# Environmental Noise Assessment

Proposed Mixed Use Development

At 825 Stanley Street, Woolloongabba

On behalf of 825 Stanley Pty Ltd

23BRA0006 R01_1

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## Revision Record

| No. | Author | Reviewed/Approved | Description | Date |
|---|---|---|---|---|
| A | S Yorke | A Ashworth | Report draft | 06/03/2023 |
| 0 | S Yorke | A Ashworth | Client issue | 06/03/2023 |
| 1 | S Yorke | A Ashworth | New design | 17/10/2025 |
| | | | | |
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# Executive Summary

Colliers (previously TTM) was engaged by 825 Stanley Pty Ltd to undertake a revised environmental noise assessment of a proposed re-design of the mixed-use development located at 825 Stanley Street, Woolloongabba. The assessment was based on the Brisbane City Council (BCC) *City Plan 2014* planning scheme.

The previous version of this report (23BRA0006 R01_0 dated 6/03/2023) was approved by BCC as part of the current development approval for the site. This report updates noise emissions in relation to the revised design for the gallery/event use.

Unattended noise monitoring was conducted to determine the current ambient noise levels in the vicinity of the site location.

Noise impacts from relevant onsite activities were assessed for the following operating hours:

- Retail tenancies (ground floor): between 6am - 10pm, 7 days (code allowed hours)
- Gallery (Levels 1 – 6): typical 10am – 5pm, Wednesday – Sunday. Assessed for between 7am – 10pm, 7 days.
- Event use (Level 6): between 6am - 10pm (internal) and 7am – 10pm (external), 7 days

Compliance with the relevant noise criteria and the Brisbane City Council *City Plan 2014* planning scheme is predicted at the nearest noise sensitive receivers with building façade recommendations and noise management strategies as outlined in Section 7 of this report.

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## Table Index



## Figure Index

# 1 Introduction

## 1.1 Background

Colliers (previously TTM) was engaged by 825 Stanley Pty Ltd to undertake a revised environmental noise assessment of a proposed re-design of the mixed-use development located at 825 Stanley Street, Woolloongabba. This report will form part of a development application for consideration by Brisbane City Council.

## 1.2 References

This report is based on the following:

- Brisbane City Council *City Plan 2014*
- *Noise impact assessment planning scheme policy* - Schedule 6, City Plan 2014
- Development plans shown in Appendix A
- Site inspection, noise measurements, analysis and calculations conducted by Colliers

## 1.3 Scope

The assessment includes the following:

- Description of the development site and proposal.
- Measurement of existing ambient noise levels.
- Statement of assessment criteria relating to environmental noise emissions.
- Assessment of noise generated by the development onto the nearest noise sensitive receivers.
- Analysis of measured and predicted noise levels.
- Details of noise control recommendations to be incorporated to achieve predicted compliance.

# 2 Site Description

## 2.1 Site Location

The site is described by the following:

- 825 Stanley Street, Woolloongabba

The site locality is shown in Figure 1.

Figure 1: Site Locality


## 2.2 Current Site Conditions

The site is bound by Stanley St to the north, Jurgens St to the west, multiple dwelling with podium levels to the east, and Trafalgar Street to the south. The current acoustic environment at the site and surrounding area is primarily comprised of road traffic noise from the surrounding road network.

# 3 The Proposed Development

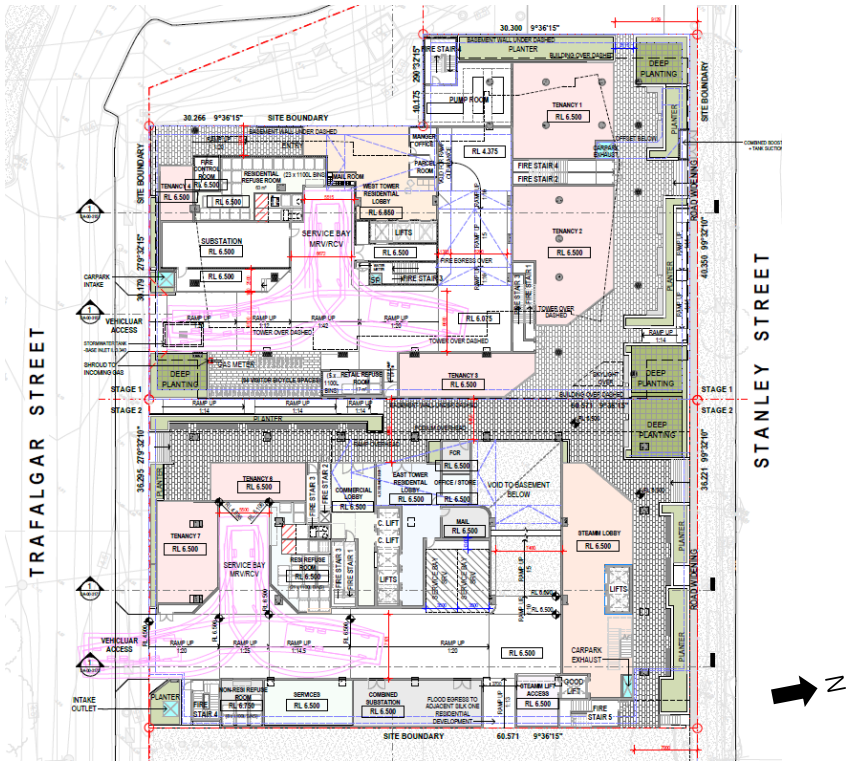
## 3.1 Development Description

The proposal is for a mixed-use development consisting of the following uses and operating hours:

- Residential apartments
- Retail tenancies (ground floor): between 6am - 10pm, 7 days (code allowed hours)
- Gallery: typical 10am – 5pm, Wednesday – Sunday. Assessed for internal (Levels 1 – 6) and outdoor area (Level 6) between 7am – 10pm, 7 days (with recommended limitations)
- Event use (Level 6): internal between 6am - 10pm, 7 days and possible outdoor area (Level 6) between 7am – 10pm (with recommended limitations)

A ground floor plan of the development is presented in Figure 2. Further development plans are shown in Appendix A.

Figure 2: Ground Floor Plan



# 4 Measurements

## 4.1 Equipment

The following equipment was used to measure existing noise levels:

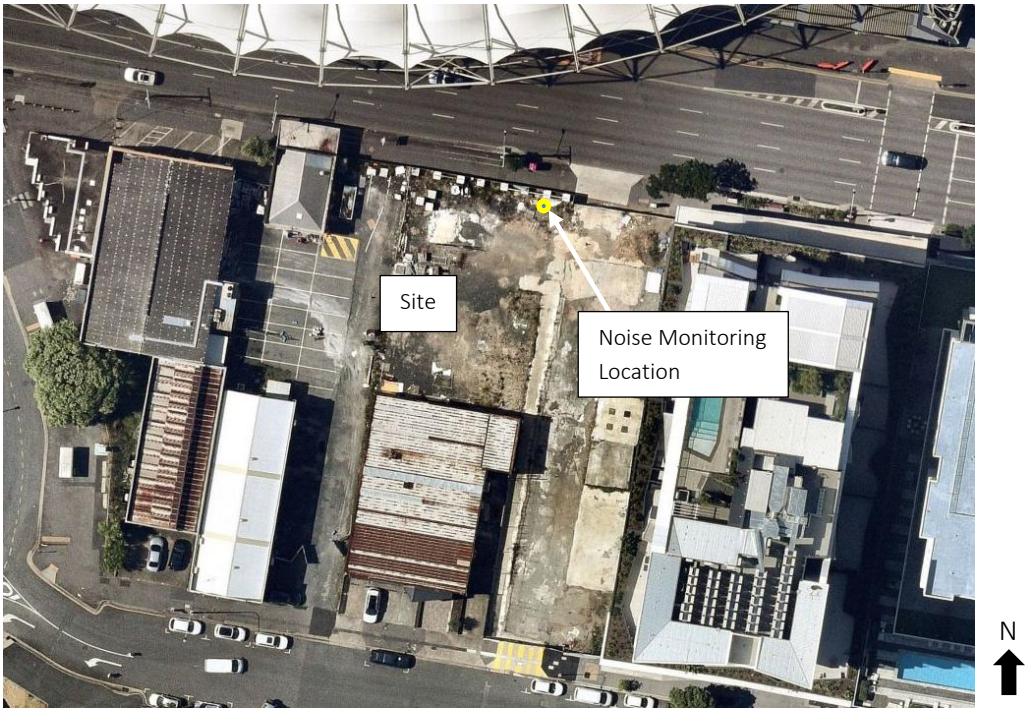
- ARL Ngara Environmental noise logger (SN# 8782A5)
- Norsonic 131 Sound Level Meter (SN# 1313158)
- Bruel & Kjaer Sound Calibrator type 4231 (SN# 3009814)

All equipment was calibrated by a National Association of Testing Authorities (NATA) accredited laboratory. The equipment was field calibrated before and after the measurement session. No significant drift from the reference signal was recorded.

