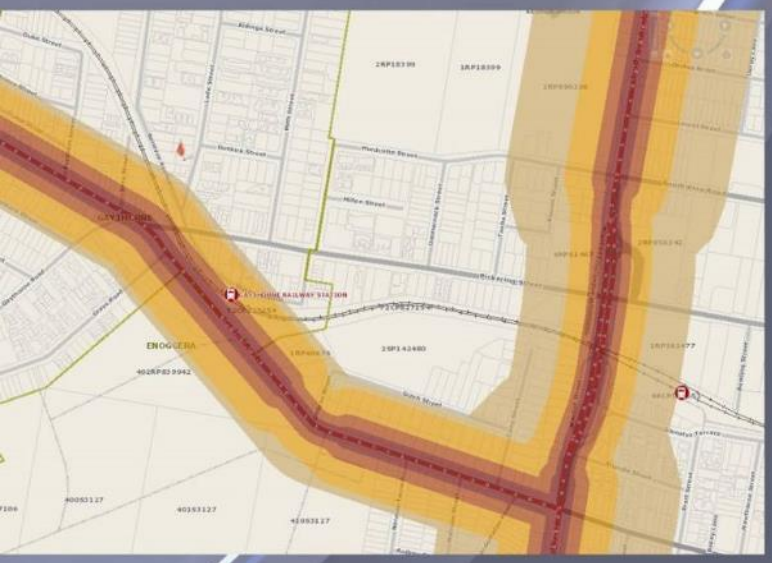
NOISE MEASUREMENT SERVICES

**Noise Impact Assessment for Environmentally Relevant Activity**

Invetus Veterinary Laboratories
Wellcamp Airport, QLD 4350

***Report 8154_0*** ***15th June 2026***





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**REPORT FOR** **Wagner Corporation** *on behalf of Invetus Veterinary Laboratories*

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# Executive Summary

An environmental noise assessment has been undertaken at the request of Wagner Corporation, on behalf of *Invetus Veterinary Laboratories*, for a proposed laboratory, kennels and associated infrastructure. The property is located on 'Road 3', Wellcamp Airport, which is part of Lot 8 on SP329720. The proposed development includes the construction of a kennel building, fenced yards, an office and laboratory building, roads and carparking on the vacant site.

The proposed hours of operation are not currently known, this assessment therefore assumes 24-hour operation.

The site is located within Toowoomba Regional Council and within the Charlton Wellcamp Enterprise Area Local Plan Area. The subject land is zoned High Impact Industry and is adjacent to Medium Impact industry to the northwest and High Impact Industry in all other directions. The nearest Rural zone is located approximately 1.1 km south east, on the opposite side of the Gore Highway (Toowoomba Bypass).

This Report aims to assess potential noise emissions from the proposal onto nearby sensitive receptors, with reference to the following:

- Toowoomba Regional Planning Scheme v28;
- Australian Standard AS1055:2018 - Acoustics-Description and Measurement of Environmental Noise;
- Department of Environment and Sciences *Noise Measurement Manual 2020*
- Environmental Protection (Noise) Policy 2008;
- Environmental Protection Act 1994.
- Department of Environment, Science and Innovation, *Guideline Application requirements for activities with noise impacts* v3.08 (2024)

## Conclusions and Recommendations

It is concluded that:

- Cumulative noise emissions from the proposed development have been predicted to the closest sensitive uses. The prediction model incorporates several conservative assumptions which are intended to represent a worst-case-scenario in terms of noise emissions and assessment.
- Cumulative noise emissions from the proposed development are predicted to comply with the background creep criteria for continuous noise sources (the most stringent criteria) at all nearby residential receivers during all time periods.
- Cumulative noise emissions from the proposed development are predicted to comply with the Acoustic Quality Objectives at all nearby commercial receivers during all time periods.
- The precise model and location of air-conditioning plant is not yet known, however given the significant distance between the development site and closest sensitive uses, the relevant criteria are expected to be readily achieved.
- The proposed development can meet the noise emission requirements of Toowoomba Regional Council and the Queensland Government.

It is recommended that:

- The development be approved on the basis that noise emission compliance is predicted at all nearby sensitive uses.
- Air-conditioning equipment be chosen, located, screened (if necessary), and maintained to ensure ongoing compliance with the night time criteria of 29 dB(A) at the closest sensitive uses. A detailed assessment of air-conditioning plant noise may be undertaken at Building Approval stage, if required.

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# 1. Introduction

## 1.1 The Development

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The proposed hours of operation are not currently known, this assessment therefore assumes 24-hour operation.

The site is located within Toowoomba Regional Council and within the Charlton Wellcamp Enterprise Area Local Plan Area. The subject land is zoned High Impact Industry and is adjacent to Medium Impact industry to the northwest and High Impact Industry in all other directions. The nearest Rural zone is located approximately 1.1 km south east, on the opposite side of the Gore Highway (Toowoomba Bypass).

This Report aims to assess potential noise emissions from the proposal onto nearby sensitive receptors, with reference to the following:

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- Environmental Protection Act 1994.
- Department of Environment, Science and Innovation, *Guideline Application requirements for activities with noise impacts* v3.08 (2024)

The following **Plates** show the site layout and locality.

***Plate 1.1:*** *Showing the site locality plan (Source: Wagner Corporation).*

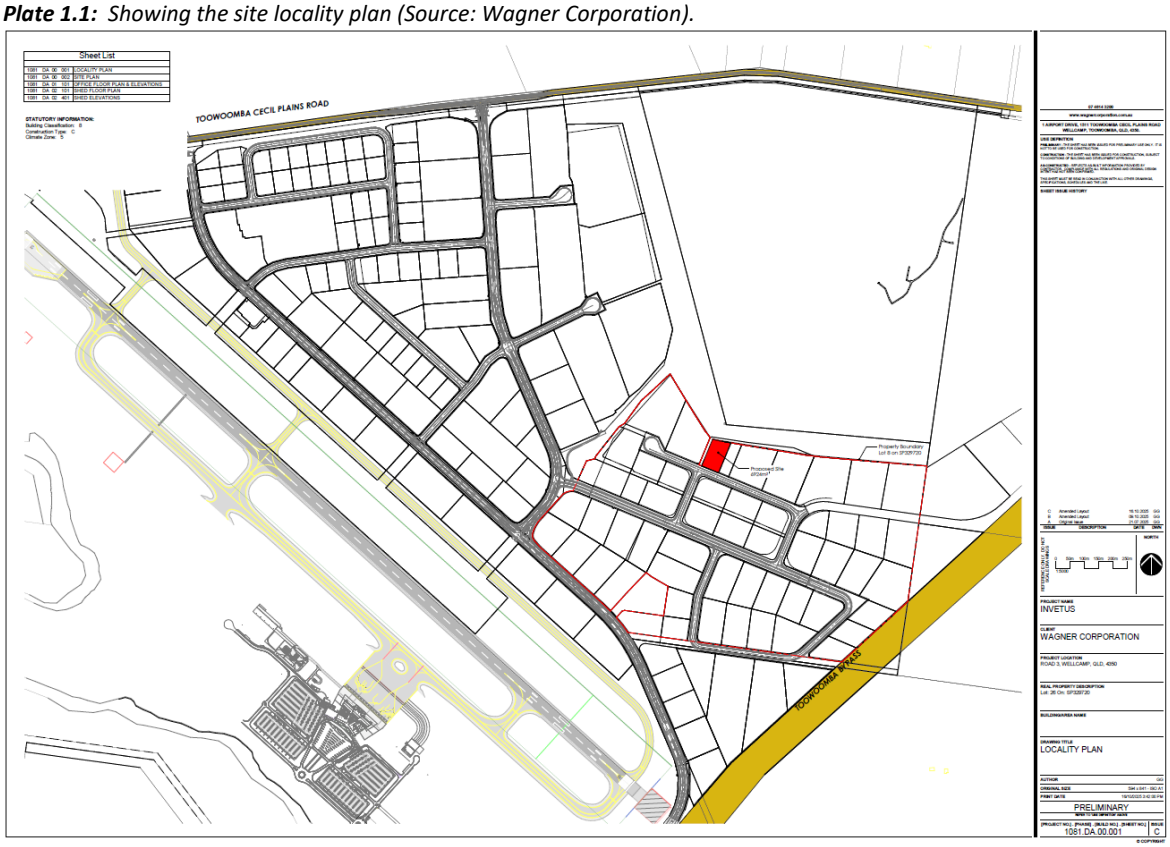



***Plate 1.2:*** *Showing the site plan. (Source: Wagner Corporation).*

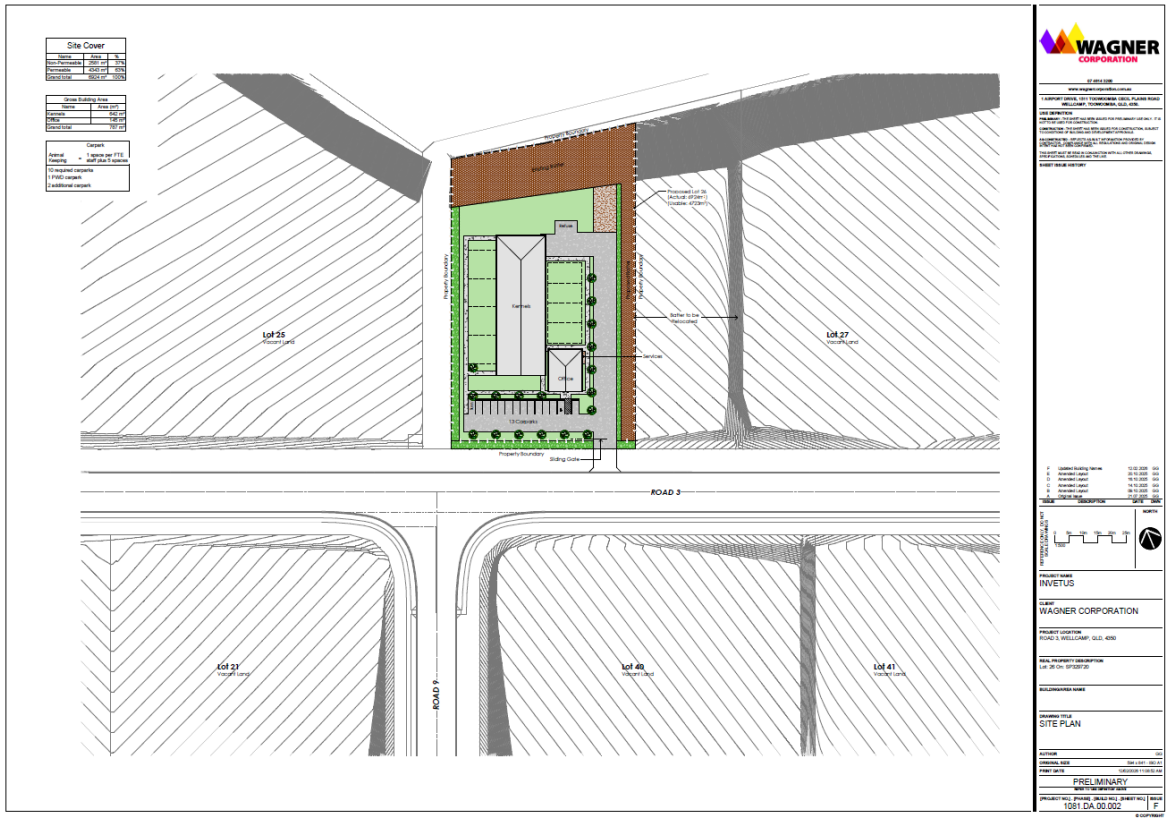


***Plate 1.3:*** *Toowoomba Regional Council Zoning with approximate site location marked. (Source: Toowoomba Regional Planning Scheme v28).*

