILD CARE CENTRE, A DISPLAY HOME, A HOSPITAL, A HOTEL, OR A TAVERN ARE TO BE CONSTRUCTED IN SUCH A WAY AS TO ENSURE THAT INTERNAL BEDROOM NOISE LEVELS DO NOT EXCEED 65dB LAmax AND 40dB LAeq, 8h FOR THE NIGHT PERIOD FROM 10PM TO 6AM.
2. A PERMIT MAY NOT BE GRANTED TO CONSTRUCT A BUILDING OR CONSTRUCT OR CARRY OUT WORKS WHICH ARE NOT IN ACCORDANCE WITH THIS RESTRICTION.

Our assessment will adopt the above target criteria as a benchmark land restriction to determine whether specific acoustic treatment will likely be required.

3.4 Train Noise Assessment

Parcel P4 Assessment

Our office has conducted a sensitivity analysis to determine the extent of glazing that would likely be required should the same land covenant (and target criteria) apply to the proposal.

Based on the measured noise levels above, the glazing requirement to the worst-affected lots is driven by L_{Amax} noise levels (being the most onerous). This is expected as rail passby's during the night period is infrequent, resulting in relatively low noise levels when averaged over 8 hours.

To comply with the L_{Amax} noise criteria, the following glazing is likely required to affected lots:

It is noted that standard forms of façade construction such as masonry or lightweight cladding with standard bulk insulation within cavities would comfortably surpass the performance requirements of the windows and doors.

Where not indicated in the markups, standard forms of glazing apply (being minimum 6mm float glass, R_w>30).

Generally, no treatment is required to second-row dwellings given that the first row of dwellings will itself provide shielding of noise impacts to dwellings further setback from boundaries.

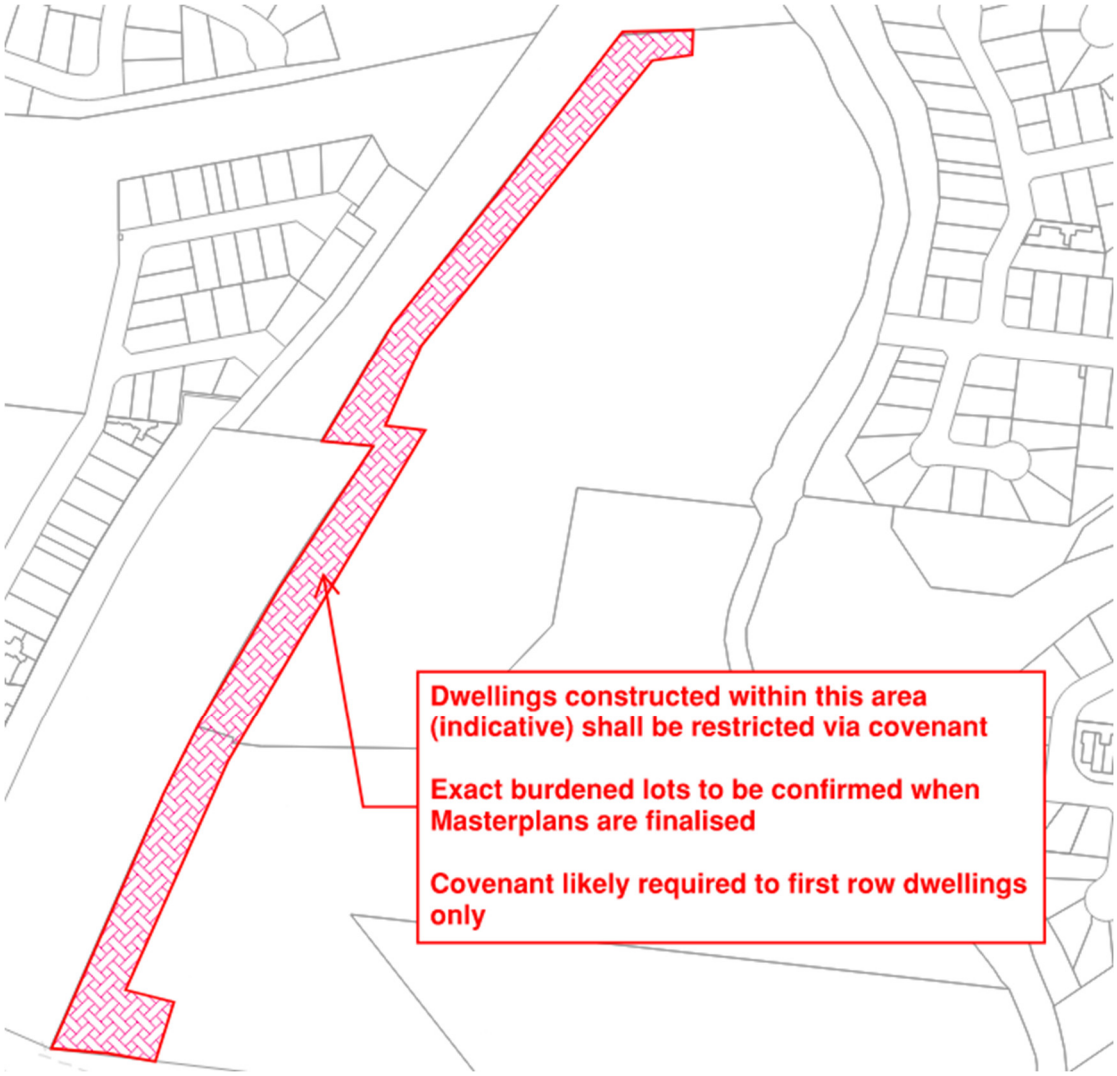
Burdened lots can be confirmed once the masterplan is finalised.

