Noise and Vibration Impact Assessment

SSD-70283710: 1 Crescent Street, Holroyd

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Document QA and Revisions

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1 GLOSSARY AND ABBREVIATIONS

REFERENCE	DESCRIPTION
CNVMP	Construction Noise and Vibration Management Plan
Council	Cumberland City Council
DCP	Development Control Plan Cumberland Development Control Plan 2021 (**CDCP 2021**)
EIS	Environmental Impact Statement
EPA	NSW Environment Protection Authority
LEP	Local Environmental Plan Cumberland Local Environmental Plan 2021(**CLEP 2021**)
NPI	Noise Policy for Industry
SSDA	State Significant Development Application
SEARs	Secretary's Environmental Assessment Requirements
TIA	Traffic Impact Assessment

2 EXECUTIVE SUMMARY

This Noise and Vibration Impact Assesment has been prepared on behalf of Tiberius (Holroyd) Pty Ltd in association with a State Significant Development Application (**SSDA**) for a proposed mixed-use development at 1 Crescent Street, Holroyd (**the site**).

The report responds to matters raised by the Department of Planning, Housing and Infrastructure (**DPHI**), Cumberland City Council, other State government authorities /agencies, utility service providers and the community during public exhibition of SSD-70283710.

The assessment has considered the following key acoustic elements:

- Traffic and rail noise impact on the residential apartments within the development
- Rail vibration impact on the residential apartments within the development
- Noise impact from traffic generation as a result of the development
- Retail and commercial impact within the development to surrounding noise-sensitive receivers
- Carparking and loading dock impact within the development to surrounding noise-sensitive receivers
- Noise emissions from mechanical plant associated with the project to surrounding noise-sensitive receivers
- Noise impact from the sports oval to the residential apartments within the development

This report concludes that the proposed development is suitable and warrants approval subject to the implementation of the following mitigation measures:

- Minimum façade acoustic performances
- Alternative means of ventilation for residential apartments
- Provision for mechanical plant and equipment treatment

Following the implementation of the above mitigation measures, the proposed mixed-use precinct development at 1 Crescent Street, Holroyd will be acceptable with regards to noise and vibration.

3 INTRODUCTION

This has been prepared on behalf of Tiberius (Holroyd) Pty Ltd in association with a State Significant Development Application (**SSDA**) for a proposed mixed-use development at 1 Crescent Street, Holroyd (**the site**).

The report responds to matters raised by the Department of Planning, Housing and Infrastructure (**DPHI**), Cumberland City Council, other State government authorities /agencies, utility service providers and the community during public exhibition of SSD-70283710.

The report also assesses the proposed amendments to the original proposal, including changes to the following:

Stage A – Mixed use podium, Buildings 1 to 3 and supporting infrastructure

Stage B – Buildings 4 and 5 and supporting infrastructure

Stage C – Buildings 6 and 7 and supporting infrastructure

The proposed changes extend beyond minor refinements which can be accommodated via a Submissions Report. As a result, a combined Submissions and Amendment Report has been prepared and consent sought from DPHI to amend the SSDA as per section 37 of the *Environmental Planning and Assessment Regulation 2021* (**the Regulation**).

To understand the cumulative impact of the above design refinements, the project description has been updated to reflect the proposed amendments to the scheme as originally lodged with DPHI for assessment.

The amended description is provided as follows:

- Site establishment works, tree removal, site preparation, earthworks and excavation, services augmentation, and remediation works.
- Development of seven residential buildings comprising four shop top housing buildings and three residential flat buildings as outlined below:
  - Buildings 1-3 are integrated with an eastern mixed-use podium building, while Building 4 is situated above mixed residential / commercial space, offering shop-top housing.
  - Buildings 5-7 consist of residential flat buildings.
- Delivery of 15% of the total floor space as affordable housing to be distributed across each of the 7 residential buildings, or within a consolidated building proposed proportionately as buildings are developed.
- Approximately 134,208 m2 total floor space comprising:
  - A total of 2,496 m2 retail GFA and approximately 2,710 m2 commercial GFA.
  - 1,374 residential apartments
  - Communal amenity facilities for residents.
  - Building services areas.
- Activation of Crescent Street through a mix of amenity areas and pockets of open space.
- Shared car parking for Buildings 1 to 3 and the commercial and retail tenancies within the podium.
- Shared car parking for Buildings 4 to 7 within the above ground parking structures adjoining Buildings 4 to 5 and 6 to 7.
- Landscaping and accompanying place making works including:
  - Public open space, hard and soft landscape works.
  - Ground and rooftop communal open space.
  - Publicly accessible through-site links.
  - At grade car parking for the park, forecourt and retail areas.

- Vehicle access via a new internal publicly accessible road and vehicle accessway.
- New pedestrian footpaths and access arrangements to the site.
- Café tenancy within park-side structure.

- Staged completion of a public park.
- Associated works involving the widening of Crescent Street and upgrades to the Crescent Street and Woodville Road intersection.

Table 1 below identifies the relevant matters raised by DPHI and SDRP and sets out the Applicant's response to these submissions.

Table 1: Applicant Response to Submissions

ITEM	ISSUE RAISED	APPLICANT RESPONSE	REFER TO SECTION OF REPORT
DPHI-16 a	Clarify why a long or short term monitoring station (NVIA Figure 2) was not provided at the north-western side of Residential Receiver Catchment area RC4 (Bane Street) to measure the as-existing noise level(s), noting the proximity of this point to affected residences and that the NVIA recommends monitoring in this location (NVIA Figure 7) as part of the future noise management / mitigation measures	LT5 and ST5 monitoring location (refer to Figure 3) was used as the representative location for RC4. The north western side of RC4 was determined not suitable at the time of monitoring due to reflection effect from the residential boundary fencing and extraneous noise sources (i.e. construction noise) that was identified at the time of noise monitor install which would not provide representative background noise levels of the residential receiver catchment. Note that noise monitoring recommended in Figure 7 is related to mitigating construction noise impacts to receivers within the nominated catchments.	Section 6.3 Appendix F – ToA Response
DPHI-16 b	Consider the construction noise impacts of the staged construction and occupation of the developments of following buildings. In addition, update Section 10.4 to include predicted noise levels of the below phases: i. construction noise impact of Phase 2 and 3 on a potentially occupied Phase 1 ii. construction noise impact of Phase 3 on potentially occupied Phase 1 and 2	Construction noise assessment has been updated to assess impacts to potentially occupied phases.	Section 9
DPHI-16 c	Consider the potential operational noise impact of the operation of the loading dock on future residential occupants within apartments, particularly within podium level and at Buildings 3 and 4	Operational noise impacts of the operation of the loading dock on future residences in apartments directly above the loading dock have been assessed and included in this revised NVIA.	Section 8.7

ITEM	ISSUE RAISED	APPLICANT RESPONSE	REFER TO SECTION OF REPORT
DPHI-16 d	Consider the potential operational noise impact of the potential future use of the ground floor retail / commercial uses as restaurant / cafes with outdoor dining	At this stage, tenants for future retail and commercial spaces have not been determined and therefore the usage / type of activities for these spaces are unknown. Future tenants are subject to a separate development applications or CDC to ensure operational noise limits are achievable. A list of operational noise considerations has been provided and will be addressed in forthcoming Development Application (DA) and Complying Development Certificate (CDC) submissions.	Section 8.8
SDRP-25	Reduce the reliance on mechanical ventilation to habitable spaces by providing passive acoustic mitigation. e.g. providing narrow balconies to habitable spaces adjacent to traffic corridors	Given the development proximity to the motorway and railway line, the predicted noise levels on the façade are expected to be exceeded in the scenario the occupant wishes to leave the window/door open. As a result, apartment areas requiring alternative means of ventilation (i.e. mechanical ventilation) to meet NCC requirement have been identified and provided in Section 10.3 and Appendix C.	Section 10.3 Appendix C

4 SITE DESCRIPTION

The land to which this SSDA relates is located at 1 Crescent Street, Holroyd (**the site**). The site is legally described as Lot 700 in Deposited Plan 1241836.

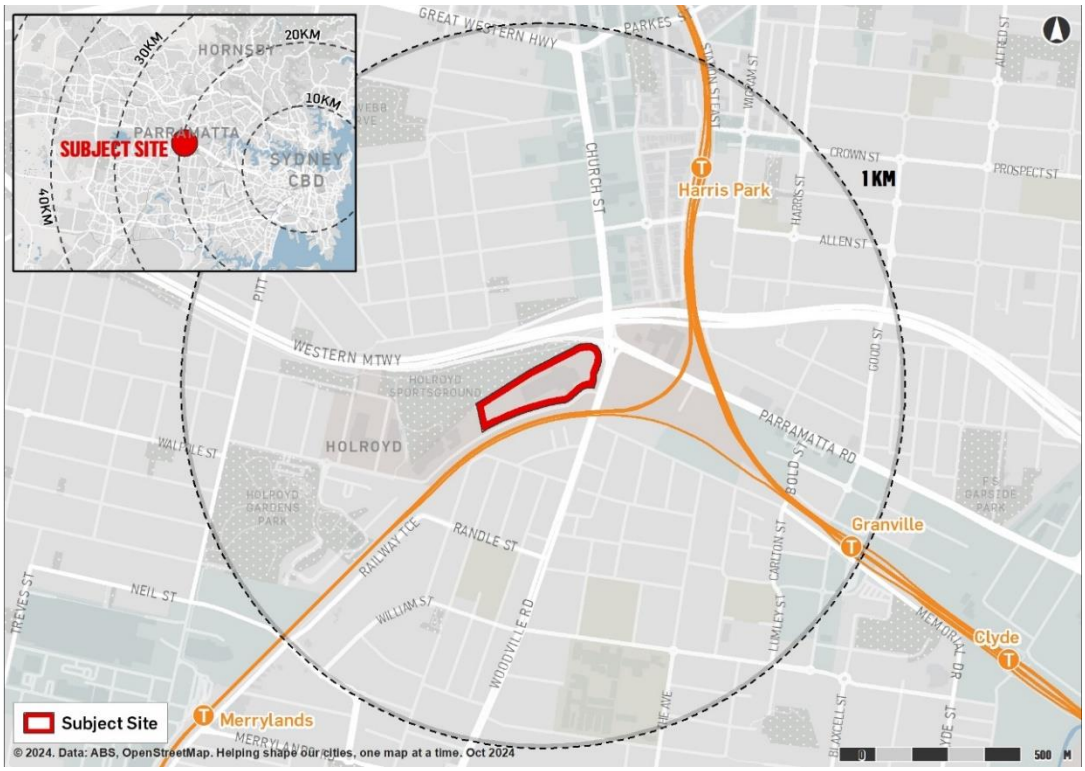
The site comprises an irregularly shaped allotment with an area of 37,877m^2 and has a primary frontage to Crescent Street to the south and a frontage to Woodville Road to the east. The northern boundary of the site adjoins the Holroyd Sportsground with the M4 Motorway beyond.

The site is located in the Cumberland Local Government Area (**LGA**) and is currently vacant and cleared after WesTrac ceased operations of an industrial facility at the site in early 2018. The site contains existing scattered pockets of landscaped vegetation, predominately located along the site's southern and eastern boundaries to Crescent Street and Woodville Road.

The site is bounded by Parramatta Road/Church Street/Woodville Road intersection to the north east, Woodville Road to the east and Crescent Street to the south. The northern frontage of the site faces the Holroyd Sportsground and the M4 Motorway beyond. It is noted that the eastern portion of the site fronting Woodville Road has been identified for potential future acquisition by Transport of NSW for future planned intersection upgrades to Woodville/Parramatta Road/M4.

A Location Plan including the site is provided in Figure 1 and Figure 2 below.

Figure 1 Location Plan



Source: Urbis, 2024

Figure 2 Aerial Photograph

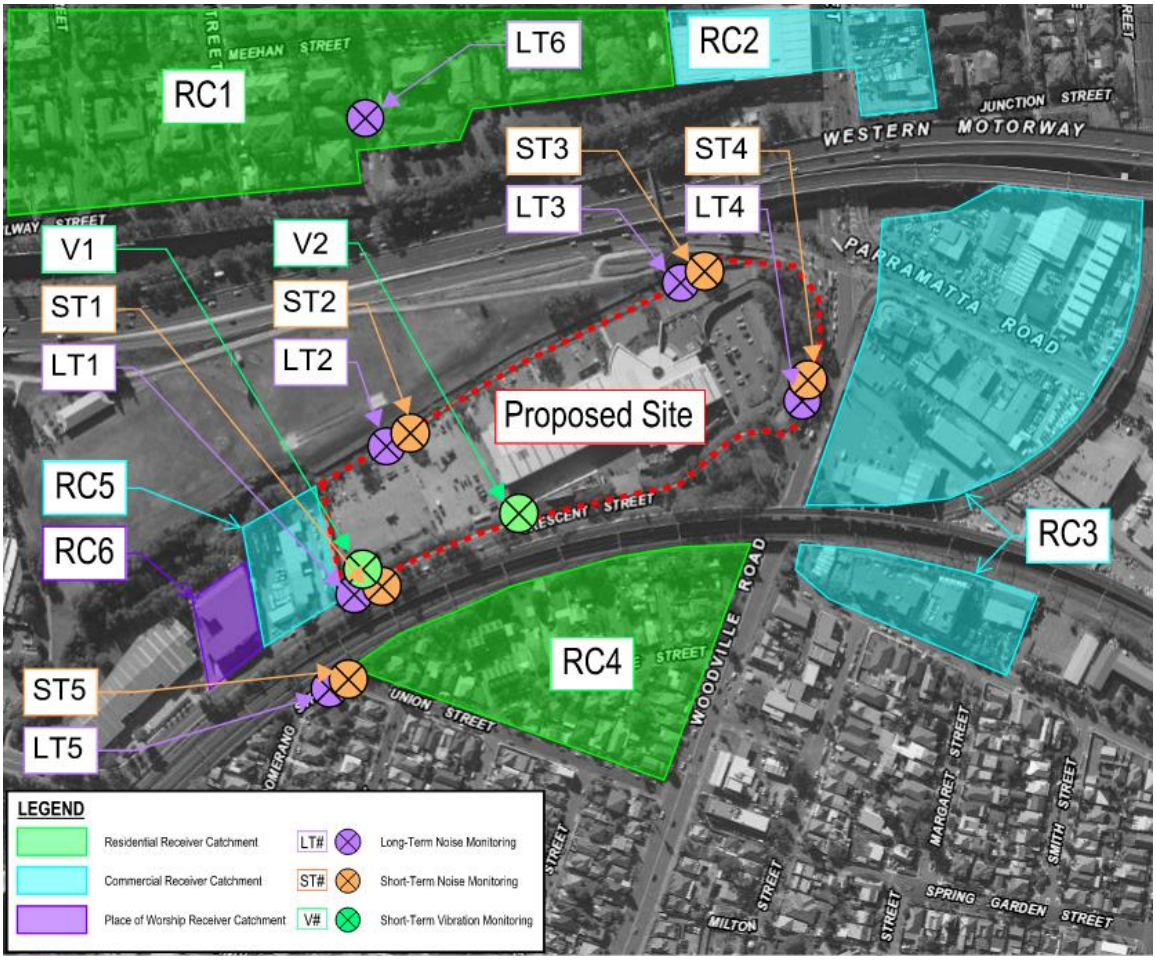


Source: Urbis, 2024

The location of the noise monitoring and measurement locations, and surrounding noise-sensitive receivers are presented in Figure 3. Noise-sensitive receivers have been delineated into receiver catchments (RCs) as shown in Figure 3.

- RC1 – Existing residential receivers to the north, across the M4 Motorway
- RC2 – Existing commercial receivers to the north across the M4 Motorway
- RC3 – Existing commercial receivers to the east across Woodville Road
- RC4 – Existing residential receivers to the south across Crescent Street / railway corridor
- RC5 – Existing commercial receivers to the west adjacent to the site
- RC6 – Existing place of worship receivers to the west on the other side of RC5

Figure 3: Acoustic site plan identifying the surrounding noise-sensitive receivers and noise monitoring locations



5 METHODOLOGY

To assess the noise and vibration impacts of the proposed development, the following process was carried out:

- Identify and classify the surrounding noise and vibration sensitive receivers surrounding the proposed development;
- Identify and classify the noise and vibration sources generated by the proposed development, together with external noise and vibration sources impacting on the proposed development;
- Carry out site noise investigations to quantify the background noise levels local to the proposed development;
- Determine the project noise and vibration criteria applicable to the proposed development in accordance with relevant standards and guidelines;
- Assess the operational and construction noise and vibration impacts of the noise and vibration sources generated by the proposed development to the surrounding noise-sensitive receivers, together with any impacts on the occupants of the proposed development; and
- Provide details of mitigation measures required to alleviate noise and vibration impacts to achieve the project noise and vibration criteria.

The following operational noise and vibration assessments were conducted as part of this noise and vibration impact assessment:

- Road and rail noise intrusion into the development from traffic and rail movement on surrounding local roads;
- Noise impacts of additional traffic on surrounding local roads generated by the proposed development.
- Noise and vibration impact of mechanical plant and equipment serving the proposed development on surrounding noise and vibration sensitive receivers; and
- Retail and commercial impact within the development to surrounding noise-sensitive receivers
- Carparking, loading dock and waste collection impact within the development to surrounding noise-sensitive receivers
- Noise impact from the sports oval to the residential apartments within the development

The following construction noise and vibration assessments were conducted as part of this noise and vibration impact assessment:

- Noise generated during the construction of the proposed development and associated impacts on the surrounding noise sensitive receivers; and
- Vibration generated during the construction of the proposed development and associated impacts on the surrounding vibration sensitive receivers.

The noise and vibration assessments conducted as part of this report have been assessed to the noise and vibration criteria established in the following guidelines, standards and policies:

- AS/NZS 2107:2016 “Acoustics - Recommended design sound levels and reverberation times for building interiors”;
- NSW Noise Policy for Industry (NPI) 2017;
- State Environmental Planning Policy (SEPP) (Transport and Infrastructure) 2021;
- Development Near Rail Corridors and Busy Roads – Interim Guideline;
- NSW Road Noise Policy (RNP), 2011;
- Interim Construction Noise Guideline (ICNG) 2009;
- Assessing vibration: A Technical Guideline 2006;
- British Standard BS5228 – Part 1:1997 “Noise and Vibration Control on Construction and Open Sites.”;

- British Standard BS7358:1993 “Evaluation and Measurement for Vibration in Buildings”;
- German Standard DIN4150 – Part 3: “Structural vibration in buildings – Effects on structures”; and
- UK Department of Transport ‘Calculation of Road Traffic Noise’ (CoRTN).

6 NOISE SURVEYS

6.1 INSTRUMENTATION

The equipment used for the noise survey was the following:

- B&K 2250 Class 1 Sound Level Meter, S/N: 3031115
- Bruel and Kjaer type 1 microphone – comprising of:
  - ZC 0032 preamplifier (S/N: 31930)
  - 4189 capsule (S/N: 3334640)
- B&K 4231 Class 1 Sound Level Calibrator, S/N: 3334640
- NSRT_mk3 Type 1 Sound Level Meter Dataloggers
- Sinus Soundbook Multi-Channel Analyser, S/N: 7006
- B&K Type 4506B Triaxial Accelerometer, S/N: 2337387

All equipment was calibrated before and after the measurements and no significant drift was found. All equipment carries current traceable calibration certificates that can be provided upon request.

6.2 SHORT-TERM NOISE MONITORING

Attended noise measurements were conducted at position ST1 to ST5 as shown in Figure 3 on the 28th of February 2023. The results of the short-term noise monitoring have been summarised in Table 2. We note that ST5 were individual train passbys and have not been presented in Table 2.

Table 2: Attended noise monitoring results

MEASUREMENT LOCATION	MEASUREMENT TIME	MEASURED L_{Aeq} dB(A)	COMMENTS
ST1	9:41am to 9:57am	64	▪ Traffic noise from Crescent St and distant noise from the M4 Motorway ▪ Train noise from the railway corridor ▪ General environment and nature sounds
ST2	10:19am to 10:24am	63	▪ Dominant traffic noise from the M4 Motorway ▪ Distant train noise from the railway corridor ▪ General environment and nature sounds
ST3	10:43am to 10:55am	70	▪ Dominant traffic noise from the M4 Motorway off-ramp ▪ General environment and nature sounds
ST4	11:02am to 11:19am	70	▪ Dominant traffic noise from Woodville Rd ▪ General environment and nature sounds

6.3 LONG-TERM NOISE MONITORING

6.3.1 Background Noise

Background noise levels and subsequent Rating Background Noise Levels (RBL) have been established in accordance with the Noise Policy for Industry 2017 using the results of the noise monitoring locations indicated in Figure 3.

The period of monitoring for each respective monitor is as follows:

- LT1 – 15/02/23 to 21/02/23
- LT2 – 15/02/23 to 28/02/23
- LT3 – 15/02/23 to 28/02/23
- LT4 – 15/02/23 to 28/02/23
- LT5 – 28/02/23 to 07/03/23
- LT6 – 13/03/23 to 20/03/23

The noise monitoring results are presented in Table 3 and have been adjusted to correct for façade reflections where applicable. Refer to Appendix A for graphical noise monitoring data.

The description of time of day presented in Table 3 is outlined within the NPI and described as follows:

- Day – the period from 7:00am to 6:00pm Monday to Saturday, 8am to 6pm on Sundays and public holidays
- Evening – the period from 6:00pm to 10:00pm
- Night – the period from 10:00pm to 7:00am, or 10:00pm to 8:00am on Sundays and public holidays.

The local ambient noise environment is typical of an Urban residential environment (as classified by the NPI).

Table 3: Unattended background noise monitoring results

LOCATION	MEASURED RATING BACKGROUND NOISE LEVELS L_{A90} dB(A)		
	DAY	EVENING	NIGHT
LT1	54	53	45
LT2	57	56	49
LT3	60	57	49
LT4	62	59	51
LT5	47	47	44
LT6	50	49	40

6.3.2 Traffic and Rail Noise

In addition to background noise, long-term noise monitoring was also conducted at the project site to establish traffic and train noise levels respectively for the site and have been summarised in Table 4. The locations in Figure 3 were chosen to be suitable as there was direct line of sight to adjacent roads and/or railway corridors.

Table 4: Long-term traffic and train noise monitoring results

LOCATION	MEASURED NOISE LEVELS, $L_{Aeq,period}$ dB(A)		
	DAY (7AM – 6PM)	EVENING (6PM – 10PM	NIGHT (10PM – 7AM)
LT1	66	66	61
LT2	62	60	58
LT3	67	66	63
LT4	70	69	66
LT5	65	66	65

7 PROJECT NOISE CRITERIA

This section presents the regulatory requirements, and acoustic design criteria for the proposed development.

7.1 CUMBERLAND CITY COUNCIL

It is noted that the project site lies within various land zones, namely being High Density Residential (R4), Mixed Use (B4), Public Recreation (RE1) and Business Development (SP2).

7.1.1 Cumberland City Council Local Environmental Plan

It is noted that there are no quantitative acoustic requirements specified Council's LEP.

7.1.2 Cumberland City Council Development Control Plan

Cumberland City Council's DCP states the following acoustic requirements for developments in residential and business zones:

Residential Zones

C13. For development adjacent to a rail corridor, or major road corridor with an annual average daily traffic volume of more than 40,000 vehicles, applicants must consult State Environmental Planning Policy (Infrastructure) 2007 and the relevant NSW guidelines. Where acoustic reports are required by the SEPP and Guidelines, the building is to be designed and detailed to comply with the recommendations of that report.

Business Zones

C8. New development shall comply with the provisions of the relevant acts, regulations, environmental planning instruments, Australian Standards and guidelines as applicable for noise, vibration and quality assurance. This includes:

- *Development Near Rail Corridors and Busy Roads, NSW Department of Planning, December 2008 – Interim Guidelines;*
- *NSW Noise Policy for Industry;*
- *Interim Guideline for the Assessment of Noise from Rail Infrastructure Projects; and*
- *NSW Road Noise Policy.*

We note that the SEPP 2007 has been superseded by SEPP 2021 and is presented in Section 7.3.1.

7.2 NOISE EMISSIONS

7.2.1 NSW EPA NPI

The NPI has been implemented to assess the noise impacts of mechanical plant and equipment, as well as other industrial noise sources on the surrounding receiver catchments.

The NPI sets out a framework for the derivation of project noise trigger levels that are used to assess the potential impacts of noise from industry (and industrial noise sources) and indicate the noise level at which feasible and reasonable noise management measures should be considered.

This policy applies to noise sources from activities listed in Schedule 1 of the POEO Act and those regulated by the EPA. This includes noise sources from mechanical plant and equipment within the proposed development, for which this policy will be applied.

The project noise trigger level provides a benchmark for assessing a proposal, where if exceeded, indicates a potential noise impact on the community and so triggers a management response such as additional mitigation measures. The project noise trigger level is the lower (the more stringent) value of the project intrusiveness noise level and project amenity noise level determined in Sections 2.3 and 2.4 of the NPI, respectively.

Project Intrusiveness Noise Level

The intrusiveness of an industrial noise source may generally be considered acceptable if the level of noise from the source (in terms of L_{Aeq}) measured over a 15-minute period does not exceed the background noise level by more than 5 dB when beyond a minimum threshold. The project intrusiveness noise level is only applicable to surrounding residential receivers.

To account for the temporal variation of background noise levels, the method outlined in Fact Sheet A of the NPI establishes a method in determining the Rating Background Noise Level (RBL) to be used in the assessment.

The intrusiveness noise level is determined as follows:

$L_{Aeq,15min}$ (Intrusiveness Criteria) = Rating Background Noise Level (RBL) + 5 dB(A)

Table 5 provides the project intrusiveness noise levels applicable to each of the surrounding residential noise-sensitive receivers.

Table 5: Project intrusiveness noise level criteria for each residential receiver catchment

RECEIVER CATCHMENT	TIME OF DAY	MEASURED RBL - dB(A)	PROJECT INTRUSIVENESS NOISE LEVELS - $L_{Aeq,15min}$ dB(A)
RC1[1]	Day	50	55
	Evening	49	54
	Night	40	45
RC4[2]	Day	47	52
	Evening	47	52
	Night	44	49

Table Note 1: Measured RBL's from monitor LT6 has been adopted for RC1
Table Note 2: Measured RBL's from monitor LT5 has been adopted for RC4

Project Amenity Noise Level

The recommended amenity noise levels represent the objective for total industrial noise at a receiver location, whereas the project amenity noise level represents the objective for noise from a single industrial development at a receiver location.

To ensure that industrial noise levels (existing plus new) remain within the recommended amenity noise levels for an area, a project amenity noise level applies for each new source of industrial noise as follows:

Project Amenity Noise Level = Recommended Amenity Noise Level (see Table 6) – 5 dB(A)

The following exceptions to the above method to derive the project amenity noise level apply:

- In areas with high traffic noise levels. Where the level of transport noise, road traffic noise in particular is high enough to make noise from an industrial source inaudible, the project amenity noise level shall be set at 15 dB(A) below the measured $L_{Aeq,period(traffic)}$ for the particular assessment period
- In proposed developments in major industrial clusters
- Where the resultant project amenity noise level is 10 dB(A) or more lower than the existing industrial noise level. In this case the project amenity noise levels can be set at 10 dB(A) below existing industrial noise levels if it can be demonstrated that existing industrial noise levels are unlikely to reduce over time
- Where cumulative industrial noise is not a necessary consideration because no other industries are present in the area, or likely to be introduced into the area in the future. In such cases the relevant amenity noise level is assigned as the project amenity noise level for the development

The converted project amenity noise level for comparison with the intrusiveness criteria (from time of day period to 15-minute) is provided for each surrounding receiver catchment in Table 6.

Table 6: Project amenity noise level criteria for each receiver catchment

RECEIVER CATCHMENT	RECEIVER TYPE	TIME OF DAY	PROJECT AMENITY NOISE LEVEL[2] - $L_{Aeq,15min}$ dB(A)
RC1	Residential (Urban)	Day	58
		Evening	48
		Night	46
RC4	Residential (Urban)	Day	58
		Evening	54
		Night	53
RC2, RC3 and RC5	Commercial	When in use	63
RC6	Place of Worship	When in use	38 (internal) 48 (external)[1]

Table Note 1: Due to an absence of external noise level criteria for places of worship in the NPI, a 10dB increase to the internal criteria has been applied to establish this.

Table Note 2: Project amenity noise levels have been adjusted for high traffic noise, as discussed in Section 2.4.1 of the NPI

Sleep Disturbance and Maximum Noise Level Assessment

Where the proposed development night-time noise levels generated at a residential location exceed either:

- $L_{Aeq,15min}$ 40 dB(A) or the prevailing RBL plus 5 dB(A), whichever is greater, and/or
- L_{AFmax} 52 dB(A) or the prevailing RBL plus 15 dB(A), whichever is greater.

a detailed maximum noise level event assessment should be undertaken.