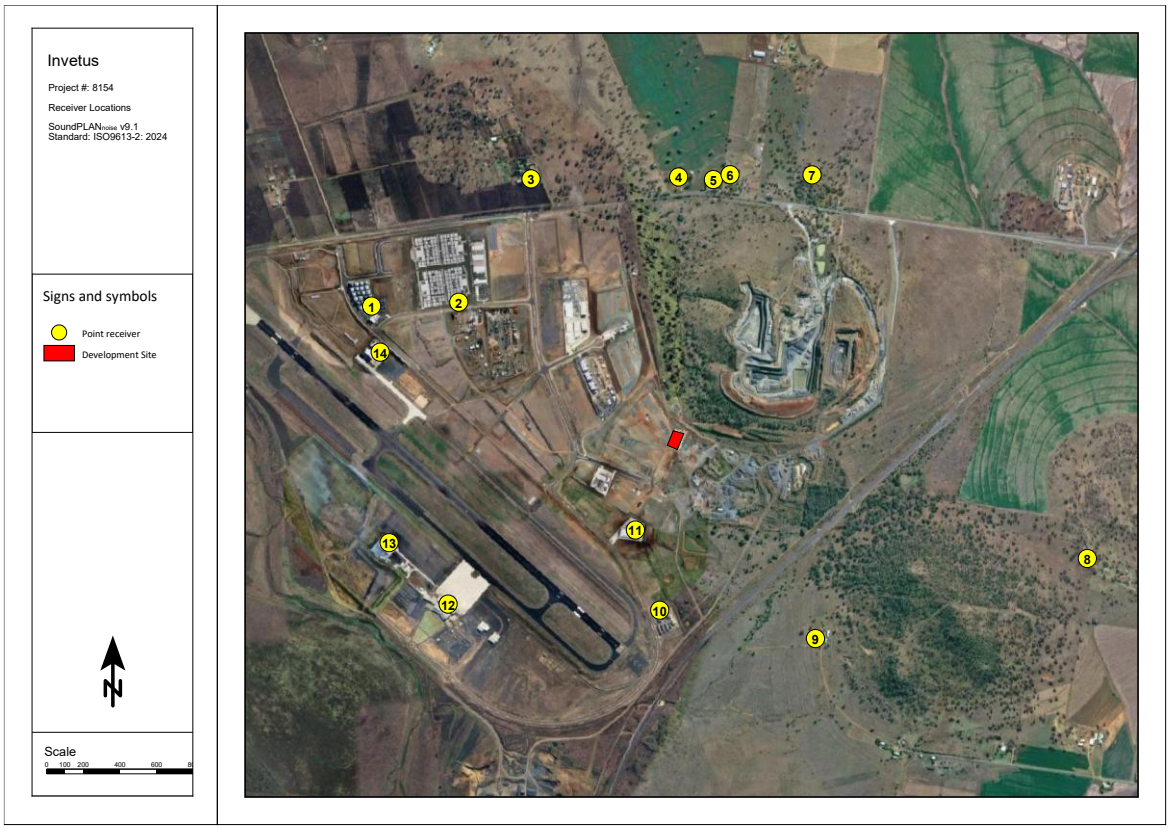

## 1.2 Sensitive Receivers

The closest sensitive uses to the proposed development have been identified using aerial imagery, site attendance, and Council mapping. Commercial receivers are identified with reference to the EP Regulation 2019 definition for commercial premises; "an office, shop or other premises where business or work, other than a manufacturing process, is carried out". Receiver points are positioned 1m from the most exposed façade of the closest sensitive uses and predicted noise levels are façade-affected. The sensitive receivers included in the noise model are presented in **Table 1.1** and are illustrated in **Plate 1.4**.

**Table 1.1:** Sensitive receivers

| Receiver | Receiver Type | Description | X Position (UTM 56) | Y Position (UTM 56) |
|---|---|---|---|---|
| 1 | Residential | 1511 Toowoomba Cecil Plains Road (dwellings) | 380756.8 | 6952153.2 |
| 2 | Residential | 1511 Toowoomba Cecil Plains Road (demountable accommodation) | 381231.8 | 6952174.5 |
| 3 | Residential | 1344 Toowoomba Cecil Plains Road (dwelling) | 381625.5 | 6952847.7 |
| 4 | Residential | 1272 Toowoomba Cecil Plains Road (dwelling) | 382430.1 | 6952858.1 |
| 5 | Residential | 1256 Toowoomba Cecil Plains Road (dwelling) | 382619.7 | 6952843.9 |
| 6 | Residential | 1242 Toowoomba Cecil Plains Road (dwelling) | 382710.6 | 6952870.7 |
| 7 | Residential | 1198 Toowoomba Cecil Plains Road (dwelling) | 383157.6 | 6952869.6 |
| 8 | Residential | 168 Kim Road (dwelling) | 384658.2 | 6950774.7 |
| 9 | Residential | Residential Dwelling on Lot 13 on SP296105 | 383176.2 | 6950337.6 |
| 10 | Commercial | RSPCA Toowoomba (office) | 382327.1 | 6950492.5 |
| 11 | Commercial | JRS (office) | 382194.5 | 6950930.2 |
| 12 | Commercial | Wellcamp Toowoomba Airport Terminal (office) | 381173.6 | 6950525.5 |
| 13 | Commercial | Menzies Aviation (office) | 380852.2 | 6950861.2 |
| 14 | Commercial | FTA Queensland (office) | 380803.2 | 6951901.7 |

**Plate 1.4:** Receiver Locations



# 2. Noise Criteria

## 2.1 Toowoomba Regional Planning Scheme v28

### 2.1.1 Environmental standards Code

The Toowoomba Regional Council planning scheme sets out its general requirements for noise emissions in $PO_8$ of the Environmental Standards Code, as set out in **Table 2.1**.

***Table 2.1:*** *Environmental Standards Code (in part)*

| **Noise** | |
|---|---|
| $PO_8$ The generation of noise from the premises does not cause Environmental Harm or Nuisance to adjoining properties or other noise sensitive land uses.<br>(a) Development:<br>(i) is located in an appropriate zone;<br>(ii) proposes best practice design and construction materials (in relation to noise attenuation); and<br>(iii) proposes operational practices that will minimise noise nuisance for adjoining sensitive land uses. | $AO_{8.1}$ The development will achieve the following noise levels (when measured at the nearest sensitive receiver):<br>(a) Background ($L_{90}$) + 5dB(A) for variable noise between the hours of 7:00 am to 10:00 pm (measured at the facade of the sensitive land use);<br>(b) Background ($L_{90}$) + 3dB(A) for variable noise between the hours of 10:00 pm and 7:00 am (measured within bedrooms assuming open windows);<br>(c) Background ($L_{90}$) for continuous noise sources (measured at the facade of the sensitive land use between 7:00 am and 10:00 pm and within bedrooms assuming open windows from 10:00 pm – 7:00 am); and<br>(d) maximum limit LAmax 45dB(A) inside dwellings; and<br>The development will achieve the Acoustic Quality Objectives listed within the *Environmental Protection (Noise) Policy 2008*.<br>HOWEVER<br>$AO_{8.2}$ Where a development is unable to meet noise levels specified in $AO_{8.1}$ an acoustic assessment has been undertaken by a suitably qualified and skilled person which demonstrates that the development will not result in environmental nuisance at any existing or likely future residential premises (within a 10 year planning horizon). |

This criteria is similar to the particular criteria set out for Industrial uses, in the following sections.

It is expected that that Toowoomba Regional Council will request the proposed development demonstrate compliance with the Toowoomba Regional Planning Scheme. The site is located within the Charlton Wellcamp Enterprise Area Local Plan Area. The Land the proposed facility is located is zoned High Impact Industry and is adjacent to Medium Impact industry to the northwest and High Impact Industry in all other directions. Relevant parts of the planning scheme are presented in the following sections.

### 2.1.2 Charlton Wellcamp Enterprise Area Local Plan Code

The proposed development is located within the Charlton Wellcamp Enterprise Area Local Plan and the Local Area Plan Code applies. Part of the Code is reproduced in **Table 2.2** below.

***Table 2.2:*** *Performance Outcome of the Charlton Wellcamp Enterprise Area Local Plan Code (in part).*

| | |
|---|---|
| **Site Layout** | |
| $PO_9$ The site layout, building form and landscaping assists in minimising noise generation and spill lighting and screening unsightly open storage and other outdoor areas from public view. | $AO_{9.1}$ The site layout and building form maximises protection of surrounding sensitive land uses from adverse impacts by providing:<br>(a) all or most building openings facing away from residential and community uses;<br>(b) external lighting oriented away from residential and community uses; and<br>(c) landscaping which complies with the Landscaping Code. |
| **Building Scale and Appearance** | |
| $PO_{22}$ Development:<br>(a) has a high quality appearance when viewed from the street, adjoining properties and public open space; and<br>(b) minimises air quality, noise and odour impacts on the amenity of adjoining land. | No acceptable outcome is nominated. |
| **Fences and Walls** | |
| $PO_{28}$ Fences and walls:<br>(a) are finished and maintained to be visually attractive and to contribute to or blend with the site's landscaping;<br>(b) where appropriate, are designed and detailed to provide visual interest to the streetscape;<br>(c) are constructed of materials which are compatible with the buildings on the site;<br>(d) can provide effective screening from any adjoining incompatible use; and<br>(e) where appropriate, assist in highlighting entrances and paths. | $AO_{28.1}$ Retaining walls do not exceed a height of 2m and are landscaped or otherwise detailed so as not to appear to be a solid expanse or mass.<br>$AO_{28.2}$ Solid fencing or walls or landscaped earth mounds are provided to screen views and/or buffer noise to any adjoining non-industrial use.<br>*Note: Figure 12 Fencing for Industrial Areas provides examples of preferred and undesirable fencing in industrial areas.* |
| **Environmental Performance - Environmental Management** | |
| $PO_{30}$ Development prevents or minimises the generation of any noise so that:<br>(a) nuisance is not caused to adjoining premises or other nearby sensitive land uses; and<br>(b) desired ambient noise levels in residential areas are not exceeded. | $AO_{30.1}$ Development achieves the noise generation levels set out in the Environmental Protection (Noise) Policy 2008. |

### 2.1.3 High Impact Industry Zone Code

The proposed development is zoned High Impact Industry and the High Impact Industry Zone Code applies. Part of the Code is reproduced in **Table 2.3** below.

***Table 2.3:*** *Performance Outcome of the High Impact Industry Zone Code (in part).*

| **Effects of development** | |
|---|---|
| $PO_5$ Development prevents or minimises the generation of any noise so that:<br>(a) nuisance is not caused to adjoining premises or other nearby sensitive land uses; and<br>(b) desired ambient noise levels in residential areas are not exceeded. | $AO_{5.1}$ Development achieves the noise generation levels set out in the *Environmental Protection (Noise) Policy 2008.* |

### 2.1.4 Industry Use Code

The proposed development is Industrial and the *Industry Uses Code* applies. Part of the Code is reproduced in **Table 2.4** below.

***Table 2.4:*** *Performance Outcome of the Industry Uses Code (in part).*

| **Amenity** | |
|---|---|
| $PO_8$ Development prevents or minimises the generation of any noise so that:<br>(a) nuisance is not caused to adjoining premises or other nearby sensitive land uses; and<br>(b) desired ambient noise levels in residential areas are not exceeded. | $AO_{8.1}$ Development achieves the noise generation levels set out in the *Environmental Protection (Noise) Policy 2008.* |

## 2.2 State Noise Policies

### 2.2.1 Environmental Protection (Noise) Policy 2019

The *Environmental Protection (Noise) Policy 2019* establishes Acoustic Quality Objectives (AQO) to protect or enhance stated environmental values. The environmental values to be enhanced or protected under the policy are the qualities of the acoustic environment that are conducive to protecting the health and biodiversity of ecosystems; and the qualities of the acoustic environment that are conducive to human health and well-being, including ensuring a suitable acoustic environment for individual's to sleep, study and learn, to be involved in recreation including relaxation and conversation; and the qualities of the acoustic environment that are conducive to protecting the amenity of the community. The Policy is specifically not applicable to noise impacts from ordinary use of public roads.