Parcel P1 & P2 Assesssment

Dwellings where constructed along the West boundary on Parcels P1 & P2 will likely experience similar rail noise levels as Parcel P4, given the similar setback distances. The exception is the portion of the land towards the North section of Parcel P1, where the West title boundary edges closer to the rail line.

On the assumption that dwellings will be constructed along the West title boundary of the above parcels, we assess that the first row of dwellings from West boundary would likely require specific acoustic treatment.

To this end, we recommend that a land restriction covenant is applied to the areas as follows:



On the assumption that dwellings will be constructed along the West title boundary of the North section of Parcel P1, it can be expected that heavier forms of glazing will likely be required compared to our assessment for Parcel P4. Regardless, this does not affect the outcome of our recommendations, noting that all first row dwellings are likely to require the same form of controls.

The above may not be material anyway, given that the North section of Parcel P1 may not be suitable for residential dwellings, subject to floodwater investigations.

Burdened lots can be confirmed once the masterplan is finalised.

4 General Environmental Duty (GED)

Under the Environment Protection Act 2017 (Act), all Victorians are required to fulfill their General Environmental Duty (GED). In effect, the GED requires that environmental impacts and the risk of harm are minimised by reasonable and practicable means, however the GED does not set out prescriptive or objective targets as it relies on discretionary principles to be approved by

the Authority. Under the GED, operators and developers are required to have reasonable knowledge about the risks the proposed activities posed.

The core principles of the GED however relate to the control of noise where:

1. It is practicable to do so, which amongst other factors, includes the cost of these controls being implemented; and
2. It is reasonable to do so, typically meaning there would be some benefit to impacted receptors if those controls were implemented.

Regarding point 1 above, this is not normally a matter that can be addressed in full by an acoustic expert; however we note that there may be some benefit if the Applicant is able to demonstrate that either:

- The cost of implementing additional controls would be a significant impost.
- Implementing additional controls would result in unreasonable design constraints

Regarding point 2 above, our assessment has already identified several mitigation strategies in Section 2.5 and 3.4 that would assist in minimising noise impacts.

It is noted that other opportunities to minimise noise impacts have already been explored by the Land Developer, including the demolition of the existing noise barrier along the Princes Highway and construction of a new noise barrier which was found to be impractical on the basis of:

- The existing noise barrier already providing a reasonable degree of mitigation.
- The cost of demolition and reconstruction was found to be unreasonable, as instructed by the Land Developer
- An alternative approach of mitigation via double-storey townhouse construction was considered cost-effective and acceptable by DoT

Further, the larger portion of the residential subdivision will benefit from inherent shielding once developed as dwellings closer to the Princes Highway and/or rail corridor will effectively act as noise barriers to dwellings further setback from noise sources.