Corrections for Annoying Noise Characteristics – Noise Policy for Industry Fact Sheet C

Fact Sheet C contained within the Noise Policy for Industry outlines the correction factors to be applied to the source noise level at the receiver before comparison with the project noise trigger levels established within this report, to account for the additional annoyance caused by these modifying factors.

The modifying factor corrections should be applied having regard to:

- The contribution noise level from the premises when assessed/measured at a receiver location, and
- The nature of the noise source and its characteristics (as set out in Fact Sheet C).

Table C1 within Fact Sheet C sets out the corrections to be applied for any assessment in-line with the NPI. The corrections specified for tonal, intermittent and low-frequency noise are to be added to be added to the measured or predicted levels at the receiver before comparison with the project noise trigger levels. The adjustments for duration are to be applied to the criterion.

Project Noise Trigger Levels

Table 7 presents the project intrusiveness and project amenity noise levels for each period, and each receiver catchment, as well as the resultant project noise trigger levels (PNTLs) that shall be applied for any assessment of impacts of mechanical plant and equipment noise on the surrounding receiver catchments.

Table 7: Project noise trigger levels (PNTL) to be applied to each surrounding receiver catchment

RECEIVER CATCHMENT	RECEIVER TYPE	TIME OF DAY	PROJECT INTRUSIVENESS NOISE LEVEL - $L_{Aeq,15min}$ dB(A)	PROJECT AMENITY NOISE LEVEL - $L_{Aeq,15min}$ dB(A)	SLEEP DISTURBANCE NOISE LEVEL - dB(A)	PROJECT NOISE TRIGGER LEVEL - $L_{Aeq,15min}$ dB(A)
RC1	Residential	Day	55	58	N/A	**55**
		Evening	54	48	N/A	**48**
		Night	45	46	45 $L_{Aeq,15min}$ 55 L_{AFmax}	**45**
RC4	Residential	Day	52	58	N/A	**52**
		Evening	52	54	N/A	**52**
		Night	49	53	49 $L_{Aeq,15min}$ 59 L_{AFmax}	**49**
RC2 RC3 RC5	Commercial	When in use	N/A	63	N/A	**63**
RC6	Place of Worship	When in use	N/A	48	N/A	**48**

7.3 INTERNAL NOISE LEVELS

7.3.1 State Environmental Planning Policy (Transport and Infrastructure) 2021

Council's DCP makes reference to SEPP 2007, which has now been superseded by SEPP 2021. Clause 2.120 of SEPP 2021 states road noise impact requirements whilst Clause 2.100 states rail noise impact requirements and are summarised below:

2.120 Impact of road noise or vibration on non-road development

(1) This section applies to development for any of the following purposes that is on land in or adjacent to the road corridor for a freeway, a tollway or a transitway or any other road with an annual average daily traffic volume of more than 20,000 vehicles (based on the traffic volume data published on the website of TfNSW) and that the consent authority considers is likely to be adversely affected by road noise or vibration—

(a) residential accommodation,

(b) a place of public worship,

(c) a hospital,

(d) an educational establishment or centre-based child care facility.

(2) Before determining a development application for development to which this section applies, the consent authority must take into consideration any guidelines that are issued by the Planning Secretary for the purposes of this section and published in the Gazette.

(3) If the development is for the purposes of residential accommodation, the consent authority must not grant consent to the development unless it is satisfied that appropriate measures will be taken to ensure that the following LAeq levels are not exceeded—

(a) in any bedroom in the residential accommodation—35 dB(A) at any time between 10 pm and 7 am,

(b) anywhere else in the residential accommodation (other than a garage, kitchen, bathroom or hallway)—40 dB(A) at any time.

(3A) Subsection (3) does not apply to a building to which State Environmental Planning Policy (Housing) 2021, Chapter 3, Part 7 applies.

(4) In this section, freeway, tollway and transitway have the same meanings as they have in the Roads Act 1993.

2.100 Impact of rail noise or vibration on non-rail development

(1) This section applies to development for any of the following purposes that is on land in or adjacent to a rail corridor and that the consent authority considers is likely to be adversely affected by rail noise or vibration—

(a) residential accommodation,

(b) a place of public worship,

(c) a hospital,

(d) an educational establishment or centre-based child care facility.

(2) Before determining a development application for development to which this section applies, the consent authority must take into consideration any guidelines that are issued by the Planning Secretary for the purposes of this section and published in the Gazette.

(3) If the development is for the purposes of residential accommodation, the consent authority must not grant consent to the development unless it is satisfied that appropriate measures will be taken to ensure that the following LAeq levels are not exceeded—

(a) in any bedroom in the residential accommodation—35 dB(A) at any time between 10.00 pm and 7.00 am,

(b) anywhere else in the residential accommodation (other than a garage, kitchen, bathroom or hallway)—40 dB(A) at any time.

7.3.2 DoP Interim Guideline

The DoP Interim Guideline provides guidance on designing residential developments which are adjacent to busy roads by governing maximum internal noise levels averaged over certain periods within bedrooms and living areas.

The guideline details the application of the SEPP 2007 (superseded by SEPP 2021) as provided in Section 7.3.1.

In addition, the DoP Interim Guideline also recommends the following in relation to the assessment of ventilation by means of opened windows or doors:

> *"If internal noise levels with windows or doors open exceed the criteria by more than 10dBA, the design of the ventilation for these rooms should be such that occupants can leave windows closed, if they so desire, and also to meet the ventilation requirements of the Building Code of Australia."*

Table 8 provides a summary of the criteria established in the DoP Interim Guideline.

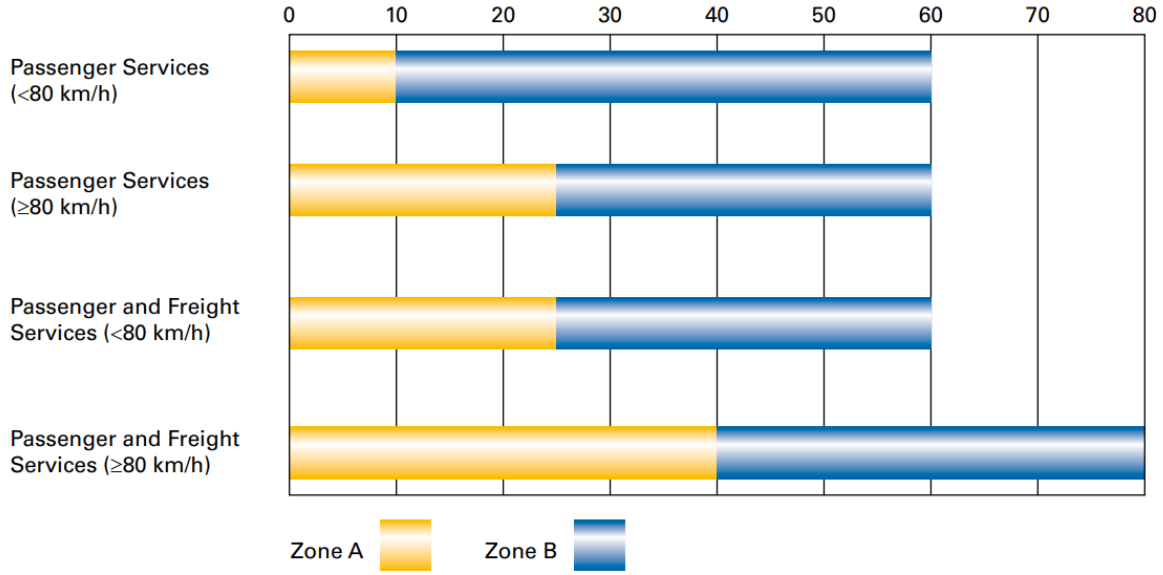
Table 8: Summary of DoP Interim Guideline criteria for residential developments adjacent to rail corridors & busy roads

TYPE OF HABITABLE SPACE	APPLICABLE TIME PERIOD	INTERNAL NOISE LEVEL CRITERIA – WINDOWS/DOORS CLOSED	INTERNAL NOISE LEVEL CRITERIA – WINDOWS/DOORS OPEN
Sleeping areas (bedrooms)	10:00pm – 7:00am	35 dB(A)$L_{Aeq(9hour)}$	45 dB(A)$L_{Aeq(9hour)}$
Living rooms	At any time	40 dB(A)$L_{Aeq(15hour)}$	50 dB(A)$L_{Aeq(15hour)}$

Rail Noise

Figure 4 has been extracted from the DoP Interim Guideline provides a guide as to the level of assessment required when noise sensitive developments are located in the vicinity of existing rail lines. Zones A and B are indicative acoustic assessment zones where sensitive land-uses are likely to be adversely affected.

Figure 4: Acoustic assessment zones based on distance (m) of noise-sensitive development from operation track (not corridor)



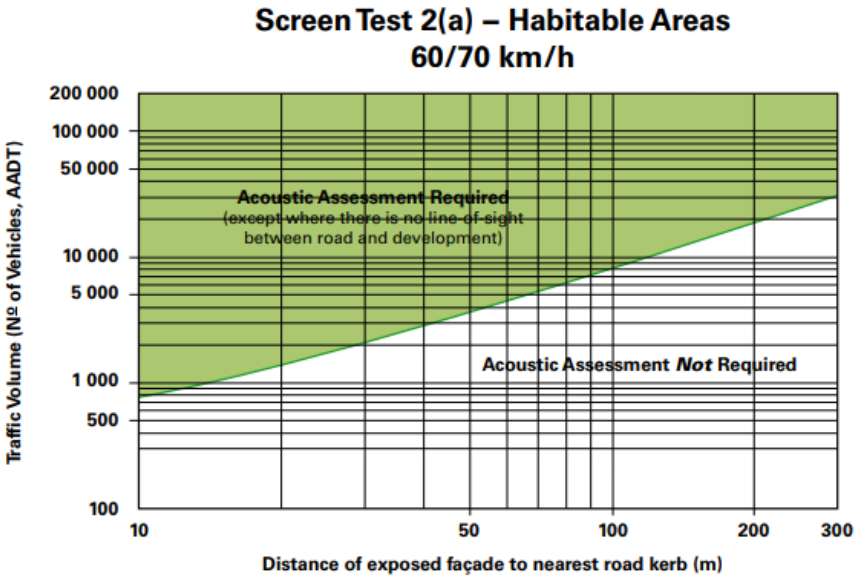
Given the proposed development boundary is located within 40 metres from the nearest rail corridor, an assessment of rail noise to the facades of the proposed development is required.

Road Noise

Figure 5 has been extracted from the DoP Interim Guideline and provides a screening test for noise sensitive developments that takes into account the volume of traffic and the distance between the proposed development and the busy road. Clause 2.120 of the SEPP 2021, through which the DoP Interim Guideline noise criteria applies through, only applies for roads with an annual average daily traffic volume of more than 20,000 vehicles, or if the road is a freeway, tollway or transitway. The screen test has been conducted to establish whether or not an acoustic assessment is required.

If the façade of the development does not have direct line of sight to the busy road, an assessment is not required.

Figure 5: Screen tests for habitable areas of multiple dwellings (noting that any exposed facade is direct line-of-sight)



Given that the project site is adjacent to the M4 Motorway and Great Western Highway / Woodville Road, which is expected to carry more than 20,000 vehicles AADT, an acoustic assessment of the road noise emissions to the façade of the proposed development is required.

7.4 GROUNDBORNE NOISE AND VIBRATION

Internal ground/structure borne noise and vibration levels to the proposal should be controlled to within the requirements of SEPP 2021 and the AVTG.

As per the AVTG, a detailed ground borne noise and vibration impact assessment of the existing railway corridor is required in accordance with SEPP 2021 as the rail corridor is located within 40m of the project site boundary.

Recommended Vibration Dose Values (VDVs) for intermittent vibration as scheduled in the AVTG are summarised in Table 9.

Table 9: Acceptable vibration dose values for intermittent vibration

LOCATION	PREFERRED VALUES		MAXIMUM VALUE	
	DAY	NIGHT	DAY	NIGHT
Residential areas	0.20 $m/s^{1.75}$	0.13 $m/s^{1.75}$	0.40 $m/s^{1.75}$	0.26 $m/s^{1.75}$

The DoP Guideline states in Section 3.6.2:

> *"Generally, ground borne noise is associated more closely with rail operations than roads. Where buildings are constructed over or adjacent to land over tunnels, ground-borne noise may be present without the normal masking effect of airborne noise. In such cases, residential buildings should be designed so that the 95th percentile of train pass-bys complies with a ground-borne L_{Amax} noise limit of 40dBA (daytime) or 35dBA (night-time) measured using the "slow" response time setting on a sound level meter."*

7.5 TRAFFIC NOISE GENERATION

The L_{Aeq} noise level or the "equivalent continuous noise level" correlates best with the human perception of annoyance associated with traffic noise.

Road traffic noise impact is assessed in accordance with the RNP. The criterion (Table 3 – Road Traffic Noise Assessment Criteria for Residential Land Uses) divides land use developments into different categories and lists the respective criteria for each case. The category that is relevant to the proposed use of the site is shown below in Table 10.

Table 10: NSW RNP – traffic noise assessment criteria

ROAD CATEGORY	TYPE OF PROJECT/LAND USE	ASSESSMENT CRITERIA – dB(A)	
		DAY (7AM – 10PM)	NIGHT (10PM – 7AM)
Local Roads	4. Existing residences affected by noise from new local road corridors	$L_{Aeq, (1\ hour)}$ 55	$L_{Aeq, (1\ hour)}$ 50
	5. Existing residences affected by noise from redevelopment of existing local roads		
	6. Existing residences affected by additional traffic on existing local roads generated by land use developments		

In the event that the traffic noise at the site is already in excess of the criteria noted above, the RNP states that the primary objective is to reduce the existing level through feasible and reasonable measures to meet the criteria above.

If this is not achievable, Section 3.4.1 of the RNP states that for existing residences affected by additional traffic on existing roads generated by land use developments, any increase in the total traffic noise should be limited to 2 dB above that of the corresponding 'no build option'.

Also, the inherent quality of noise from vehicles on public roads arriving to and departing from the site would be indistinguishable from other traffic noise on public roads.

7.6 CONSTRUCTION NOISE CRITERIA

Interim Construction Noise Guideline (ICNG)

The noise criteria outlined within the ICNG has been adopted for the assessment of noise emissions from the construction of the proposed redevelopment.

Airborne Noise – Residential Receiver Catchments

The airborne noise criteria for surrounding residential receiver catchments have been extracted from Table 2 in the ICNG and is presented in Table 11 below.

Table 11: NSW ICNG construction noise criteria for surrounding residential receiver catchments

TIME OF DAY	MANAGEMENT LEVEL $L_{Aeq,15min}$[1]	HOW TO APPLY
Recommended Standard Hours: Monday – Friday 7am – 6pm Saturday 8am – 1pm No work on Sundays or public holidays	Noise Affected RBL + 10dB	The noise-affected level represents the point above which there may be some community reaction to noise. ▪ Where the predicted or measured **$L_{Aeq,15min}$** is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. ▪ The proponent should also inform all potentially impacted residences of the nature of works to be carried out, the expected noise levels and duration as well as contact details.
	Highly Noise Affected 75 dB(A)	The highly noise affected level represents the point above which there may be strong community reaction to noise. ▪ Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur in, taking into account: – Times identified by the community when they are less sensitive to noise (such as before and after school, for works near schools, or mid-morning or mid-afternoon for works near residences) – If the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside Recommended Standard Hours	Noise Affected RBL + 5dB	▪ The proponent should apply all feasible and reasonable work practices to meet the noise affected level. ▪ Where all feasible and reasonable practices have been applied and noise is more than 5 dB(A) above the noise affected level, the proponent should negotiate with the community. ▪ For guidance on negotiating agreements see section 7.2.2.

Note 1: Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5 m above ground level. If the property boundary is more than 30 m from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30m of the residence. Noise levels may be higher at upper floors of the noise affected residence.

The construction airborne noise criteria for surrounding residential receiver catchments are summarised in Table 12.

Table 12: Construction noise criteria for residential receiver catchments

RECEIVER	MEASURED RATING BACKGROUND NOISE LEVELS - dB(A)	CONSTRUCTION NOISE CRITERIA dB(A) $L_{eq,15min}$
RC1	50	60
RC4	47	57

Airborne Noise – Non-Residential Receiver Catchments

The airborne noise criteria for surrounding receiver catchments have been extracted from Table 3 in the ICNG and is presented in Table 13 below.

Table 13: NSW ICNG construction noise criteria for surrounding hospital receiver catchments

LAND USE	MANAGEMENT LEVEL (APPLIES WHEN BEING USED) dB(A) $L_{eq,15min}$
Commercial	60
Place of Worship	55

Ground-borne Noise – Residential Receiver Catchments

Ground-borne noise is noise generated by vibration transmitted through the ground into a structure, such as an excavator with a hydraulic hammer attachment, or impact/bore piling. The following ground-borne noise levels for residences have been extracted from Section 4.2 of the ICNG and indicate when management actions should be implemented.

- Evening (6pm to 10pm) – Internal Noise Level: $L_{Aeq,15min}$ 40 dB(A); and
- Night-time (10pm to 7am) – Internal Noise Level: $L_{Aeq,15min}$ 35 dB(A).

An assessment of ground-borne noise to these levels is only required when the ground-borne noise levels are higher than airborne noise levels, and for surrounding residential receiver catchments. The ground-borne noise levels are for evening and night-time periods only. The levels shall be assessed at the centre of the most affected habitable room.

7.7 CONSTRUCTION VIBRATION CRITERIA

It is important for vibration emissions from vibration-intensive equipment utilised during the construction works be managed to maintain appropriate levels of human comfort, and to avoid both cosmetic and structural damage. The vibration limits proposed in the ensuing sub-sections aid in achieving this outcome.

7.7.1 Human Comfort

The office of Environment and Heritage (OEH) developed a document, "Assessing Vibration: A Technical Guideline" in February 2006 to assist in preventing people from exposure to excessive vibration levels from construction and operation of a development within buildings. The guideline does not however address vibration induced damage to structures or structure-borne noise effects. Vibration and its associated effects are usually classified as continuous, impulsive or intermittent.

Continuous and Impulsive Vibration

Structural vibration in buildings can be detected by occupants and can affect them in many ways including reducing their quality of life and also their working efficiency. Complaint levels from occupants of buildings subject to vibration depend upon their use of the building and the time of the day.

Maximum allowable magnitudes of building vibration with respect to human response are shown in Table 14. It should be noted that the human comfort for vibration is more stringent than the building damage criteria.

Table 14: Preferred and maximum weighted RMS values for continuous and impulsive vibration acceleration (m/s^2) 1-80 Hz

LOCATION	ASSESSMENT PERIOD[1]	PREFERRED VALUES		MAXIMUM VALUES	
		z-axis	x- and y-axes	z-axis	x- and y-axes
Continuous vibration					
Critical areas[2]	Day- or night time	0.0050	0.0036	0.010	0.0072
Residences	Daytime	0.010	0.0071	0.020	0.014
	Night time	0.007	0.005	0.014	0.010
Offices, schools, educational institutions and places of worship	Day- or night time	0.020	0.014	0.040	0.028
Impulsive vibration					
Residences	Daytime	0.30	0.21	0.60	0.42
	Night time	0.10	0.071	0.20	0.14
Offices, schools, educational institutions and places of worship	Day- or night time	0.64	0.46	1.28	0.92

Note 1: Daytime is 7:00am to 10:00pm and night time is 10:00pm to 7:00am

Note 2: Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring. There may be cases where sensitive equipment or delicate tasks require more stringent criteria than the human comfort criteria specified above. Stipulation of such criteria is outside the scope of this policy, and other guidance documents (e.g. relevant standards) should be referred to. Source: BS 6472–1992

Intermittent Vibration Criteria

Disturbance caused by vibration will depend on its duration and its magnitude. This methodology of assessing intermittent vibration levels involves the calculation of a parameter called the Vibration Dose Value (VDV) which is used to evaluate the cumulative effects of intermittent vibration. Various studies support the fact that VDV assessment methods are far more accurate in assessing the level of disturbance than methods which is only based on the vibration magnitude. Table 15 provide the acceptable vibration dose values for intermittent vibration.

Table 15: Acceptable vibration dose values for intermittent vibration ($m/s^{1.75}$)

LOCATION	DAYTIME[1]		NIGHT-TIME[1]	
	PREFERRED VALUE	MAXIMUM VALUE	PREFERRED VALUE	MAXIMUM VALUE
Critical areas[2]	0.10	0.20	0.10	0.20
Residences	0.20	0.40	0.13	0.26
Offices, schools, educational institutions and places of worship	0.40	0.80	0.40	0.80

Note 1: Daytime is 7:00am to 10:00pm and night time is 10:00pm to 7:00am

Note 2: Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring. There may be cases where sensitive equipment or delicate tasks require more stringent criteria than the human comfort criteria specified above. Stipulation of such criteria is outside the scope of this policy, and other guidance documents (e.g. relevant standards) should be referred to. Source: BS 6472–1992

7.7.2 Cosmetic Damage

Structural vibration thresholds are set to minimize the risk of cosmetic surface cracks and lie below the levels that have the potential to cause damage to the main structure. Table 16 presents guide values for building vibration, based on the vibration thresholds above which cosmetic damage has been demonstrated (as outlined within BS7385-Part 2:1993). These values are evaluated to give a minimum risk of vibration-induced damage, where minimal risk for a named effect is usually taken as 95% probability of no effect.

Table 16: Transient vibration guide values for cosmetic damage – BS 7385-2:1993

TYPE OF BUILDING	PEAK PARTICLE VELOCITY IN FREQUENCY RANGE OF PREDOMINANT PULSE (PPV)	
	4 Hz TO 15 Hz	15 Hz AND ABOVE
Reinforced or framed structures Industrial or light commercial type buildings	50mm/s	N/A
Unreinforced or light framed structures Residential or light commercial type buildings	15mm/s	20mm/s (50mm/s at 40Hz and above)

7.7.3 Structural Damage

Ground vibration criteria are defined in terms of the vibration emission levels from the construction activities which will avoid the risk of damaging surrounding buildings or structures. It should be noted that human comfort criteria are normally expressed in terms of acceleration whereas structural damage criteria are typically expressed in terms of velocity.

Most specified structural vibration levels are defined to minimize the risk of cosmetic surface cracks and are set below the levels that have the potential to cause damage to the main structure. Structural damage criteria are presented in German Standard DIN4150-Part 3 "Structural vibration in buildings – Effects on structures" and British Standard BS7385-Part 2: 1993 "Evaluation and Measurement for Vibration in Buildings". Table 17 indicates the vibration limits presented in DIN4150-Part 3 to ensure structural damage doesn't occur.

Table 17: Guideline value of vibration velocity, vi, for evaluating the effects of short-term vibration – DIN4150-3

LINE	TYPE OF STRUCTURE	VIBRATION VELOCITY, V_i, IN mm/s			
		FOUNDATION			PLANE OF FLOOR OF UPPERMOST FULL STOREY
		AT A FREQUENCY OF			
		< 10HZ	10 TO 50HZ	50 TO 100HZ[1]	ALL FREQUENCIES
1	Buildings used for commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40
2	Dwellings and buildings of similar design and/or use	5	5 to 15	15 to 20	15
3	Structures that, because of their particular sensitivity to vibration, do not correspond to those listed in lines 1 and 2 and are of great intrinsic value (e.g. buildings that are under a preservation order)	3	3 to 8	8 to 10	8
Note 1: For frequencies above 100Hz, at least the values specified in this column shall be applied					

7.7.4 Project Specific Construction Vibration Limits

Table 18 summarises the vibration criteria for the surrounding sensitive receivers to the development.

Table 18: Summary of construction vibration limits

RECEIVER	PERIOD	HUMAN COMFORT VIBRATION OBJECTIVES			BUILDING DAMAGE OBJECTIVES mm/s
		CONTINUOUS mm/s (RMS)		INTERMITTENT $m/s^{1.75}$ (VDV)	
		Z-AXIS	X- AND Y-AXIS		
RC1 RC4	Day	10 - 20	7 - 14	0.20 – 0.40	5
	Night	7 - 14	5 - 10	0.13 – 0.26	
RC2 RC3 RC5 RC6	Day- or night time	20 -40	14 - 28	0.40 – 0.80	20

8 NOISE IMPACT ASSESSMENT

8.1 MECHANICAL PLANT AND EQUIPMENT NOISE EMISSION

At this stage of the proposed development, the design has not progressed enough for mechanical plant and equipment selections to be made. During the design development stage of the project, the mitigation measures outlined in Section 10.1 should be considered when preparing the mechanical services, to ensure compliance with the external noise emissions criteria established in Section 7.2.

8.2 ROAD AND RAIL AIRBORNE NOISE

8.2.1 Noise Modelling and Assumptions

In order to provide acoustic amenity to occupants of the proposed development and comply with the project specific internal noise limits, the noise impact of surrounding roads and rail corridor were assessed at the façade of the proposed development.

3D acoustic modelling for noise emissions from the surrounding roads was conducted using the software SoundPlan (Version 9.0). Noise emissions and impacts from surrounding roads and rail corridor were modelled in accordance with the CoRTN prediction techniques and calibrated to the measurements conducted for this assessment.

This model is recognised by regulatory authorities around Australia and is endorsed by the NSW DPHI for use in projects of this scale. The acoustic modelling was undertaken considering specific meteorological characteristics such as wind speeds, prevailing wind directions and temperature in accordance with the hourly weather data for a full calendar year described in the Test Reference Year for Mascot 1987 (94767 Mascot (Syd AMO) 1978-87 1987).

Attenuation due to distances, building shielding and environmental absorption, together with additional noise incident on the façade due to façade reflections are taken into account within the 3D model.

8.2.2 "Windows Closed" Assessment

The results of the 3D modelling are provided in Appendix B (in the form of façade noise contours), showing the incident noise levels on the façade (daytime and night-time) as a result of external noise sources (traffic and rail). The incident noise levels are presented as $L_{Aeq,9h}$ and $L_{Aeq,15h}$ statistical metrics for the purpose of demonstrating compliance with SEPP 2021 and the DoP Interim Guideline, and mitigation measures are presented in Section 10.2.

8.2.3 "Windows Open" Assessment

A preliminary "windows open" assessment has been conducted to assess whether the habitable spaces can meet the project internal noise limits established in Section 7.3 with windows open for natural ventilation (open in accordance with the natural ventilation requirements of the NCC).

If the project internal noise limits for windows/doors open is exceeded, the habitable area is considered noise-affected and an alternative means of ventilation is required in accordance with the requirements of the NCC (i.e. an alternative ventilation system complying with AS 1668.2 and AS/NZS 3666.1).

The assessment has been conducted under the assumption the occupant has opened their windows to achieve natural ventilation (and as recommended in the DoP Interim Guideline), that is, when the windows are open to 5% of the floor area of the room being ventilated, with a reduction of incident noise level to internal noise level of 10dB(A). Room loss has also been considered as part of this assessment.

In order to achieve the project internal noise limits established in Section 7.3 whilst simultaneously achieving the ventilation requirements, mitigation measures have been proposed in Section 10.3 for the proposed development.

8.3 RAIL GROUND-BORNE NOISE

Section 3.6.2 of the DoP Interim Guideline states that as a general guide, ground borne noise may be assessed for residential buildings near above ground rail corridors where there is a line of site between windows of habitable spaces and railway line. For rooms that are shielded from the line of site (such as bedrooms to the rear of the development) we have measured ground borne noise levels that are within the requirements of SEPP 2021 and the AVTG. Therefore, no additional mitigation measures are required to address rail ground-borne noise for the development.

8.4 RAIL VIBRATION

Operator attended measurements of vibration levels from passenger carriage trains on ballast tracks have been undertaken at the project site boundary facing the rail corridor (locations V1 and V2 as indicated in Figure 3).

Table 19 provides the worst-case overall VDV based on the undertaken measurements of train pass-by's and checks for compliance against the AVTG criteria. As the night VDV criteria is the most stringent, this was used to check for compliance. VDV's in Table 19 represent a worst-case scenario and confirms compliance with the project vibration criteria and require no further mitigation.

Table 19: Rail vibration compliance

LOCATION	VIBRATION DOSE VALUE VDV ($M/S^{1.75}$)			COMPLIANCE (YES / NO)
	MEASURED	PREFERRED	MAXIMUM	
V1	0.03	0.13	0.26	Yes
V2	0.001	0.13	0.26	Yes

8.5 HOLROYD SPORTSGROUND NOISE

An assessment of noise from the use of the Holroyd Sportsground has been conducted to determine the level of impact on the development noise-sensitive areas particularly to the apartment bedrooms directly facing the Sportsground.