It is noted that the Acoustic Quality Objectives (AQO) are to be progressively achieved over the long term, to meet the stated purpose of the Noise Policy:

a) identifying environmental values to be enhanced or protected; and
b) stating acoustic quality objectives for enhancing or protecting the environmental values; and
c) providing a framework for making consistent, equitable and informed decisions about the acoustic environment.

Noise management strategies are required to the extent it is reasonable to do so. It is therefore concluded that the AQO are not intended to be necessarily limiting criteria, as reasonableness and equity are fundamental precepts of the policy.

Application of the Noise Policy therefore requires consideration of the existing environment. It is also understood that the AQO are not intended to override Council Policy, where in force.

Plant and equipment such as air conditioning and pool pumps are assessed as continuous noise sources. The Acoustic Quality Objectives for residential buildings are presented in **Table 2.5** below.

**Table 2.5:** Acoustic Quality Objectives from EPP (Noise) (in part).

| **Type of Occupancy / Activity** | **Recommended Acoustic Quality Objective** | | |
|---|---|---|---|
| **RESIDENTIAL BUILDINGS** | **$L_{Aeq,adj,1hr}$** | **$L_{A10,adj,1hr}$** | **$L_{A01,adj,1hr}$** |
| Dwelling, outdoors, daytime & evening | 50 | 55 | 65 |
| Dwelling, indoors, daytime & evening | 35 (*45) | 40 (*50) | 45 (*55) |
| Dwelling, indoors, night-time | 30 (*40) | 35 (*45) | 40 (*50) |
| Commercial and retail activity (for indoors), when the activity is open for business. | 45 (*55) | - | - |

* the internal AQO has been converted to external value assuming 10 dB(A) of attenuation through open windows as per Locher et al, **"***Differences between Outdoor and Indoor Sound Levels for Open, Tilted, and Closed Windows",* International Journal of Environmental Research and Public Health, 2018.

### 2.2.2 Environmental Protection (Noise) Policy 2008

Council explicitly references the EPP (Noise) 2008, which sets recommended criteria for the control of background creep. The *Ennvironmental Standards Code* also presents criteria which corresponds with the the controlling background creep criteria. The criteria as set out in the EPP (Noise) 2008 is:

> To the extent that it is reasonable to do so, noise from an activity must not be—
>
> - for noise that is continuous noise measured by $L_{A90,T}$—more than nil dB(A) greater than the existing acoustic environment measured by $L_{A90,T}$; or
> - for noise that varies over time measured by $L_{Aeq,adj,T}$—more than 5dB(A) greater than the existing acoustic environment measured by $L_{A90,T}$

The overall criteria are the same as in the 2019 policy. The background creep criteria in the 2008 policy are presented in **Table 2.6**. below. Background creep criteria have been calculated with reference to the RBL background levels measured on site(discussed in **Section 3**).

**Table 2.6:** Background Creep Criteria from EPP Noise EPP (Noise) 2008.

| **Noise Source** | **Descriptor** | **Noise Criteria** | | |
|---|---|---|---|---|
| | | **Day** | **Evening** | **Night** |
| Continuous Noise - measured by $L_{A90,T}$, is nil greater than existing background | $L_{A90,T}$ | 36 | 36 | 29 |
| Noise that varies over time – Measured by $L_{Aeq,\ adj,T}$ is not more than 5 dB(A) greater than existing background | $L_{Aeq,adj,T}$ | 41 | 41 | 34 |

A summary of the assessment criteria applied is presented in **Section 2.4**.

## 2.3 Air Conditioning Equipment

State requirements are set out under the *Environmental Protection Act 1994* (EPA 1994); in that Act noise from air conditioning must not exceed the following noise levels when measured as the $L_{A90}$ dB(A) level over a period of 15 minutes at an affected building:

- Between 10 pm and 7 am: 3 dB(A) above the background level;
- From 7 am to 10 pm: 5 dB(A) above the background level.

Nominal air-conditioning equipment is included in the noise prediction model. Detailed calculation of mechanical plant noise emissions can be conducted – if required – once all specific plant and installation can be determined. Given the significant distance between the development site and closest sensitive uses, it is expected that the applicable criteria can be readily achieved with consideration of the selection of plant, location and screening (if required). It is noted that the Act represents an ongoing legal obligation, and it is recommended that plant be maintained to ensure compliance at all times.

## 2.4 Noise Emission Criteria Summary

It is expected that noise emissions from the most significant sources at the proposed development will be generally continuous in nature. To ensure a robust assessment, predicted noise emissions from all sources at the site will be assessed against the EPP (Noise) 2008 Background Creep criteria for continuous noise at residential receivers, and against the AQO for commercial receivers. The assessment criteria are summarised in **Table 2.7** and are based on the Rating Background levels at ML2 as presented in **Section 3.2**.

**Table 2.7:** Assessment criteria applicable at the facade of the sensitive uses. Levels are in dB(A).

| Receivers | Criteria | Descriptor | Day | Evening | Night |
|---|---|---|---|---|---|
| Residential (Receivers 1-9) | EPP (Noise) 2008, Controlling Background Creep – Continuous Noise | $L_{A90,T}$ | 36 | 36 | 29 |
| Commercial (Receivers 10-14) | EPP (Noise) 2008/2019, Acoustic Quality Objectives | $L_{Aeq,adj,1hr}$ | 55* | 55* | 55* |

* the internal AQO has been converted to external value assuming 10 dB(A) of attenuation through open windows as per Locher et al, **"***Differences between Outdoor and Indoor Sound Levels for Open, Tilted, and Closed Windows",* International Journal of Environmental Research and Public Health, 2018.

Demonstrating compliance with the EPP (Noise) 2008 criteria is considered to demonstrate that the noise emissions requirements of the Toowoomba Regional Council Codes are met.

Definition of terms used in this report are presented in **Appendix C**.

# 3. Ambient Noise Monitoring

## 3.1 Measured Ambient Sound Levels – ML1

Noise monitoring has been undertaken close to sensitive uses to the northwest of the proposed use in order to measure existing ambient noise levels in the locality. The first noise logger was located 1.5 metres above ground in a free-field environment near to receiver R2 (see **Section 1.2**), the nearest receiver to the northwest. The approximate measurement location of the noise logger in relation to the proposed development site is shown in **Plate 3.1** below.

***Plate 3.1:*** *Showing the approximate noise measurement location (ML1) in relation to the subject site.*


The instrument was field calibrated before and after the measurement session and the instrument was found to be within 0.2 dB of the reference signal. All instrumentation used in this assessment holds a current calibration certificate from a certified NATA calibration laboratory. The following instruments were used to measure the ambient noise levels-

- Rion NL21 sound level meter;
- Larson Davis CAL200 Class 1 calibrator.

Ambient sound pressure levels were measured generally in accordance with Australian Standard AS1055 2018 - '*Acoustics-Description and measurement of environmental noise*. Ambient noise levels were recorded at 15-minute intervals between the 13th and 22nd of March 2025. Measured noise levels are presented graphically in **Figure 3.1** and the 7-day average ambient levels are presented in **Table 3.1**. Calculation of the Rating Background Level is presented in **Table 3.2**. Definition of terms used in this report are presented in **Appendix C**.

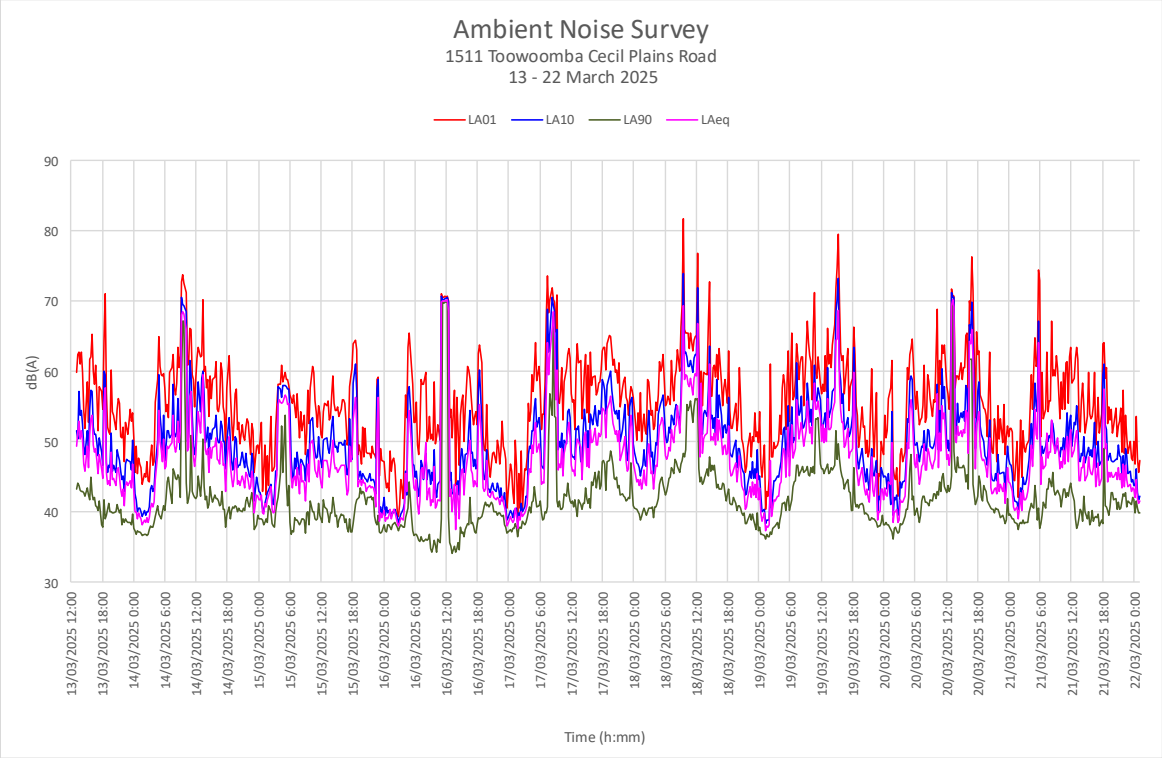



***Figure 3.1:*** *Average ambient noise levels at ML1 (levels in dB(A), free field).*

The chart above shows periods of elevated background noise which may have been caused by machinery or vehicles idling close to the measurement location. Sound levels from these times are excluded from the RBL calculation presented in **Table 3.2**.