5 Environment Reference Standard (ERS)

The ERS is made under Section 93 of the EP Act 2017. It sets out the environmental values of ambient sound that are sought to be achieved or maintained across Victoria and standards to support those values.

The ERS is not a compliance standard, and the values prescribed by the ERS for different land uses are not to be considered as noise limits or targets, noting that the primary purpose of the ERS is to provide an environmental assessment and reporting benchmark. The indicators and objectives within the ERS provide a basis for assessment and reporting on environmental conditions in Victoria.

In the context of the Subject Land being in a Category III zone (GRZ), the following indicators and objectives apply (highlighted in yellow below):

Column 1 Land use category	Column 2 Indicators	Column 3 Objectives
Category I	Outdoor $L_{Aeq,8h}$ from 10 p.m. to 6 a.m.	55 dB(A)
	Outdoor $L_{Aeq,16h}$ from 6 a.m. to 10 p.m.	60 dB(A)
Category II	Outdoor $L_{Aeq,8h}$ from 10 p.m. to 6 a.m.	50 dB(A)
	Outdoor $L_{Aeq,16h}$ from 6 a.m. to 10 p.m.	55 dB(A)
Category III	Outdoor $L_{Aeq,8h}$ from 10 p.m. to 6 a.m.	40 dB(A)
	Outdoor $L_{Aeq,16h}$ from 6 a.m. to 10 p.m.	50 dB(A)
Category IV	Outdoor $L_{Aeq,8h}$ from 10 p.m. to 6 a.m.	35 dB(A)
	Outdoor $L_{Aeq,16h}$ from 6 a.m. to 10 p.m.	40 dB(A)
Category V	Qualitative	A sound quality that is conducive to human tranquillity and enjoyment having regard to the ambient natural soundscape

In the context of the development, ERS values are regularly exceeded near major highways and/or arterial roads, even when meeting VicRoads policy. The ERS value being approximately 10dB lower than VicRoads criteria would be extremely difficult to achieve without impractically high noise barriers and is not a standard commonly achieved throughout Victoria.

Under Section 7.3 of the Act, there are more specific obligations for infrastructure and land managers that require it *to comply with a specified document, code, standard or rule, subject to any modification specified in the order, when managing land, managing or operating infrastructure or planning the management of land or infrastructure*. Our understanding is that these provisions of the Act may have been drafted to provide a more practical utility of compliance under the Act, GED and ERS.

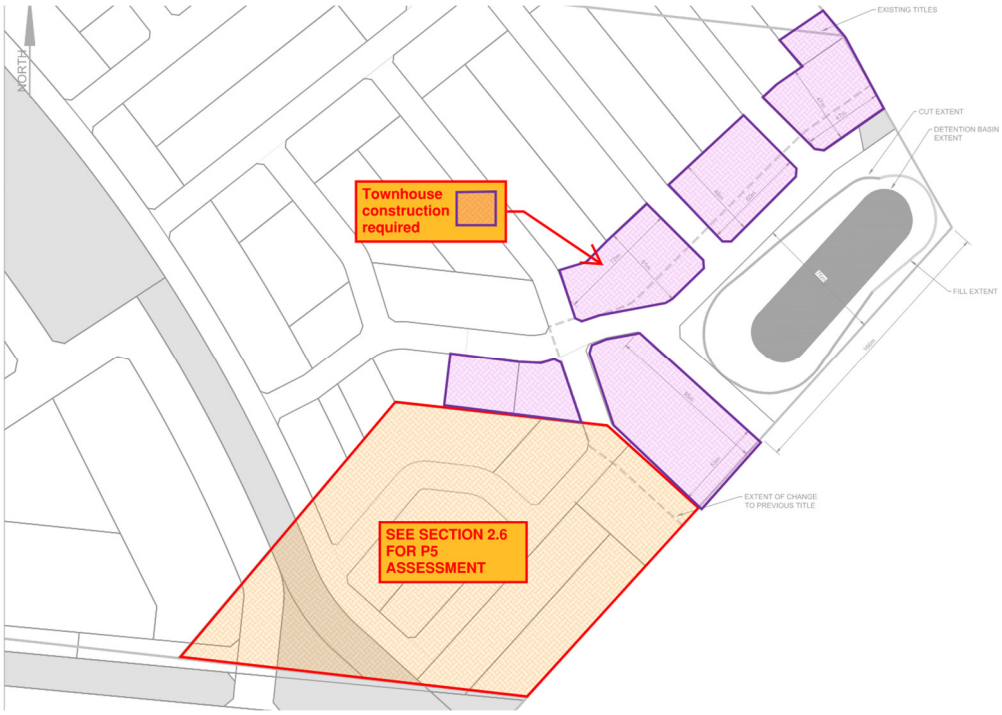
In practice, it is likely that the majority of the residential subdivision further setback from noise sources will achieve these values once the subdivision is developed as the built form of dwellings will effectively screen noise emissions from road and rail traffic. Maintaining or meeting the ERS values is not viewed as being practical when in proximity to major roads.