## 4.2 Unattended Noise Monitoring

Unattended noise monitoring was conducted to establish the existing ambient noise levels between Tuesday 21st February to Tuesday 28th February, 2023. The noise monitoring location is shown in Figure 3. The monitor was in a position considered representative of the current ambient noise levels experienced in the vicinity of the site with consideration to access and security requirements.

Figure 3: Noise Monitoring Location



The microphone was in a free-field location and 2.0m above ground level. The noise monitor was set to measure statistical noise levels in 'A'-weighting, 'Fast' response, over 15 minute intervals. Ambient noise levels were measured in accordance with Australian Standard *AS1055:1997 Acoustics – Description and Measurement of Environmental Noise* (AS1055).

Weather during the monitoring period was generally fine with rainfall recorded between 9am 22/02 – 9am 23/02 (source: Bureau of Meteorology). Data affected by rainfall was excluded from the analysis.

## 4.3 Noise Source Measurements

Noise levels associated with typical on-site activities were taken from similar investigations conducted by Colliers. All measurements were conducted generally in accordance with AS1055.

## 4.4 Results of Measurements

### 4.4.1 Ambient Noise Levels

Table 1 presents the measured ambient noise levels. The Rating Background Level (RBL) was determined in accordance with the BCC *Noise Impact Assessment Planning Scheme Policy* (NIAPSP). Graphical presentation of the measured levels is shown in Appendix B. The measurement results were used to determine the assessment criteria for the development.

Table 1: Measured Ambient Noise Levels

| Time Period | Measured Noise Levels, dB(A) | |
|---|---|---|
| | RBL $L_{90}$ | $L_{eq}$ |
| Daytime (7am – 6pm) | 58 | 68 |
| Evening (6pm – 10pm) | 55 | 67 |
| Night time (10pm – 7am) | 52 | 65 |

# 5 Noise Criteria

The previous Brisbane City Council *Information Request* (28/11/2022) asked for noise assessment in accordance with the Centre or mixed use code (AO1.1 - AO1.2) and the Community facilities code (AO1.1 – AO2.2). Table 2 summarises the planning scheme requirements for the site which are relevant to this environmental noise assessment.

Table 2: City Plan 2014 – Relevant Codes

| Location | Zone | Code |
|---|---|---|
| Site | Mixed use zone | Centre or mixed use code<br>Community facilities code |
| Nearest sensitive receivers | Mixed use zone | N/A |

It is noted that the previous development approval for the site included a noise assessment (by Vipac dated 17/06/2016) that addressed road traffic noise and potential Gabba stadium noise.

## 5.1 Centre or Mixed Use Code

The proposed retail and function facility use is applicable for assessment under the Centre or mixed use code. Table 3 summarises the Performance Outcome PO1 of the code.

Table 3: Centre or Mixed Use Code Performance Outcome P01

| Performance Outcomes | Acceptable Outcomes |
|---|---|
| **PO1**<br>Development:<br>(a) has hours of operation which are controlled so that the use does not detrimentally impact on the amenity of adjoining residents;<br>(b) where not located in a Special entertainment precinct identified in a neighbourhood plan, does not result in noise emissions that exceed the noise (planning) criteria in Table 9.3.3.F low frequency noise criteria in Table 9.3.3.3.G and night-time noise criteria in Table 9.3.3.3.H in a sensitive zone or a nearby sensitive use.<br>Note—A noise impact assessment report prepared in accordance with the Noise impact assessment planning scheme policy can assist in demonstrating achievement of this performance outcome. | **AO1.1**<br>Development:<br>(a) for accommodation activities, dwelling unit or emergency services has unlimited hours of operation;<br>(b) for a club, if licensed, function facility, hotel or nightclub entertainment facility does not generate noise which is clearly audible and detectable, or impacts on the amenity of a resident, in a dwelling or other sensitive use;<br>Note-Development for a club, if licensed, function facility, hotel or nightclub entertainment facility is not expected to achieve this outcome.<br>(c) for any other use:<br>i. Where in the Principal centre zone or Major centre zone has unlimited hours of operation;<br>ii. Where in the District centre zone, Neighbourhood centre zone or Mixed use zone:<br>a. Has hours of operation, including deliveries, which are limited to 6am to 10pm; or<br>b. Does not generate noise which is clearly audible and disturbing in a dwelling or other sensitive use;<br>iii. Where in any other zone: |

| | |
|---|---|
| | a. Has hours of operation, including for deliveries, which are limited to 6am to 8pm; or<br>b. Does not generate noise which is clearly audible and disturbing in a dwelling or other sensitive use. |
| | **AO1.2**<br>Development ensures mechanical plant or equipment is acoustically screened from an adjoining sensitive use. |

The site is located in a Mixed-use zone. In accordance with AO1.1(c)ii, the proposed development is allowed hours of operation, including for deliveries, of 6am to 10pm. The proposed hours of operation for retail uses are between 6am – 10pm in compliance with AO1.1(c)ii.

To comply with Acceptable Outcome AO1.2, it is recommended the development apply acoustic screening to exposed mechanical plant with the potential to impact adjacent noise sensitive receivers.

The garden gallery outdoor area (Level 6) is assessed in accordance with PO1 for potential gallery/event use.

### 5.1.1 Noise (Planning) Criteria

The Centre or mixed use code, Performance Outcome P01, *Table 9.3.3.3.F* outlines noise (planning) criteria for noise emissions from the development. This criteria, described by $L_{Aeq,adj,T}$, is reproduced in Table 7 for the applicable hours of operation.

Table 4: Noise (Planning) Criteria (Table 9.3.3.3.F)

| Criteria Location | Intrusive noise criteria, dB(A)<br>Day, evening and night $L_{Aeq,adj,T}$ are not greater than the RBL plus the amount in 'Column 1' for the relevant criteria location | | | | Acoustic amenity criteria, dB(A)<br>Day, evening and night $L_{Aeq,adj,T}$ are not greater than the values in this column for the relevant criteria location | | |
|---|---|---|---|---|---|---|---|
| | Column 1 | Day 7am-6pm | Evening 6pm-10pm | Night 10pm-7am | Day | Evening | Night |
| At a sensitive use in the Mixed use zone | 5 | 63 | 60 | 57 | 60 | 55 | 50 |
| Project Specific Criteria* | | 60 | 55 | 50 | | | |

Day: 7am – 6pm. Evening: 6pm – 10pm. Night: 10pm – 7am.

*The project specific noise criterion is taken as the most stringent value for each time period from the Intrusive and Amenity noise criteria.

Table 5 summarises the Performance Outcome PO7 of the Centre or mixed use code.