**Table 3.1:** Average ambient noise levels recorded at ML1 (levels in dB(A), free field).

| Date | Day | Time of Day | Time period | L01 | L10 | L90 | Leq |
|---|---|---|---|---|---|---|---|
| 17 Mar | Monday | Day | 7:00am – 6:00pm | 70.1 | 54.2 | 43.9 | 57.5 |
| | | Evening | 6.00pm – 10pm | 64.5 | 55.7 | 45.6 | 53.2 |
| | | Night | 10pm – 7.00am | 59.2 | 44.3 | 39.1 | 45.0 |
| 18 Mar | Tuesday | Day | 7:00am – 6:00pm | 66.8 | 56.7 | 47.5 | 58.1 |
| | | Evening | 6.00pm – 10pm | 58.4 | 47.9 | 40.7 | 46.4 |
| | | Night | 10pm – 7.00am | 59.7 | 50.4 | 41.6 | 48.8 |
| 19 Mar | Wednesday | Day | 7:00am – 6:00pm | 69.0 | 55.9 | 46.3 | 56.9 |
| | | Evening | 6.00pm – 10pm | 61.4 | 48.9 | 40.6 | 50.1 |
| | | Night | 10pm – 7.00am | 59.0 | 45.6 | 39.0 | 45.4 |
| 20 Mar | Thursday | Day | 7:00am – 6:00pm | 70.5 | 54.7 | 45.5 | 59.9 |
| | | Evening | 6.00pm – 10pm | 62.6 | 49.0 | 41.9 | 48.3 |
| | | Night | 10pm – 7.00am | 61.4 | 46.5 | 39.2 | 47.3 |
| 21 Mar | Friday | Day | 7:00am – 6:00pm | 62.2 | 49.9 | 41.2 | 48.4 |
| | | Evening | 6.00pm – 10pm | 62.3 | 49.7 | 41.4 | 49.3 |
| | | Night | 10pm – 7.00am | 61.0 | 47.4 | 39.4 | 51.2 |
| 22 & 15 Mar | Saturday | Day | 7:00am – 6:00pm | 57.8 | 48.8 | 39.3 | 46.4 |
| | | Evening | 6.00pm – 10pm | 63.5 | 47.7 | 41.6 | 48.6 |
| | | Night | 10pm – 7.00am | 58.7 | 48.0 | 41.5 | 50.5 |
| 16 Mar | Sunday | Day | 9:00am – 6:00pm | 70.6 | 50.7 | 41.2 | 62.8 |
| | | Evening | 6.00pm – 10pm | 61.9 | 46.8 | 40.2 | 47.3 |
| | | Night | 10pm – 9.00am | 59.1 | 44.1 | 37.8 | 46.1 |
| **Average** | | **Day** | | **67** | **53** | **44** | **58** |
| | | **Evening** | | **62** | **49** | **42** | **50** |
| | | **Night** | | **60** | **47** | **40** | **48** |

**Table 3.2:** Rating Background Level (RBL) calculation (levels in dB(A), free field). Levels formatted as ~~00.0~~ have been excluded from the RBL calculation as they are atypically high.

| Period | Hour | Mon | Tue | Wed | Thu | Fri | Sat | Sun | RBL |
|---|---|---|---|---|---|---|---|---|---|
| Day | **7:00** | 42.8 | 45.7 | 45.7 | 41.5 | 42.9 | 38.8 | | **41** |
| | **8:00** | ~~58.0~~ | 46.7 | 46.0 | 41.2 | 44.2 | 38.9 | | |
| | **9:00** | ~~44.4~~ | 47.6 | 45.7 | 42.1 | 42.6 | 38.7 | 35.0 | |
| | **10:00** | 41.0 | ~~53.4~~ | 46.0 | 42.9 | 42.3 | 40.2 | 35.3 | |
| | **11:00** | 42.7 | ~~54.9~~ | ~~51.7~~ | 44.3 | 42.6 | 39.7 | ~~62.1~~ | |
| | **12:00** | 41.4 | ~~50.6~~ | 45.9 | 43.3 | 41.9 | 40.1 | ~~53.7~~ | |
| | **13:00** | 40.7 | 44.5 | 46.1 | ~~52.5~~ | 38.8 | 39.6 | 34.7 | |
| | **14:00** | 41.6 | 46.2 | 47.6 | 46.6 | 40.3 | 40.5 | 35.7 | |
| | **15:00** | 41.4 | 46.1 | 47.7 | 45.8 | 39.0 | 39.0 | 37.1 | |
| | **16:00** | 44.3 | 43.5 | 44.2 | ~~53.0~~ | 39.4 | 39.2 | 39.2 | |
| | **17:00** | 47.8 | 41.2 | 41.0 | 42.9 | 40.8 | 42.5 | 40.8 | |
| | **ABL** | **40.9** | **42.8** | **43.9** | **41.4** | **39.0** | **38.8** | **34.9** | |
| Evening | **18:00** | 46.1 | 42.1 | 42.2 | 43.4 | 42.3 | 39.6 | 38.9 | **40** |
| | **19:00** | 47.8 | 41.2 | 41.0 | 42.9 | 40.8 | 42.5 | 40.8 | |
| | **20:00** | 45.3 | 40.6 | 40.0 | 40.9 | 41.7 | 42.2 | 41.1 | |
| | **21:00** | 43.1 | 39.1 | 39.1 | 40.2 | 41.0 | 42.0 | 40.2 | |
| | **ABL** | **43.7** | **39.5** | **39.4** | **40.4** | **40.9** | **40.3** | **39.3** | |
| Night | **22:00** | 48.0 | 41.9 | 39.3 | 38.6 | 39.7 | 42.1 | 39.5 | **38** |
| | **23:00** | 38.1 | 43.5 | 38.6 | 38.5 | 39.6 | 41.5 | 37.7 | |
| | **0:00** | 37.4 | 40.5 | 37.3 | 38.3 | 39.4 | 40.9 | 37.7 | |
| | **1:00** | 37.6 | 39.5 | 36.5 | 37.3 | 38.3 | 39.3 | 37.9 | |
| | **2:00** | 38.0 | 40.0 | 37.1 | 37.5 | 38.5 | 39.4 | 38.0 | |
| | **3:00** | 39.0 | 40.3 | 38.0 | 38.0 | 38.5 | 40.3 | 37.9 | |
| | **4:00** | 40.9 | 41.2 | 40.3 | 40.5 | 40.6 | ~~46.7~~ | 39.3 | |
| | **5:00** | 41.8 | 44.4 | 41.4 | 44.6 | 41.2 | ~~45.6~~ | 39.4 | |
| | **6:00** | 39.9 | 43.5 | 42.4 | 39.7 | 39.2 | 37.5 | 36.5 | |
| | **7:00** | | | | | | | 36.0 | |
| | **8:00** | | | | | | | 36.3 | |
| | **ABL** | **37.5** | **39.9** | **36.9** | **37.4** | **38.5** | **38.6** | **36.3** | |

## 3.2 Measured Ambient Sound Levels – ML2

Additional noise monitoring was undertaken close to the subject site, with the objective of measuring RBLs that are more reflective of the acoustic environment at the receivers to the southeast that are not within the industry zone. The measurement location was chosen as it is similar in distance from the Toowoomba Bypass as the closest dwelling to the southeast (the bypass is expected to be the most significant noise source at the measurement location, particularly during the night), and was on property accessible to the proponents. The noise logger was located 1.5 metres above ground in a free-field environment. The approximate measurement location is shown in **Plate 3.2**.

The instrument was field calibrated before and after the measurement session and the instrument was found to be within 0.1 dB of the reference signal. All instrumentation used in this assessment holds a current calibration certificate from a certified NATA calibration laboratory. The following instruments were used to measure the ambient noise levels-

- Rion NL21 sound level meter;
- Larson Davis CAL200 Class 1 calibrator.

Ambient sound pressure levels were measured generally in accordance with Australian Standard AS1055 2018 - '*Acoustics-Description and measurement of environmental noise*. Ambient noise levels were recorded at 15-minute intervals between the 20th and 28th of April 2025. Measured noise levels are presented graphically in **Figure 3.2** and the 7-day average ambient levels are presented in **Table 3.3**. Calculation of the Rating Background Level is presented in **Table 3.4**.

***Plate 3.2:*** *Showing the approximate noise measurement location (ML2) in relation to the subject site.*

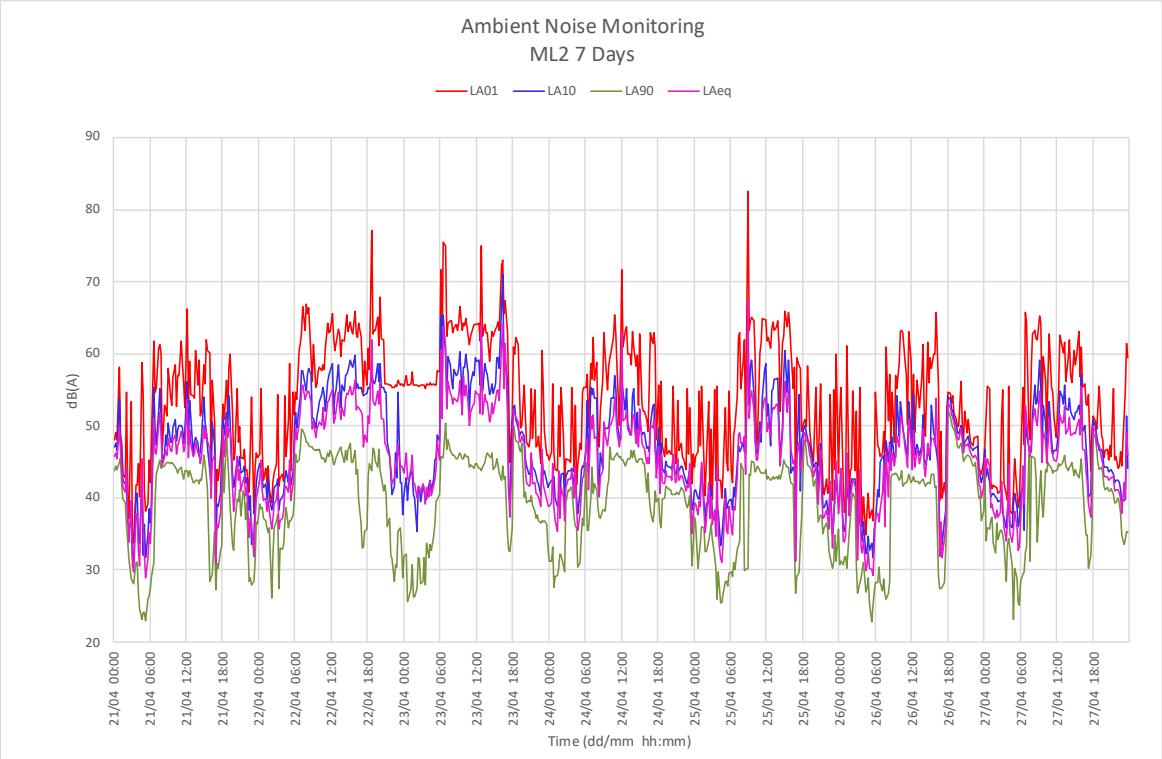




***Figure 3.2:*** *Average ambient noise levels at ML1 (levels in dB(A), free field).*

As is evident in **Figure 3.2**, the measured noise levels at ML2 were affected by extraneous noise sources (e.g. adverse weather, construction machinery, etc). Importantly, the measured $L_{A90}$ levels indicate lower nighttime background levels compared to ML1. Extraneous noise is excluded from the RBL calculation presented in **Table 3.3**.