To this end, we are satisfied that the construction of the townhouses and proposed internal performance requirements is sufficient in ensuring a reasonable level of noise amenity to future residents, regardless of the ERS objectives.

6 Conclusion and Recommendations

Overall, the proposal presents as low risk in terms of adverse noise impacts, noting that both traffic and rail noise can be adequately managed by townhouse construction and land restriction covenants (subject to approval from VicRoads and the Referral Authorities) requiring townhouse construction to specific areas and affected lots to be designed to achieve internal rail and road traffic noise criteria, as follows:

6.1 Road Traffic Noise



We recommend that the following requirements be applied to the above areas:

Internal Layout Design

1. Non-sensitive spaces such as garages, stairs, storage etc shall be sited interfacing with or orientated to the Princes Highway
2. Bedrooms shall be sited facing away from the Princes Highway (towards the rear of the townhouses)
3. Where the above is not feasible due to lot constraints and/or specific orientation requirements, habitable spaces shall be designed to meet the following internal noise levels:
    a. No greater than 40dB(A) $L_{eq\text{-}16hr}$ in living rooms; and
    b. No greater than 35dB(A) $L_{eq\text{-}8hr}$ in bedrooms

Private Outdoor Spaces

- Private outdoor spaces should be positioned where shielded by the built form of townhouses (towards the rear)
- Balconies and outdoor terraces shall not be constructed where exposed (within line-of-sight) to the Princes Highway
- Where the above is not achievable due to space constraints and lot orientation (e.g. for corner lots), the following shall be provided:
    - 1.8m boundary acoustic fencing shall be installed to ground floor private open spaces, where deemed acceptable by council; **OR**
    - An alternative private outdoor space must be provided that is shielded (not within