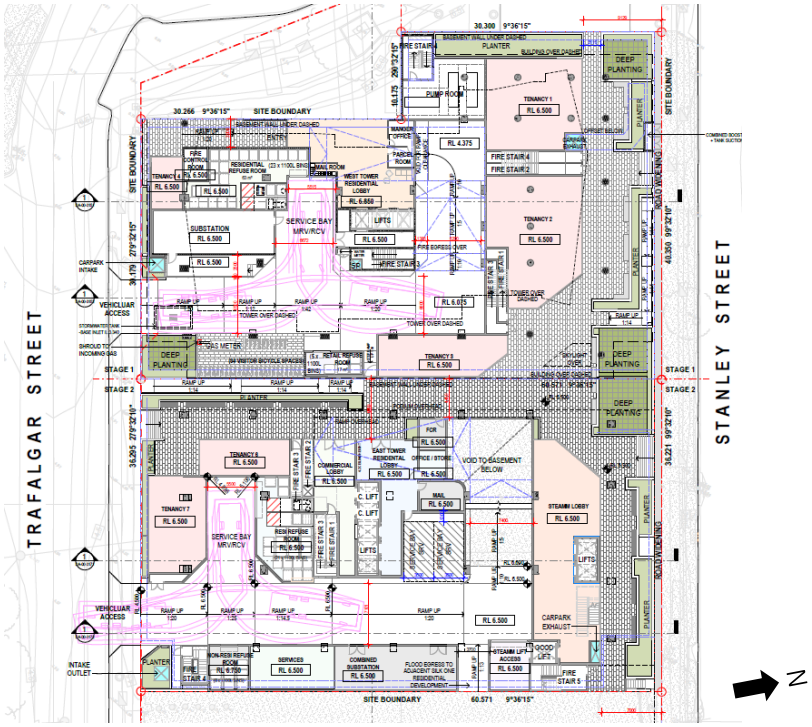
Table 5: Centre or Mixed Use Code - Performance Outcome PO7

| Performance Outcome | Acceptable Outcome |
|---|---|
| PO7<br>Development mitigates impacts on residential amenity in or adjoining the building through:<br><br>a. providing an outdoor dining area that is appropriately located;<br>b. ensuring external dining and entertainment areas are visually and acoustically screened from an adjoining dwelling. | AO7<br>Development provides for external dining or entertainment areas to be:<br><br>a. located in or directly adjacent to the public realm;<br>b. visually and acoustically screened from an adjoining dwelling. |

Potential outdoor dining locations are adjacent to retail tenancy locations as shown in Figure 4. Adjacent, existing residential dwellings to the east (and approximately at floor level 5 height) are acoustically screened from these areas by the building structure above.

Onsite residential dwellings have mandatory façade treatment requirements in accordance with PO21, Multiple dwelling code, which are intended to address mixed-use zone noise environments such as retail and outdoor dining. Hence, acoustic screening is provided in accordance with AO7/PO7.

Figure 4: Tenancy Locations - Potential Outdoor Dining Locations



## 5.2 Community Facilities Code

Noise emissions from the gallery use are applicable for assessment under the Community facilities code. Performance Outcome P01 and PO2 of the code are reproduced in Table 6.

Table 6: Community Facilities Code Performance Outcomes

| Performance Outcomes | Acceptable Outcomes |
|---|---|
| PO1<br>Development ensures that the hours of operation are:<br>a) consistent with reasonable community expectations for the use and are consistent with the purpose of the zone or zone precinct;<br>b) controlled so that the community facility does not impact on the amenity of:<br>i. a residence within the building where the use is located;<br>ii. nearby sensitive uses. | AO1.1<br>Development for a non-residential use has hours of operation, including the use of indoor activity areas and private open space, which are limited to 7am to 6pm. |
| | AO1.2<br>Development has hours of operation for delivery vehicles which are limited to 7am to 6pm Monday to Saturday, excluding public holidays |
| PO2<br>Development ensures noise generated does not exceed the noise (planning) criteria in Table 9.3.5.3.B and night-time noise criteria in Table 9.3.5.3.C at a sensitive zone or sensitive use.<br>Note—A noise impact assessment report prepared in accordance with the Noise impact assessment planning scheme policy can assist in demonstrating achievement of this performance outcome. | AO2.1<br>Development:<br>a) does not involve amplified music entertainment;<br>b) is conducted wholly within an enclosed building and does not involve external activity, dining or entertainment areas;<br>c) provides a 2m high acoustic fence along any boundary with land in a residential zone;<br>d) ensures mechanical plant or equipment is acoustically screened from adjoining sensitive uses. |

Typical hours of operation of the gallery are 10am – 5pm (Wednesday – Sunday) in accordance with AO1.1. Possible operation between 7am – 10pm was also assessed. The gallery internal use is within an enclosed building and primarily for exhibitions, installations and curated experiences. Possible use of the garden gallery outdoor area on Level 6 was assessed in accordance with PO2 with required limitations recommended.

### 5.2.1 Noise (planning) criteria

The Community Facilities Code, *Table 9.3.5.3.B* outlines noise (planning) criteria for noise emissions from the development. This criteria, described by $L_{Aeq,adj,T}$, is reproduced in Table 7.

Table 7: Noise (Planning) Criteria (Table 9.3.5.3.B)

| Criteria Location | Intrusive noise criteria, dB(A) Day, evening and night $L_{Aeq,adj,T}$ are not greater than the RBL plus the amount in 'Column 1' for the relevant criteria location | | | | Acoustic amenity criteria, dB(A) Day, evening and night $L_{Aeq,adj,T}$ are not greater than the values in this column for the relevant criteria location | | |
|---|---|---|---|---|---|---|---|
| | Column 1 | Day 7am-6pm | Evening 6pm-10pm | Night 10pm-7am | Day | Evening | Night |
| At a sensitive use in the Mixed use zone | 5 | 63 | 60 | 57 | 60 | 55 | 50 |
| Project Specific Criteria* | | 60 | 55 | 50 | | | |

Day: 7am – 6pm. Evening: 6pm – 10pm. Night: 10pm – 7am.

*The project specific noise criterion is taken as the lowest value of the Intrusive and Amenity noise criteria.

# 6 Analysis – Onsite Noise

As outlined in Section 5, the relevant on-site activities for noise assessment are:

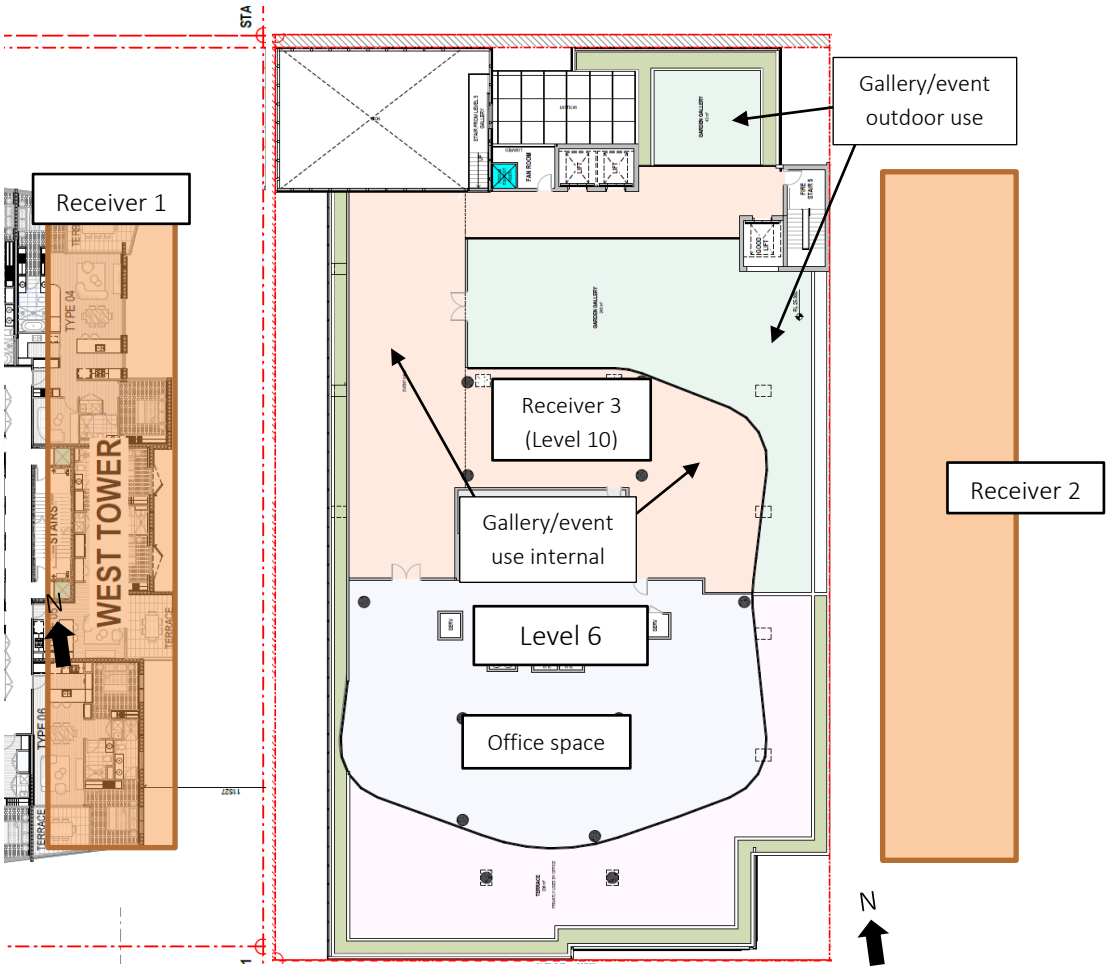
- Gallery/event: internal noise (Level 1-6) and possible use of outdoor area (Level 6)

## 6.1 Noise Sensitive Receivers

This assessment will focus on the nearest noise sensitive receivers as outlined below and shown in Figure 5. If compliance can be achieved at these receivers, then all remaining noise sensitive locations are expected to comply.