**Table 3.3:** Rating Background Level (RBL) calculation for ML2 (levels in dB(A), free field). Levels formatted as ~~00.0~~ have been excluded from the RBL calculation as they are atypically high.

| Period | Hour | Mon | Tue | Wed | Thu | Fri | Sat | Sun | RBL |
|---|---|---|---|---|---|---|---|---|---|
| Day | **7:00** | 44.3 | ~~48.9~~ | ~~46.9~~ | 42.0 | 36.3 | 27.1 | | **35** |
| | **8:00** | 44.6 | ~~47.3~~ | ~~45.7~~ | 37.9 | 33.5 | 35.4 | | |
| | **9:00** | 44.9 | ~~46.6~~ | ~~45.8~~ | 40.1 | 44.1 | 43.1 | 40.4 | |
| | **10:00** | 43.9 | ~~45.8~~ | ~~45.5~~ | ~~45.8~~ | 43.9 | 42.6 | 44.3 | |
| | **11:00** | 43.5 | ~~45.9~~ | 44.5 | ~~45.9~~ | 43.6 | 42.5 | 43.8 | |
| | **12:00** | 43.5 | ~~45.2~~ | 44.2 | ~~45.0~~ | 42.7 | 42.5 | 44.5 | |
| | **13:00** | 42.3 | ~~46.6~~ | ~~45.3~~ | ~~45.8~~ | 42.8 | 42.3 | 44.9 | |
| | **14:00** | 43.3 | ~~45.9~~ | ~~45.4~~ | ~~45.4~~ | 43.8 | 42.0 | 44.2 | |
| | **15:00** | 39.4 | ~~46.0~~ | 44.5 | ~~45.2~~ | 44.1 | 42.5 | 43.5 | |
| | **16:00** | 30.2 | 40.9 | 43.1 | 40.7 | 35.9 | 31.4 | 39.9 | |
| | **17:00** | 31.8 | 34.4 | 34.1 | 38.7 | 32.6 | 31.4 | 33.3 | |
| | **ABL** | **31.8** | **35.1** | **37.7** | **38.2** | **33.5** | **31.4** | **38.6** | |
| Evening | **18:00** | ~~45.5~~ | ~~44.6~~ | ~~48.7~~ | 38.1 | ~~46.7~~ | ~~50.9~~ | ~~47.2~~ | **35*** |
| | **19:00** | 36.9 | ~~45.7~~ | ~~45.2~~ | 41.1 | ~~43.3~~ | ~~47.9~~ | ~~43.3~~ | |
| | **20:00** | 39.3 | ~~42.4~~ | 39.8 | 40.7 | 39.2 | ~~46.1~~ | ~~41.2~~ | |
| | **21:00** | 39.0 | 36.4 | 38.7 | 40.9 | 36.2 | ~~45.8~~ | ~~40.1~~ | |
| | **ABL** | **37.3** | **36.4** | **38.8** | **38.1** | **36.5** | ~~**45.9**~~ | ~~**40.4**~~ | |
| Night | **22:00** | ~~48.3~~ | 31.2 | 30.3 | 37.0 | 40.0 | 32.6 | ~~43.9~~ | **29** |
| | **23:00** | ~~46.1~~ | 33.1 | 33.3 | 35.7 | 35.9 | 33.3 | 38.8 | |
| | **0:00** | ~~44.3~~ | 38.4 | 29.0 | 30.8 | 34.0 | 31.1 | 37.4 | |
| | **1:00** | ~~41.6~~ | 35.9 | 27.7 | 30.2 | 34.5 | 33.6 | 35.1 | |
| | **2:00** | 32.7 | 32.7 | 29.7 | 32.9 | 34.5 | 37.7 | 35.5 | |
| | **3:00** | 29.7 | 32.8 | 30.5 | ~~41.2~~ | 30.6 | 28.5 | 32.7 | |
| | **4:00** | 24.7 | 36.2 | 33.2 | 34.9 | 26.8 | 28.6 | 30.3 | |
| | **5:00** | 24.9 | 37.8 | 39.1 | 34.8 | 28.6 | 25.1 | 27.5 | |
| | **6:00** | 31.8 | ~~45.8~~ | ~~46.8~~ | 39.0 | 30.0 | 28.8 | 30.0 | |
| | **7:00** | | | | | | | 39.1 | |
| | **8:00** | | | | | | | ~~42.0~~ | |
| | **ABL** | **24.8** | **32.3** | **28.6** | **30.6** | **28.2** | **27.8** | **29.5** | |

** Calculated evening RBL is 37 however 35 is applied as evening is not typically higher than day.*

The calculated RBLs for ML2 are lower during all time periods compared with ML1. The RBLs at ML2 are considered to be representative of the acoustic environment at nearby rural dwellings, particularly during the critical night time period. The RBLs for ML2 are therefore used as the basis of any assessment where background levels are used.

# 4. Noise Impact Assessment

## 4.1 Noise Sources

Expected noise sources from the proposed development have been predicted onto the surrounding sensitive uses using SoundPLAN v9.1 software and the prediction methodology ISO 9613-2: 2024. The noise model includes screening from structures and topography, with topographic information sourced from Queensland Government (1-metre). The significant sources of noise emission at the site are expected to include:

- Noise breakout from inside the kennels
- Noise from animals (e.g. dogs) in the outdoor yards
- Air-conditioning plant
- Truck movements, loading and unloading
- Car movements

Noise breakout from the kennels is expected to be the most significant source at the site, it is represented in the model as an industrial building with an internal sound pressure level that emanates from the walls, roofs, and openings of the buildings. A uniform internal sound pressure level is applied consistently throughout the interior spaces. The individual and group outdoor quarters are represented as openings through the building façade for direct noise propagation. The remaining solid wall and roof components of the external building envelope are assigned a sound reduction index of 15 $R_w$. This model configuration introduces is intended to present a conservative assessment, as the model intentionally omits the acoustic attenuation provided by the internal partitions and screening within the building layout itself.

The internal sound pressure level is based on a measurement at a previous kennel of 10 dogs socializing and barking regularly which resulted in a point source sound power level of 90 dB(A) Leq,15min. The average internal sound pressure level with approximately 70 dogs inside the kennel is calculated to be 81 dB(A) Leq,15min[1] assuming the space is reverberant. The resulting sound pressure level is adjusted by +5 dB to allow for any potential tonality or intermittency, and the result (86 dB(A)) was applied as the average sound pressure level throughout the proposed kennel.

Truck movements are modelled as a moving point source at a speed of 10km/hr with 2 movements per hour. Car movements are modelled as a moving point source at a speed of 10km/hr with 13 movements per hour, representing a situation where vehicles arrive or leave all 13 carparks during the same hour. A point source is positioned in the refuse area which is intended to represent noise from loading and unloading vehicles, including waste collection.

Mechanical plant is included to represent the air-conditioning that is expected to be included at the office building. It is not known whether the kennel building will be air-conditioned, however mechanical plant is included in order to present a worst-case scenario. The modelled noise sources are based on a nominal requirement of 50 watts of cooling/heating per cubic metre of enclosed space, equating to approximately 25 kW for the office building and 100 kW for the kennel

[1] Internal sound pressure level is calculated according to the formula $Lp = Lw - 10\log(V) + 10\log(T) + 14$ where Lw is the source sound power level (98 dB(A) for 70 dogs), V is the room volume (2500 $m^3$) and T is the reverberation time (2.0s based on absorption coefficient of 0.1). The formula is a simplified method sourced from ARUP's Strutt acoustic calculation software.

building. Mechanical plant is modelled as individual point sources representing 25 kW outdoor condenser units which are positioned in the services area of the office, and on each façade of the kennel building.

Other noise sources may exist at the site but are not expected to be significant relative to the modelled sources. Noise emissions from expected activities at the proposed development have been forecast using the environmental noise model detailed in **Appendix B**. The noise source levels used in the noise model are summarised in **Table 4.1** with noise sources positioned as presented in **Plate 4.1**.

**Table 4.1:** Source levels used in this assessment, dB Leq, rounded.

| Source | Frequency Spectrum Leq dB(Lin) | | | | | | | | Sum |
|---|---|---|---|---|---|---|---|---|---|
| | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | dB(A),$L_{eq}$ |
| Noise breakout, kennel (internal SPL) | 59 | 54 | 58 | 83 | 84 | 72 | 61 | 53 | 86 |
| 25 kW AC Outdoor Unit (Daikin REYQ8BYM9) | 89 | 84 | 81 | 76 | 74 | 71 | 69 | 67 | 80 |
| Car movement (13 vph @ 10kph) | 78 | 85 | 79 | 76 | 79 | 80 | 76 | 73 | 85 |
| Truck movement (2 vph @ 10kph) | 102 | 96 | 92 | 90 | 90 | 86 | 82 | 79 | 94 |
| Loading / Unloading | 73 | 73 | 73 | 73 | 73 | 73 | 73 | 73 | 80 |

**Plate 4.1:** Location of noise sources

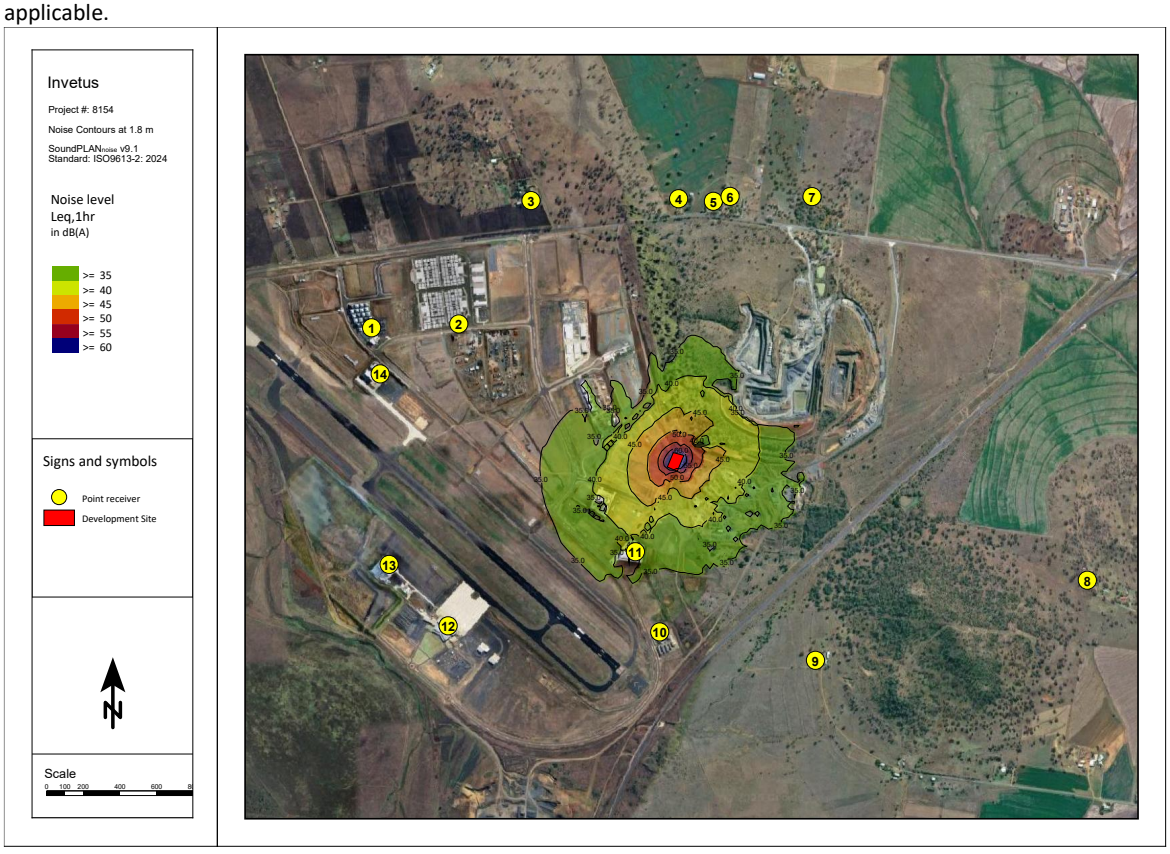
## 4.2 Predicted Noise Emissions & Assessment

The noise model predicts cumulative noise levels from all identified sources, which are located as described in **Section 4.1**. Predicted cumulative $L_{Aeq}$ noise levels are assessed against the background creep criteria for continuous noise sources for residential receivers, and against the AQO for commercial receivers. This ensures a conservative assessment at residential receivers by assuming all sources at the site are continuous. Predicted noise levels and assessment is presented in **Table 4.3,** and visual noise contours are presented in **Plate 4.3.** Further details of the noise model are presented in **Appendix B**.