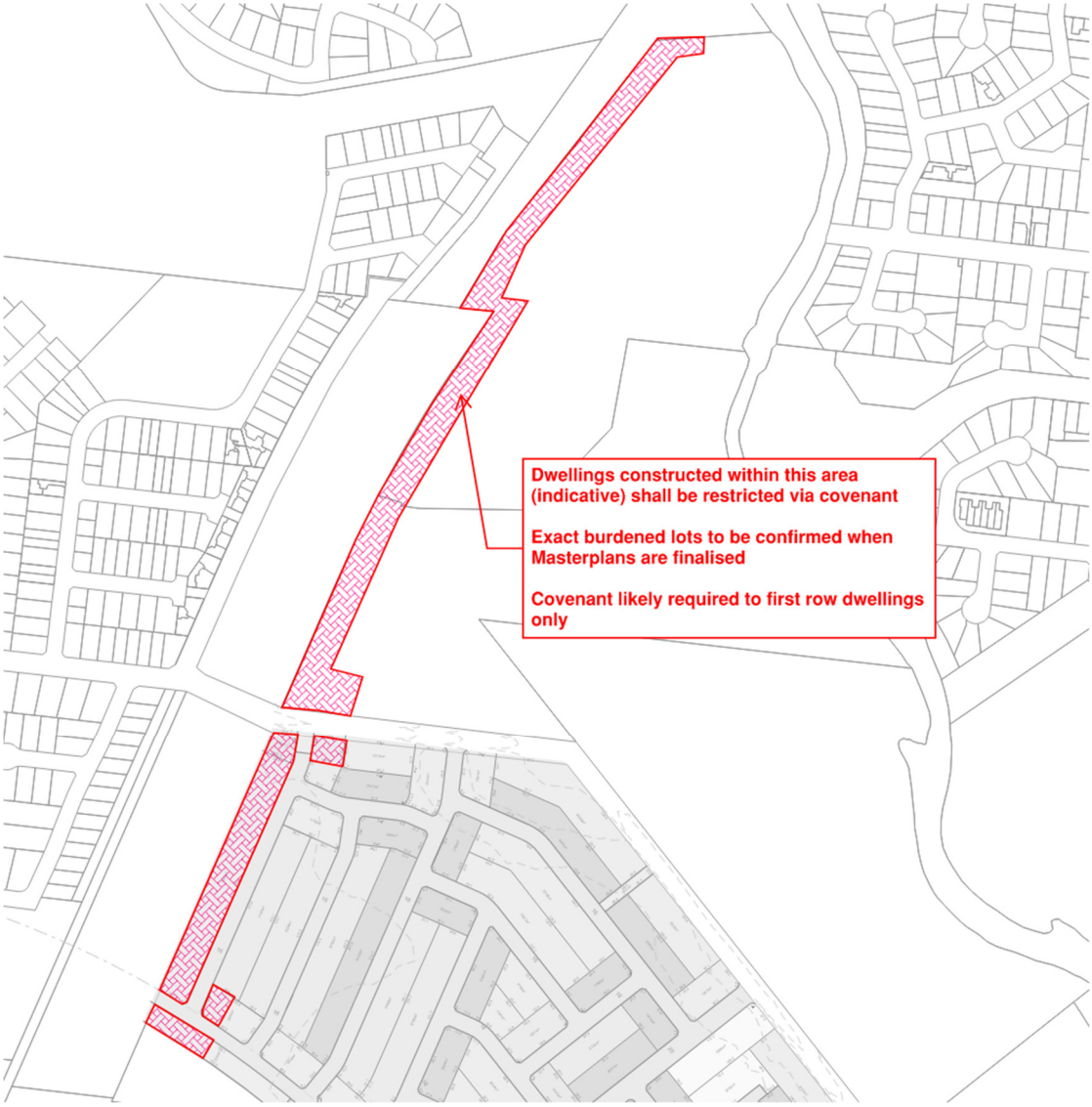
line-of-sight) to the Princes Highway

The assessment above also confirms that the development of Parcel P4 can commence regardless of the development outcomes and timings for Parcel P5.

Separately, we are satisfied that an application to rezone Parcel P5 can be approved, noting that noise mitigation/controls similar to above will also be effective in mitigating road traffic noise on this section of the land.

The extents of noise mitigation, including potential townhouse areas can be confirmed at a later stage, subject to further site-specific investigations and review of parcel P5 masterplan, which can be conducted if or when a planning permit is sought for residential development on this parcel.

6.2 Rail Traffic Noise



We recommend that the following covenant be applied to the above areas:

1. Rail traffic noise for any residential uses shall be designed such that internal bedroom noise levels do not exceed 65dB(A) L_{max} and 40dB(A) $L_{eq\text{-}8hr}$ for the night period between 10pm to 6am.

To this end, Enfield Acoustics is satisfied that the Subject Land is suitable for siting residential uses, providing that covenants are applied to ensure the amenity of future residents are protected. This report validates the support for rezoning and can inform further and more detailed acoustic assessments at later stages of the planning approval process.

Appendix A: Noise Model Calibration

Legend:

- Road
- Barrier
- Contour Line
- Receiver
- Building Evaluation
- Calculation Area

Scale: 1: 4067 @ A3

ENFIELD ACOUSTICS NOISE VIBRATION

PO Box 920
North Melbourne, VIC 3051
P: 03 9111 0090

Noise emission levels from TRAFFIC

LA10-18hr Noise Levels (facade corrected)