- Receiver 1: Onsite dwellings (west tower)
- Receiver 2: Dwellings to the east of the site (from Level 5 height)
- Receiver 3: Onsite dwellings (east tower, from Level 10)

Figure 5: Noise Sensitive Receiver Locations



## 6.2 Noise Source Levels

Table 8 presents the typical noise sources associated with the development with the potential to impact the nearest sensitive receivers. The noise source levels were calculated to one metre and include corrections for tonality and impulsiveness as per AS1055. The number of events was estimated for a 'peak' one-hour time period providing a 'worst case scenario' applied to relevant time periods.

Table 8: Relevant Noise Sources

| Noise Source | Time Period | Location (Figure 6) | Measured Duration (s) | $L_{eq,T}$ dB(A) | Duration |
|---|---|---|---|---|---|
| Crowd (42 people) | Day (7am – 6pm) | East area of outside area (Level 6) | 60 | 80 | Continuous |
| Crowd (42 people) | | West area of outside area (Level 6) | 60 | 80 | Continuous |
| Crowd (19 people) | Evening (6pm – 10pm) | East area of outside area (Level 6) | 60 | 75 | Continuous |
| Crowd (19 people) | | West area of outside area (Level 6) | 60 | 75 | Continuous |

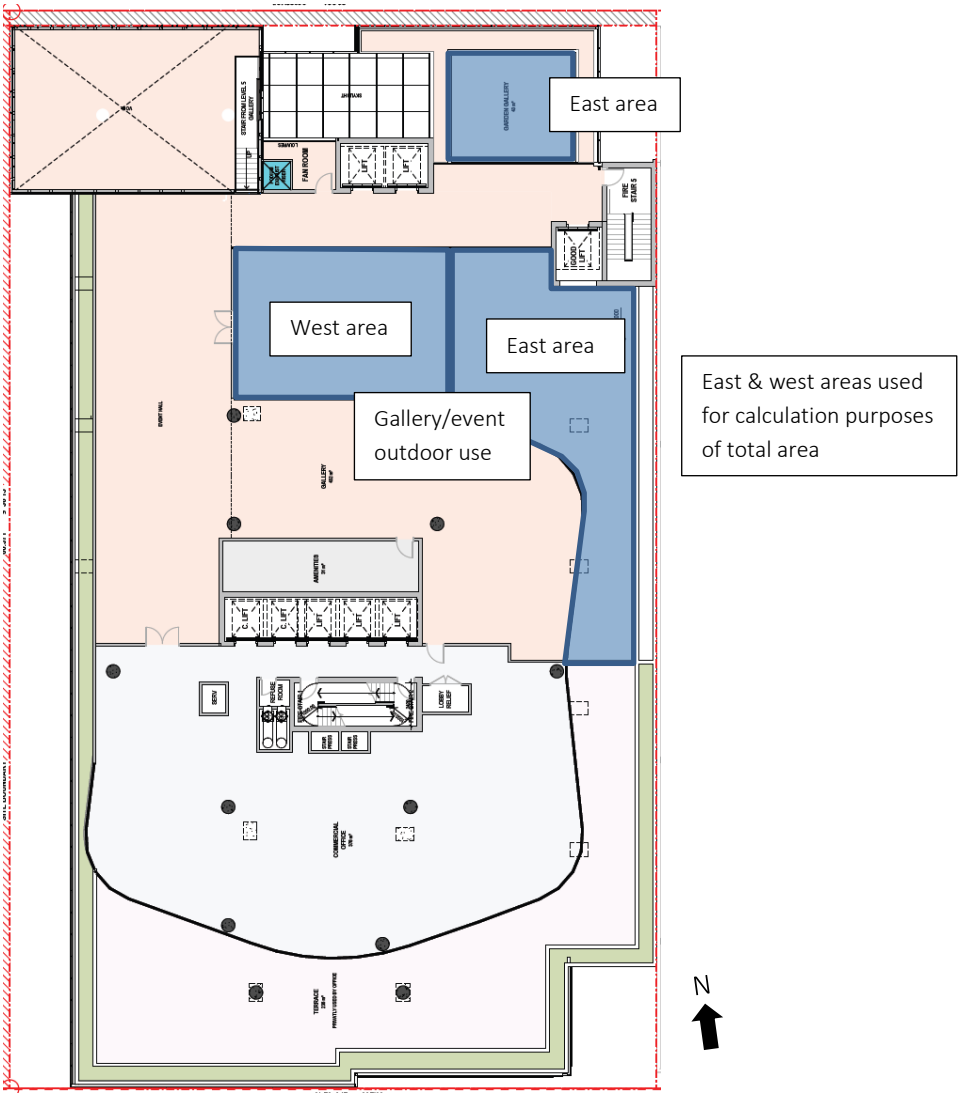
Internal noise was assessed in Section 6.5.

## 6.3 Calculation Assumptions

The following assumptions have been made for noise calculations:

- Crowd noise was based on data contained in paper 'Prediction of Noise from Small to Medium Sized Crowds' Hayne et al, 2011. Duration was assumed to occur continuously during the assessment period.
- An acoustic barrier is recommended along the east side of the outdoor area (Level 6) as detailed in Section 7. Noise attenuation from the acoustic barrier was not included in the noise calculations to represent the noise path from the outdoor area over the top of the barrier to higher floor levels of the receiver.
- Noise attenuation from balcony solid balustrades was included for the receiver 3 onsite apartments (from Level 10) adjacent and above the Level 6 outdoor area.
- Noise source locations are shown in Figure 6. Noise source predictions were calculated from a central location for each noise source location.

Figure 6: Noise Source Locations – Gallery/Event Outdoor Use (Level 6)




## 6.4 Predicted Onsite Noise Levels at Receivers

The predicted noise levels from typical onsite activities are based on the noise sources presented in Table 8 and the assumptions outlined in Section 6.3. Sample calculations are included in Appendix C.

### 6.4.1 Noise Planning Criteria - $L_{eq}$

Table 9 presents the predicted onsite noise emission levels at the nearest sensitive receiver. The criteria are specified in the table heading. Crowd patron numbers are based on maximum patron numbers for compliance with the noise criteria for each time period.

Table 9: Predicted Noise Planning Impacts

| Receiver | Noise Source | Predicted External Noise Level $L_{Aeq}$ dB(A) | Complies with Criteria? | |
|---|---|---|---|---|
| | | | Day 7am-6pm 60dB(A) | Evening 6pm-10pm 55dB(A) |
| 1 | Outdoor crowd (84 people) (day) | 52 | ✓ | n/a |
| | Outdoor crowd (38 people) (evening) | 47 | n/a | ✓ |
| 2 | Outdoor crowd (84 people) (day) | 60 | ✓ | n/a |
| | Outdoor crowd (38 people) (evening) | 55 | n/a | ✓ |
| 3 | Outdoor crowd (84 people) (day) | 52 | ✓ | n/a |
| | Outdoor crowd (38 people) (evening) | 47 | n/a | ✓ |

Noise activities are predicted to comply with the noise criteria when the outside crowd patron number is limited for each relevant time period.

## 6.5 Internal Sound Levels

The main noise source within the gallery/event internal spaces are expected to be patron and/or amplified sound (voice or music). Noise level predictions to determine a maximum internal sound level were based on reverse calculations. The calculations are based on the following assumptions which are considered worst case:

- Nearest sensitive receiver: Receiver 1 and 2
- Distance attenuation between nearest façade and receiver: 10m (gallery/event internal spaces)
- Minimum attenuation of façade: Rw35
- Criteria: 60/55dB(A) $L_{eq}$ (day/evening)

Based on the above assumptions, Table 10 presents the predicted maximum allowable internal patron and/or amplified sound levels. Calculations are included in Appendix C.