**Table 4.3:** Intrusive Noise Criteria noise assessment. Calculated cumulative sound levels in dB $L_{Aeq,adj,1hr}$, façade-affected.

| Receiver | Receiver Type | Predicted Noise Level | Criteria | | | Assessment | | |
|---|---|---|---|---|---|---|---|---|
| | | | Day | Evening | Night | Day | Evening | Night |
| 1 | Residential | 23 | 36 | 36 | 29 | Pass | Pass | Pass |
| 2 | Residential | 27 | 36 | 36 | 29 | Pass | Pass | Pass |
| 3 | Residential | 25 | 36 | 36 | 29 | Pass | Pass | Pass |
| 4 | Residential | 23 | 36 | 36 | 29 | Pass | Pass | Pass |
| 5 | Residential | 22 | 36 | 36 | 29 | Pass | Pass | Pass |
| 6 | Residential | 19 | 36 | 36 | 29 | Pass | Pass | Pass |
| 7 | Residential | 12 | 36 | 36 | 29 | Pass | Pass | Pass |
| 8 | Residential | 19 | 36 | 36 | 29 | Pass | Pass | Pass |
| 9 | Residential | 28 | 36 | 36 | 29 | Pass | Pass | Pass |
| 10 | Commercial | 32 | 55 | 55 | 55 | Pass | Pass | Pass |
| 11 | Commercial | 38 | 55 | 55 | 55 | Pass | Pass | Pass |
| 12 | Commercial | 27 | 55 | 55 | 55 | Pass | Pass | Pass |
| 13 | Commercial | 26 | 55 | 55 | 55 | Pass | Pass | Pass |
| 14 | Commercial | 25 | 55 | 55 | 55 | Pass | Pass | Pass |

**Plate 4.3:** Noise contours at 1.8m above ground. Levels are in dB(A), Leq,1hr and include façade effects where applicable.



## 4.3 Discussion

Noise emissions from the proposed development have been predicted to the closest sensitive uses and are predicted to comply with the assessment criteria at all nearby sensitive uses during all time periods. The prediction model and assessment incorporates several conservative assumptions which are intended to represent a worst-case scenario and ensure a conservative assessment, these assumptions include;

- A low level of acoustic performance provided by the wall and roof systems of the kennel (15 $R_w$). It is expected that the wall and roof systems will readily meet or exceed this rating.
- All noise sources are modelled as operating simultaneously and predicted noise levels are cumulative of all sources.
- Assessment of all noise from the site as continuous noise, the most stringent criteria.

On this basis, it is considered that noise emission from the proposed development can meet the assessment criteria at the closest sensitive uses and be readily compliant with the noise emission requirements of Toowoomba Regional Council and the Queensland Government.

# 5. Conclusions and Recommendations

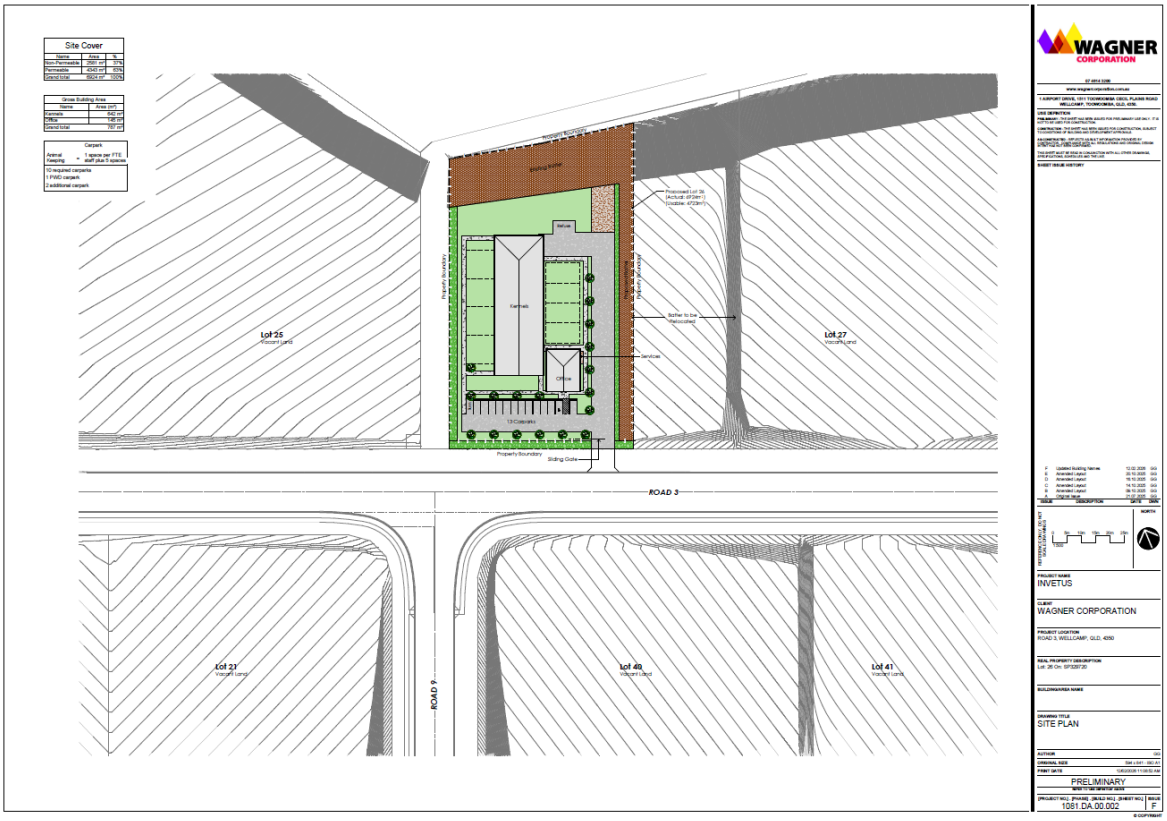
It is concluded that:

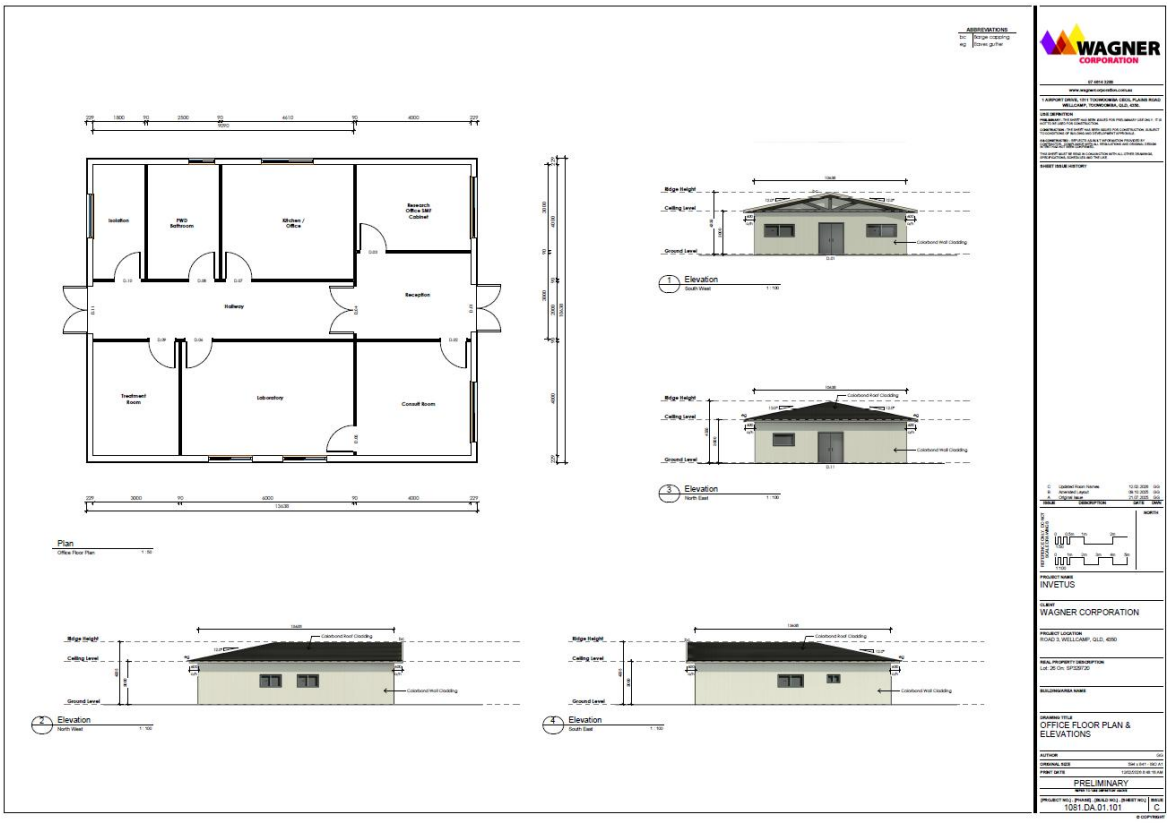
- Cumulative noise emissions from the proposed development have been predicted to the closest sensitive uses. The prediction model incorporates several conservative assumptions which are intended to represent a worst-case-scenario in terms of noise emissions and assessment.
- Cumulative noise emissions from the proposed development are predicted to comply with the background creep criteria for continuous noise sources (the most stringent criteria) at all nearby residential receivers during all time periods.
- Cumulative noise emissions from the proposed development are predicted to comply with the Acoustic Quality Objectives at all nearby commercial receivers during all time periods.
- The precise model and location of air-conditioning plant is not yet known, however given the significant distance between the development site and closest sensitive uses, the relevant criteria are expected to be readily achieved.
- The proposed development can meet the noise emission requirements of Toowoomba Regional Council and the Queensland Government.

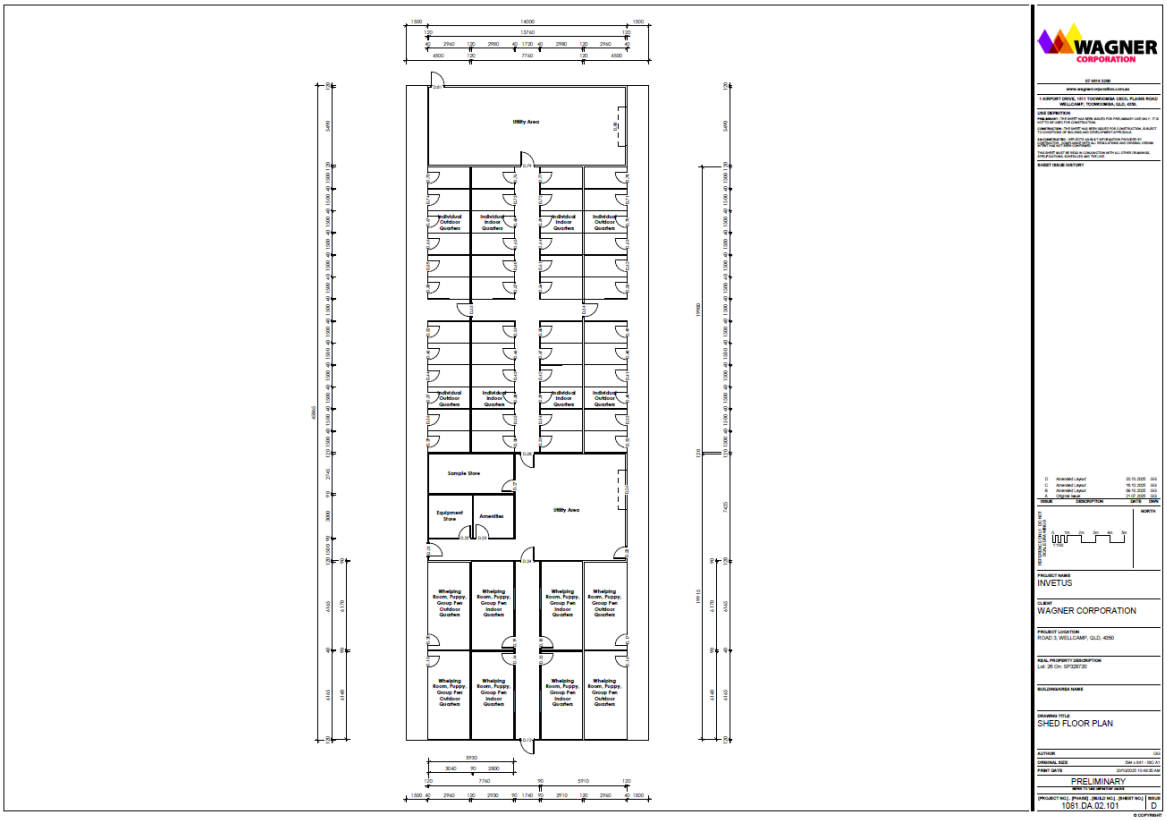
It is recommended that:

- The development be approved on the basis that noise emission compliance is predicted at all nearby sensitive uses.
- Air-conditioning equipment be chosen, located, screened (if necessary), and maintained to ensure ongoing compliance with the night time criteria of 29 dB(A) at the closest sensitive uses. A detailed assessment of air-conditioning plant noise may be undertaken at Building Approval stage, if required.