Year 2021

1.5m above ground

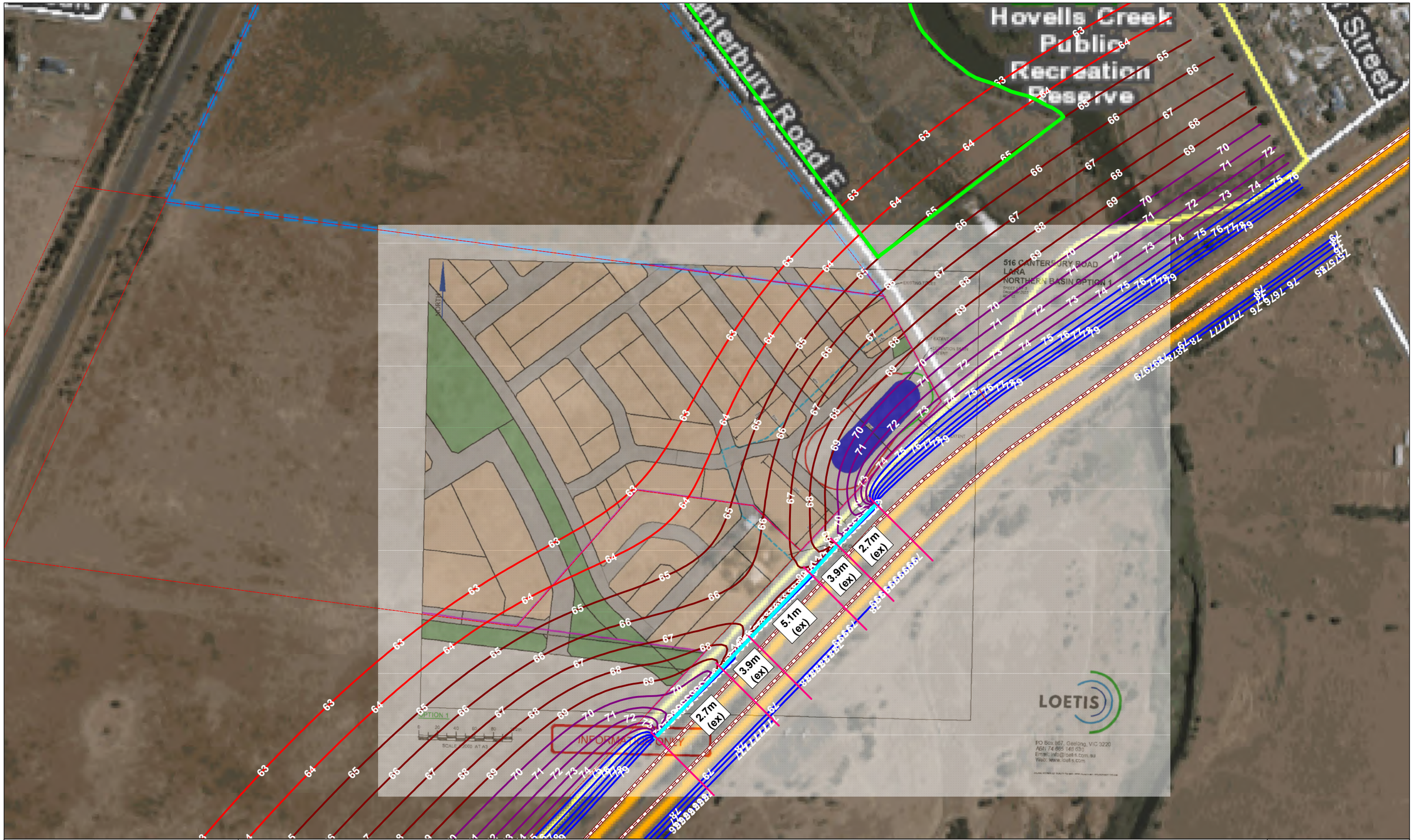
Noise Model Calibration

Project No: V798 Drawing No: MAP-1 Date: 24.05.2022

NOTES:

*Propagation in accordance with CoRTN

Appendix B: Noise Modelling Contours



Legend:

- Line Source
- Road
- Building
- Barrier
- Contour Line
- Receiver
- Building Evaluation
- Calculation Area

Scale: 1: 3877 @ A3

ENFIELD ACOUSTICS NOISE VIBRATION

PO Box 920
North Melbourne, VIC 3051
P: 03 9111 0090

Noise emission levels from TRAFFIC

LA10-18hr Noise Levels (facade corrected)