Table 10: Indicative Maximum Allowable Internal Sound Level Predictions

| Space | Indicative Maximum Allowable Internal Reverberant Sound Level* $L_{eq}$ dB(A) | | |
|---|---|---|---|
| | Day 7am - 6pm | Evening 6pm - 10pm | Night 6am - 7am |
| Gallery (Level 2 – 5) | 115 | 110 | n/a |
| Gallery / event (Level 6) | 107 | 102 | 97 |

*Measured at centre of room equidistant from any speakers

The predicted maximum allowable internal sound levels for patron and/or amplified sound are expected to be adequate for operation of each space with façades closed during operating hours:

- Gallery: between 7am – 10pm, 7 days
- Event use: between 6am - 10pm, 7 days (internal)

See Section 7 for recommended noise mitigation measures.

# 7 Recommendations

Recommended acoustic mitigation measures are presented in this section to achieve predicted compliance with the relevant assessment criteria.

## 7.1 Building Attenuation

### 7.1.1 Habitable Rooms

The development is located in a Mixed-use zone. To comply with *Performance Outcome PO21* of the *Multiple Dwelling Code*, we recommend the adoption of *Acceptable Outcome AO21* for residential habitable rooms (bedrooms and living areas) to attenuate any surrounding retail activity noise (including outdoor dining):

> *Development in a zone in the centre zones category or the Mixed use zone has a minimum acoustic performance of:*
>
> *a) $R_w35$ for glazing (windows and doors) where total area of glazing is greater than 1.8m$^2$;*
> *b) $R_w32$ for glazing (windows and doors) where total area of glazing is less than or equal to 1.8m$^2$.*

### 7.1.2 Gallery and Event Spaces

The following building attenuation measures are recommended:

- Gallery and event use external façades on Levels 2 – 6 to achieve a minimum sound reduction rating of Rw35 (glazing, walls) and Rw40 (roof).

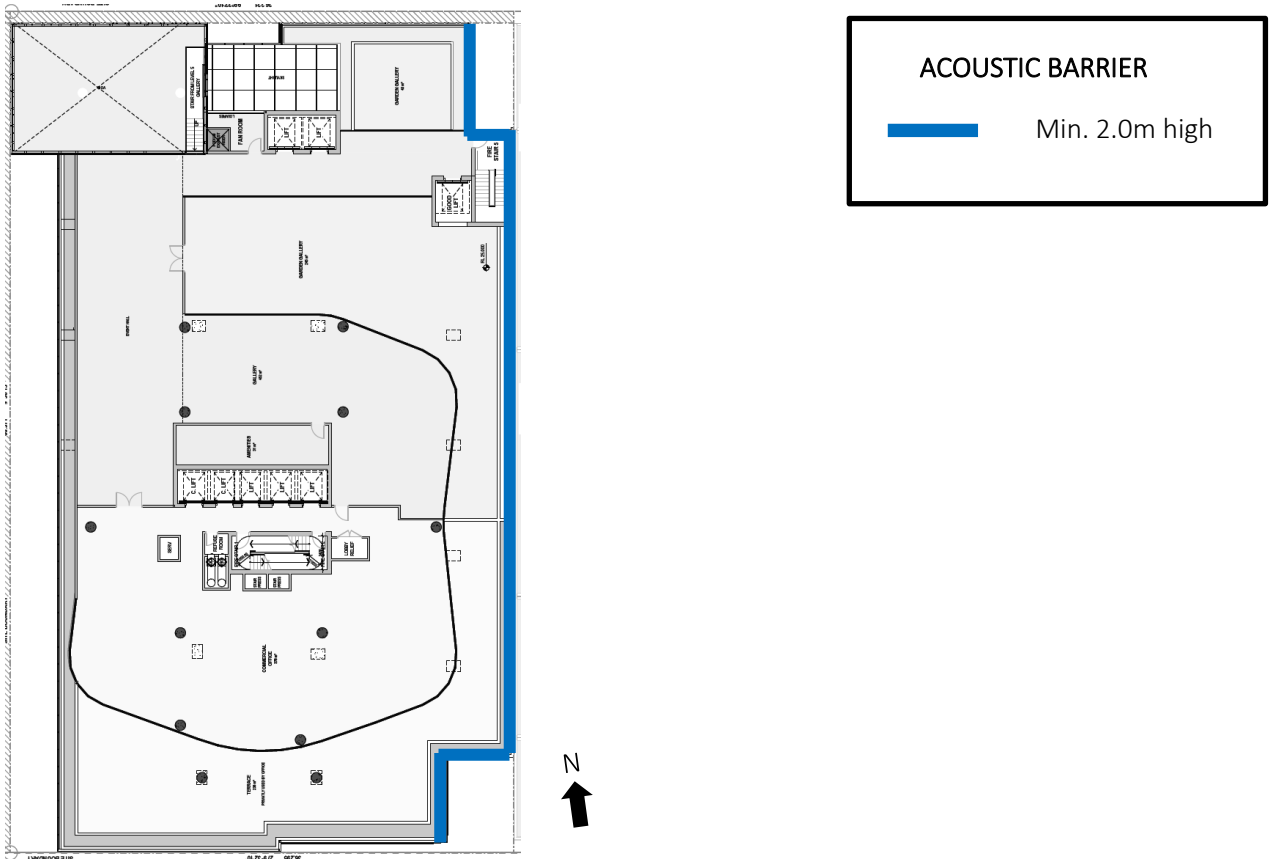
## 7.2 Acoustic Barrier

To improve noise attenuation of the Level 6 outdoor area, an acoustic barrier is recommended at the location and height as shown in Figure 7.

The acoustic barrier should:

- Be the minimum height relative to the adjacent floor level.
- Be of solid construction and have no gaps or holes for the extent shown.
- Be constructed of a material with a surface mass not less than 12.5kg/m$^2$.
- The barrier can be constructed of a transparent material (eg. glazing, acrylic – min. 12.5kg/m$^2$)

Figure 7: Recommended Acoustic Barrier




## 7.3 Management Strategies

The following management strategies are recommended to comply with the relevant noise criteria:

a. Possible operating hours (internal use):

   i. Gallery (Levels 1 – 6): between 7am – 10pm, 7 days

   ii. Event use (Level 6): between 6am – 10pm, 7 days

b. Gallery and event use of the outdoor area (Garden Gallery) on Level 6:

   i. Day 7am – 6pm: maximum 84 people

   ii. Evening 6pm – 10pm: maximum 38 people

   iii. No outdoor use between 10pm – 7am

   iv. No amplified music (no external speakers)

v. The same limitations apply to the office outdoor area (Level 6, south end) if private event use occurs

c. Gallery and event use external building facades to be closed (eg. no open windows or external doors) during noise generating use (crowd, amplified sound). Except for momentary external door open for patron enter/exit if required for outdoor area access (as per (b) above). Door to have automatic closing mechanism.

## 7.4 Mechanical Plant Noise

To comply with AO1.2 (*Centre or mixed use code)* and AO2.1(d) *(Community facilities code)* for mechanical plant, we recommend the following for plant with the potential to adversely impact nearby sensitive receivers:

> *Development ensures mechanical plant is acoustically screened from nearby sensitive uses.*

The definition of 'acoustically screened' is provided in Table SC1.2.3.B of Brisbane City Plan 2014, Schedule 1 Definitions:

> *The source of noise is completely screened from view of habitable rooms (including balconies, patios, decks and verandas) of an adjoining sensitive use by solid, gap free material and construction e.g. acoustic fence, building, or enclosure.*
>
> *Acoustic barrier: Solid, gap free barrier with minimum surface density of 12.5kg/m$^2$*

Furthermore, it is also recommended that a mechanical plant noise assessment is conducted once plant selections are finalised during design development stage to ensure noise emissions comply with criteria.