In order to assess the noise impact from the Holroyd Sportsground, a noise model was prepared using commercial software SoundPLAN v9.0, which is a comprehensive software package for conducting three-dimensional complex noise propagation modelling. Within the model, the effects of the environment (built and natural) on propagation of sound were considered to reliably estimate the resulting noise effects on the development receivers.

The noise model represents the 'reasonable' worst case periods when the sportsground is in use, assuming noise from sportsground activities to be constant during a 15-minute observation period.

Table 20 summarises the noise levels used in the modelling to determine noise attenuation requirement to the development noise sensitive areas to comply with internal noise levels established in Section 7.

Table 20: Noise levels from Sportsground use for modelling

ACTIVITY / SCENARIO	NOISE LEVEL	TIME PERIOD
100 people at the Sportsground cheering and applauding with 1 in 2 people conversing with a normal to raised voice	94dB(A)	All periods
Sports activities – for example a soccer/football game	90dB(A)	All periods

The assessment for the Sportsground noise impacts to the development apartment bedroom receivers are driven by the façade performance requirements determined for the development in Section 8.2 and Section 10.2 to address road and rail noise to the development. Based on the nominated façade arrangement for the development, the predicted noise levels from the Sportsground use to the development are presented in Table 21.

Noise contour maps produced from the model have also been produced in Appendix C.

Table 21: Holroyd Sportsground noise assessment

RECEIVER LOCATION	FAÇADE ARRANGEMENT	CRITERIA, dB(A)	PREDICTED NOISE LEVEL dB(A)	COMPLIANCE (YES/NO)
Development Apartment Bedroom	6.38mm laminated glazing	35 (internal)	< 35	YES

The predicted noise level within the development apartment bedroom areas contributed to the Holroyd Sportsground is expected to be compliant with internal noise level targets for the development based on the façade glazing arrangement (required for road and rail noise reduction) and do not require further mitigation.

8.6 TRAFFIC NOISE GENERATION

A traffic noise generation assessment has been conducted based on peak hourly vehicle movements. These volumes have been modelled and provided in The Transport Planning Partnership (TTPP) Transport Impact Assessment dated November 2024. The residential properties along Walpole Street are considered the most affected, considering that the only other connection to Crescent Street is Woodville Road which is a sub-arterial road and carries a substantially higher number of vehicles. Noise levels based on the traffic movements along Walpole Street have been summarised below in Table 22.

Table 22: Summary of peak traffic movements on Walpole Street

TYPE	TOTAL PEAK TRAFFIC VOLUMES (VEHICLES/HOUR)		
	AM	PM	SAT
Existing traffic	618	546	509
Additional traffic generated from development	288	293	272
Predicted increase in traffic noise, dB(A)	< 2	< 2	< 2

The predicted increase in traffic noise has been based on the methodologies given in the UK Department of Transport 'Calculation of Road Traffic Noise' (CoRTN) document. This model describes noise emitted by constant traffic flows. The model uses standard curves to approximate vehicle noise levels. It also assumes the traffic can be broken into two broad categories: cars, and heavy vehicles. The source sound levels used in this project to model traffic noise levels are contained within the calculation algorithms of the noise model. The values presented in Table 22 compare the existing noise levels estimated by the model with the estimated noise levels expected from an increase in vehicle movements associated with the proposed development.

As shown in Table 22, the predicted increase in peak traffic noise due to the development is less than 2dB(A), which is within the limits outlined in the Road Noise Policy criteria. For this reason, we have determined that the traffic generated by the proposed development will not have an adverse impact on the surrounding residents.

8.7 CARPARK AND LOADING DOCK NOISE

8.7.1 Details and Modelling Assumptions

An assessment of the noise generated by vehicular movements for the project site has been conducted to determine the impacts on the surrounding noise receivers. We have used the following assumptions in our assessment:

- Sound power levels are as per Table 23
- Loading dock and carpark are accessible at all times, including the night period (10pm – 7am)
- 1 HRV enters or exits the development in a 15-minute period at all times
- HRV engines are switched off when parked
- HRV airbrakes are only released inside the loading dock
- 75 cars enter or exits the development in any given 15-minute period (5 cars per minute) during the night
- 150 cars enter or exits the development in any given 15-minute period (10 cars per minute) during the day/evening
- Vehicles travel at no faster than 10km/h within the development

We advise that once more information on the carpark and loading dock is provided, a detailed assessment is recommended. Detailed information such as times of operation, compaction, HRV and truck frequency and movements would be required for more accuracy in such an assessment.

Table 23 presents the typical sound power level (SWL) associated with general loading dock and carpark activities.

Table 23: Typical sound power levels

ACTIVITIES	SOUND POWER LEVEL – dB(A)
HRV Idling – $L_{Aeq,period}$	95
HRV Engine Start – $L_{Aeq,period}$	102
Air Brakes – $L_{Aeq,period}$	113
Reversing Alarm – $L_{Aeq,period}$	111
HRV Manoeuvring @ 10km/hr – $L_{Aeq,period}$	91
Car Manoeuvring @ 10km/hr – $L_{Aeq,period}$	85
Vehicle Door Close – L_{Amax}	84

8.7.2 Predicted Noise Levels

The noise generated by the activities during a 15-minute period and a maximum noise level during the night time have been predicted to the facades of the surrounding receiver catchments and are summarised below in Table 24. Attenuation factors from distance, barriers, etc. have been applied where applicable.

In addition to the loading dock and carpark noise impact assessment to the surrounding receiver catchments, an assessment to the apartments directly adjacent to the loading dock (Building 3 and Building 4) has been undertaken to ensure the apartment occupant's amenity is maintained and impacts from the loading dock and carpark movement is controlled.

Table 24: Predicted Noise Levels at Most Affected Façade of Receiver Catchment

RECEIVER CATCHMENT	PREDICTED NOISE LEVEL dB(A)			PROJECT NOISE TRIGGER LEVEL dB(A)			COMPLIES (YES/NO)
	DAY/EVENING $L_{Aeq,15min}$	NIGHT $L_{Aeq,15min}$	NIGHT L_{AFmax}	DAY	EVENING	NIGHT	
RC1	< 40	< 39	< 40	55 $L_{Aeq,15min}$	48 $L_{Aeq,15min}$	45 $L_{Aeq,15min}$ 55 $L_{AF,max}$	Yes
RC2	< 40	< 39	N/A	63 $L_{Aeq,15min}$			Yes
RC3	< 40	< 39	N/A	63 $L_{Aeq,15min}$			Yes
RC4	42	39	41	52 $L_{Aeq,15min}$	52 $L_{Aeq,15min}$	49 $L_{Aeq,15min}$ 59 $L_{AF,max}$	Yes
RC5	< 40	< 39	N/A	63 $L_{Aeq,15min}$			Yes
RC6	< 40	< 39	N/A	48 $L_{Aeq,15min}$			Yes

Table 25: Predicted Noise Levels at Most Affected Façade of Building 3 & 4

LOCATION	PREDICTED NOISE LEVEL dB(A)			PROJECT NOISE TRIGGER LEVEL dB(A)[1]			COMPLIES (YES/NO)
	DAY/EVENING $L_{Aeq,15min}$	NIGHT $L_{Aeq,15min}$	NIGHT L_{AFmax}	DAY	EVENING	NIGHT	
Building 3 Apartment Facade	< 48	< 48	< 56	52 $L_{Aeq,15min}$	52 $L_{Aeq,15min}$	49 $L_{Aeq,15min}$ 59 $L_{AF,max}$	Yes
Building 4 Apartment Facade	< 50	< 47	< 47	52 $L_{Aeq,15min}$	52 $L_{Aeq,15min}$	49 $L_{Aeq,15min}$ 59 $L_{AF,max}$	Yes

Note 1: RC4 project noise trigger levels have been adopted as this is the most representative being in close proximity to Building 3 and Building 4.

Based on our assumptions and assessment, the predicted noise levels at the surrounding receiver catchments comply with the project noise trigger levels established in Section 7.2 and require no further noise mitigation.

8.8 RETAIL & COMMERCIAL NOISE EMISSION

At the time of writing, the tenants for the retail and commercial spaces have not been determined and therefore the usage / type of activities for these spaces are unknown.

Future usage of the retail and commercial spaces may be subject to a separate development application and detailed assessment of their expected operation and activities may be required by Cumberland City Council. The selected tenants may be required by Council to submit a separate Development Application based on use.

Future Development Applications or CDCs for retail and commercial uses are to consider the following and how noise impacts will be mitigated:

- Hours of operation
- Number of occupants
- If outdoor uses (for F&B as an example) are expected
- If any speakers or amplified music will be used

9 CONSTRUCTION NOISE AND VIBRATION ASSESSMENT

9.1 PROPOSED CONSTRUCTION ACTIVITIES

In this assessment, the noise impact from the construction works are considered, which are expected to comprise of the following stages:

- Civil works (excavation, retention and foundation); and
- Structural works (construction, façade, finishes and services).

The construction works are expected to occur during the following hours (in line with the NSW ICNG):

- Monday to Friday: 7:00am to 6:00pm;
- Saturday: 8:00am to 1:00pm; and
- Sunday and public holidays: no work.

Demolition works on the project have already been completed, therefore no adverse impacts are expected from the demolition activities on site. Each stage of the project during its construction stage will be fenced off using Solid A class Hoardings to mitigate noise impacts to the receivers within the development.

9.2 EXPECTED CONSTRUCTION EQUIPMENT

The noise sources likely to be associated with the works listed in the previous section of this report are presented in Table 26. The equipment noise levels have been extracted from AS2436:2010 “Guide to Noise and Vibration Control on Construction, Demolition and Maintenance Sites”.

Table 26: Cumulative impact – construction equipment noise levels

STAGES	EQUIPMENT	QUANTITY (STAGE A)	QUANTITY (STAGE B & C)	SOUND POWER LEVEL – dB(A)	ACOUSTICAL USAGE FACTOR (%)	USAGE IN 15-MINUTE PERIOD (MINUTES)	TIME CORRECTED SOUND POWER LEVEL– dB(A) $L_{Aeq,15min}$
Civil Works - Excavation, Retention and Foundation	Excavator 30 tonne	2	1	110	40	6	109
	Excavator breaker	2	1	115	40	6	114
	Jackhammer	2	2	113	20	3	109
	Electric hand tools	9	6	102	50	7.5	108
	Concrete pump	2	2	109	50	7.5	109
	Bored piling	2	2	110	16	2.4	105
	Mobile Crane[1]	4	2	98	16	2.4	96
	Generator	2	2	104	20	3	100
	Truck	4	3	108	40	6	110
Structural Works – Construction, Façade and Finishes	Powered hand tool	15	9	102	50	7.5	111
	Concrete pump	3	2	109	50	7.5	111
	Mobile Crane[1]	4	2	98	16	2.4	96

1. Electric Crane, luffing type proposed for the project

9.3 NOISE MODELLING AND ASSUMPTIONS

In order to assess the noise impact from the site during the various construction stages, a noise model was prepared using commercial software SoundPLAN v9.0, which is a comprehensive software package for conducting three-dimensional complex noise propagation modelling. Using the software, a 3D model of the site and its surroundings was constructed including the nearby buildings, and the construction plant and equipment were positioned as noise sources. Within the model, the effects of the environment (built and natural) on propagation of sound were considered to reliably estimate the resulting noise effects on the surrounding noise sensitive receivers.

The noise model represents the 'reasonable' worst case periods of construction activities, meaning that all the equipment of each stage is operating simultaneously during a 15-minute observation period.

The assumptions that were made within the assessment include the following:

- The predicted noise levels represent the worst-case scenario for each receiver;
- The mitigation measures outlined in Section 10.4 are implemented; and
- Neutral weather conditions;

9.4 PREDICTED NOISE LEVELS

The predicted noise levels have been presented below and have been assessed to the construction noise criteria established in Section 7.7. The noise contour maps produced by the three-dimensional noise propagation modelling are provided in Appendix E.

Table 27: Predicted noise levels – Stage A: Excavation, Retention & Foundations

RECEIVER	PREDICTED NOISE LEVEL RANGE dB(A) $L_{Aeq,15min}$	NOISE MANAGEMENT LEVEL dB(A) $L_{Aeq,15min}$	NOISE MANAGEMENT LEVEL EXCEEDANCE dB	NOISE MANAGEMENT LEVEL – HIGHLY NOISE AFFECTED dB(A) $L_{Aeq,15min}$	EXCEEDS HIGHLY NOISE AFFECTED LEVEL (YES/NO)
RC1	60 – 65	60	Up to 5	75	No
RC2	55 – 60	60	N/A	75	No
RC3	65 – 70	60	Up to 10	75	No
RC4	60 – 65	57	Up to 8	75	No
RC5	55 - 60	60	N/A	75	No
RC6	50 - 55	55	N/A	75	No

Table 28: Predicted noise levels – Stage B: Excavation, Retention & Foundations

RECEIVER	PREDICTED NOISE LEVEL RANGE dB(A) $L_{Aeq,15min}$	NOISE MANAGEMENT LEVEL dB(A) $L_{Aeq,15min}$	NOISE MANAGEMENT LEVEL EXCEEDANCE dB	NOISE MANAGEMENT LEVEL – HIGHLY NOISE AFFECTED dB(A) $L_{Aeq,15min}$	EXCEEDS HIGHLY NOISE AFFECTED LEVEL (YES/NO)
RC1	55 – 60	60	N/A	75	No
RC2	50 – 55	60	N/A	75	No
RC3	55 – 60	60	N/A	75	No
RC4	65 – 70	57	Up to 13	75	No
RC5	55 – 60	60	N/A	75	No
RC6	55 – 60	55	Up to 5	75	No
Stage A Towers	65 - 70	70	N/A	75	No

Table 29: Predicted noise levels – Stage C: Excavation, Retention & Foundations

RECEIVER	PREDICTED NOISE LEVEL RANGE dB(A) $L_{Aeq,15min}$	NOISE MANAGEMENT LEVEL dB(A) $L_{Aeq,15min}$	NOISE MANAGEMENT LEVEL EXCEEDANCE dB	NOISE MANAGEMENT LEVEL – HIGHLY NOISE AFFECTED dB(A) $L_{Aeq,15min}$	EXCEEDS HIGHLY NOISE AFFECTED LEVEL (YES/NO)
RC1	55 – 60	60	N/A	75	No
RC2	50 – 55	60	N/A	75	No
RC3	50 – 55	60	N/A	75	No
RC4	65 – 70	57	Up to 13	75	No
RC5	65 – 70	60	Up to 10	75	No
RC6	55 – 60	55	Up to 5	75	No
Stage A Towers	60 – 65	70	N/A	75	No
Stage B Towers	70 - 75	67	Up to 8	75	No

Table 30: Predicted noise levels – Stage A: Construction, façade, finishes and services

RECEIVER	PREDICTED NOISE LEVEL RANGE dB(A) $L_{Aeq,15min}$	NOISE MANAGEMENT LEVEL dB(A) $L_{Aeq,15min}$	NOISE MANAGEMENT LEVEL EXCEEDANCE dB	NOISE MANAGEMENT LEVEL – HIGHLY NOISE AFFECTED dB(A) $L_{Aeq,15min}$	EXCEEDS HIGHLY NOISE AFFECTED LEVEL (YES/NO)
RC1	55 – 60	60	N/A	75	No
RC2	55 – 60	60	N/A	75	No
RC3	55 – 60	60	N/A	75	No
RC4	55 – 60	57	Up to 3	75	No
RC5	50 – 55	60	N/A	75	No
RC6	50 – 55	55	N/A	75	No

Table 31: Predicted noise levels – Stage B: Construction, façade, finishes and services

RECEIVER	PREDICTED NOISE LEVEL RANGE dB(A) $L_{Aeq,15min}$	NOISE MANAGEMENT LEVEL dB(A) $L_{Aeq,15min}$	NOISE MANAGEMENT LEVEL EXCEEDANCE dB	NOISE MANAGEMENT LEVEL – HIGHLY NOISE AFFECTED dB(A) $L_{Aeq,15min}$	EXCEEDS HIGHLY NOISE AFFECTED LEVEL (YES/NO)
RC1	50 – 55	60	N/A	75	No
RC2	50 – 55	60	N/A	75	No
RC3	50 – 55	60	N/A	75	No
RC4	60 – 65	57	Up to 8	75	No
RC5	55 - 60	60	N/A	75	No
RC6	50 - 55	55	N/A	75	No
Stage A Towers	60 - 65	70	N/A	75	No

Table 32: Predicted noise levels – Stage C: Construction, façade, finishes and services

RECEIVER	PREDICTED NOISE LEVEL RANGE dB(A) $L_{Aeq,15min}$	NOISE MANAGEMENT LEVEL dB(A) $L_{Aeq,15min}$	NOISE MANAGEMENT LEVEL EXCEEDANCE dB	NOISE MANAGEMENT LEVEL – HIGHLY NOISE AFFECTED dB(A) $L_{Aeq,15min}$	EXCEEDS HIGHLY NOISE AFFECTED LEVEL (YES/NO)
RC1	50 - 55	60	N/A	75	No
RC2	45 - 50	60	N/A	75	No
RC3	50 - 55	60	N/A	75	No
RC4	60 - 65	57	Up to 8	75	No
RC5	65 - 70	60	Up to 10	75	No
RC6	55 - 60	55	Up to 5	75	No
Stage A Towers	50 - 55	70	N/A	75	No
Stage B Towers	65 - 70	67	Up to 3	75	No

10 NOISE MITIGATION MEASURES

10.1 MECHANICAL SERVICES

Mitigation measures for the mechanical plant should be considered during the design development stage to ensure compliance with the outlined criteria at the nearest sensitive receiver catchments. These mitigation measures could include but not limited to the following:

- Positioning mechanical plant away from nearby receivers
- Acoustic attenuators fitted to duct work
- Screening around mechanical plant
- Acoustic insulation within duct work

It should be noted that the noise reduction requirements will likely be refined and reduced once the mechanical plant and equipment selections and designs have been progressed further during the detailed design of the proposed development. The mitigation measures proposed at this stage of the development are conservative in nature.

10.2 EXTERNAL SOUND ISOLATION – BUILDING ENVELOPE

10.2.1 Glazed Façade Elements

To simplify the acoustic façade requirements across the development, an Acoustic Facade Type (AFT) has been provided along with glazing arrangements / systems scheduled (including frames) in Table 33 to ensure the internal noise level requirements presented in Section 7.3.1 are achievable.

The AFT's are to be read in conjunction with the façade matrix provided in Table 34 for sleeping areas and Table 35 for living areas. The detailed incident façade noise levels are presented in Appendix B.

The matrix is based on typical apartment living room/bedroom dimensions and internal finishes which are considered conservative for the volume of room.

Table 33: Acoustic performance and typical equivalent glass lites for acoustic façade types

ACOUSTIC FAÇADE TYPE	ACOUSTIC PERFORMANCE (WEIGHTED SOUND REDUCTION INDEX, R_w)	GLASS LITES
1	26	6mm Monolithic
2	32	6.38mm Laminated
3	33	10.38mm Laminated
4	35	12.38mm Laminated
5	38	12.5mm VLam Hush

The acoustic ratings for each of the typical glazing arrangements in Table 33 are indicative of the glazing assembly in its entirety (glass and frame).

Table 34: Acoustic façade type designation for glazed elements (sleeping areas)

INCIDENT FAÇADE NOISE LEVEL dB(A)$L_{Aeq,9hour}$	TOTAL AREA OF GLAZING			
	≤4m^2	≤6m^2	≤8m^2	≤10m^2
≤57	1	1	2	2
58	1	2	2	2
59	1	2	2	2
60	2	2	2	2
61	2	2	2	2
62	2	2	2	3
63	2	2	3	4
64	2	3	4	5
65	2	3	5	5

Table 35: Acoustic façade type designation for glazed elements (living areas)

INCIDENT FAÇADE NOISE LEVEL dB(A)$L_{Aeq,15hour}$	TOTAL AREA OF GLAZING			
	≤4m^2	≤6m^2	≤8m^2	≤10m^2
≤60	1	1	1	1
61	1	1	1	1
62	1	1	1	2
63	1	1	2	2
64	1	2	2	2
65	1	2	2	2
66	2	2	2	3
67	2	2	2	3
68	2	2	3	3

On the basis that the above minimum acoustic performances for façade glazing assemblies are implemented, the internal noise levels are predicted to satisfy the acoustic requirements of the SEPP 2021 and the DoP Interim Guideline.

The preliminary façade recommendations presented in Table 34 and Table 35, for each building will be refined once the architectural design is further progressed during detailed design.

10.2.2 Non-Glazed Façade Elements

In addition to the required glazing systems outlined in Table 34, the solid/non-glazed elements of the façade shall be constructed to ensure the resulting internal noise levels within each space in the proposed development do not exceed the project internal noise limits outlined in Section 7.3.

Masonry constructions such as concrete or core-filled blockwork will be satisfactory with no additional acoustic treatment required.

Lightweight constructions are to have an indicative acoustic performance of no less than R_w 50 to ensure the resulting internal noise levels within each space in the proposed development do not exceed the project internal noise limits outlined in Section 7.3.

10.3 ALTERNATE MEANS OF VENTILATION

An open windows assessment has been conducted in order to determine whether the residential spaces are able to meet the internal noise level requirements of the DoP Interim Guideline with windows open to achieve natural ventilation (open in accordance with the natural ventilation requirements of the NCC and ADG).

The DoP interim Guideline states:

> *If internal noise levels with windows or doors open exceeds the criteria by more than 10dB(A), the design of the ventilation for these rooms should be such that occupants can leave windows closed, if they so desire, and also to meet the ventilation requirements of the Building Code of Australia.*

If the project internal noise limits for windows/doors open is exceeded, alternative means of ventilation is required in accordance with the requirements of the NCC (i.e. alternative ventilation system complying with AS 1668.2 and AS/NZS 3666.1) to the noise-affected spaces (noise-affected as defined in Section 8.2.3). The design of the ventilation for these areas should be such that occupants can leave windows closed, if they so desire, and also to meet the ventilation requirements of the NCC. The noise-affected spaces identified in Appendix C as requiring alternative means of ventilation are based on façade noise levels presented in Appendix B.

The results of the incident façade noise levels presented in Appendix B indicate that:

- Sleeping areas (i.e. bedrooms) with an incident façade noise level of greater than 55dB(A)$L_{Aeq,9hour}$ will require an alternative means of ventilation to meet the aforementioned requirements
- Other habitable areas (i.e. living rooms) with an incident façade noise level of greater than 60dB(A)$L_{Aeq,15hour}$ will require an alternative means of ventilation to meet the aforementioned requirements

Areas not identified in Appendix C as requiring alternative means of ventilation can maintain internal amenity noise criteria with window open for natural ventilation.

It should be noted that these zones are preliminary and may change as the design develops due to a change in the building form, form of the façade, internal finishes within each of the habitable spaces and location of openings.

10.4 CONSTRUCTION NOISE AND VIBRATION

10.4.1 General Acoustic Recommendations for Construction

According to AS 2436 – 2010 "Guide to noise and vibration control on construction, demolition and maintenance sites" the following techniques could be applied to minimise the spread of noise and vibrations to the potential receivers.

Noise

If a process that generates significant noise levels cannot be avoided, the amount of noise reaching the receiver should be minimised. Two ways of achieving this are to either increase the distance between the noise source and the receiver or to introduce noise reduction measures such as screens.

Physical methods to reduce the transmission of noise between the site works and residences, or other sensitive land uses, are generally suited to works where there is longer-term exposure to the noise. Practices that will reduce noise from the site include:

- Increasing the distance between noise sources and sensitive receivers;
- Reducing the line-of-sight noise transmission to residences or other sensitive land uses using temporary barriers (stockpiles, shipping containers and demountable offices can be effective barriers);
- Constructing barriers that are part of the project design early in the project to introduce the mitigation of site noise; and
- Installing purpose-built noise barriers, acoustic sheds and enclosures.

Screening

On sites where distance is limited, the screening of noise may be beneficial, and this should be taken into account during the planning stages.

If structures such as stores, site offices and other temporary buildings are situated between the noisiest part of the site and the nearest dwellings, some of the noise emission from the site can be reduced. If these buildings are occupied, sound insulation measures may be necessary to protect workers inside the buildings.

A hoarding that includes a site office on an elevated structure offers superior noise reduction when compared with a standard (simple) hoarding. The acoustic performance is further enhanced when the hoarding is a continuous barrier.

Storage of building materials or the placement of shipping containers between the noise source and any noise-sensitive area may also provide useful screening and the same is true of partially completed or demolished buildings. A noisy, stationary plant can be placed in a basement, the shell of which has been completed, provided reverberant noise can be controlled. Where compressors or generators are used in closed areas, it is necessary to ensure that the exhaust gases are discharged directly to the outside air and that there is good cross-ventilation to prevent the build-up of poisonous carbon monoxide fumes and to allow an adequate air supply to maintain efficiency when operating the equipment.

Where such noise barriers are not practical, a worthwhile reduction in noise can be obtained by siting the plant behind and as close as possible to mounds of earth, which may effectively screen any noise-sensitive areas from the plant. These can often be designed into the construction schedule or site arrangement for future landscaping.

Water pumps, fans and other plant equipment that operate on a 24-hour basis may not be an irritating source of noise during the day but may be problematic at night. They should therefore be effectively screened by either situating them behind a noise barrier or by being positioned in a trench or a hollow in the ground provided this does not generate reverberant noise. In such cases, however, adequate ventilation should also be ensured. Long, temporary earth embankments can provide quite an effective noise screen for mobile equipment moving, for example, on a haulage road. When the earthworks are complete, the earth mounds should be removed, if possible, with smaller, quieter excavators. A noise barrier may be a more reliable method of noise control than the imposition of restrictions on throttle settings.

In many cases it is not be practical to screen earthmoving operations effectively, but it may be possible to partially shield a construction plant or to build-in at the early stages protective features required to screen traffic noise. Where earth noise barriers are not practical due to lack of space, consideration should be given to the possibility of constructing temporary screens from wood or any equivalent material in surface density.

The usefulness of a noise barrier will depend upon its length, its height, its position relative to the source and to the receiver, and the material from which it is made. A barrier designed to reduce noise from a moving source should extend beyond the last property to be protected to a distance of not less than ten times the shortest measurement from the property to the barrier. A barrier designed to reduce noise from a stationary source should, where possible, extend to a distance beyond the direct line between the noise source and the receiver to a distance equal to ten times the effective barrier height, which is the height above the direct line between source and receiver.

If the works are predominately within nominally closed structures, careful consideration should be given to reducing noise breakout at any openings.

Crane (diesel operated)

An appropriate silencer on the muffler and acoustic screen around the engine bay are recommended to attenuate the noise from it.

Reversing and warning alarms

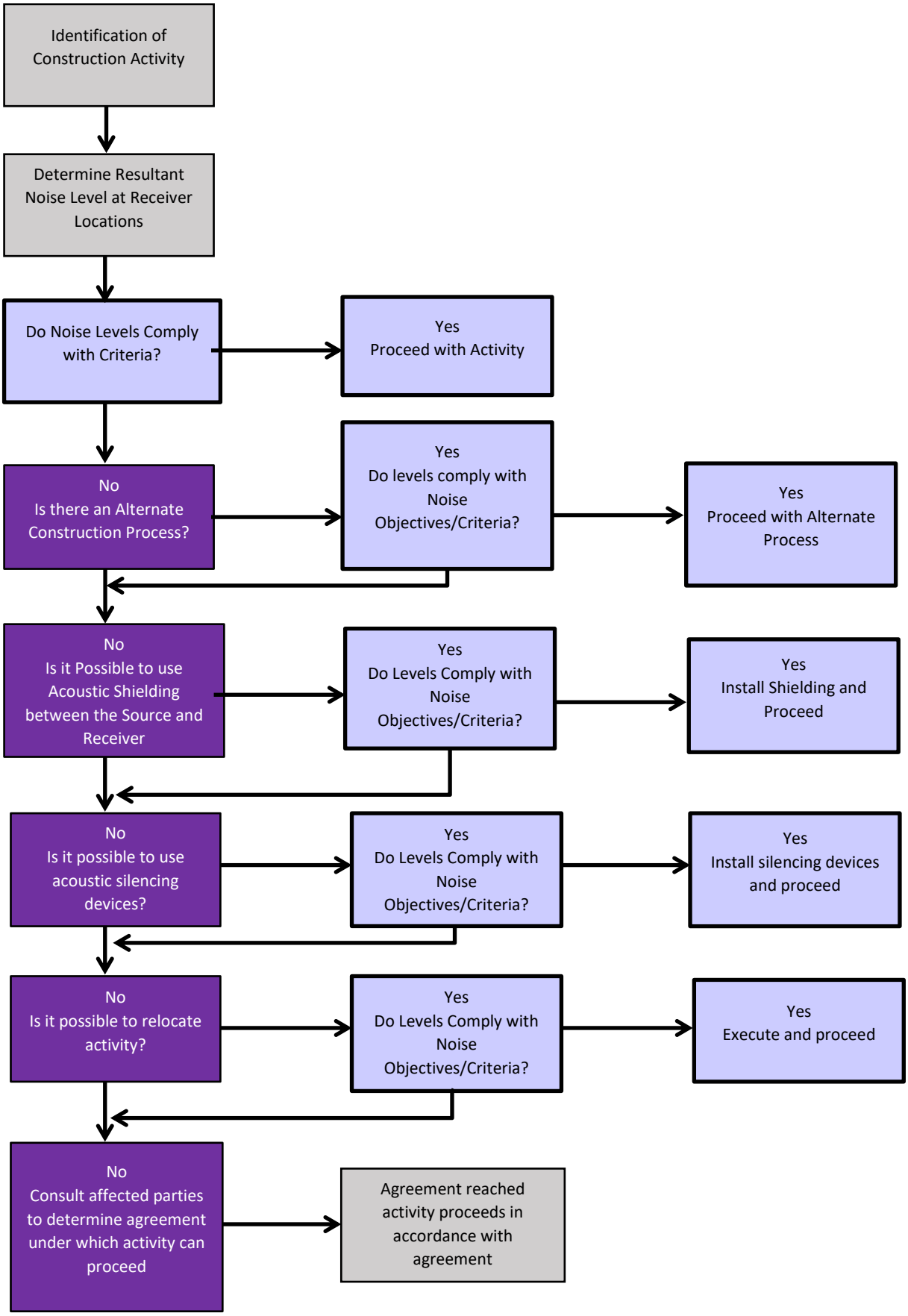
Community complaints often involve the intrusive noise of alarms commonly used to provide a safe system of work for vehicles operating on a site. Beeper reversing alarm noise is generally tonal and may cause annoyance at significant distances from the work site.