Year 2039

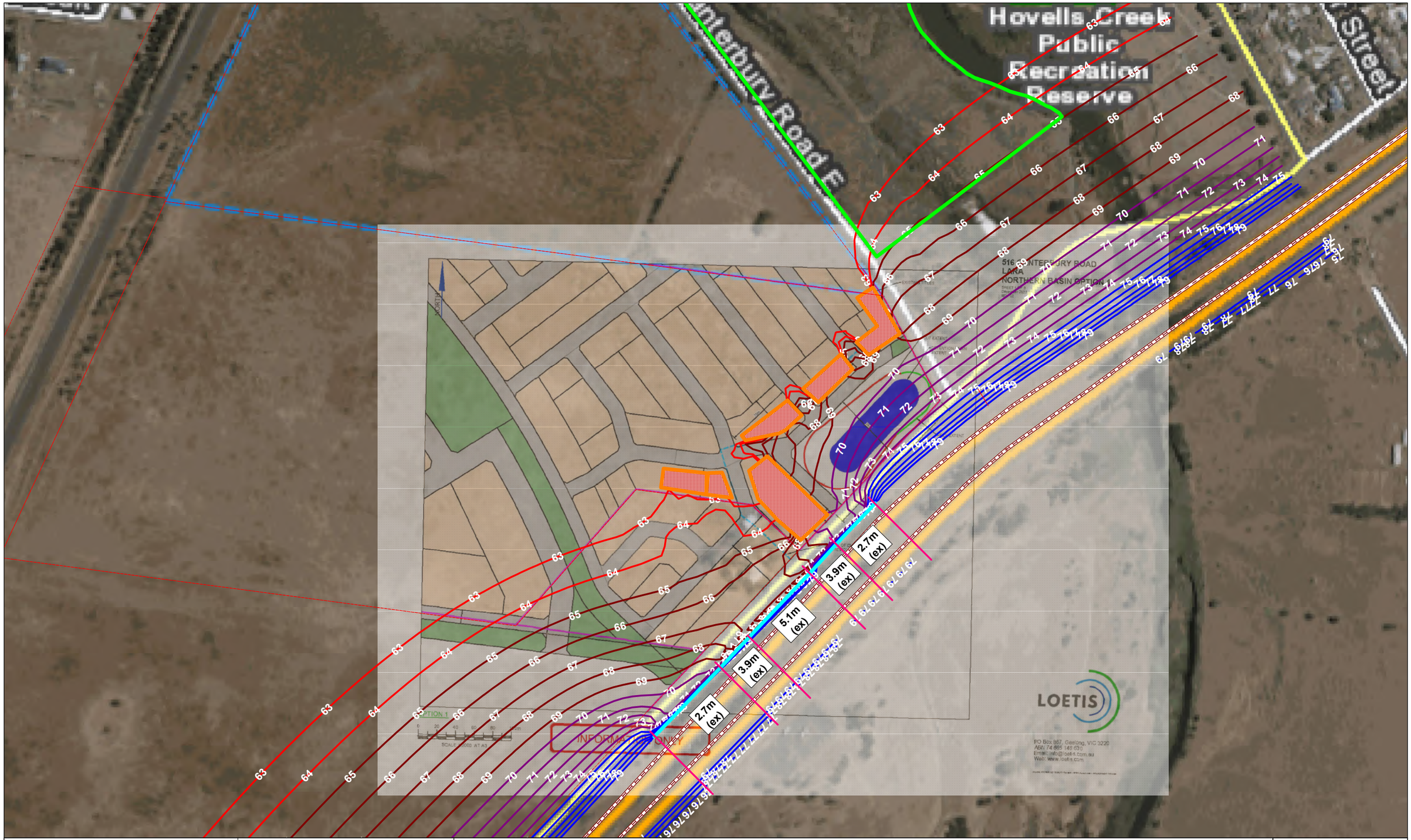
1.5m above ground

Do Nothing scenario

Project No: V798 Drawing No: MAP-02 Date: 18.01.2024

NOTES:

*Propagation in accordance with CoRTN



Legend:

- Line Source
- Road
- Building
- Barrier
- Contour Line
- Receiver
- Building Evaluation
- Calculation Area

Scale: 1: 3877 @ A3

ENFIELD ACOUSTICS NOISE VIBRATION

PO Box 920
North Melbourne, VIC 3051
P: 03 9111 0090

Noise emission levels from TRAFFIC

LA10-18hr Noise Levels (facade corrected)

Year 2039

1.5m above ground

Townhouse Construction

Project No: V798 Drawing No: MAP-03 Date: 18.01.2024

NOTES:

*Propagation in accordance with CoRTN