# Appendix A: Plans


WAGNER CORPORATION
Isolation
PWD Bathroom
Kitchen / Office
Research Office SMP Cabinet
Reception
Hallway
Treatment Room
Laboratory
Consult Room
Plan
Office Floor Plan
1 Elevation
South West
3 Elevation
North East
2 Elevation
North West
4 Elevation
South East
INVETUS
WAGNER CORPORATION
OFFICE FLOOR PLAN & ELEVATIONS
PRELIMINARY
1081.DA.01.101
C


WAGNER CORPORATION
Utility Area
Individual Outdoor Goofies
Individual Indoor Goofies
Sample Store
Equipment Store
Amenities
Whelping Room, Puppy, Group Pen Outdoor Goofies
Whelping Room, Puppy, Group Pen Indoor Goofies
INVETUS
WAGNER CORPORATION
SHED FLOOR PLAN
PRELIMINARY
1081.DA.02.101
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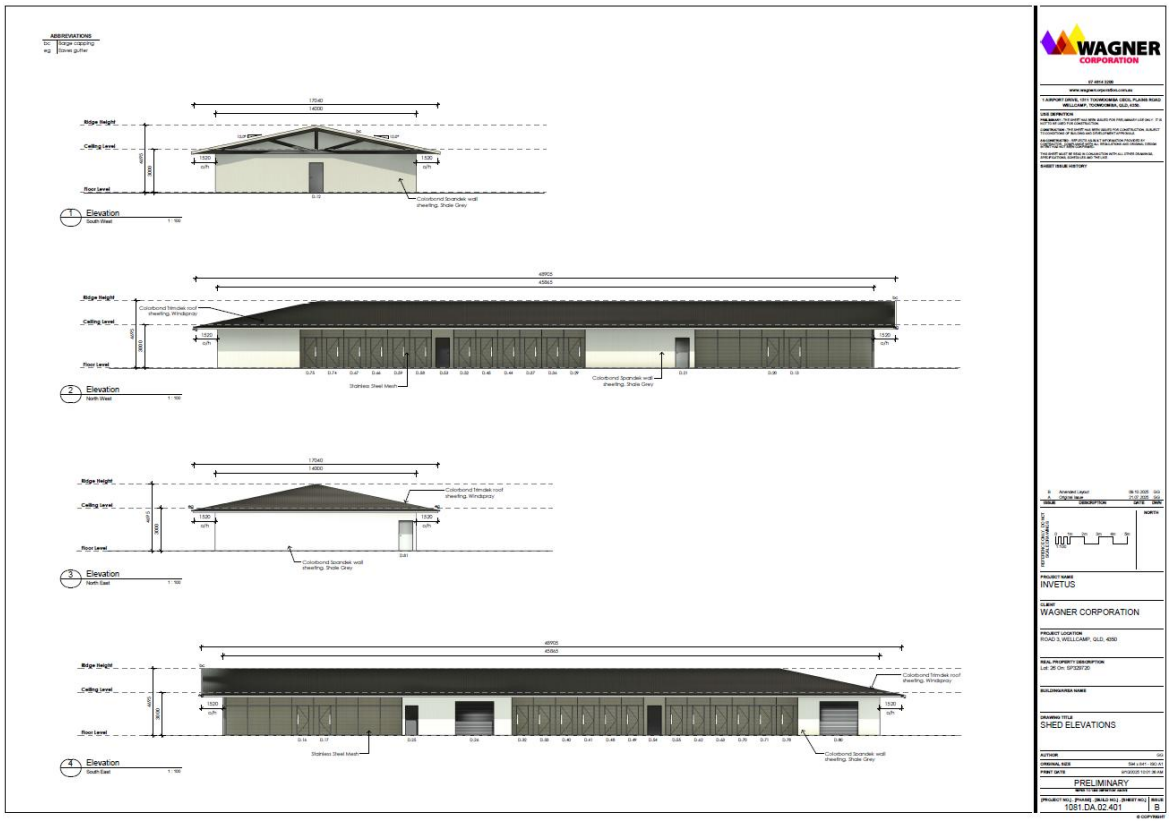

ABBREVIATIONS
Ridge Height
Ceiling Level
Floor Level
1 Elevation
South West
2 Elevation
North West
3 Elevation
North East
4 Elevation
South East
Colorbond Trimdek roof sheeting, Windspray
Colorbond Spandek wall sheeting, Shale Grey
Stainless Steel Mesh
WAGNER CORPORATION
INVETUS
WAGNER CORPORATION
ROAD 3, WELLCAMP, QLD, 4350
SHED ELEVATIONS
PRELIMINARY
1061.DA.02.401
B

# Appendix B: Environmental Noise Model

Noise levels from the proposed development have been predicted onto the surrounding sensitive zone boundaries and uses. Noise levels are predicted using SoundPLAN v8.0 and the prediction methodology ISO 9613-2: 1996. Sound power levels used in the noise model have been sourced from the SoundPlan Emission Library, equipment specifications, previous measurements of similar equipment, and published technical papers.

All prediction models have limits to their accuracy of prediction. This is due to the inherent nature of the calculation algorithms that go into the design of the models, the assumptions made in the implementation of the model, and the availability of good source sound power data. Various researchers have suggested that an un-calibrated model has an accuracy of ±5 dB while a calibrated model has an accuracy of ±2 dB. Calibration means that the model has been established with reference to measured sound levels at a receiver, known source levels and tightly defined propagation variables (wind speed and direction, for example). Alternatively, a series of predictions with different programs but the same assumption variables can be used for verification purposes. In this case, the proposed development does not yet exist for the purposes of verification and the model is therefore considered to be un-calibrated.

## B1 Sources and Receivers

Expected noise sources from the proposed development have been predicted onto the surrounding sensitive uses using SoundPLAN v9.1 software and the prediction methodology ISO 9613-2: 2024. The noise model includes screening from structures and topography, with topographic information sourced from Queensland Government (1-metre). The significant sources of noise emission at the site are expected to include:

- Noise breakout from inside the kennels
- Noise from animals (e.g. dogs) in the outdoor yards
- Air-conditioning plant
- Truck movements, loading and unloading
- Car movements

Noise breakout from the kennels is expected to be the most significant source at the site, it is represented in the model as an industrial building with an internal sound pressure level that emanates from the walls, roofs, and openings of the buildings. A uniform internal sound pressure level is applied consistently throughout the interior spaces. The individual and group outdoor quarters are represented as openings through the building façade for direct noise propagation. The remaining solid wall and roof components of the external building envelope are assigned a sound reduction index of 15 $R_w$. This model configuration introduces is intended to present a conservative assessment, as the model intentionally omits the acoustic attenuation provided by the internal partitions and screening within the building layout itself.

The internal sound pressure level is based on a measurement at a previous kennel of 10 dogs socializing and barking regularly which resulted in a point source sound power level of 90 dB(A) Leq,15min. The average internal sound pressure

level with approximately 70 dogs inside the kennel is calculated to be 81 dB(A) Leq,15min[2] assuming the space is reverberant. The resulting sound pressure level is adjusted by +5 dB to allow for any potential tonality or intermittency, and the result (86 dB(A)) was applied as the average sound pressure level throughout the proposed kennel.

Truck movements are modelled as a moving point source at a speed of 10km/hr with 2 movements per hour. Car movements are modelled as a moving point source at a speed of 10km/hr with 13 movements per hour, representing a situation where vehicles arrive or leave all 13 carparks during the same hour. A point source is positioned in the refuse area which is intended to represent noise from loading and unloading vehicles, including waste collection.

Mechanical plant is included to represent the air-conditioning that is expected to be included at the office building. It is not known whether the kennel building will be air-conditioned, however mechanical plant is included in order to present a worst-case scenario. The modelled noise sources are based on a nominal requirement of 50 watts of cooling/heating per cubic metre of enclosed space, equating to approximately 25 kW for the office building and 100 kW for the kennel building. Mechanical plant is modelled as individual point sources representing 25 kW outdoor condenser units which are positioned in the services area of the office, and on each façade of the kennel building.

Other noise sources may exist at the site but are not expected to be significant relative to the modelled sources. The noise source levels used in the noise model are presented in **Table B1** with noise sources positioned as presented in **Plate B1**. The nominal transmission loss spectrum for the kennel building walls and roof is presented in **Table B2**.

**Table B1:** Source levels used in this assessment, dB Leq, rounded.

| Source | Frequency Spectrum Leq dB(Lin) | | | | | | | | Sum |
|---|---|---|---|---|---|---|---|---|---|
| | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | dB(A),$L_{eq}$ |
| Noise breakout, kennel (internal SPL) | 59 | 54 | 58 | 83 | 84 | 72 | 61 | 53 | 86 |
| 25 kW AC Outdoor Unit (Daikin REYQ8BYM9) | 89 | 84 | 81 | 76 | 74 | 71 | 69 | 67 | 80 |
| Car movement (13 vph @ 10kph) | 78 | 85 | 79 | 76 | 79 | 80 | 76 | 73 | 85 |
| Truck movement (2 vph @ 10kph) | 102 | 96 | 92 | 90 | 90 | 86 | 82 | 79 | 94 |
| Loading / Unloading | 73 | 73 | 73 | 73 | 73 | 73 | 73 | 73 | 80 |

**Table B2:** Transmission loss of shed and tower wall and roof systems, sound reduction index.

| 63Hz | 125Hz | 250Hz | 500Hz | 1kHz | 2kHz | 4kHz | 8kHz | Rw (dB) | C | Ctr |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 4 | 6 | 10 | 15 | 19 | 13 | 13 | 15 | -1 | -4 |

[2] Internal sound pressure level is calculated according to the formula $Lp = Lw - 10\log(V) + 10\log(T) + 14$ where Lw is the source sound power level (98 dB(A) for 70 dogs), V is the room volume (2500 m$^3$) and T is the reverberation time (2.0s based on absorption coefficient of 0.1). The formula is a simplified method sourced from ARUP's Strutt acoustic calculation software.