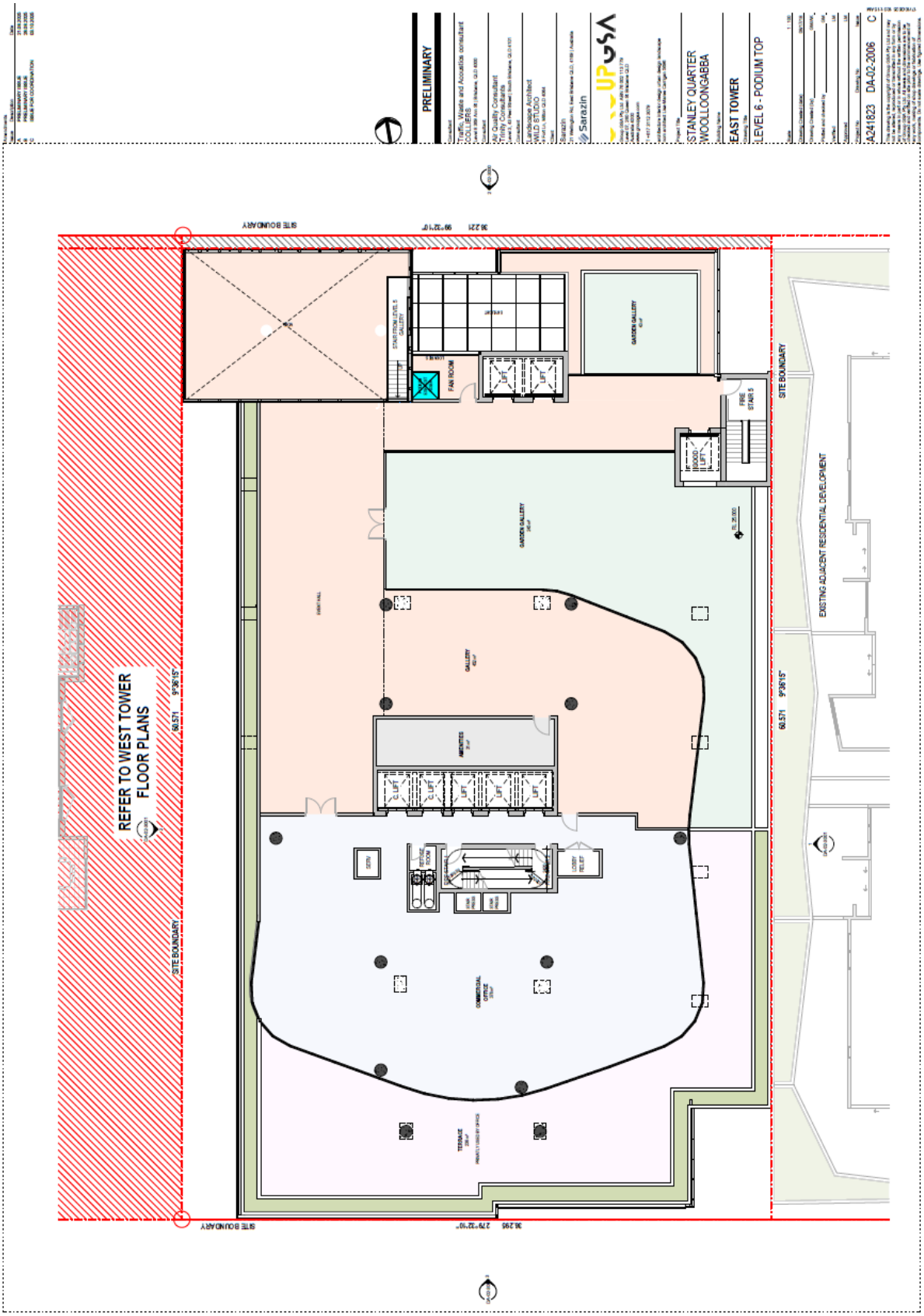
# 8 Conclusion

Colliers (previously TTM) was engaged by 825 Stanley Pty Ltd to undertake a revised environmental noise assessment of a proposed re-design of the mixed-use development located at 825 Stanley Street, Woolloongabba.

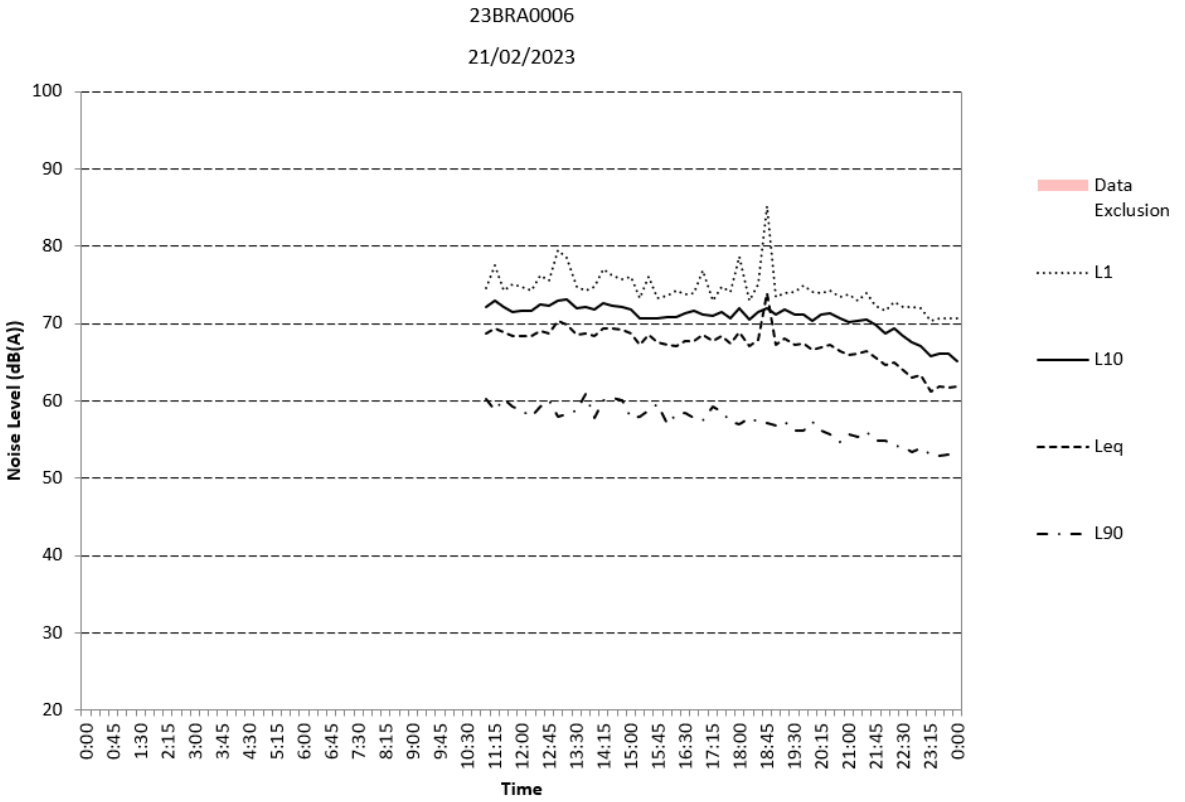
Compliance with the Brisbane City Council *City Plan 2014* planning scheme is predicted to be achieved based on the analysis and recommendations outlined in Section 7 of this report.