There are alternative warning alarms capable of providing a safe system of work that are equal to or better than the traditional 'beeper', while also reducing environmental noise impacts. The following alternatives should be considered for use on construction sites as appropriate:

- Broadband audible alarms incorporating a wide range of sound frequencies (as opposed to the tonal frequency 'beep') are less intrusive when heard in the neighbourhood;
- Variable-level alarms reduce the emitted noise levels by detecting the background noise level and adjusting the alarm level accordingly;
- Non-audible warning systems (e.g. flashing lights, reversing cameras) may also be employed, providing safety considerations, are not compromised;
- Proximity alarms that use sensors to determine the distance from objects, such as people or structures, and generate an audible alarm in cabin for the driver; and
- Spotters or observers.

The above methods should be combined, where appropriate.

Figure 6: Noise mitigation management flow chart



10.4.2 Noise & Vibration Monitoring Strategy

General Methodology

Noise and vibration levels should be monitored from time to time to ensure that noise generated as a result of remediation and construction activities does not disturb local businesses and residents.

Monitoring may be in the form of regular checks by the builder or indirectly by an acoustic consultant engaged by the builder and in response to any noise or vibration complaints. Where noise and vibration criteria are being exceeded or in response to valid complaints, noise and / or vibration monitoring should be undertaken. This would be performed inside the premises of the affected property and on site adjacent to the affected receivers.

Monitoring is to be undertaken by an experienced noise and vibration monitoring professional or an acoustic consultant. The results of any noise or vibration monitoring are to be provided to the relevant party or person in a timely manner allowing the builder to address the issue and respond to the complaints.

Noise and vibration monitoring can take two forms:

- Short term monitoring; and
- Long-term monitoring.

Short-term monitoring

Short-term monitoring consists of attended monitoring when critical stages of the construction are occurring. This normally provides real-time assistance and guidance to the subcontractor on site letting them know when the noise and vibration criteria are exceeded allowing the selection of alternative method on construction or equipment selection in order to minimise noise and vibration impacts.

Long-term monitoring

Similarly, long-term monitoring uses noise and vibration loggers providing real-time alerts to the builder / site manager when the noise and vibration criteria are exceeded.

Typically, the noise and vibration loggers stay on site for a period of several months for the critical construction stages of the project. Sometimes the period of construction noise and vibration monitoring is dictated by the local authorities through the DA conditions.

Both methodologies are complementary and normally used simultaneously providing a significant of amount of data via the long-term monitoring but also providing information on the sources of noise and vibration generating exceedances via the short-term or attended monitoring.

Noise & Vibration Monitoring Program

A monitoring programme for the construction works is proposed in Table 36. The monitoring programme is to be carried out during the likely noisiest periods during each construction phase as agreed with the Acoustic engineer and Contractor.

Refer to Figure 7 for the receiver locations corresponding the monitoring locations.

Figure 7: Proposed monitoring locations



Table 36: Noise and vibration monitoring programme

CONSTRUCTION PHASE	LOCATION REFERENCE	MONITORING REQUIRED
Structural Works & Façade and Finishes	RC3 RC4 RC5	Noise
Structural Works & Façade and Finishes	RC4 RC5	Vibration

11 CONCLUSION

This NVIA has been prepared to accompany a State Significant Development Application (**SSDA**) for a proposed mixed use residential development located at 1 Crescent, Holroyd (**the site**).

The assessment has considered the following key acoustic elements:

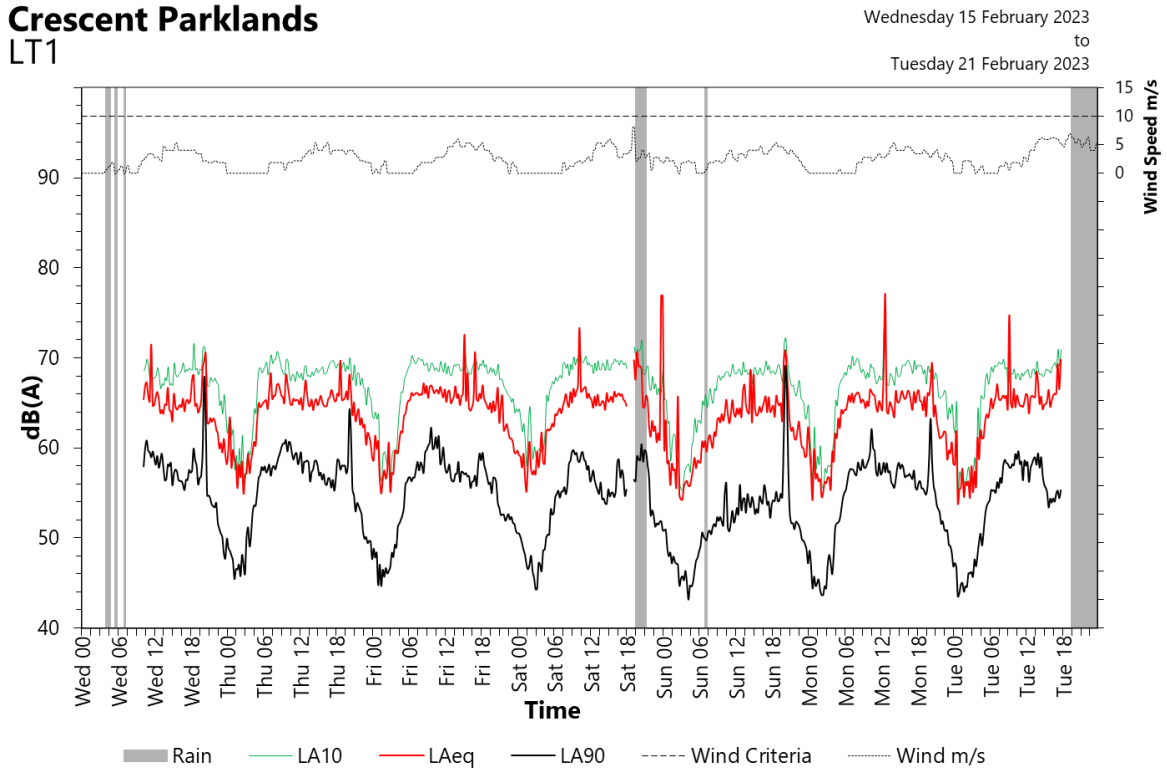
- Traffic and rail noise impact on the residential apartments within the development
- Rail vibration impact on the residential apartments within the development
- Noise impact from traffic generation as a result of the development
- Nosie impact from use of Holroyd Sportsground adjacent to the development
- Retail and commercial impact within the development to surrounding noise-sensitive receivers
- Carparking and loading dock movement within the development to surrounding noise-sensitive receivers
- Noise emissions from mechanical plant associated with the project to surrounding noise-sensitive receivers

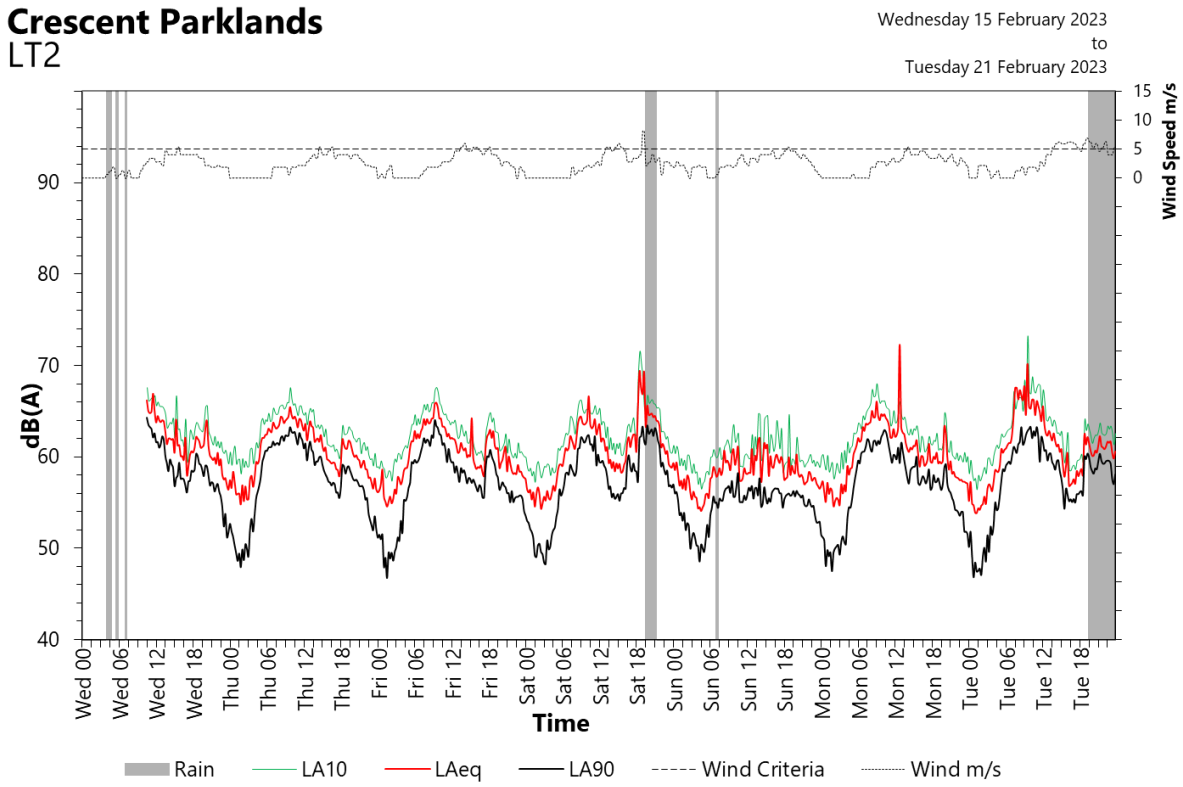
To assess each of the acoustic considerations for the proposed development, noise criteria has been established in Section 7 in accordance with the following documents:

- Architectural drawings prepared by Woods Bagot (Architectural Drawings)
- NSW Government's State Environmental Planning Policy (Infrastructure) 2007 (SEPP 2007)
- Cumberland City Council's Cumberland Local Environmental Plan 2021 (LEP)
- Cumberland City Council's Cumberland Development Control Plan 2021 (DCP)
- NSW Department of Planning's Development Near Rail Corridors and Busy Roads – Interim Guideline (DoP Interim Guideline)
- NSW Government's State Environmental Planning Policy (Transport and Infrastructure) 2021 (SEPP 2021)
- NSW EPA's Assessing Vibration: a technical guideline, dated February 2006 (AVTG)
- NSW EPA's Road Noise Policy, dated March 2011 (RNP)
- NSW EPA's Noise Policy for Industry, dated January 2017 (NPI)
- National Construction Code 2022 (NCC)
- NSW Department of Planning's Apartment Design Guide, dated July 2015 (ADG)
- Australian Standard AS 1668.2 - The use of ventilation and air-conditioning in buildings, Part 2: Mechanical ventilation in buildings (AS 1668.2)
- Australian Standard AS/NZS 3666.1 - Air-handling and water systems of buildings - Microbial control Design, installation and commissioning (AS/NZS 3666.1)
- Bureau of Meteorology, Daily rainfall report (BOM)

Having given regard to the analysis conducted within this report, it is the finding of this NVIA that the proposed development is compliant with the relevant noise criteria controls for this type of development, and it is expected to comply with the applicable regulations with regards to noise, particularly those listed above. Based on the assessment and recommendations in the report the proposed development is expected to meet compliance to project criteria established in this report.

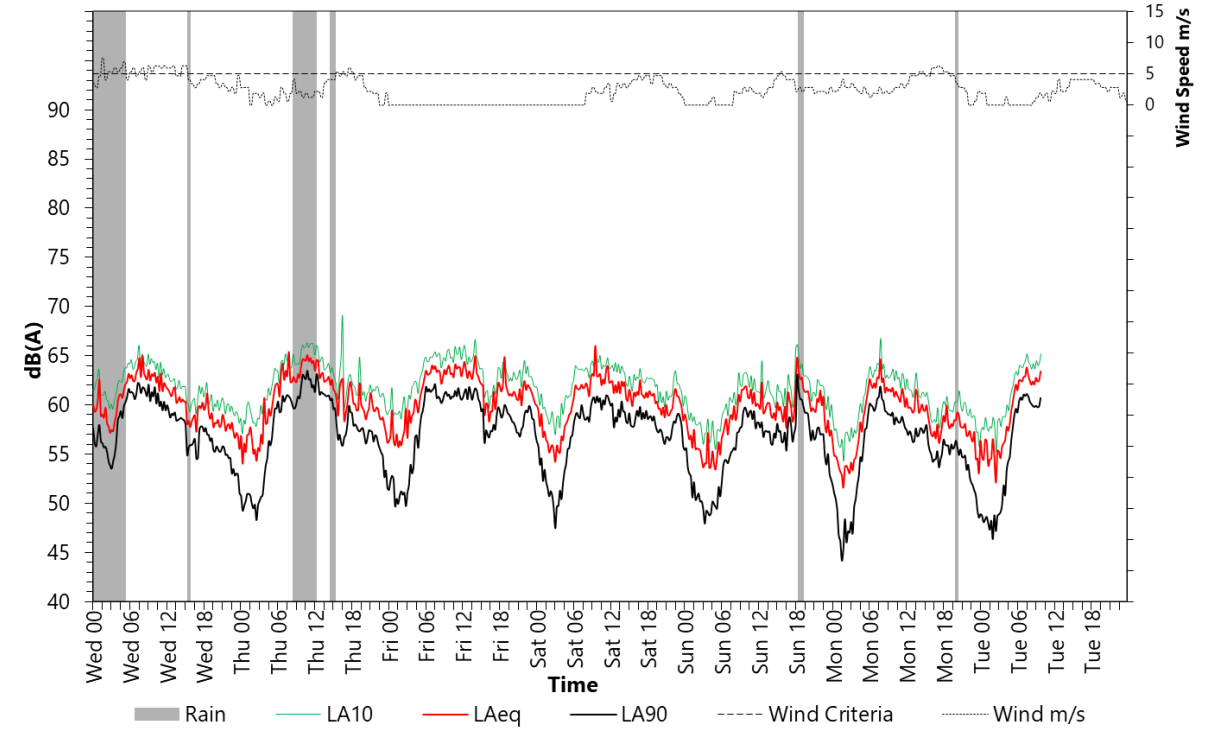
Appendix A **Noise Monitoring Data**





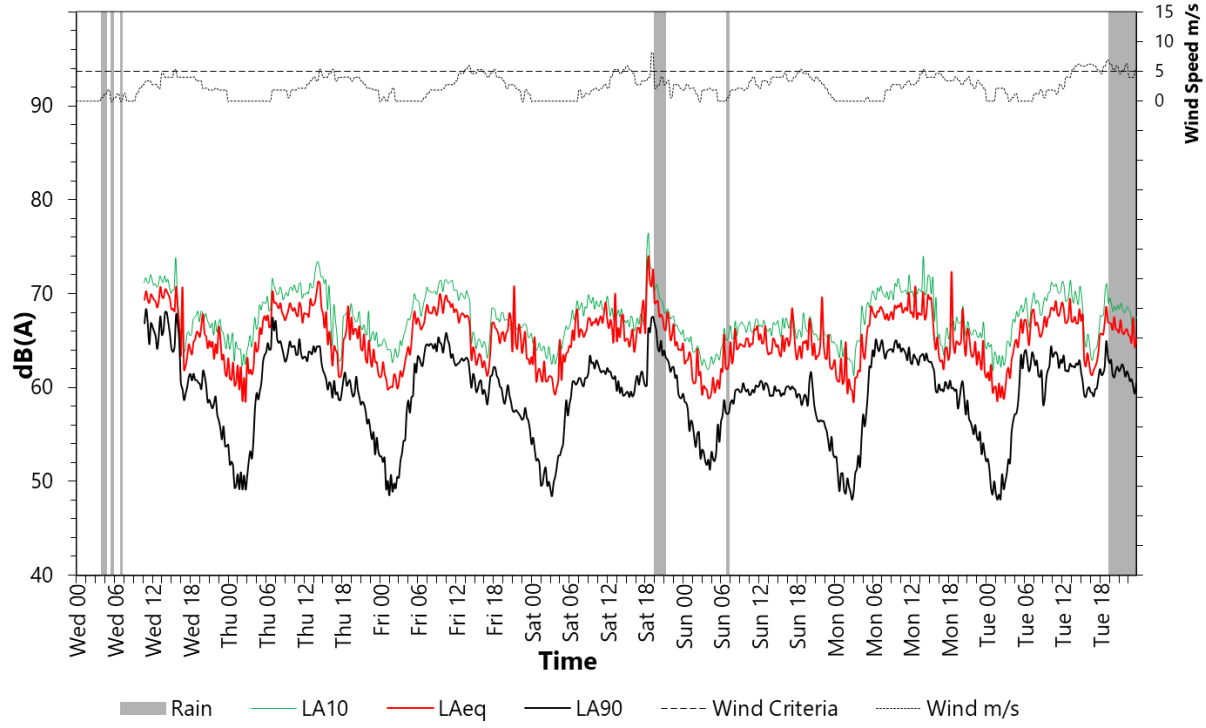
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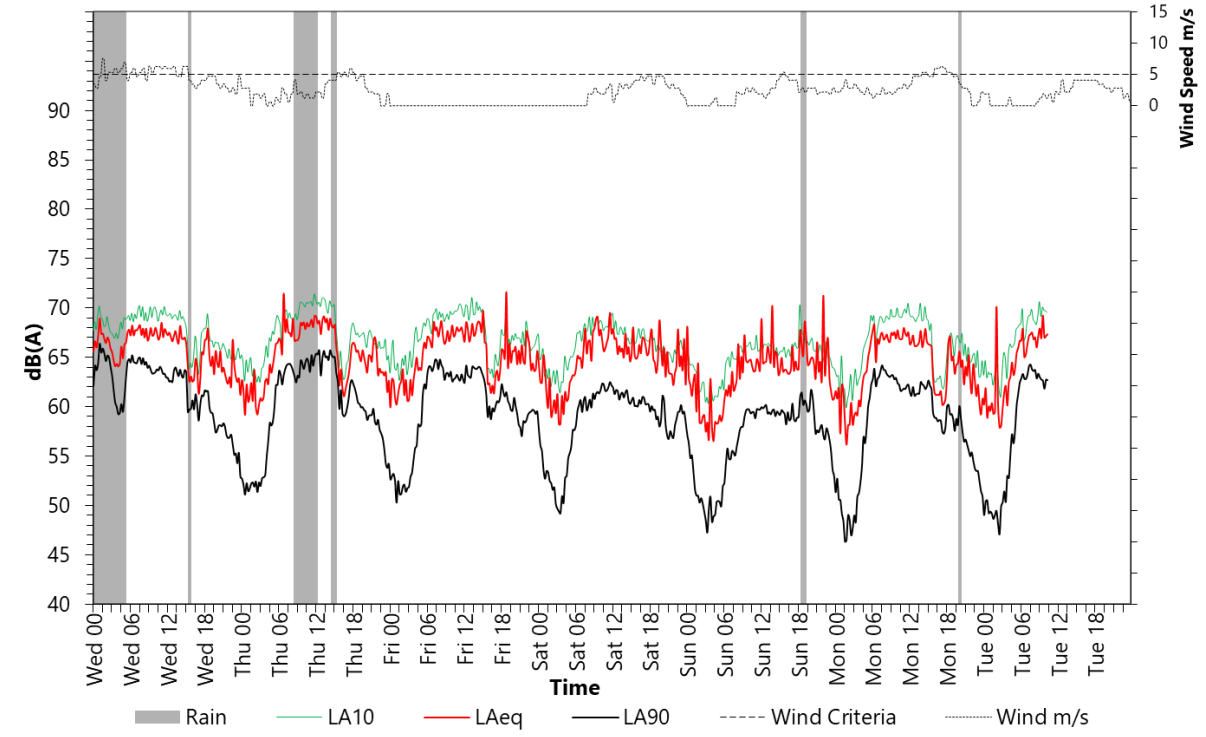
Crescent Parklands
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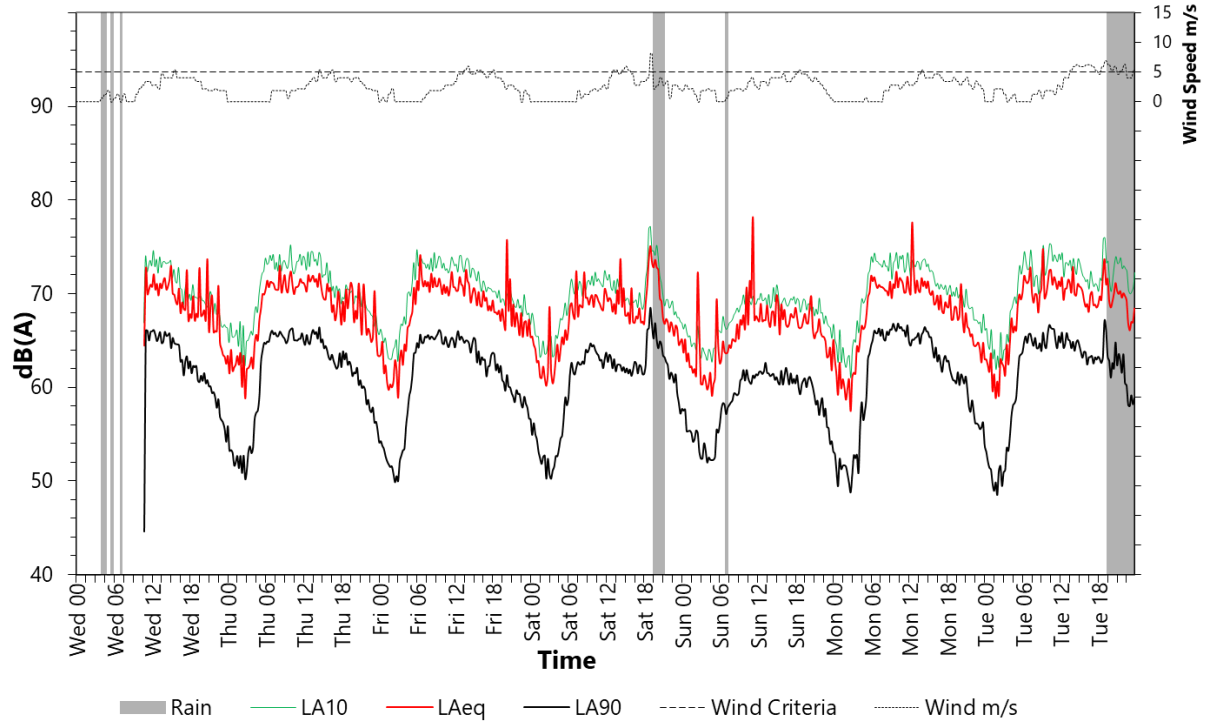
Crescent Parklands
LT3