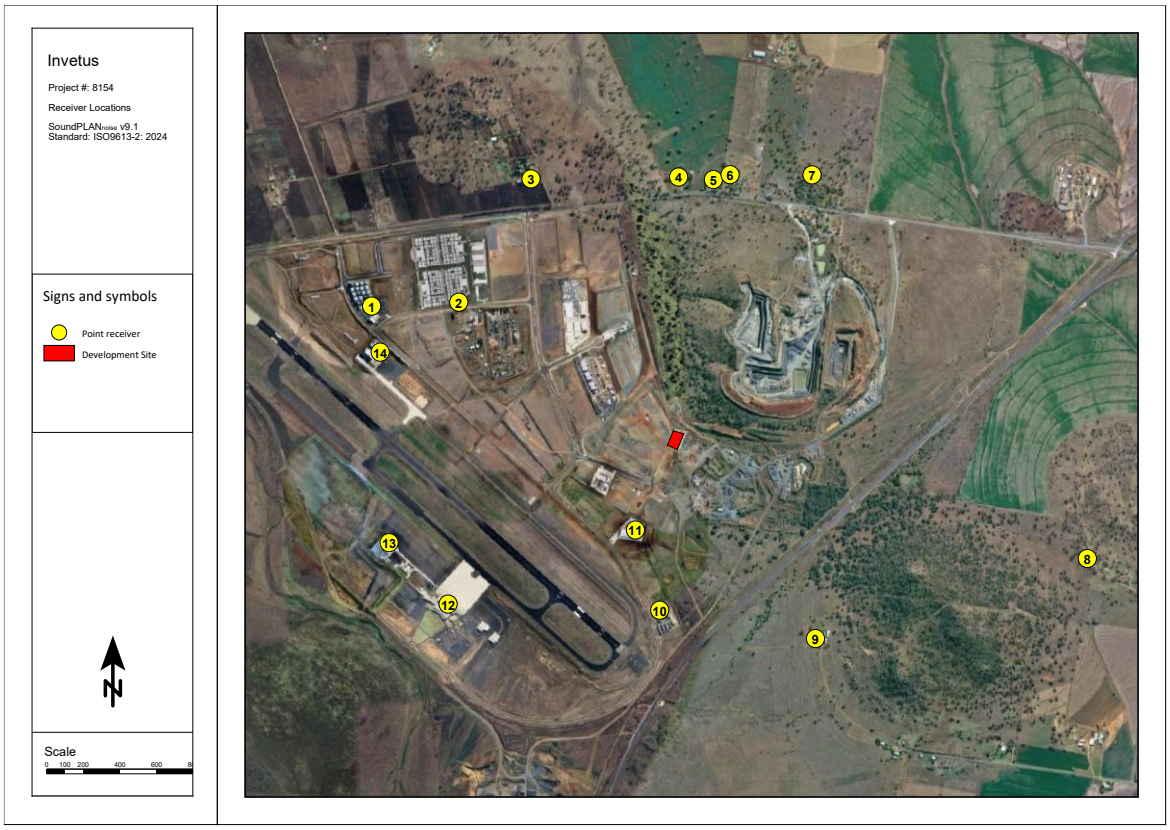
**Plate B1:** Location of noise sources


The closest sensitive uses to the proposed development have been identified using aerial imagery, site attendance, and Council mapping. Receiver points are positioned 1m from the most exposed façade of the closest sensitive uses and predicted noise levels are façade-affected. The sensitive receivers included in the noise model are presented in **Table B3** and are illustrated in **Plate B3**.

**Table B3:** Sensitive receivers.

| Receiver | Receiver Type | Description | X Position (UTM 56) | Y Position (UTM 56) |
|---|---|---|---|---|
| 1 | Residential | 1511 Toowoomba Cecil Plains Road (dwellings) | 380756.8 | 6952153.2 |
| 2 | Residential | 1511 Toowoomba Cecil Plains Road (demountable accommodation) | 381231.8 | 6952174.5 |
| 3 | Residential | 1344 Toowoomba Cecil Plains Road (dwelling) | 381625.5 | 6952847.7 |
| 4 | Residential | 1272 Toowoomba Cecil Plains Road (dwelling) | 382430.1 | 6952858.1 |
| 5 | Residential | 1256 Toowoomba Cecil Plains Road (dwelling) | 382619.7 | 6952843.9 |
| 6 | Residential | 1242 Toowoomba Cecil Plains Road (dwelling) | 382710.6 | 6952870.7 |
| 7 | Residential | 1198 Toowoomba Cecil Plains Road (dwelling) | 383157.6 | 6952869.6 |
| 8 | Residential | 168 Kim Road (dwelling) | 384658.2 | 6950774.7 |
| 9 | Residential | Residential Dwelling on Lot 13 on SP296105 | 383176.2 | 6950337.6 |
| 10 | Commercial | RSPCA Toowoomba (office) | 382327.1 | 6950492.5 |
| 11 | Commercial | JRS (office) | 382194.5 | 6950930.2 |
| 12 | Commercial | Wellcamp Toowoomba Airport Terminal (office) | 381173.6 | 6950525.5 |
| 13 | Commercial | Menzies Aviation (office) | 380852.2 | 6950861.2 |
| 14 | Commercial | FTA Queensland (office) | 380803.2 | 6951901.7 |

**Plate B2:** Receiver Locations.



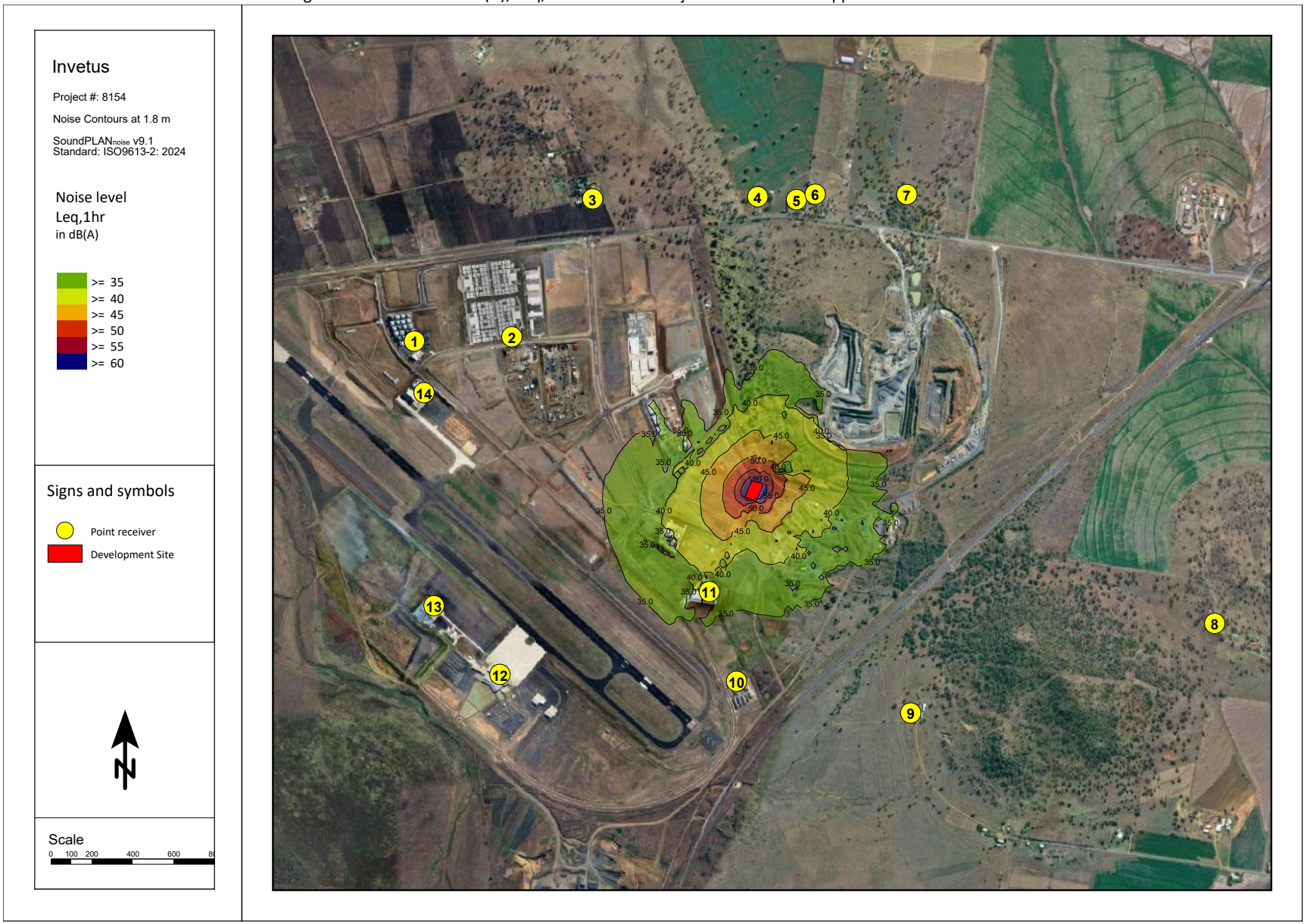
## B2 Predicted Noise Emissions

The noise model predicts cumulative noise levels from all identified sources, which are located as described in **Section B1**. Predicted noise levels are presented in **Table B4**, visual noise contours are presented in **Plate B3**.

**Table B4:** Intrusive Noise Criteria noise assessment. Calculated cumulative sound levels in dB $L_{Aeq,adj,1hr}$, façade-affected.

| Receiver | Receiver Type | Description | Predicted Noise Level |
|---|---|---|---|
| 1 | Residential | 1511 Toowoomba Cecil Plains Road (dwellings) | 23.2 |
| 2 | Residential | 1511 Toowoomba Cecil Plains Road (demountable accommodation) | 27.3 |
| 3 | Residential | 1344 Toowoomba Cecil Plains Road (dwelling) | 24.8 |
| 4 | Residential | 1272 Toowoomba Cecil Plains Road (dwelling) | 22.7 |
| 5 | Residential | 1256 Toowoomba Cecil Plains Road (dwelling) | 21.7 |
| 6 | Residential | 1242 Toowoomba Cecil Plains Road (dwelling) | 18.6 |
| 7 | Residential | 1198 Toowoomba Cecil Plains Road (dwelling) | 12.3 |
| 8 | Residential | 168 Kim Road (dwelling) | 19.0 |
| 9 | Residential | Residential Dwelling on Lot 13 on SP296105 | 27.9 |
| 10 | Commercial | RSPCA Toowoomba (office) | 31.8 |
| 11 | Commercial | JRS (office) | 38.2 |
| 12 | Commercial | Wellcamp Toowoomba Airport Terminal (office) | 26.6 |
| 13 | Commercial | Menzies Aviation (office) | 25.9 |
| 14 | Commercial | FTA Queensland (office) | 25.1 |

**Plate B3:** Noise contours at 1.8m above ground. Levels are in dB(A), Leq,1hr and include façade effects where applicable.



# Appendix C: Definitions

Noise assessment terms used in this Report include-

**Event maximum sound pressure level ($L_{A\%,adj,T}$), L01**

The L01 level is calculated as the noise level equalled and exceeded for 1% of the measurement time, for example 9 seconds in any 15 minute interval. L01 is an appropriate level to characterise single events, such as from train bypass.

**Average maximum sound pressure level ($L_{A\%,adj,T}$), L10**

The "L10" level is an indicator of "steady-state" noise or intrusive noise conditions from traffic, music and other relatively non-impulsive noise sources. The L10 level is calculated as the noise level equalled and exceeded for 10% the measurement time, for example 90 seconds in any 15 minute interval. The measured L10 time-intervals for day/evening/night are arithmetically averaged to present the "average maximum" levels of the environment for day/evening/night. The level can be adjusted for tonality or impulsiveness.

**Background sound pressure level ($L_{A90,T}$), L90**

Commonly called the "L90" or "background" level and is an indicator of the quietest times of day, evening or night. The L90 level is calculated as the noise level equalled and exceeded for 90% the measurement time. The measured L90 time-intervals are arithmetically averaged to present the "average background" levels of the environment for day/evening/night. The level is recorded in the absence of any noise under investigation. The level is not adjusted for tonality or impulsiveness.

**Rating Background Level (RBL)**

The overall, single-figure, background level representing each assessment period (day/evening/night) over the whole monitoring period (as opposed to over each 24-hour period used for the assessment of background level). This is defined as the median value of all the day evening or night assessment background levels.

**Equivalent Continuous or time average sound pressure level ($L_{Aeq,T}$), Leq**

Commonly called the "Leq" level it is the logarithmic average noise level from all sources far and near. The level can be adjusted for tonality.

**Adjustments to levels**

Under some circumstances, noise levels may be "adjusted" for tonal or impulsive characteristics by the addition of +2 or +5 dB. The adjustments are made in accordance with AS1055. Measured noise levels are not normally adjusted for the purposes of a traffic noise assessment.

**Free-field level**

A sound level that is measured at a distance of more than 3.5 metres from a wall or facade.