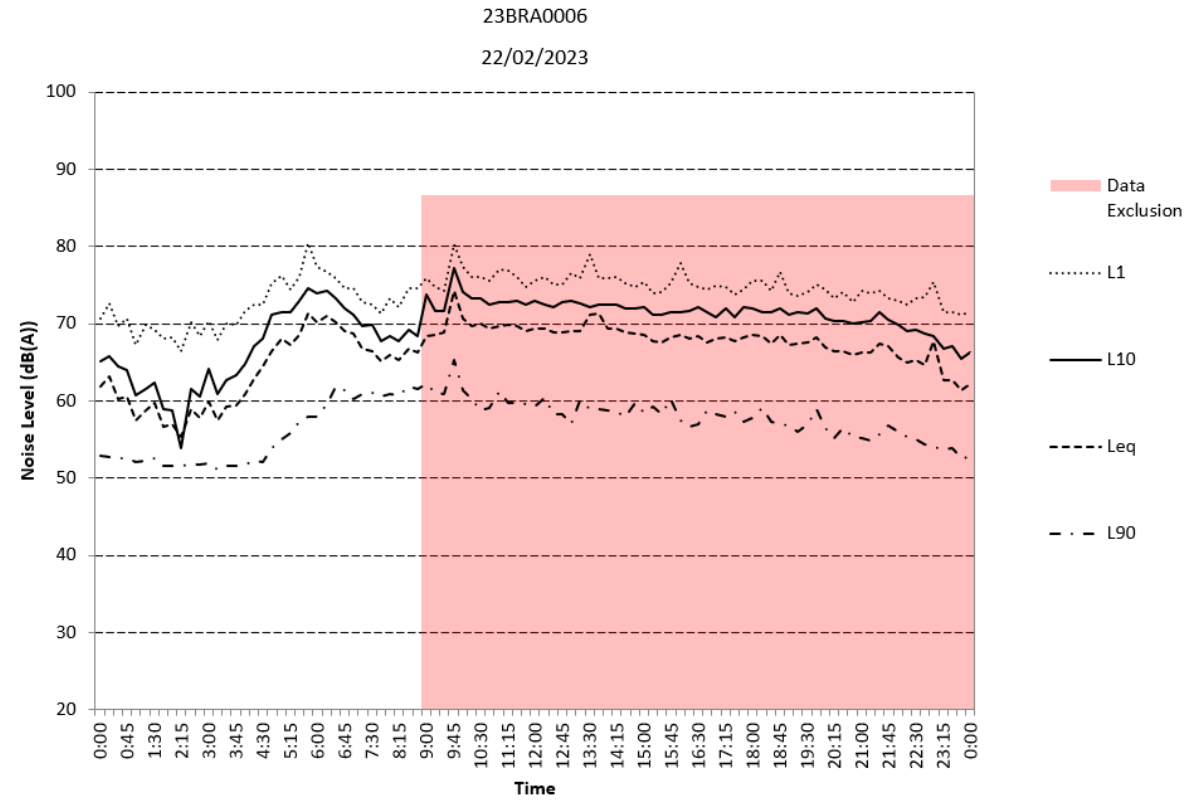
# Appendix A Development Plans

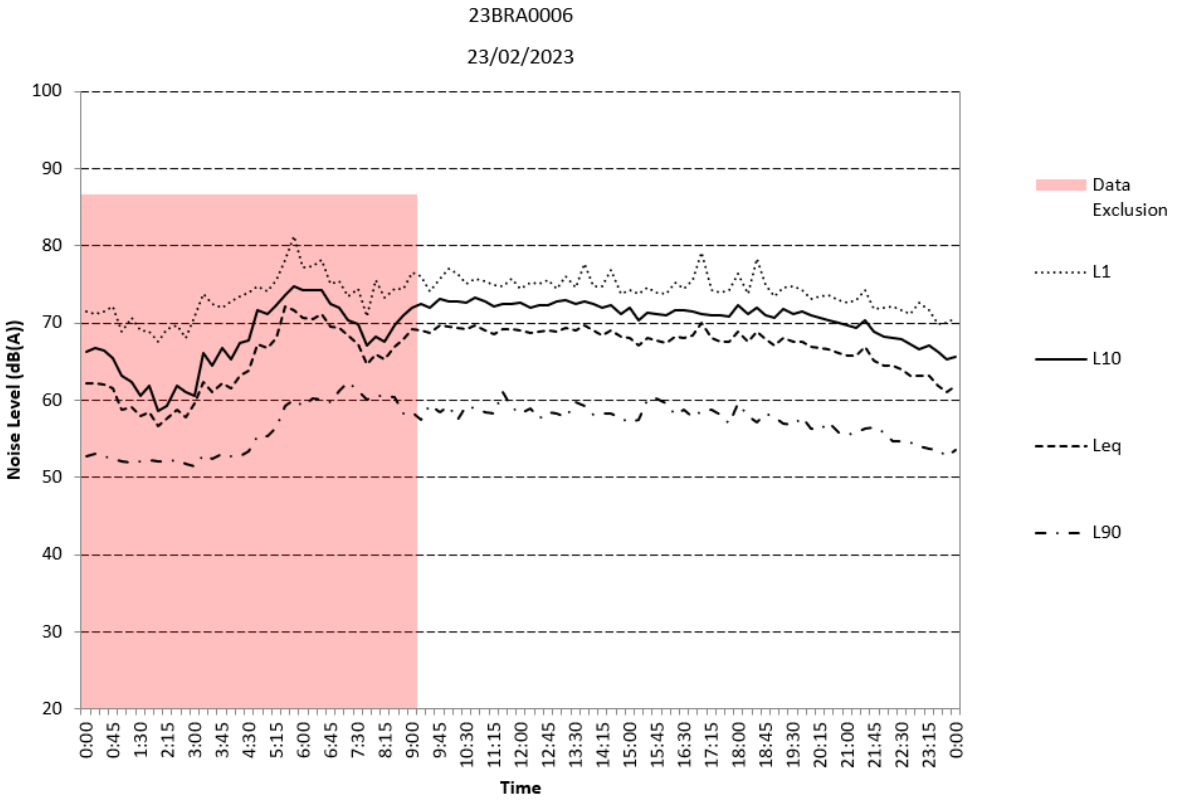

DRAFT EDQ
STANLEY QUARTER
WOOLLOONGABBA
COMBINED EAST & WEST
LEVEL 1 - GROUND
DA-00-2000
E
STAGE 2 - EAST TOWER
REFER DETAIL PLANS
STAGE 1 - WEST TOWER
REFER DETAIL PLANS
STANLEY STREET
JERGENS STREET
TRAFALGAR STREET
SITE BOUNDARY
STAGE 1
STAGE 2
DEEP PLANTING
VEHICULAR ACCESS


PRELIMINARY
STANLEY QUARTER
WOOLLOONGABBA
EAST TOWER
LEVEL 6 - PODIUM TOP
A241823
DA-02-2006
C
REFER TO WEST TOWER
FLOOR PLANS
SITE BOUNDARY
EXISTING ADJACENT RESIDENTIAL DEVELOPMENT
FAN ROOM
FIRE STAIR 5
LIFT
GARDEN GALLERY
GALLERY
AMENITIES
TERRACE