Wednesday 22 February 2023
to
Tuesday 28 February 2023



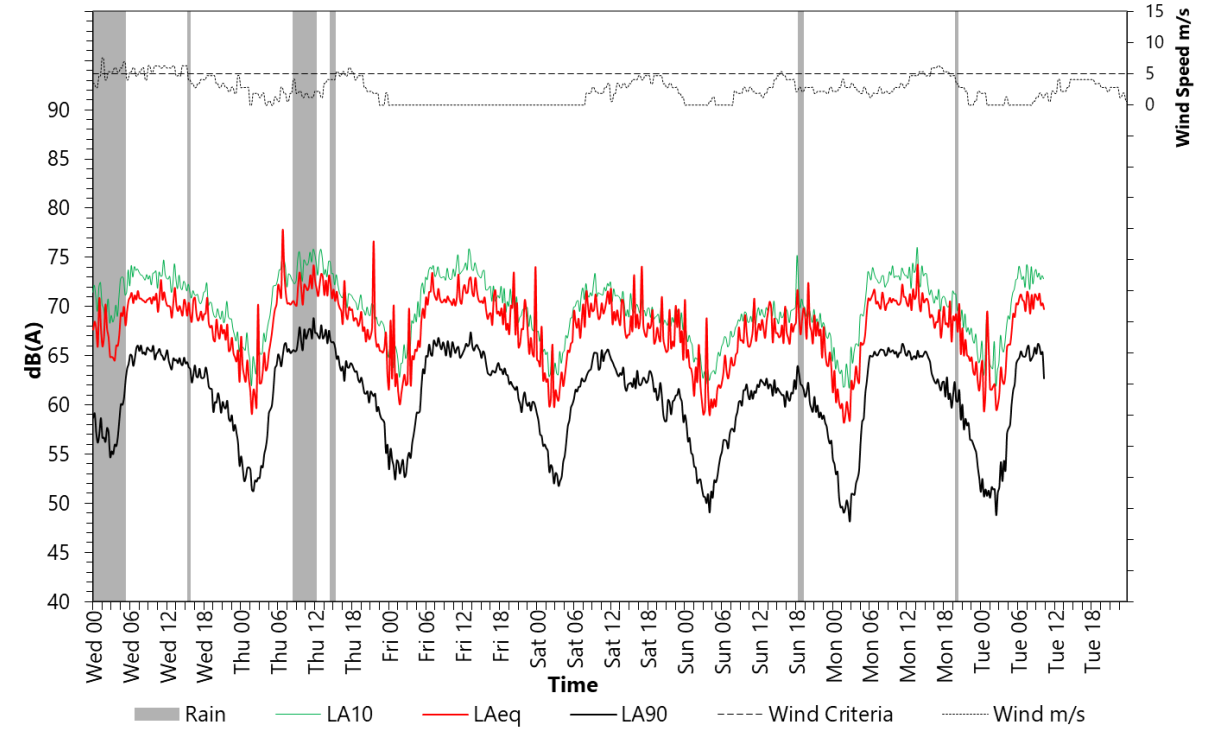
Crescent Parklands
LT4

Wednesday 15 February 2023
to
Tuesday 21 February 2023



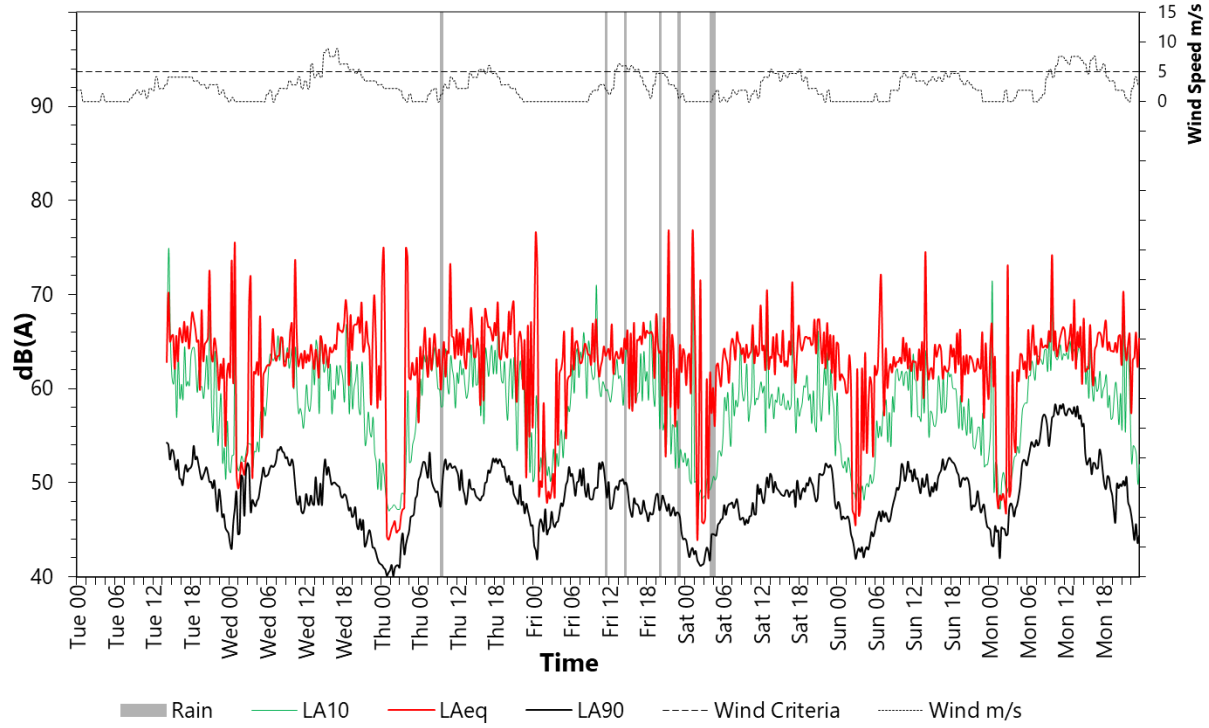
Crescent Parklands
LT4

Wednesday 22 February 2023
to
Tuesday 28 February 2023



Crescent Parklands
LT5

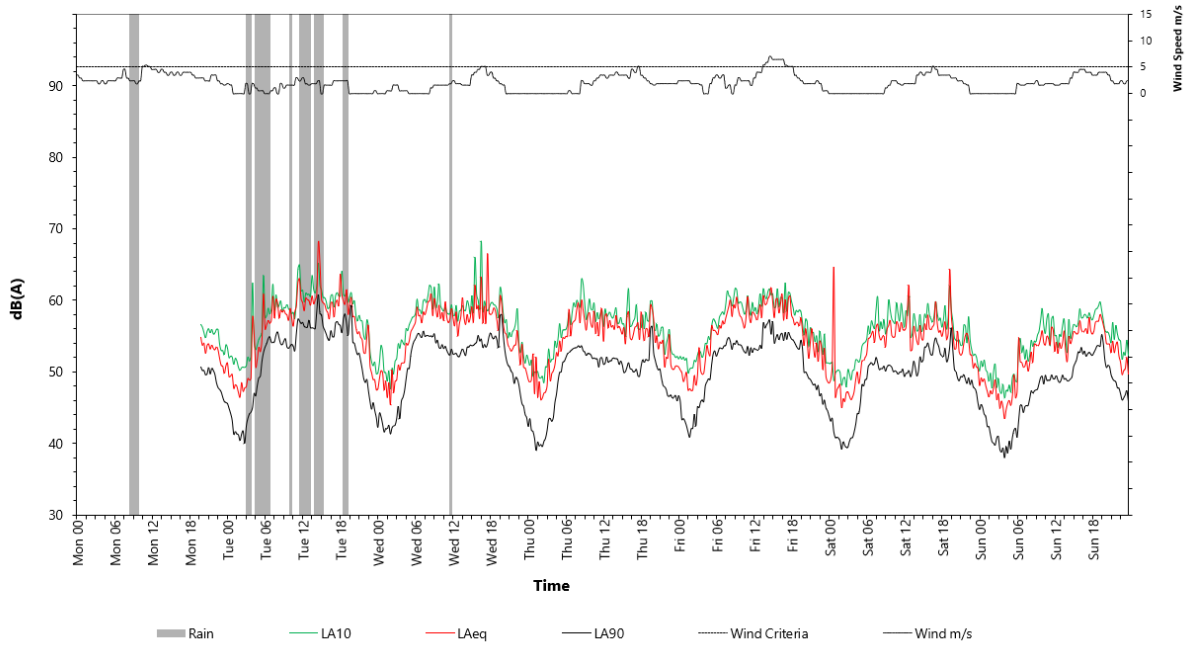
Tuesday 28 February 2023
to
Monday 06 March 2023



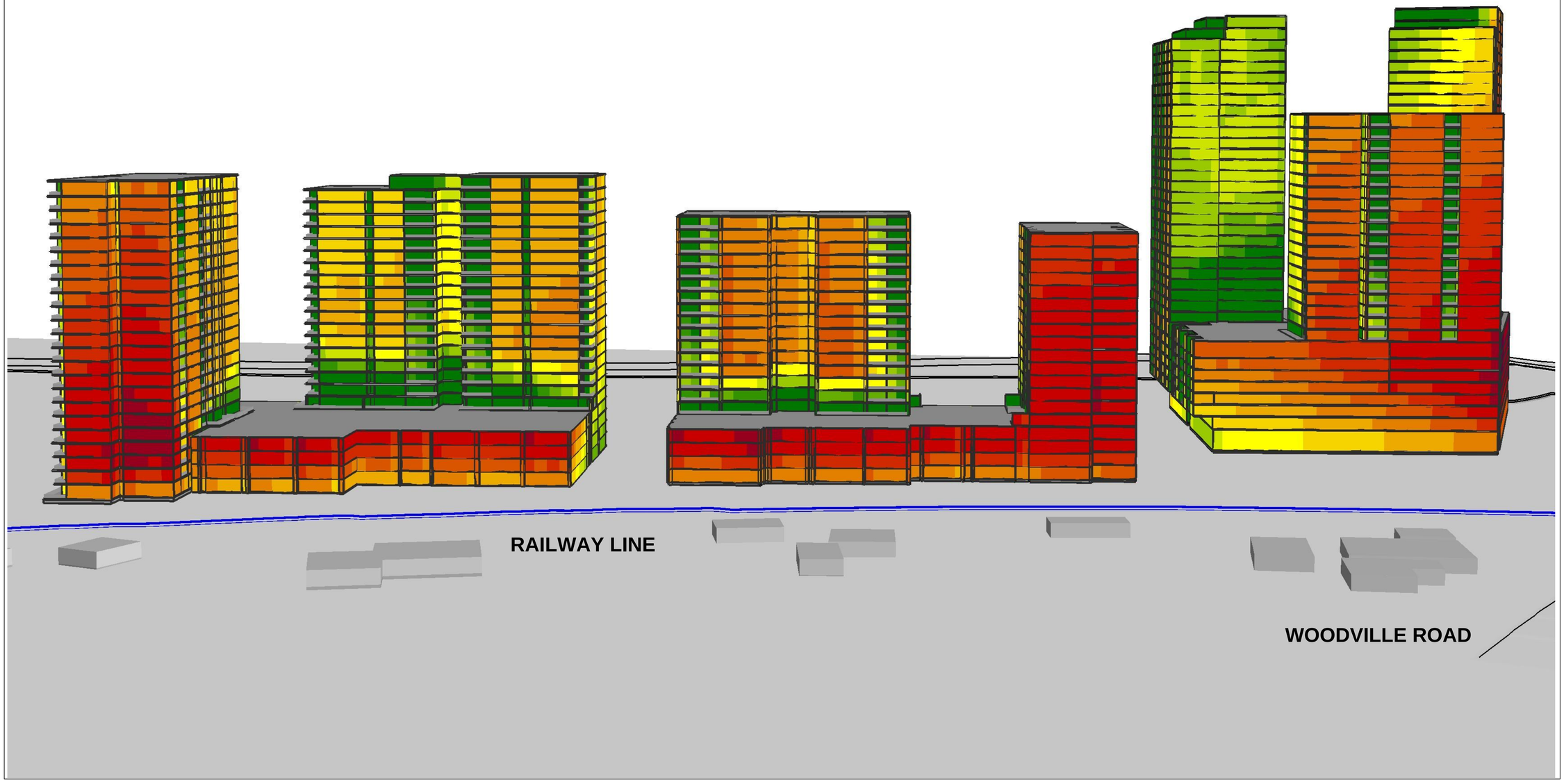
Crescent Parklands

LT6

Monday 13 March 2023
to
Sunday 19 March 2023



Appendix B **Incident Façade Noise Levels**



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	6/11/2024	For Information
2	14/11/2024	For Information
3	22/11/2024	For Information
4	30/09/2025	For Information

LEGEND

Daytime Facade Noise Levels ($L_{Aeq,15hour}$ dBA)

- ≤ 55
- 55 - 56
- 56 - 57
- 57 - 58
- 58 - 59
- 59 - 60
- 60 - 61
- 61 - 62
- 62 - 63
- 63 - 64
- 64 - 65
- 65 - 66
- 66 - 67
- 67 - 68
- 68 - 69
- ≥ 69

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD

SCALE
NTS

STATUS
FOR INFORMATION

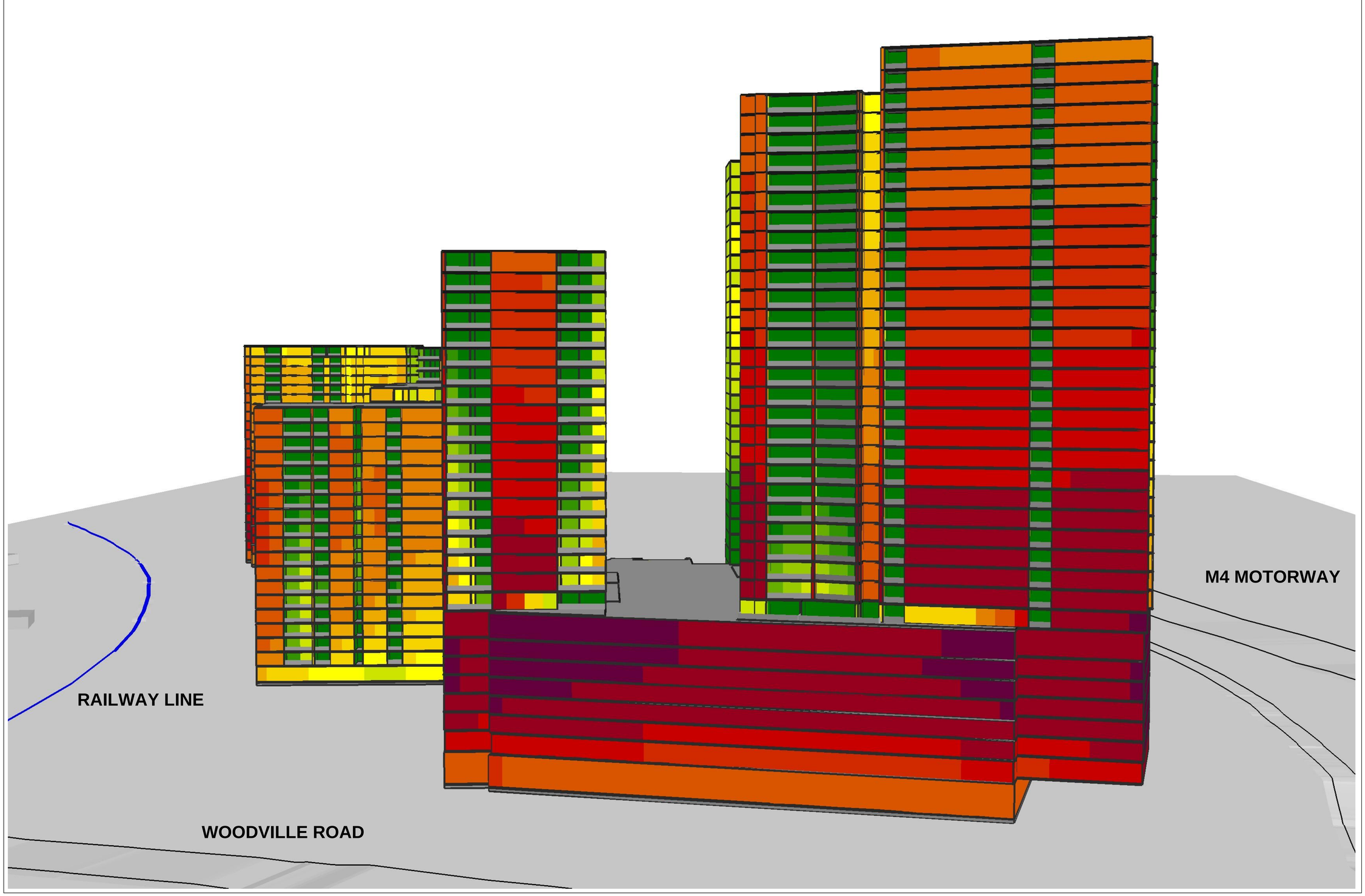
DRAWING
DAYTIME FACADE NOISE LEVELS

VIEW 1

DISCIPLINE
ACOUSTICS

DRAWING NUMBER
AC-DWG-600-01-01

REVISION
004



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	6/11/2024	For Information
2	14/11/2024	For Information
3	22/11/2024	For Information
4	30/09/2025	For Information

LEGEND

Daytime Facade Noise Levels ($L_{Aeq,15hour}$ dBA)

- ≤ 55
- 55 - 56
- 56 - 57
- 57 - 58
- 58 - 59
- 59 - 60
- 60 - 61
- 61 - 62
- 62 - 63
- 63 - 64
- 64 - 65
- 65 - 66
- 66 - 67
- 67 - 68
- 68 - 69
- ≥ 69

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD

SCALE
NTS

STATUS
FOR INFORMATION

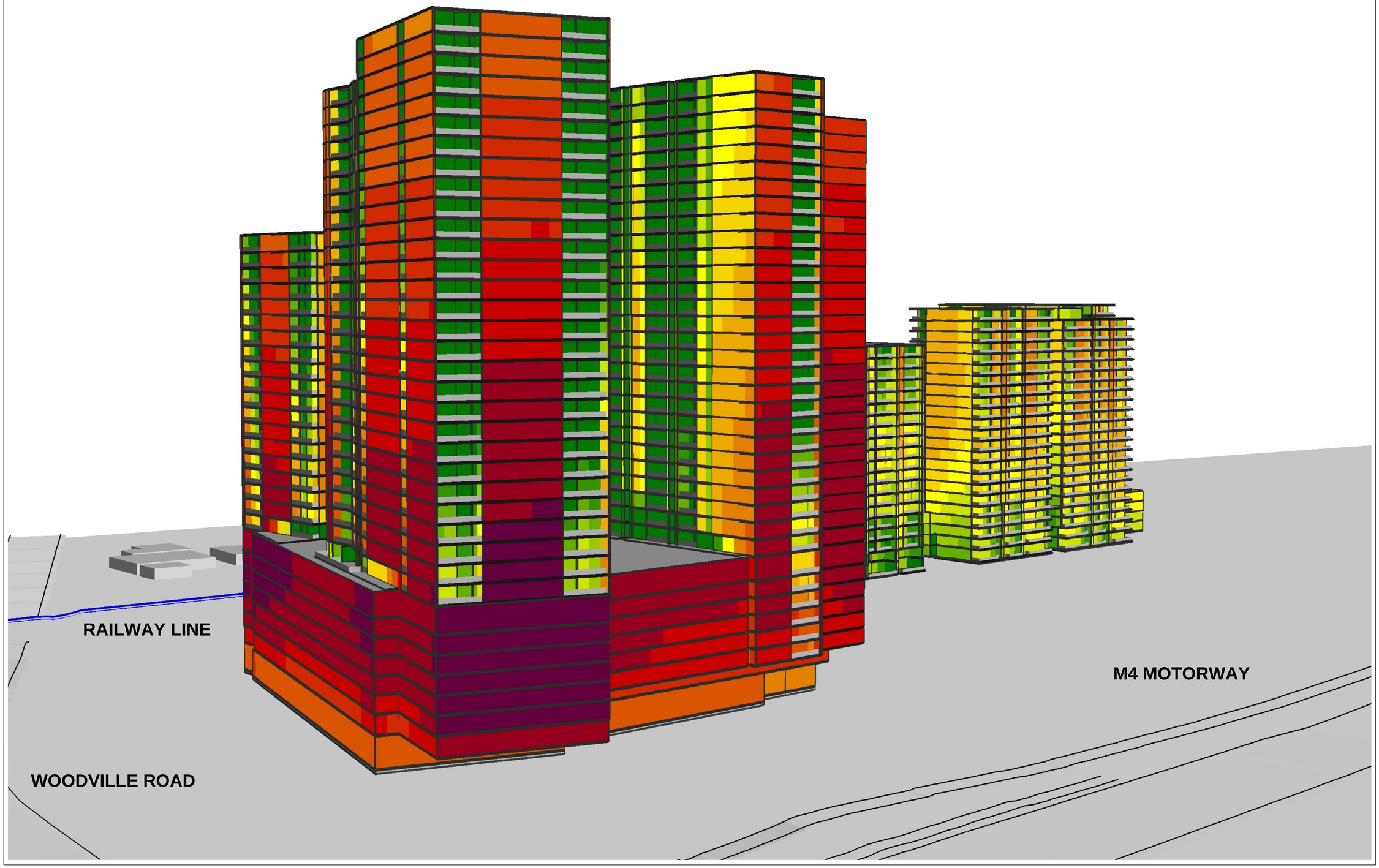
DRAWING
DAYTIME FACADE NOISE LEVELS

VIEW 2

DISCIPLINE
ACOUSTICS

DRAWING NUMBER
AC-DWG-600-01-02

REVISION
004



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	6/11/2024	For Information
2	14/11/2024	For Information
3	22/11/2024	For Information
4	30/09/2025	For Information

LEGEND

Daytime Facade Noise Levels ($L_{Aeq,15hour}$ dBA)

- ≤ 55
- 55 - 56
- 56 - 57
- 57 - 58
- 58 - 59
- 59 - 60
- 60 - 61
- 61 - 62
- 62 - 63
- 63 - 64
- 64 - 65
- 65 - 66
- 66 - 67
- 67 - 68
- 68 - 69
- ≥ 69

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD

SCALE
NTS

STATUS
FOR INFORMATION

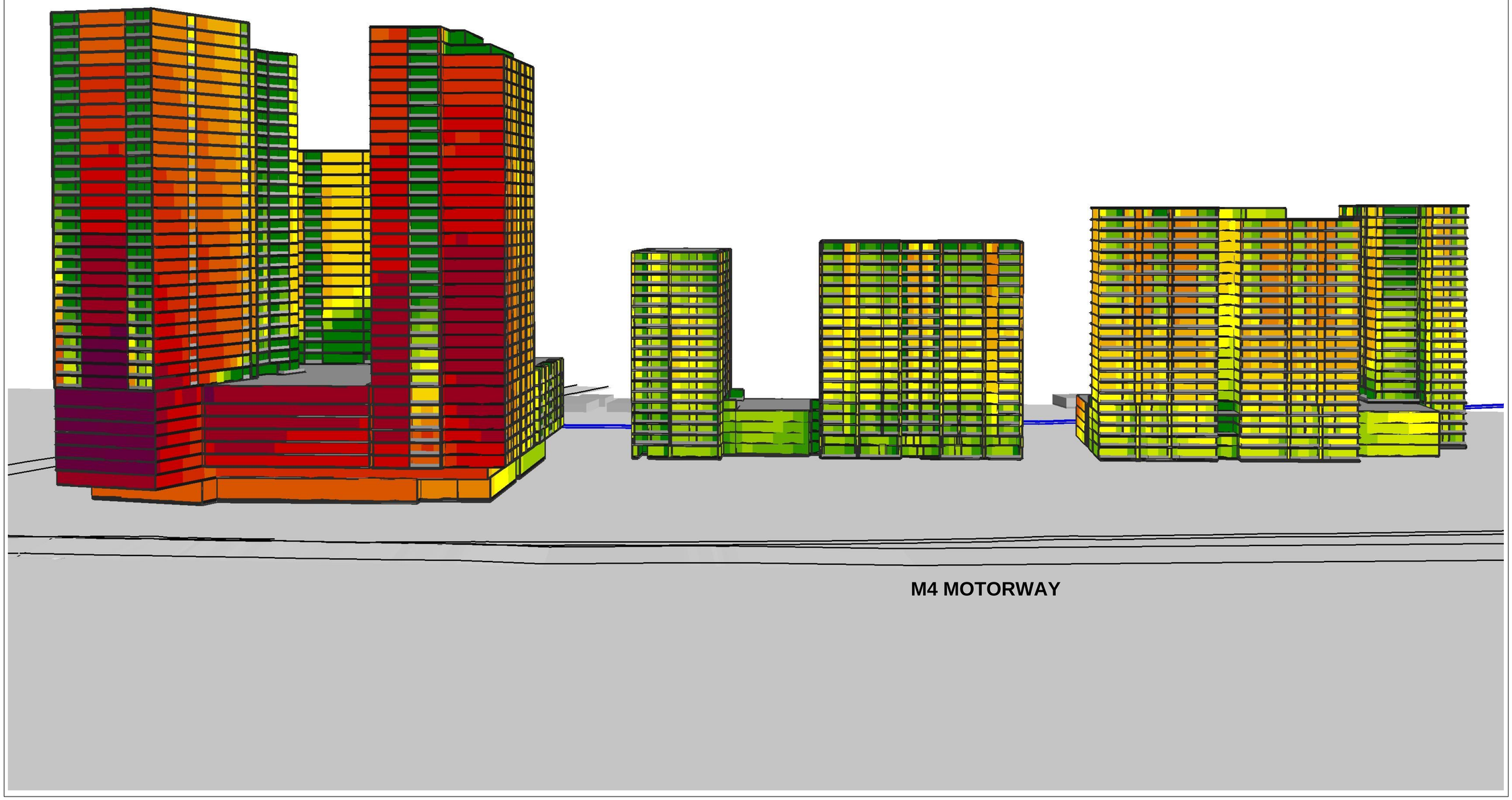
DRAWING
DAYTIME FACADE NOISE LEVELS

VIEW 3

DISCIPLINE
ACOUSTICS

DRAWING NUMBER
AC-DWG-600-01-03

REVISION
004



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	6/11/2024	For Information
2	14/11/2024	For Information
3	22/11/2024	For Information
4	30/09/2025	For Information

LEGEND

Daytime Facade Noise Levels ($L_{Aeq,15hour}$ dBA)

- ≤ 55
- 55 - 56
- 56 - 57
- 57 - 58
- 58 - 59
- 59 - 60
- 60 - 61
- 61 - 62
- 62 - 63
- 63 - 64
- 64 - 65
- 65 - 66
- 66 - 67
- 67 - 68
- 68 - 69
- ≥ 69

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD

SCALE
NTS

STATUS
FOR INFORMATION

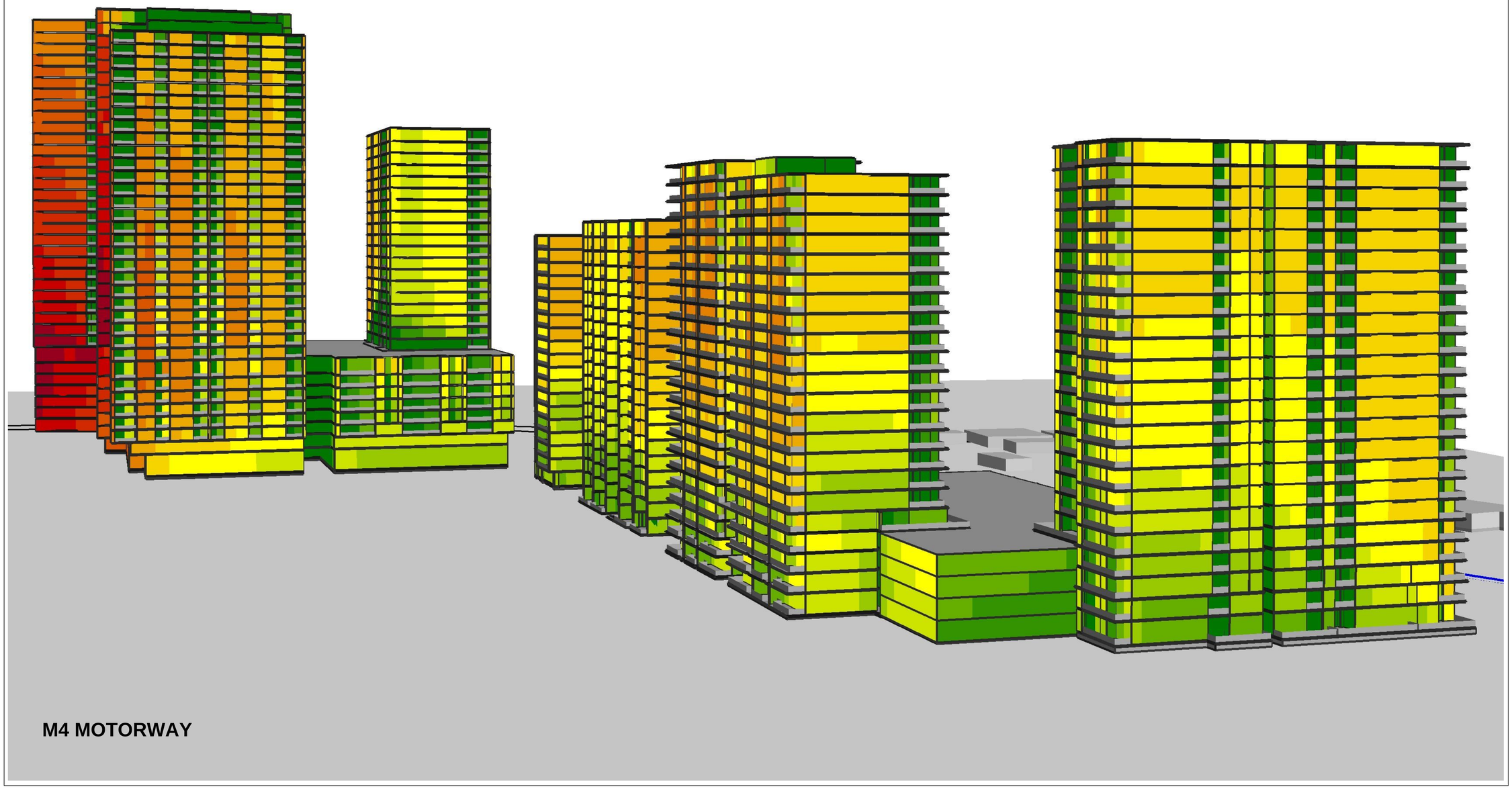
DRAWING
DAYTIME FACADE NOISE LEVELS

VIEW 4

DISCIPLINE
ACOUSTICS

DRAWING NUMBER
AC-DWG-600-01-04

REVISION
004



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	6/11/2024	For Information
2	14/11/2024	For Information
3	22/11/2024	For Information
4	30/09/2025	For Information

LEGEND

Daytime Facade Noise Levels ($L_{Aeq,15hour}$ dBA)

- ≤ 55
- 55 - 56
- 56 - 57
- 57 - 58
- 58 - 59
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- 61 - 62
- 62 - 63
- 63 - 64
- 64 - 65
- 65 - 66
- 66 - 67
- 67 - 68
- 68 - 69
- ≥ 69