# Appendix B Unattended Noise Monitoring Graphs


23BRA0006
21/02/2023
Noise Level (dB(A))
Time
Data Exclusion
L1
L10
Leq
L90


23BRA0006
22/02/2023
Noise Level (dB(A))
Time
Data Exclusion
L1
L10
Leq
L90


23BRA0006
23/02/2023
Noise Level (dB(A))
Time
Data Exclusion
L1
L10
Leq
L90


23BRA0006
24/02/2023
Noise Level (dB(A))
Time
Data Exclusion
L1
L10
Leq
L90

23BRA0006

25/02/2023


23BRA0006

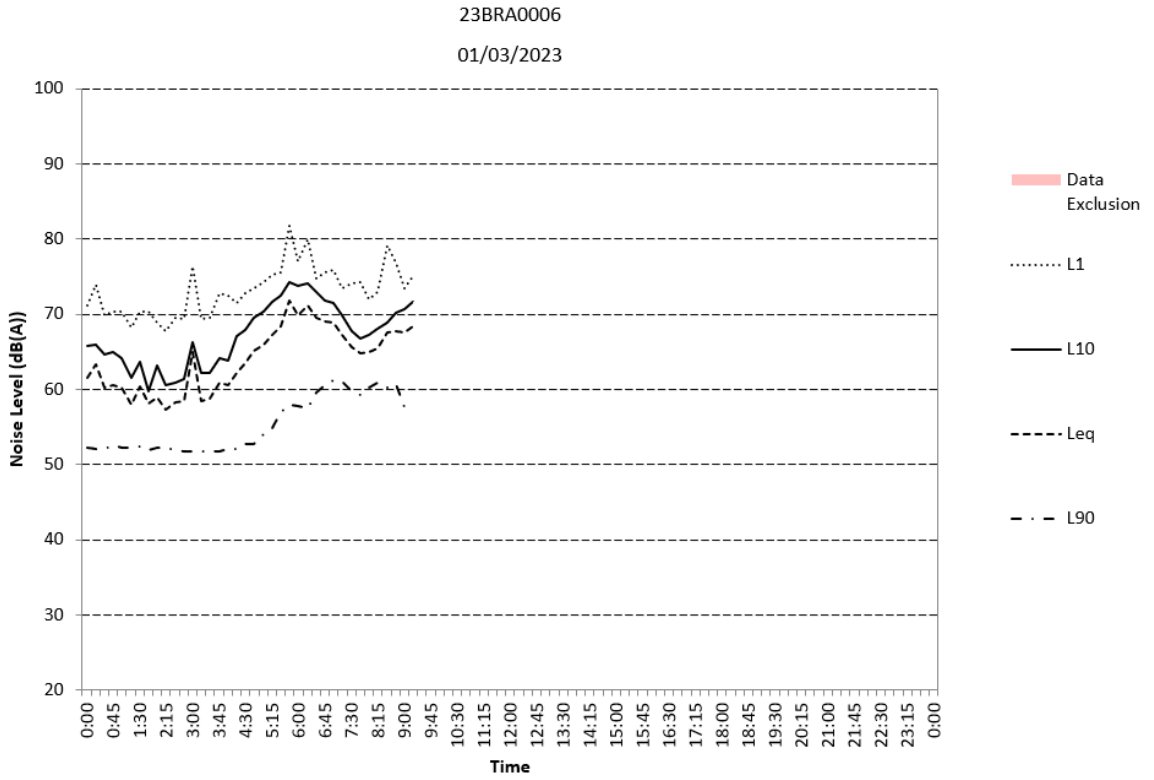
26/02/2023

23BRA0006

27/02/2023


23BRA0006

28/02/2023


23BRA0006
01/03/2023
Noise Level (dB(A))
100
90
80
70
60
50
40
30
20
0:00
0:45
1:30
2:15
3:00
3:45
4:30
5:15
6:00
6:45
7:30
8:15
9:00
9:45
10:30
11:15
12:00
12:45
13:30
14:15
15:00
15:45
16:30
17:15
18:00
18:45
19:30
20:15
21:00
21:45
22:30
23:15
0:00
Time
Data Exclusion
L1
L10
Leq
L90

# Appendix C Calculations

| PROJECT #: | Activity Noise | | | | | Distance to Receivers (from centre of crowd areas) | | |
|---|---|---|---|---|---|---|---|---|
| Noise Source | Duration (sec) | Leq | 1 Hour Period (sec) | Events | Leq Level | R1 (onsite) | R2 (east) | R3 (onsite) |
| Crowd (58 people) - East area (max Day) | 60 | 80 | 3600 | 60 | 80 | 40 | 12 | 15 |
| Crowd (58 people) - West area (max Day) | 60 | 80 | 3600 | 60 | 80 | 30 | 22 | 15 |
| Crowd (27 people) - East area (max Evening) | 60 | 75 | 3600 | 60 | 75 | 40 | 12 | 15 |
| Crowd (27 people) - West area (max Evening) | 60 | 75 | 3600 | 60 | 75 | 30 | 22 | 15 |

| Noise level due to Distance loss | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Crowd (58 people) - East area (max Day) | | | | | | 48 | 58 | 56 |
| Crowd (58 people) - West area (max Day) | | | | | | 50 | 53 | 56 |
| Crowd (27 people) - East area (max Evening) | | | | | | 43 | 53 | 51 |
| Crowd (27 people) - West area (max Evening) | | | | | | 45 | 48 | 51 |

| Shielding (acoustic barrier, solid balustrades) | | | | | | R1(onsite) | R2(east) | R3(onsite) |
|---|---|---|---|---|---|---|---|---|
| Crowd (58 people) - East area (max Day) | Noise path over internal gallery room to higher R1 floor levels | | | | | 0 | 0 | 7 |
| Crowd (58 people) - West area (max Day) | Noise path over acoustic barrier to higher R2 floor levels | | | | | 0 | 0 | 7 |
| Crowd (27 people) - East area (max Evening) | | Solid balcony balustrade attenuation 7dB | | | | 0 | 0 | 7 |
| Crowd (27 people) - West area (max Evening) | | | | | | 0 | 0 | 7 |

| Noise Level at Receiver | | | | | | R1(onsite) | R2(east) | R3(onsite) |
|---|---|---|---|---|---|---|---|---|
| Crowd (58 people) - East area (max Day) | | | | | | 48 | 58 | 49 |
| Crowd (58 people) - West area (max Day) | | | | | | 50 | 53 | 49 |
| Crowd (27 people) - East area (max Evening) | | | | | | 43 | 53 | 44 |
| Crowd (27 people) - West area (max Evening) | | | | | | 45 | 48 | 44 |

| Cumulative - East and West | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Day time | | | | | | 52 | 60 | 52 |
| Evening time | | | | | | 47 | 55 | 47 |

| Job No. | Job Title | | | |
|---|---|---|---|---|
| 23BRA0006 | | | | |
| Date Created | By | Date Revised | Rev | Sheet |
| | SY | | | 1 |
| Date Reviewed | By | Review Type | Review Status | |
| | | | | |

## Internal noise emission - Patron/amplified sound (voice/music) - Façade Closed

| Item / Description | | Rating/Broadband/Input Rating | dB | dB(A) | Octave Band Centre Frequency, Hz 31.5 | 63 | 125 | 250 | 500 | 1k | 2k | 4k | 8k |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Room** | **Gallery (Level 2-5)** | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| **Façade Attenuation** | **Façade Closed** | | | | | | | | | | | | |
| Library - Type: Transmission Loss, Source: Local, ID: 24 | | Rw 30 | | | | | -19.8 | -21.8 | -28.0 | -33.2 | -33.6 | -27.0 | |
| modifiy | 4 | Rw 35 | | | | | -23.8 | -25.8 | -32.0 | -37.2 | -37.6 | -31.0 | |
| | | | | | | | | | | | | | |
| **Noise Level at Reciever** | | Distance | Façade area | | | | | | | | | | |
| Receiver 1/2 | | 10 m | 15 m² | **56 (A)** | | | 60.8 | 60.4 | 50.8 | 47.6 | 43.7 | 43.2 | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| **No acoustic barrier/fence included** | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| **Noise Criteria** | | **Day** | **Evening** | **Night** | | | | | | | | | |
| Criteria | **Leq dB(A)** | 60 | 55 | 50 | | | | | | | | | |
| Exceedance | | -5 | 1 | 6 | | | | | | | | | |
| **Max allowable internal sound level** | **Leq dB(A)** | **115** | **110** | **105** | | | | | | | | | |

| Job No. | Job Title | | | |
|---|---|---|---|---|
| 23BRA0006 | | | | |
| Date Created | By | Date Revised | Rev | Sheet |
| | SY | | | 2 |
| Date Reviewed | By | Review Type | Review Status | |

## Internal noise emission - Patron/amplified sound (voice/music) - Façade Closed

| Item / Description | | Rating/Broadband/Input Rating | dB | dB(A) | Octave Band Centre Frequency, Hz 31.5 | 63 | 125 | 250 | 500 | 1k | 2k | 4k | 8k |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Room** | **Gallery/Event Use (Level 6)** | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| **Reverberant Sound Level** | | 613 m³ | 1 x | **102 (A)** | | | 98.7 | 100.3 | 96.9 | 98.9 | 95.5 | 88.4 | |
| | | | | | | | | | | | | | |
| **Façade Attenuation** | **Façade Closed** | | | | | | | | | | | | |
| Library - Type: Transmission Loss, Source: Local, ID: 24 | | Rw 30 | | | | | -19.8 | -21.8 | -28.0 | -33.2 | -33.6 | -27.0 | |
| modifiy | 4 | Rw 35 | | | | | -23.8 | -25.8 | -32.0 | -37.2 | -37.6 | -31.0 | |
| | | | | | | | | | | | | | |
| **Noise Level at Reciever** | | Distance | Façade area | | | | | | | | | | |
| Receiver 1/2 | | 10 m | 88 m² | **55 (A)** | | | 60.3 | 60.0 | 50.3 | 47.1 | 43.3 | 42.8 | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| **No acoustic barrier/fence included** | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| **Noise Criteria** | | **Day** | **Evening** | **Night** | | | | | | | | | |
| Criteria | **Leq dB(A)** | 60 | 55 | 50 | | | | | | | | | |
| Exceedance | | -5 | 0 | 5 | | | | | | | | | |
| **Max allowable internal sound level** | **Leq dB(A)** | **107** | **102** | **97** | | | | | | | | | |