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD

SCALE
NTS

STATUS
FOR INFORMATION

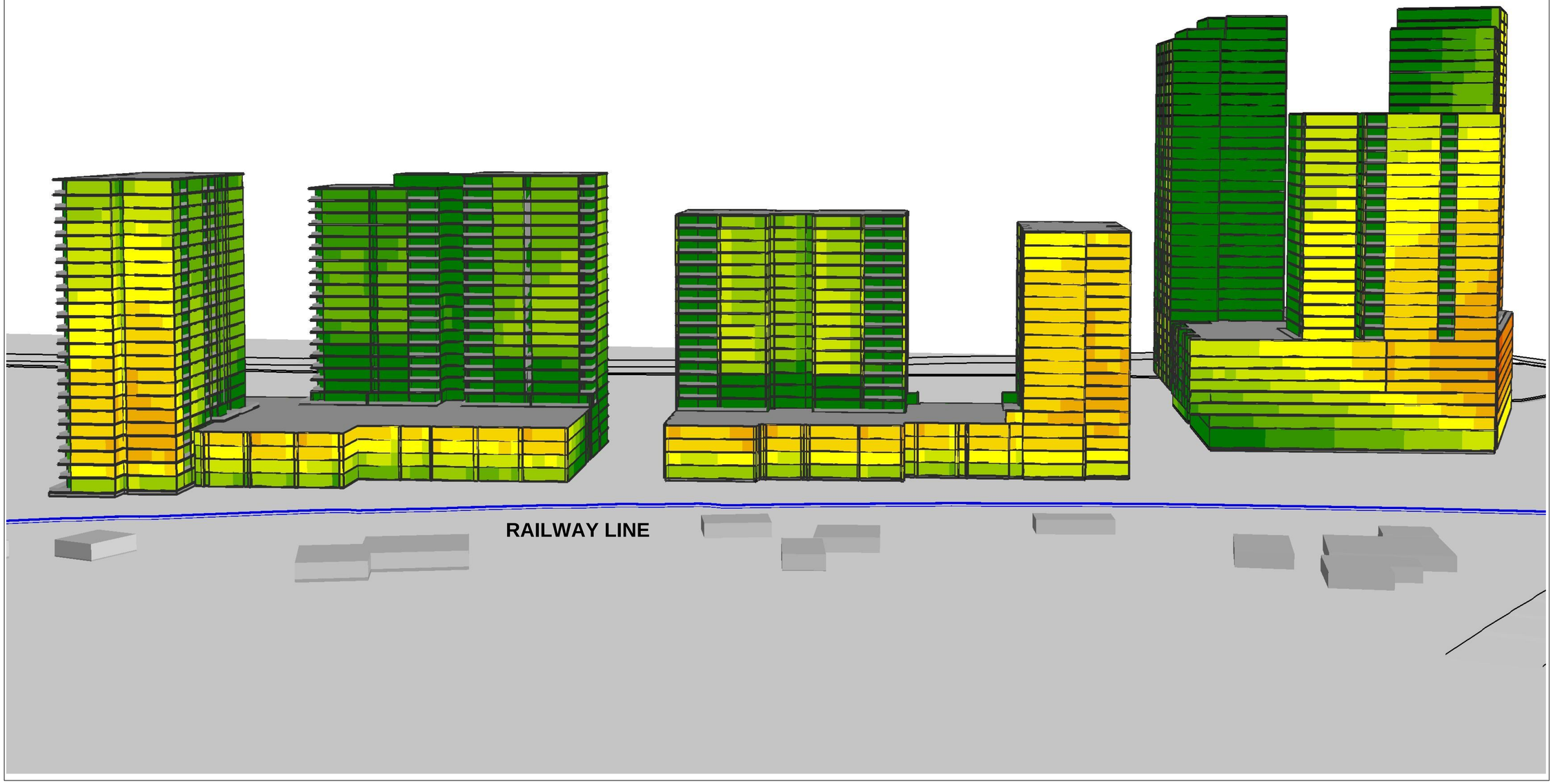
DRAWING
DAYTIME FACADE NOISE LEVELS

VIEW 5

DISCIPLINE
ACOUSTICS

DRAWING NUMBER
AC-DWG-600-01-05

REVISION
004



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	6/11/2024	For Information
2	14/11/2024	For Information
3	22/11/2024	For Information
4	30/09/2025	For Information

LEGEND

Nighttime Facade Noise Levels ($L_{Aeq,9hour}$, dBA)

- ≤ 55
- 55 - 56
- 56 - 57
- 57 - 58
- 58 - 59
- 59 - 60
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- 61 - 62
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- 64 - 65
- 65 - 66
- 66 - 67
- 67 - 68
- 68 - 69
- ≥ 69

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD

SCALE
NTS

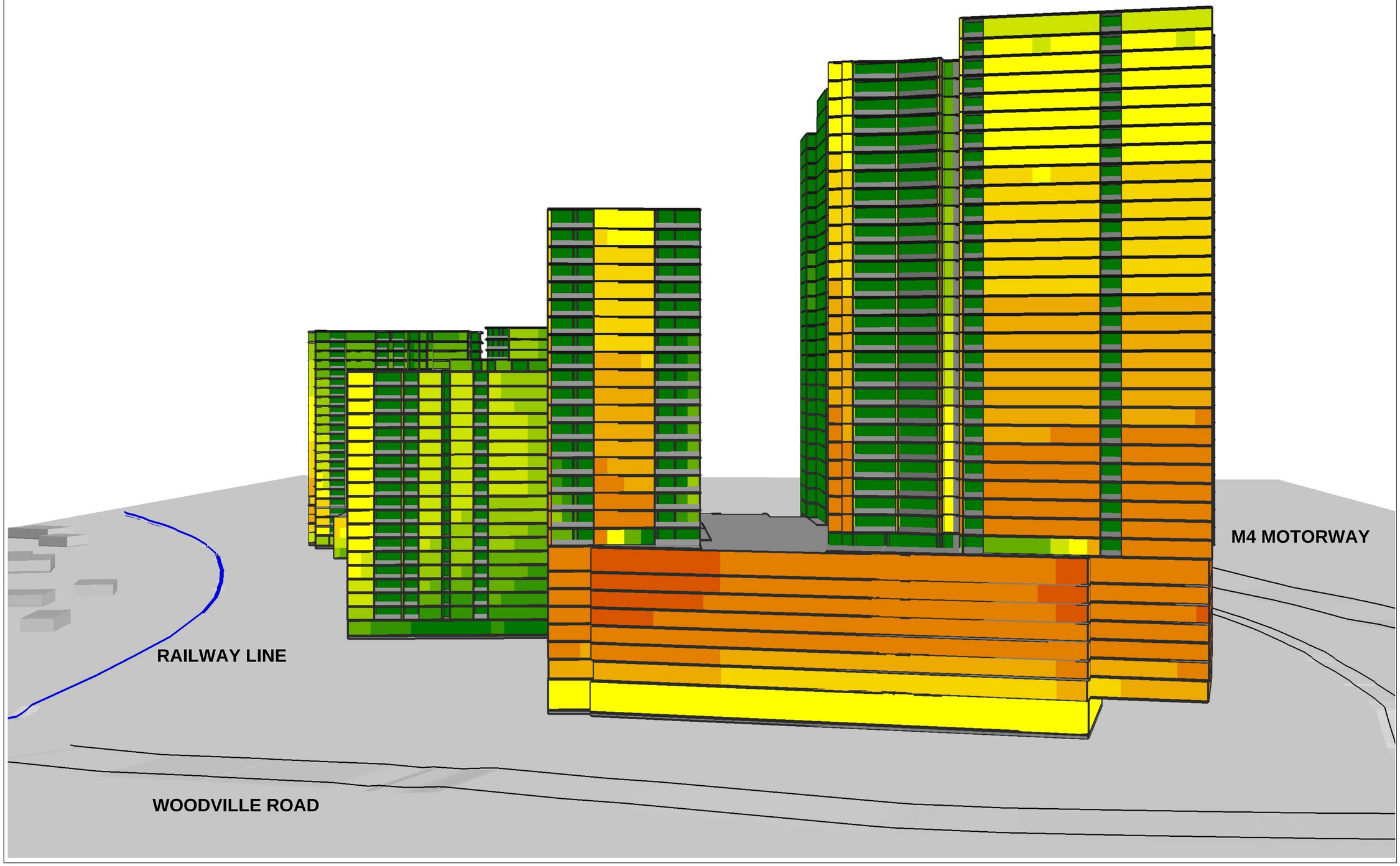
STATUS
FOR INFORMATION

DRAWING
NIGHTTIME FACADE NOISE LEVELS

VIEW 1

DISCIPLINE
ACOUSTICS

DRAWING NUMBER	REVISION
AC-DWG-600-02-01	004



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	6/11/2024	For Information
2	14/11/2024	For Information
3	22/11/2024	For Information
4	30/09/2025	For Information

LEGEND

Nighttime Facade Noise Levels ($L_{Aeq,9hour}$ dBA)

- ≤ 55
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- 58 - 59
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- 64 - 65
- 65 - 66
- 66 - 67
- 67 - 68
- 68 - 69
- ≥ 69

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD

SCALE
NTS

STATUS
FOR INFORMATION

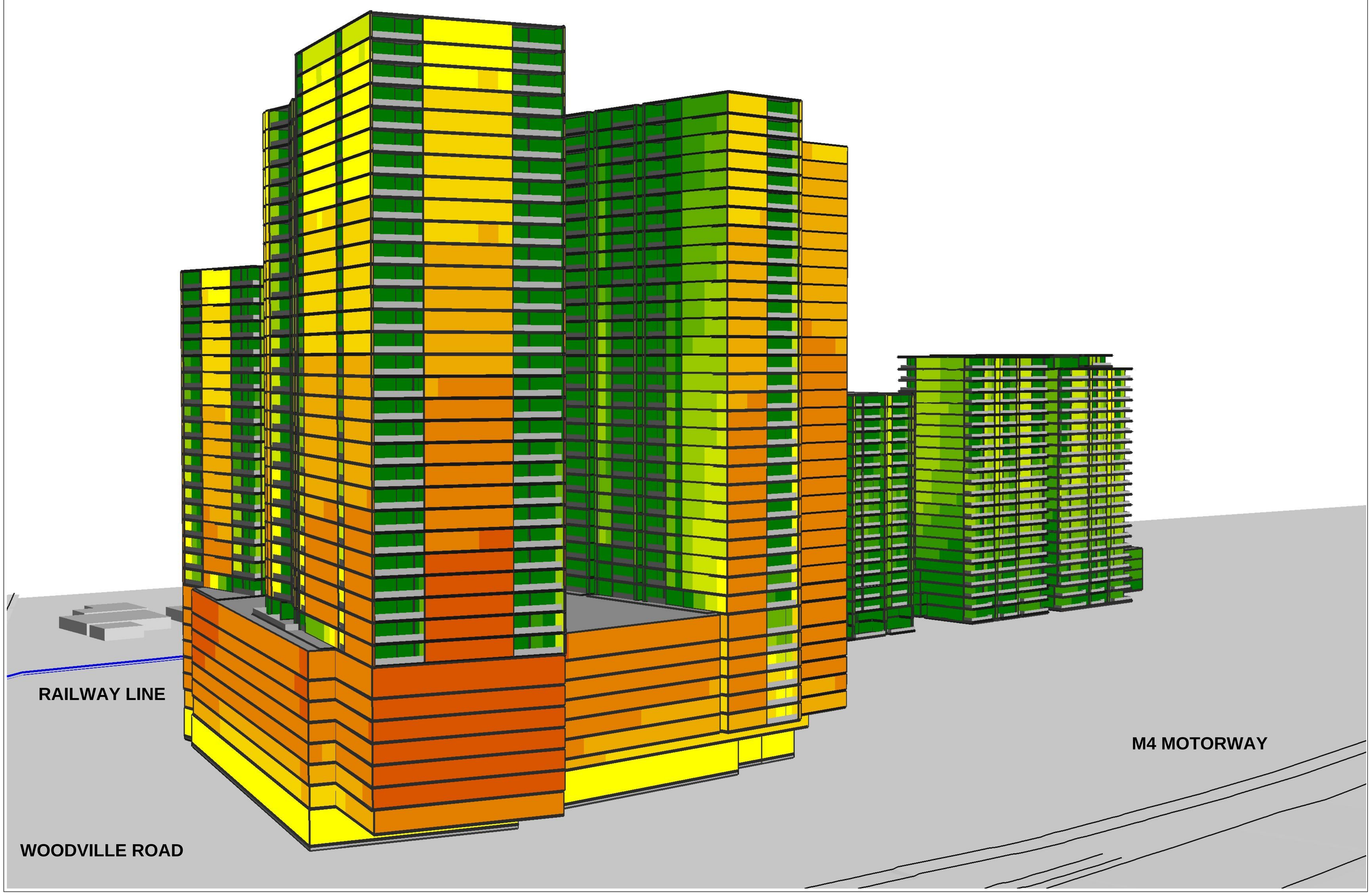
DRAWING
NIGHTTIME FACADE NOISE LEVELS

VIEW 2

DISCIPLINE
ACOUSTICS

DRAWING NUMBER
AC-DWG-600-02-02

REVISION
004



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	6/11/2024	For Information
2	14/11/2024	For Information
3	22/11/2024	For Information
4	30/09/2025	For Information

LEGEND

Nighttime Facade Noise Levels ($L_{Aeq,9hour}$ dBA)

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- 64 - 65
- 65 - 66
- 66 - 67
- 67 - 68
- 68 - 69
- ≥ 69

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD

SCALE
NTS

STATUS
FOR INFORMATION

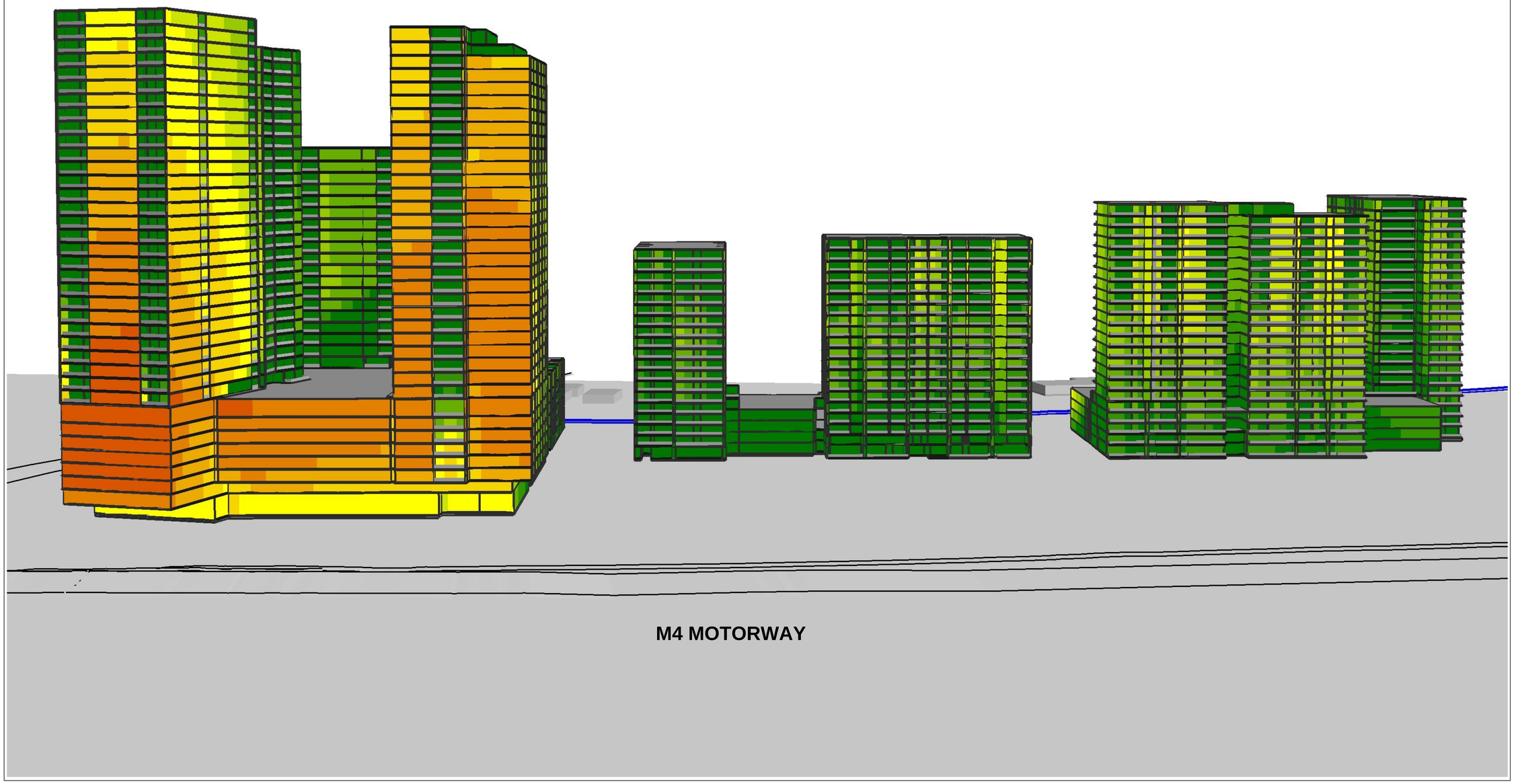
DRAWING
NIGHTTIME FACADE NOISE LEVELS

VIEW 3

DISCIPLINE
ACOUSTICS

DRAWING NUMBER
AC-DWG-600-02-03

REVISION
004



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	6/11/2024	For Information
2	14/11/2024	For Information
3	22/11/2024	For Information
4	30/09/2025	For Information

LEGEND

Nighttime Facade Noise Levels ($L_{Aeq,9hour}$, dBA)

- ≤ 55
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- 58 - 59
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- 64 - 65
- 65 - 66
- 66 - 67
- 67 - 68
- 68 - 69
- ≥ 69

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD

SCALE
NTS

STATUS
FOR INFORMATION

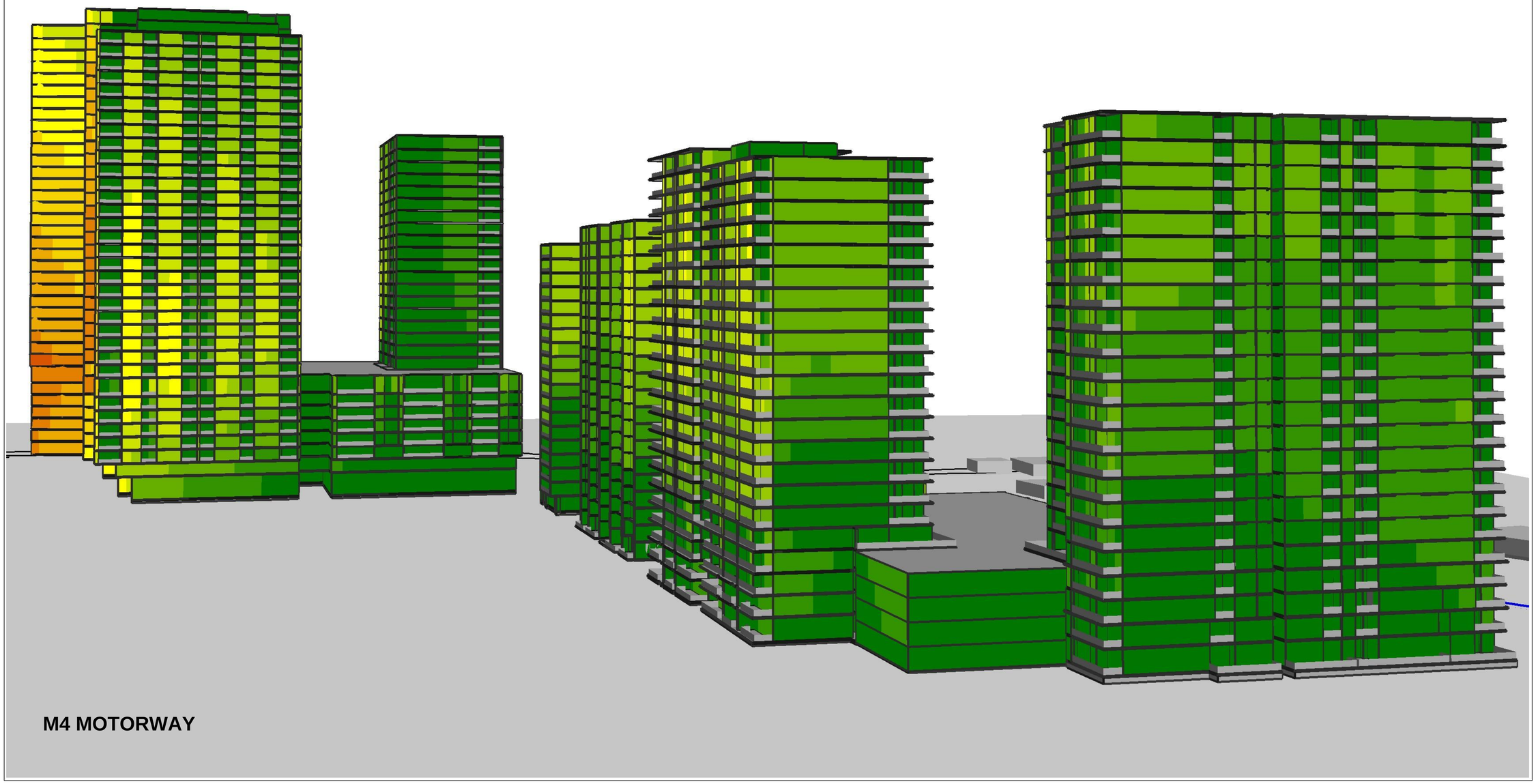
DRAWING
NIGHTTIME FACADE NOISE LEVELS

VIEW 4

DISCIPLINE
ACOUSTICS

DRAWING NUMBER
AC-DWG-600-02-04

REVISION
004



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	6/11/2024	For Information
2	14/11/2024	For Information
3	22/11/2024	For Information
4	30/09/2025	For Information

LEGEND

Nighttime Facade Noise Levels ($L_{Aeq,9hour}$ dBA)

- ≤ 55
- 55 - 56
- 56 - 57
- 57 - 58
- 58 - 59
- 59 - 60
- 60 - 61
- 61 - 62
- 62 - 63
- 63 - 64
- 64 - 65
- 65 - 66
- 66 - 67
- 67 - 68
- 68 - 69
- ≥ 69

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD

SCALE
NTS

STATUS
FOR INFORMATION

DRAWING
NIGHTTIME FACADE NOISE LEVELS

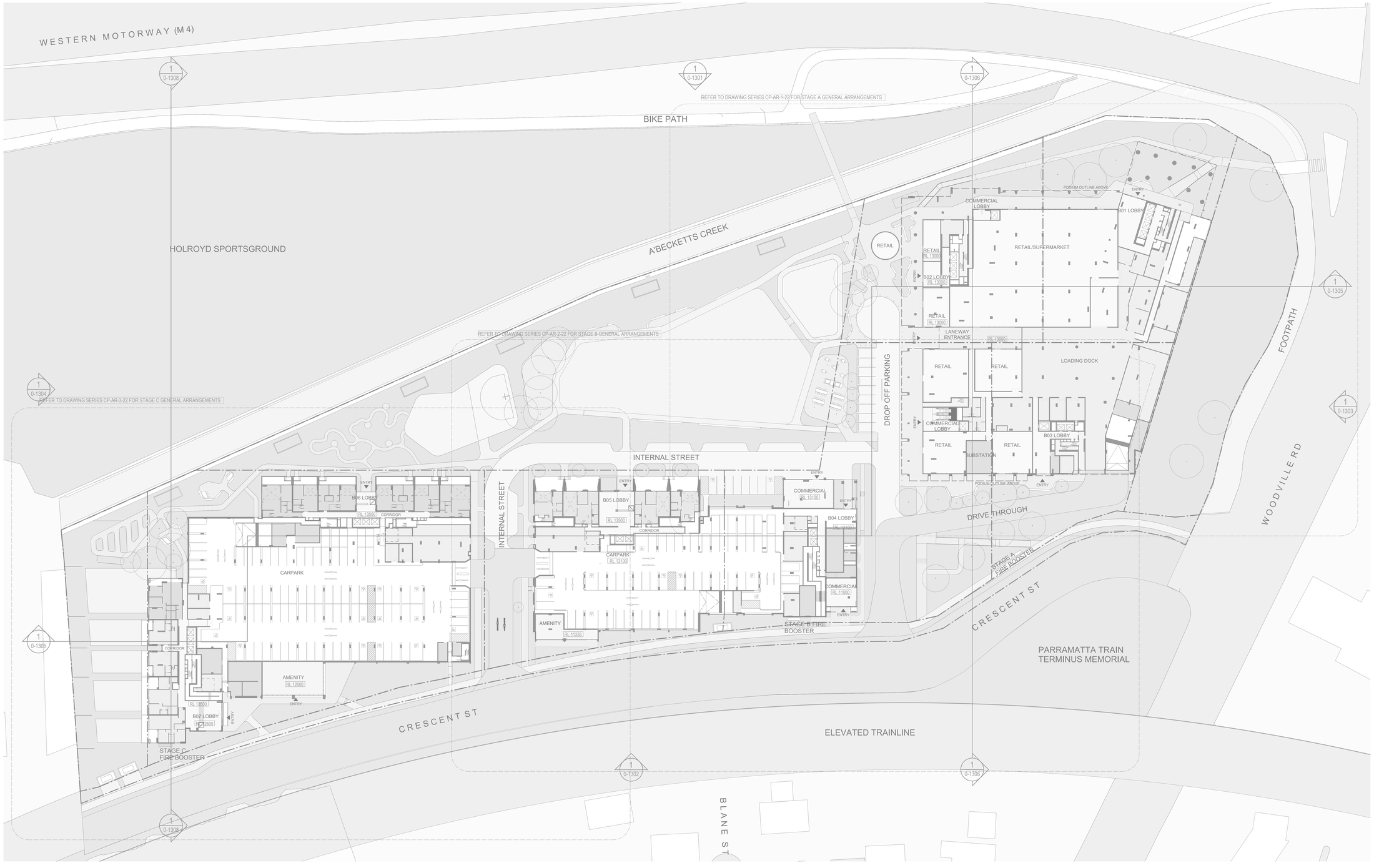
VIEW 5

DISCIPLINE
ACOUSTICS

DRAWING NUMBER
AC-DWG-600-02-05

REVISION
004

Appendix C **Alternative Means of Ventilation Areas**



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	30/09/2025	For Information

LEGEND

Alternative Means of Ventilation Required

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

STATUS
FOR INFORMATION

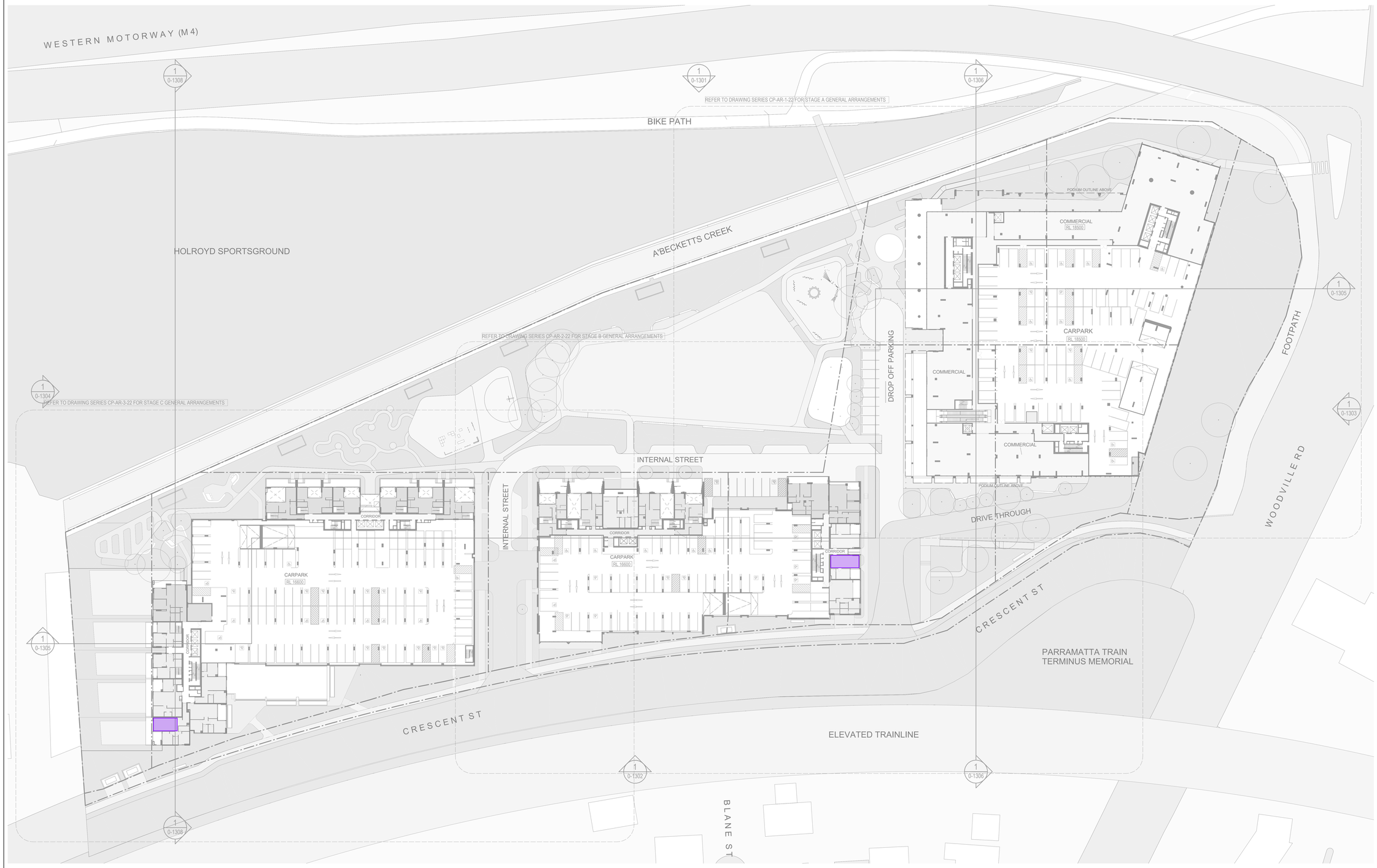
DRAWING
DAYTIME ALTERNATIVE MEANS OF VENTILATION

GROUND FLOOR

DISCIPLINE
ACOUSTICS

DRAWING NUMBER
AC-DWG-900-01-01

REVISION
001



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	30/09/2025	For Information

LEGEND

Alternative Means of Ventilation Required

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

STATUS
FOR INFORMATION

DRAWING
DAYTIME ALTERNATIVE MEANS OF VENTILATION

LEVEL 1

DISCIPLINE
ACOUSTICS

DRAWING NUMBER
AC-DWG-900-01-02

REVISION
001



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	30/09/2025	For Information

LEGEND

Alternative Means of Ventilation Required

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

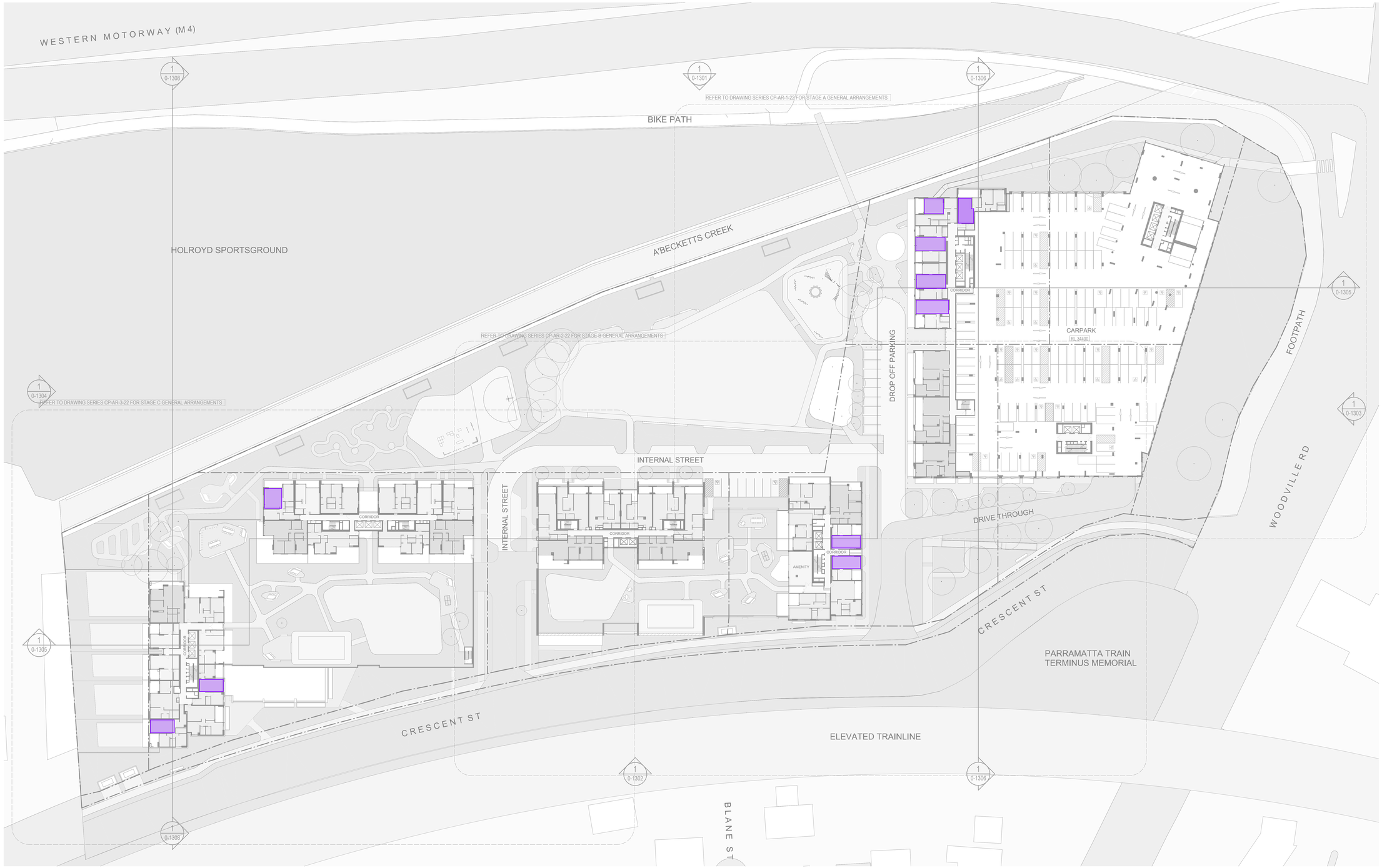
STATUS
FOR INFORMATION

DRAWING
DAYTIME ALTERNATIVE MEANS OF VENTILATION

LEVEL 2 - 3

DISCIPLINE
ACOUSTICS

DRAWING NUMBER	REVISION
AC-DWG-900-01-03	001



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	30/09/2025	For Information

LEGEND

Alternative Means of Ventilation Required

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

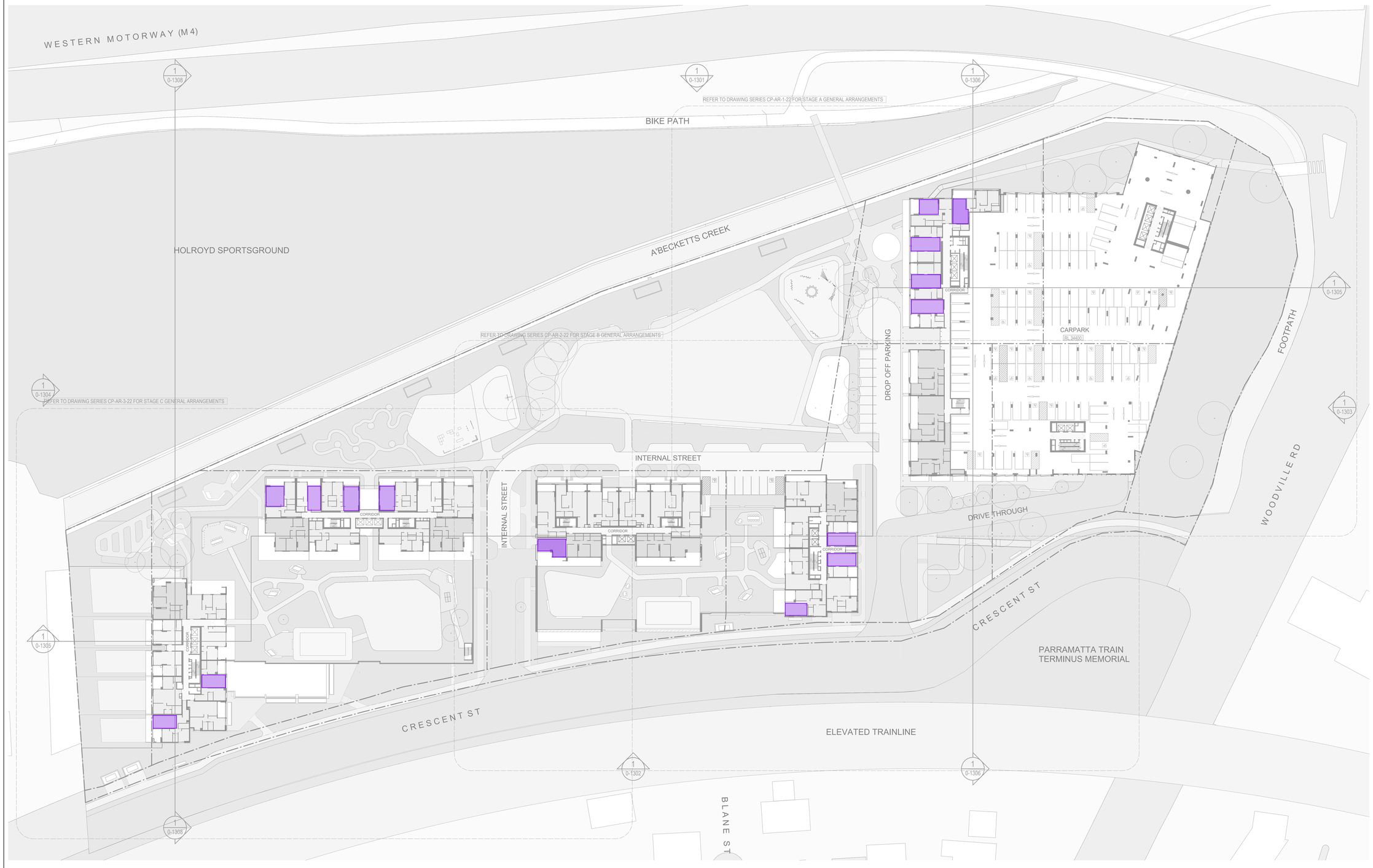
STATUS
FOR INFORMATION

DRAWING
DAYTIME ALTERNATIVE MEANS OF VENTILATION

LEVEL 4

DISCIPLINE
ACOUSTICS

DRAWING NUMBER	REVISION
AC-DWG-900-01-04	001



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	30/09/2025	For Information

LEGEND

Alternative Means of Ventilation Required

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

STATUS
FOR INFORMATION

DRAWING
DAYTIME ALTERNATIVE MEANS OF VENTILATION

LEVEL 5

DISCIPLINE
ACOUSTICS

DRAWING NUMBER	REVISION
AC-DWG-900-01-05	001



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	30/09/2025	For Information

LEGEND

Alternative Means of Ventilation Required

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

STATUS
FOR INFORMATION

DRAWING
DAYTIME ALTERNATIVE MEANS OF VENTILATION

LEVEL 6

DISCIPLINE
ACOUSTICS

DRAWING NUMBER	REVISION
AC-DWG-900-01-06	001



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	30/09/2025	For Information

LEGEND

Alternative Means of Ventilation Required

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

STATUS
FOR INFORMATION

DRAWING
DAYTIME ALTERNATIVE MEANS OF VENTILATION

LEVEL 7

DISCIPLINE
ACOUSTICS

DRAWING NUMBER
AC-DWG-900-01-07

REVISION
001



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	30/09/2025	For Information

LEGEND

Alternative Means of Ventilation Required

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

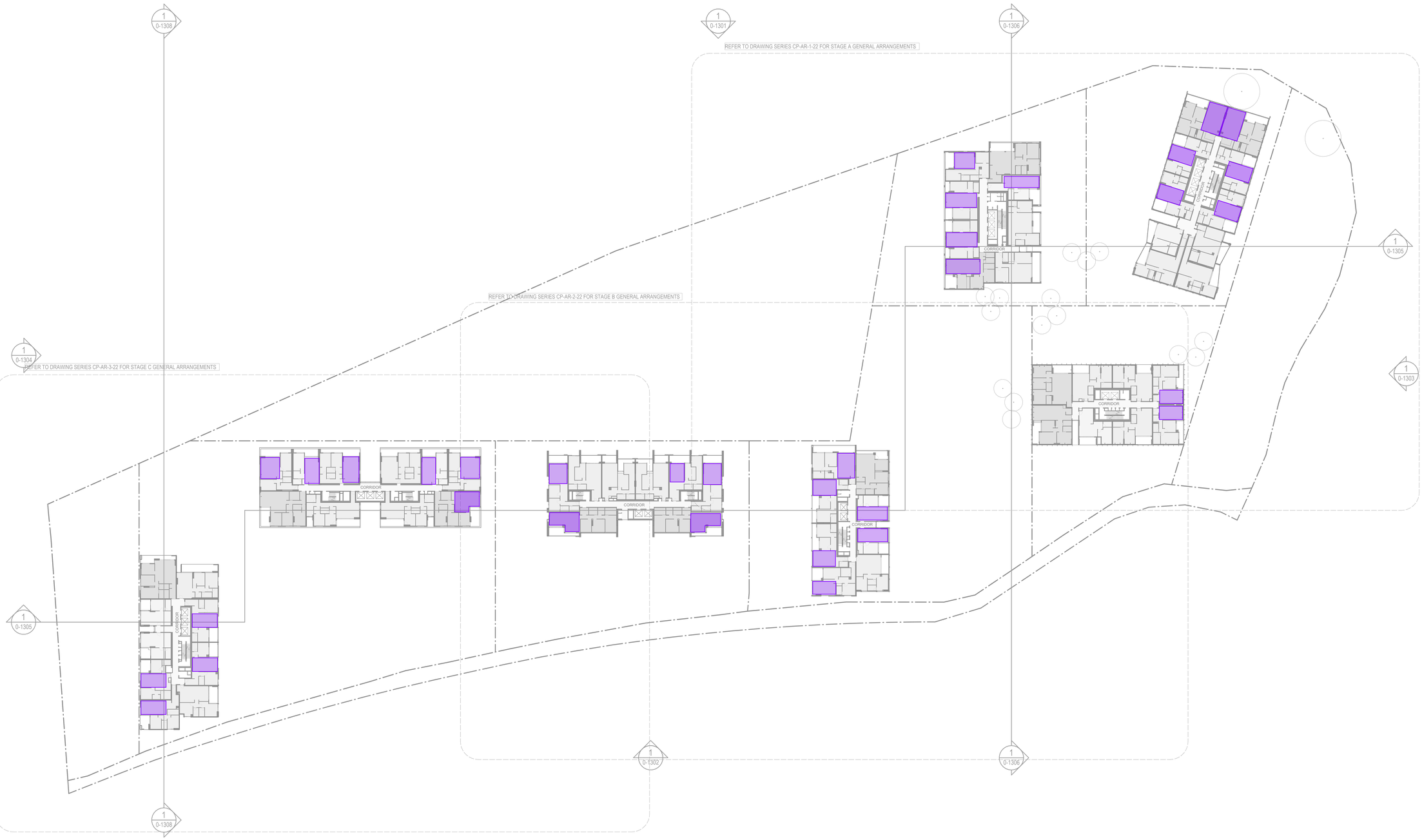
STATUS
FOR INFORMATION

DRAWING
DAYTIME ALTERNATIVE MEANS OF VENTILATION

LEVEL 8

DISCIPLINE
ACOUSTICS

DRAWING NUMBER	REVISION
AC-DWG-900-01-08	001



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	30/09/2025	For Information

LEGEND

Alternative Means of Ventilation Required

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

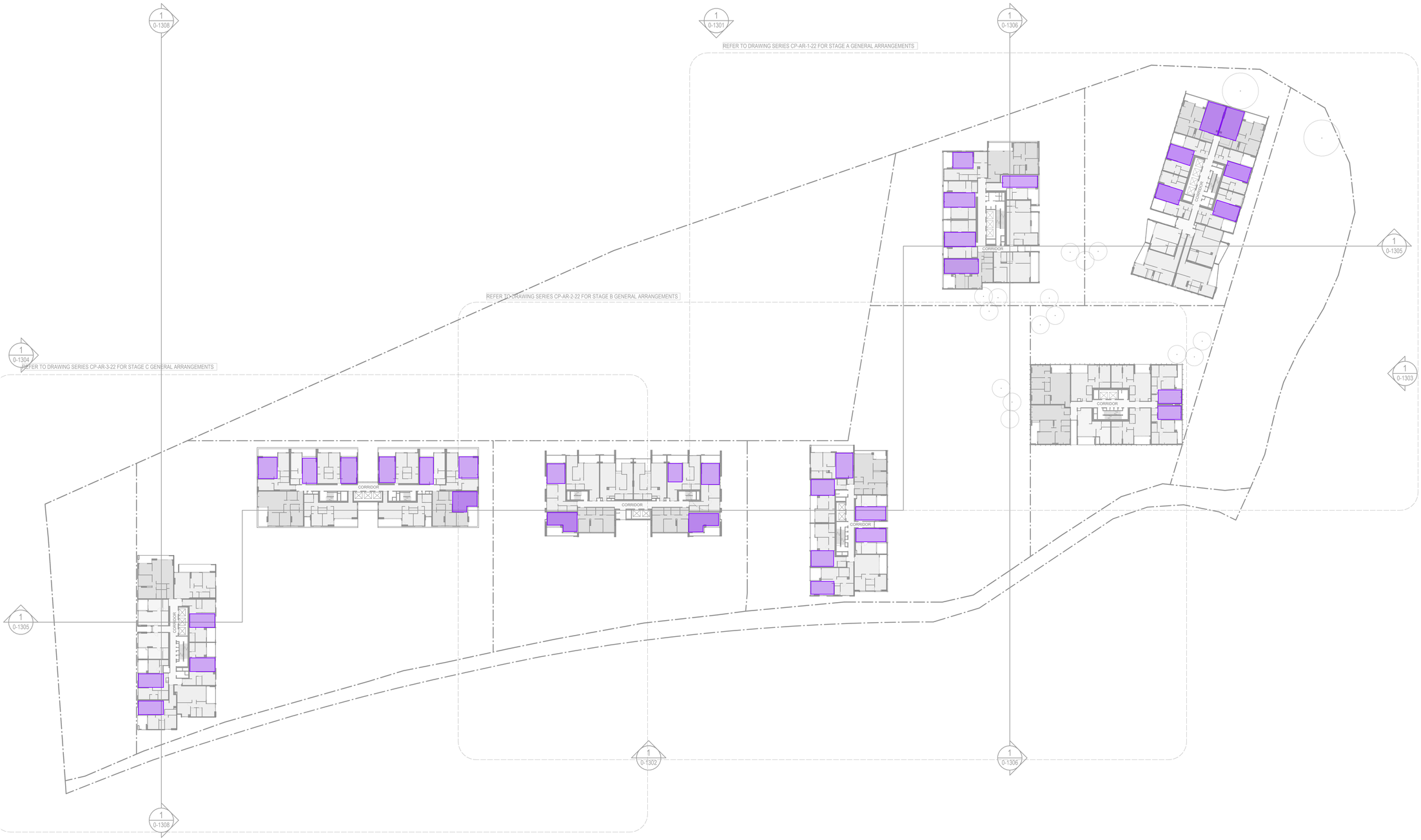
STATUS
FOR INFORMATION

DRAWING
DAYTIME ALTERNATIVE MEANS OF VENTILATION

LEVEL 9-10

DISCIPLINE
ACOUSTICS

DRAWING NUMBER	REVISION
AC-DWG-900-01-09	001



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	30/09/2025	For Information

LEGEND

Alternative Means of Ventilation Required

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

STATUS
FOR INFORMATION

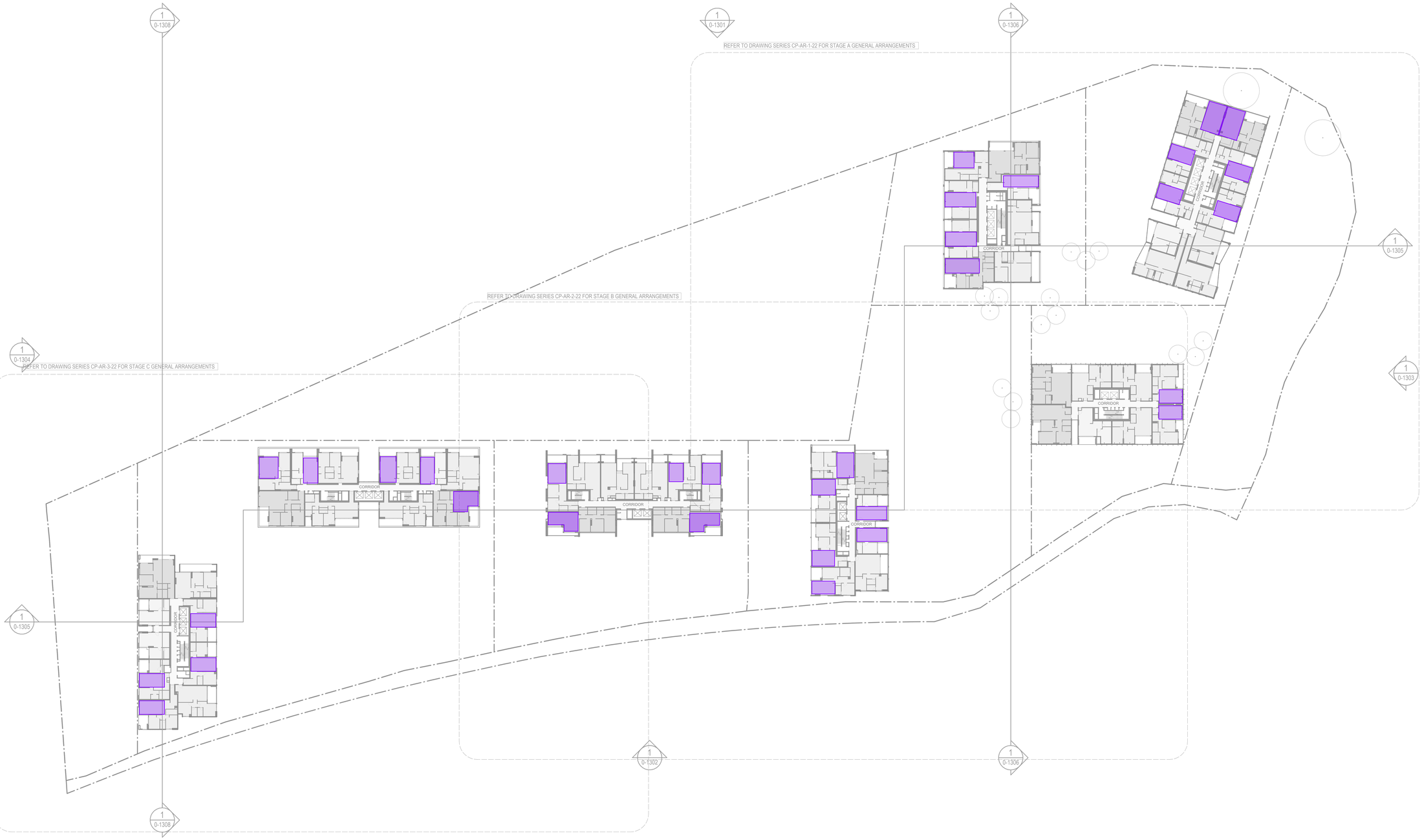
DRAWING
DAYTIME ALTERNATIVE MEANS OF VENTILATION

LEVEL 11

DISCIPLINE
ACOUSTICS

DRAWING NUMBER
AC-DWG-900-01-10

REVISION
001



E-LAB CONSULTING

ISSUE	DATE	STATUS
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Alternative Means of Ventilation Required

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

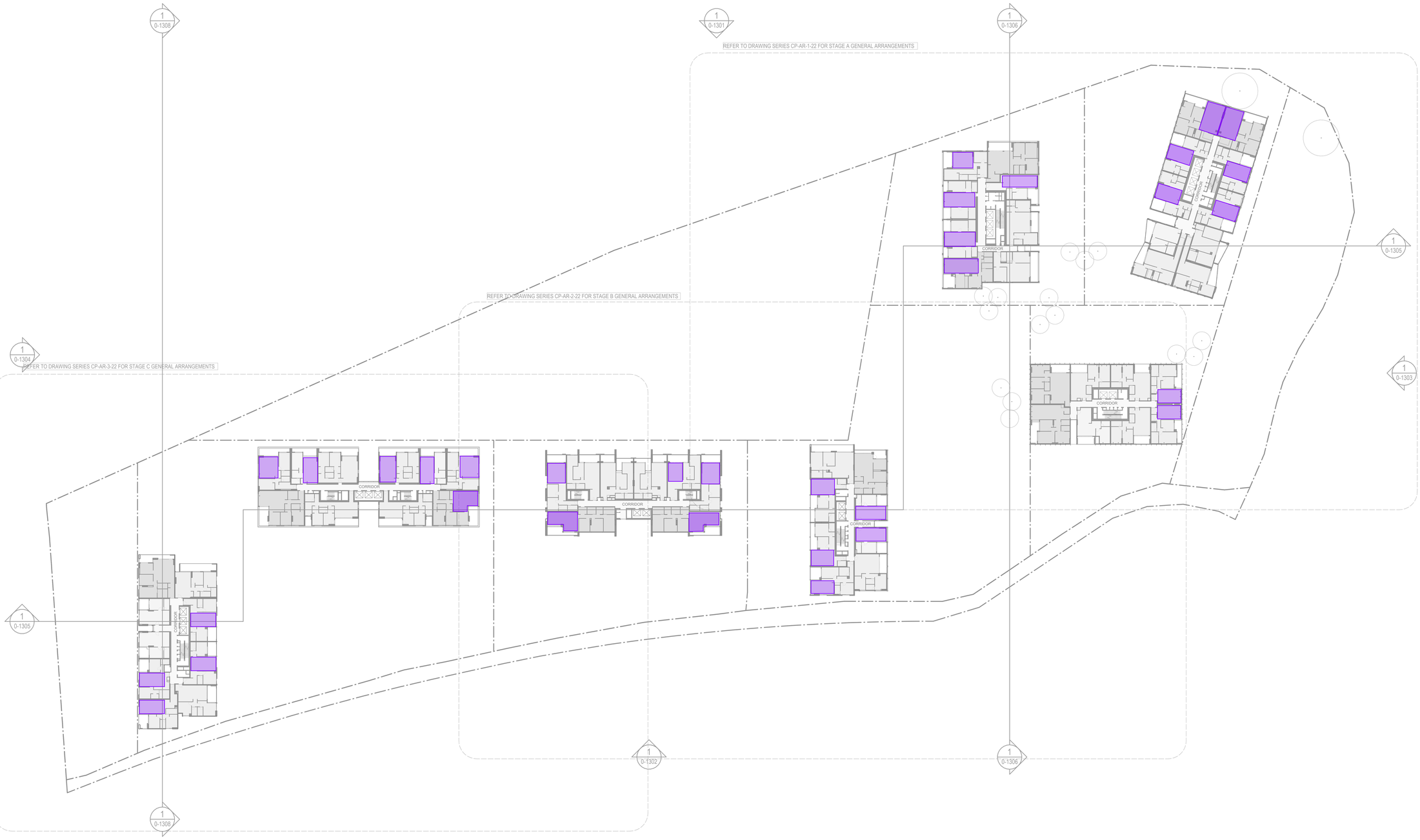
STATUS
FOR INFORMATION

DRAWING
DAYTIME ALTERNATIVE MEANS OF VENTILATION

LEVEL 12

DISCIPLINE
ACOUSTICS

DRAWING NUMBER	REVISION
AC-DWG-900-01-11	001



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NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

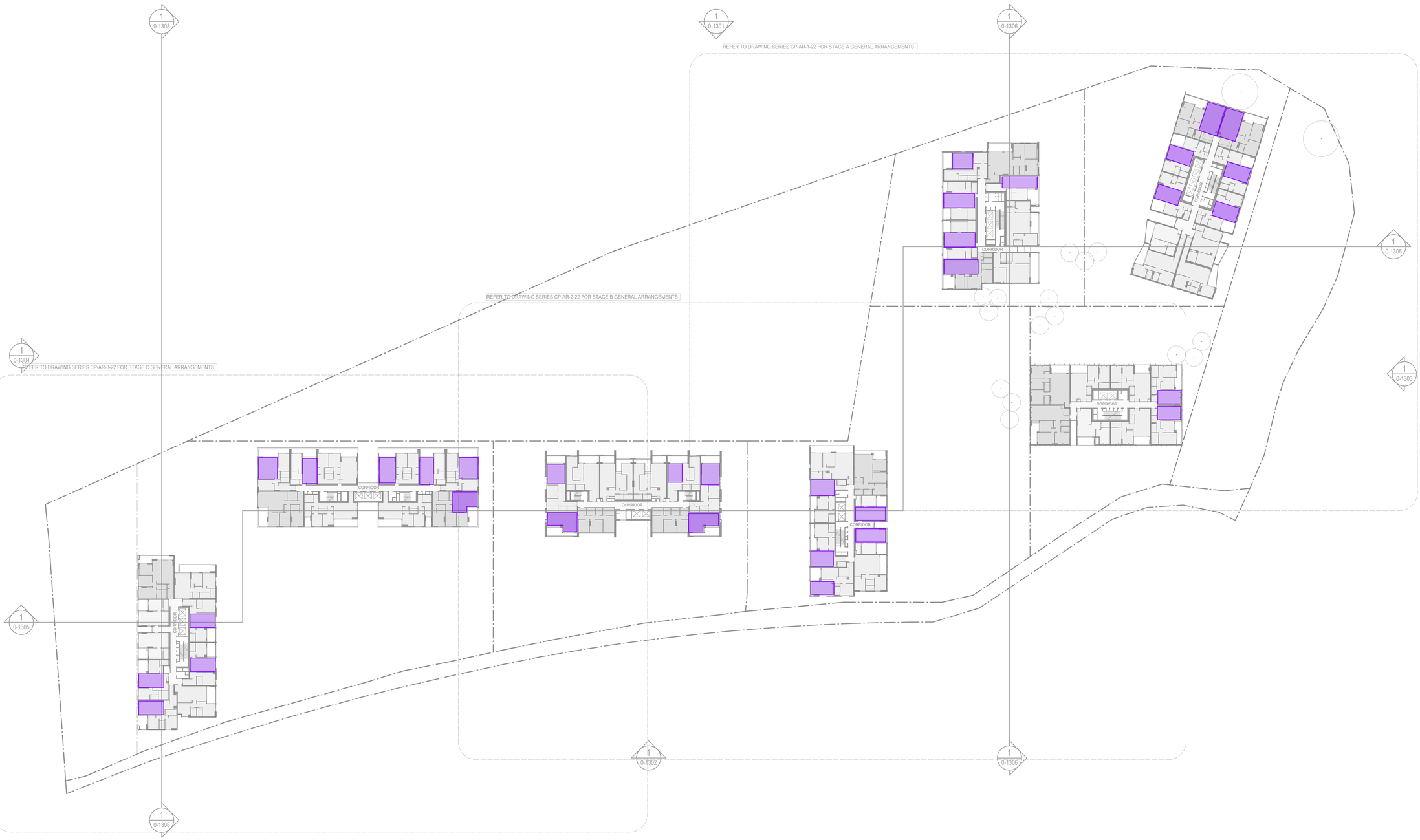
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FOR INFORMATION

DRAWING
DAYTIME ALTERNATIVE MEANS OF VENTILATION

LEVEL 13

DISCIPLINE
ACOUSTICS

DRAWING NUMBER	REVISION
AC-DWG-900-01-12	001



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PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

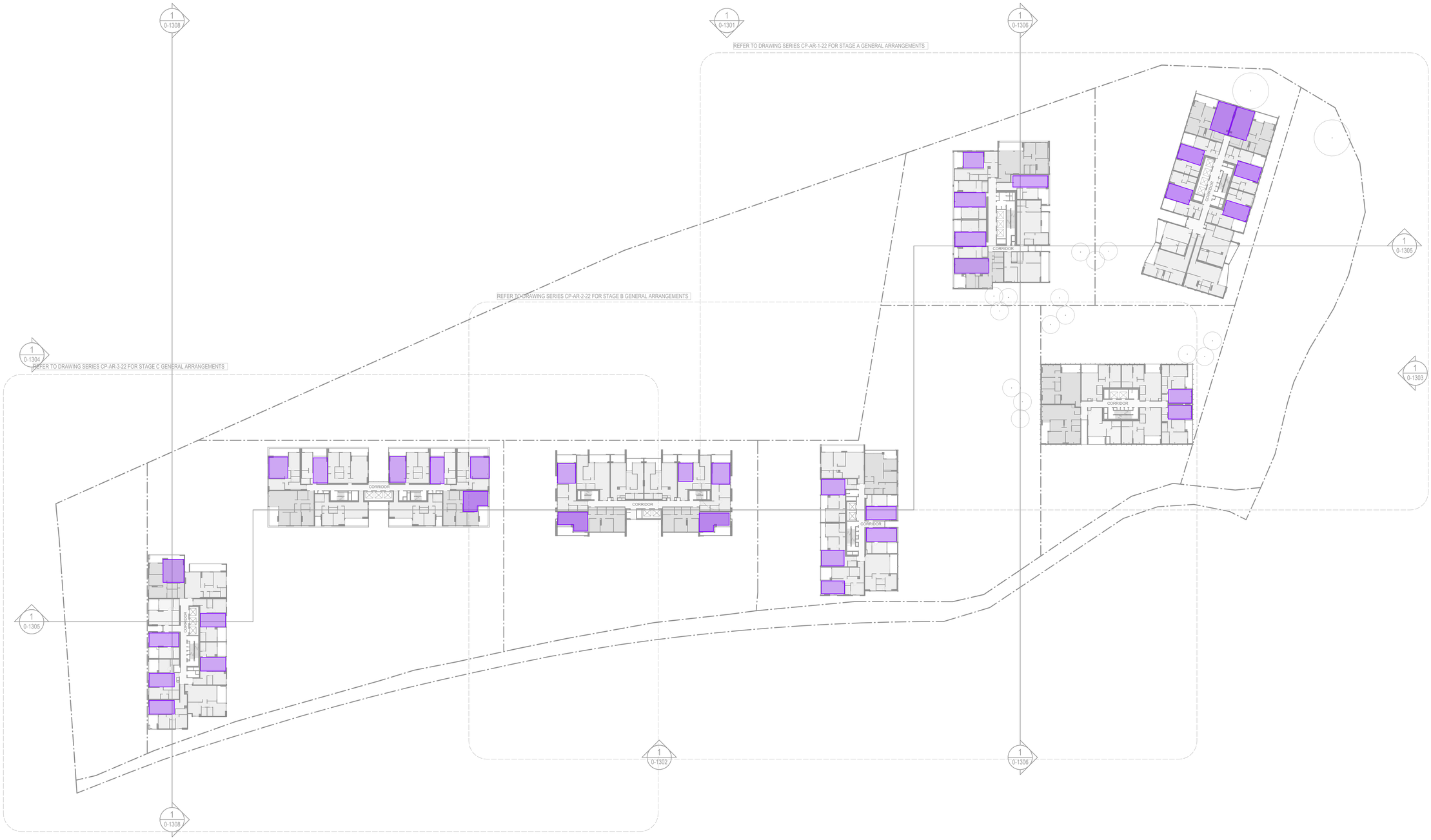
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DRAWING
DAYTIME ALTERNATIVE MEANS OF VENTILATION

LEVEL 14

DISCIPLINE
ACOUSTICS

DRAWING NUMBER	REVISION
AC-DWG-900-01-13	001



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1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

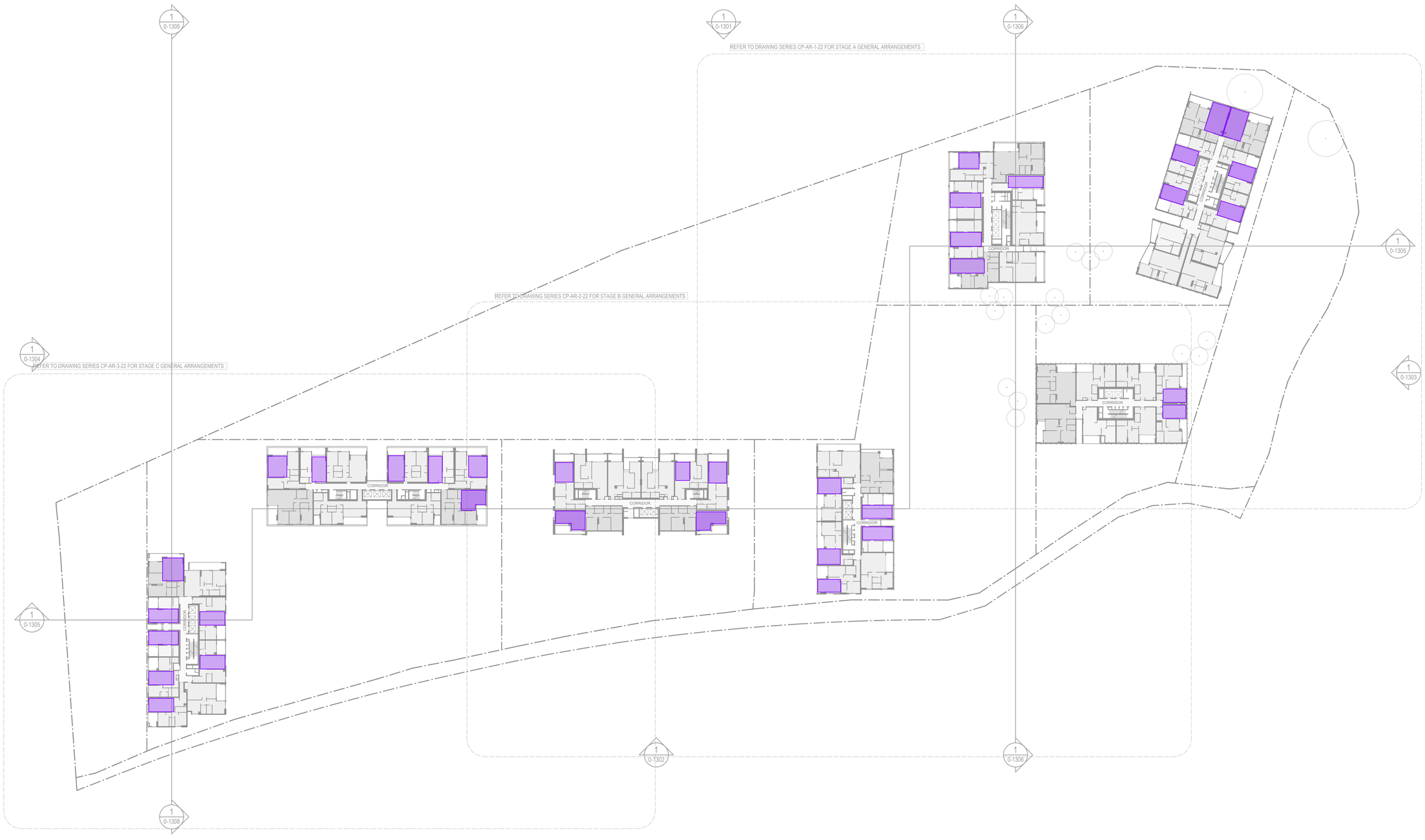
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DRAWING
DAYTIME ALTERNATIVE MEANS OF VENTILATION

LEVEL 15

DISCIPLINE
ACOUSTICS

DRAWING NUMBER	REVISION
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1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

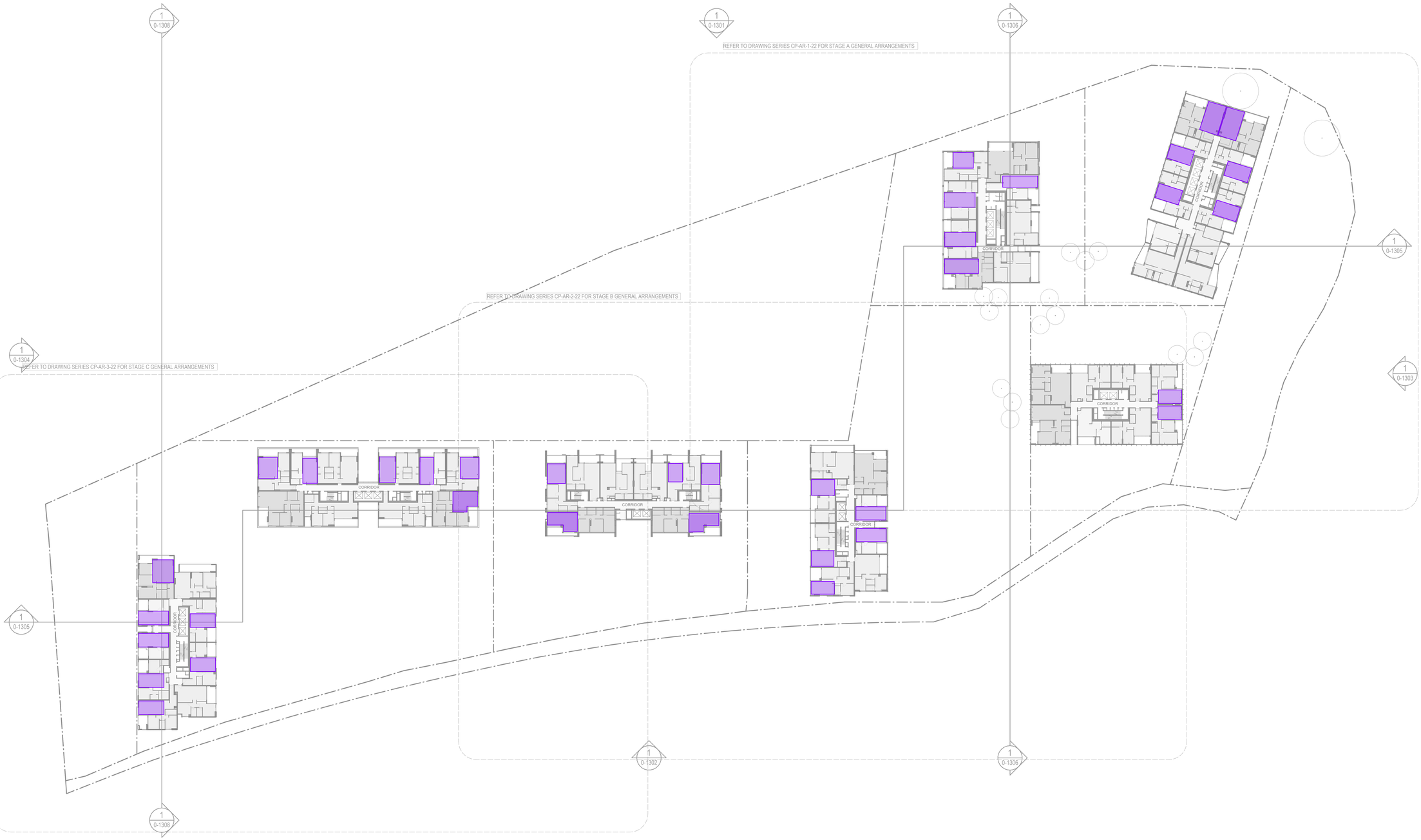
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DRAWING
DAYTIME ALTERNATIVE MEANS OF VENTILATION

LEVEL 16

DISCIPLINE
ACOUSTICS

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1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

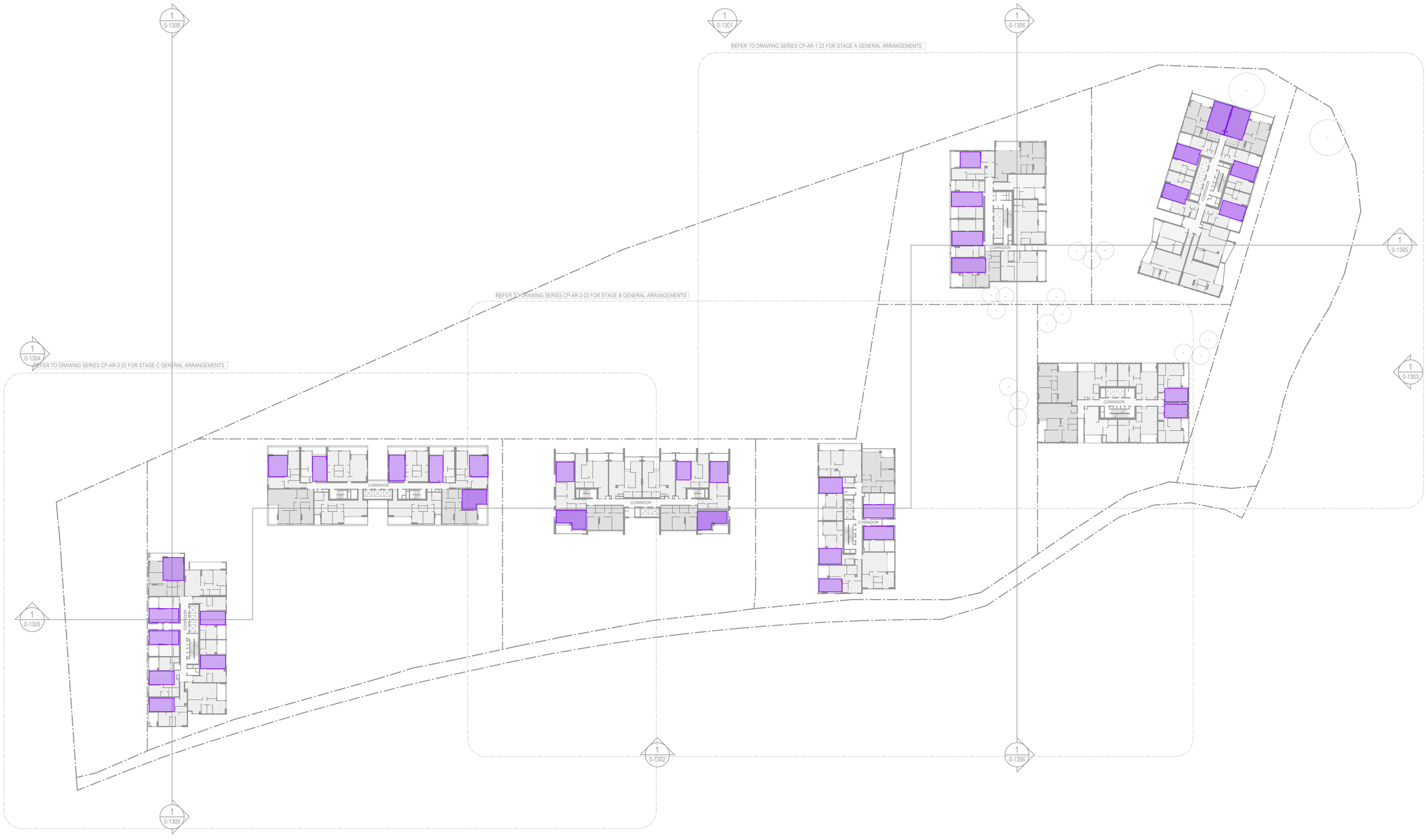
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FOR INFORMATION

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DAYTIME ALTERNATIVE MEANS OF VENTILATION

LEVEL 17

DISCIPLINE
ACOUSTICS

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PROJECT NO.
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CLIENT
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1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

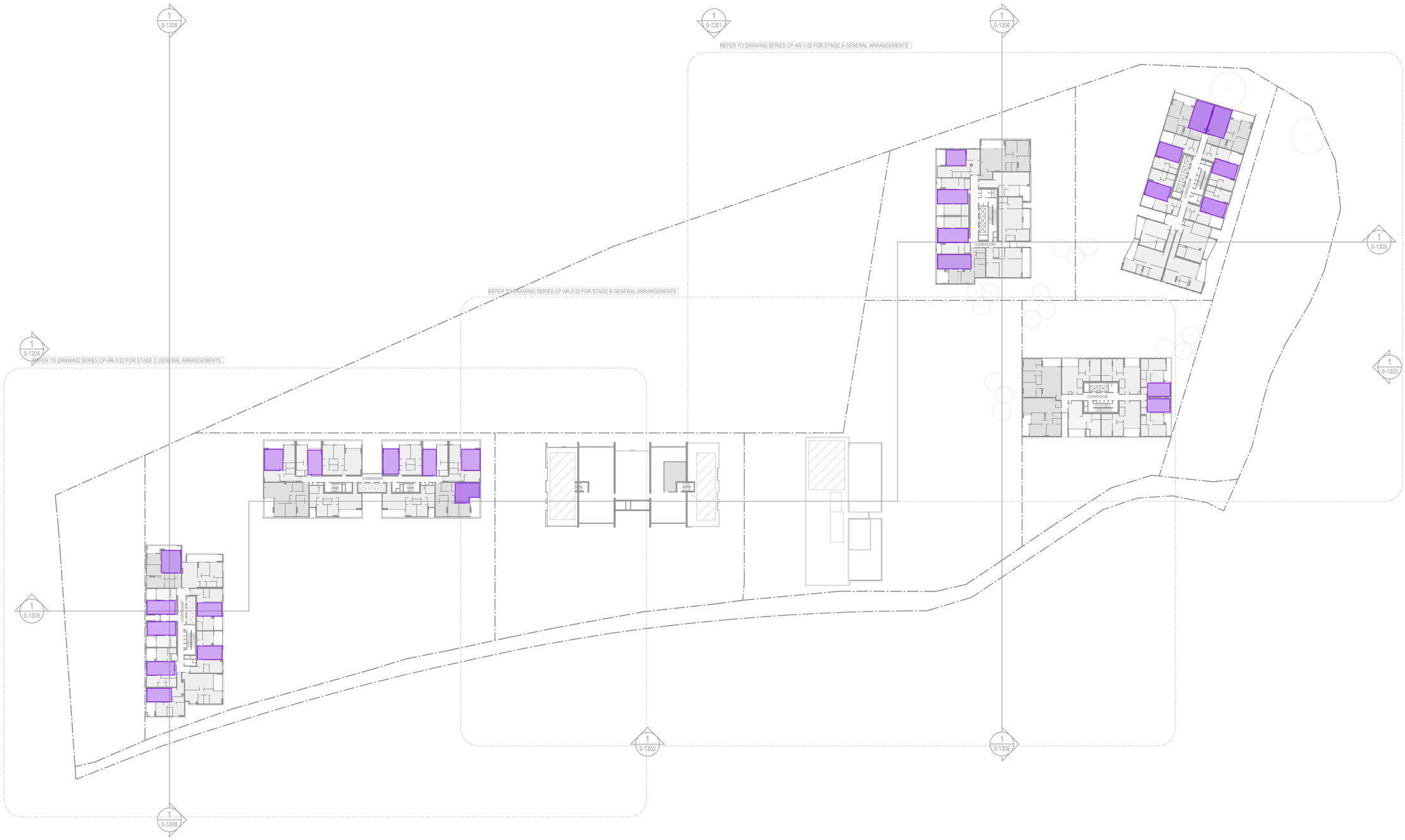
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LEVEL 19

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PROJECT NO.
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ARCHITECT
WOODS BAGOT

CLIENT
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P00485

ARCHITECT
WOODS BAGOT

CLIENT
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1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

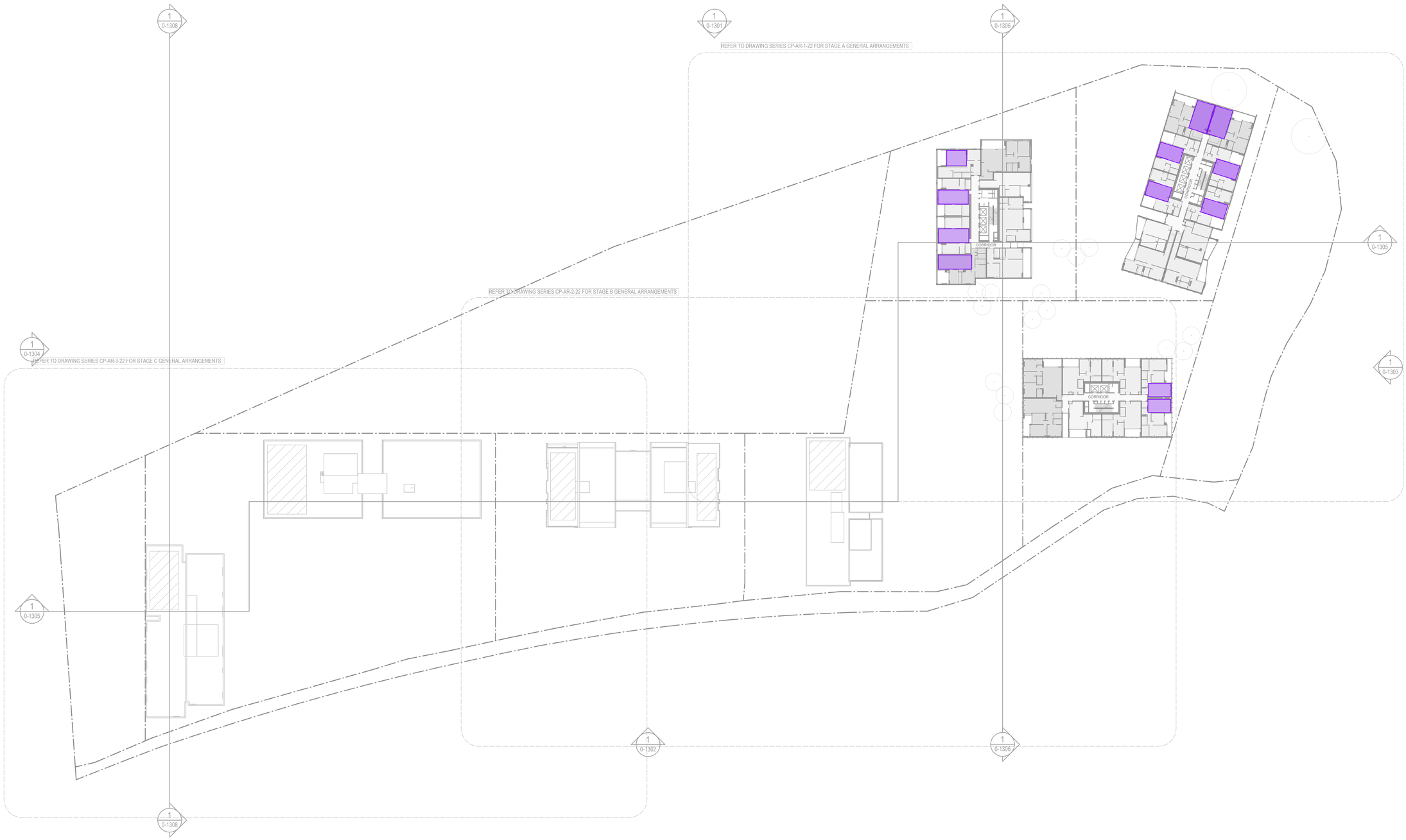
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DAYTIME ALTERNATIVE MEANS OF VENTILATION

LEVEL 22

DISCIPLINE
ACOUSTICS

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PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

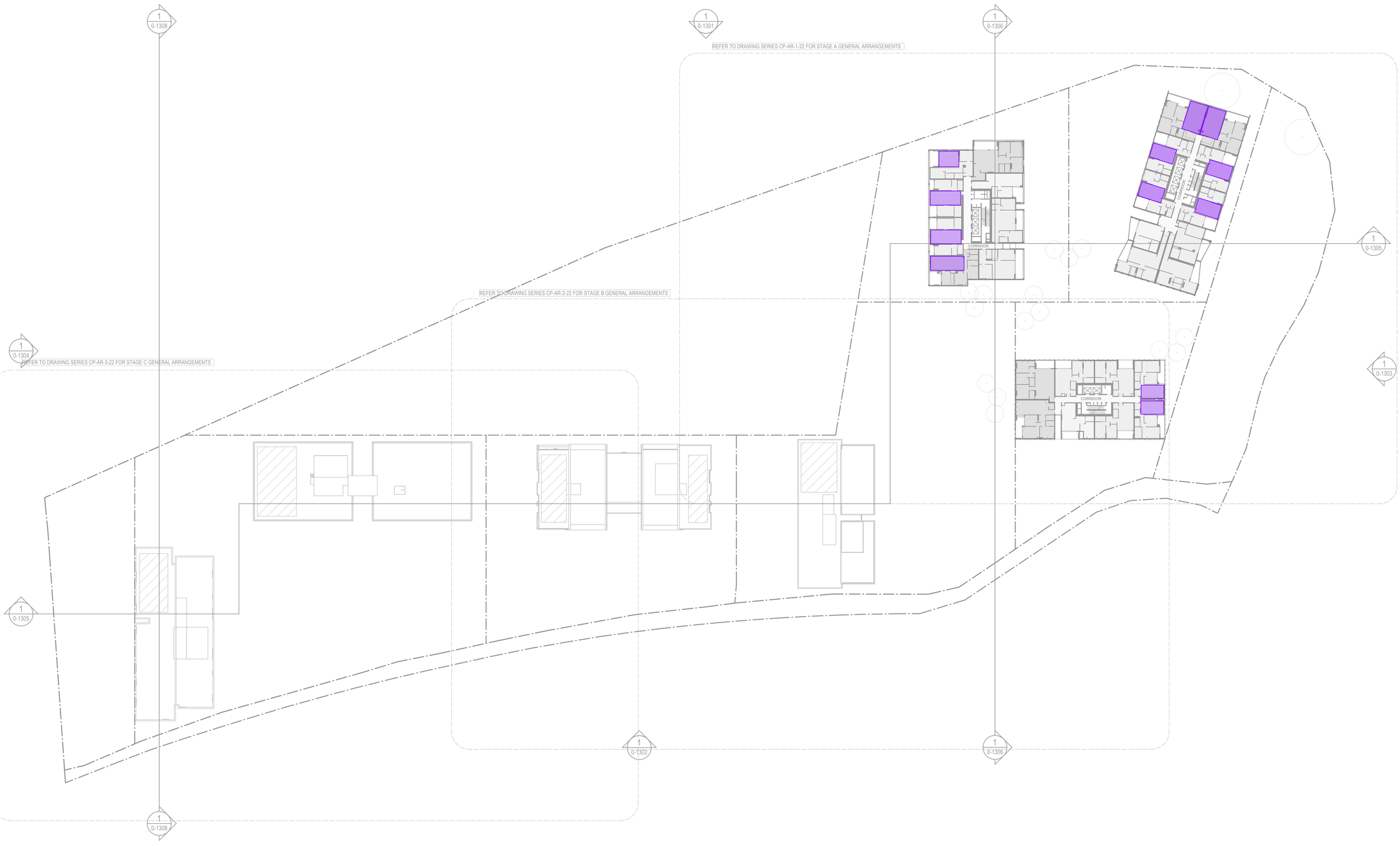
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FOR INFORMATION

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DAYTIME ALTERNATIVE MEANS OF VENTILATION

LEVEL 23

DISCIPLINE
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PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

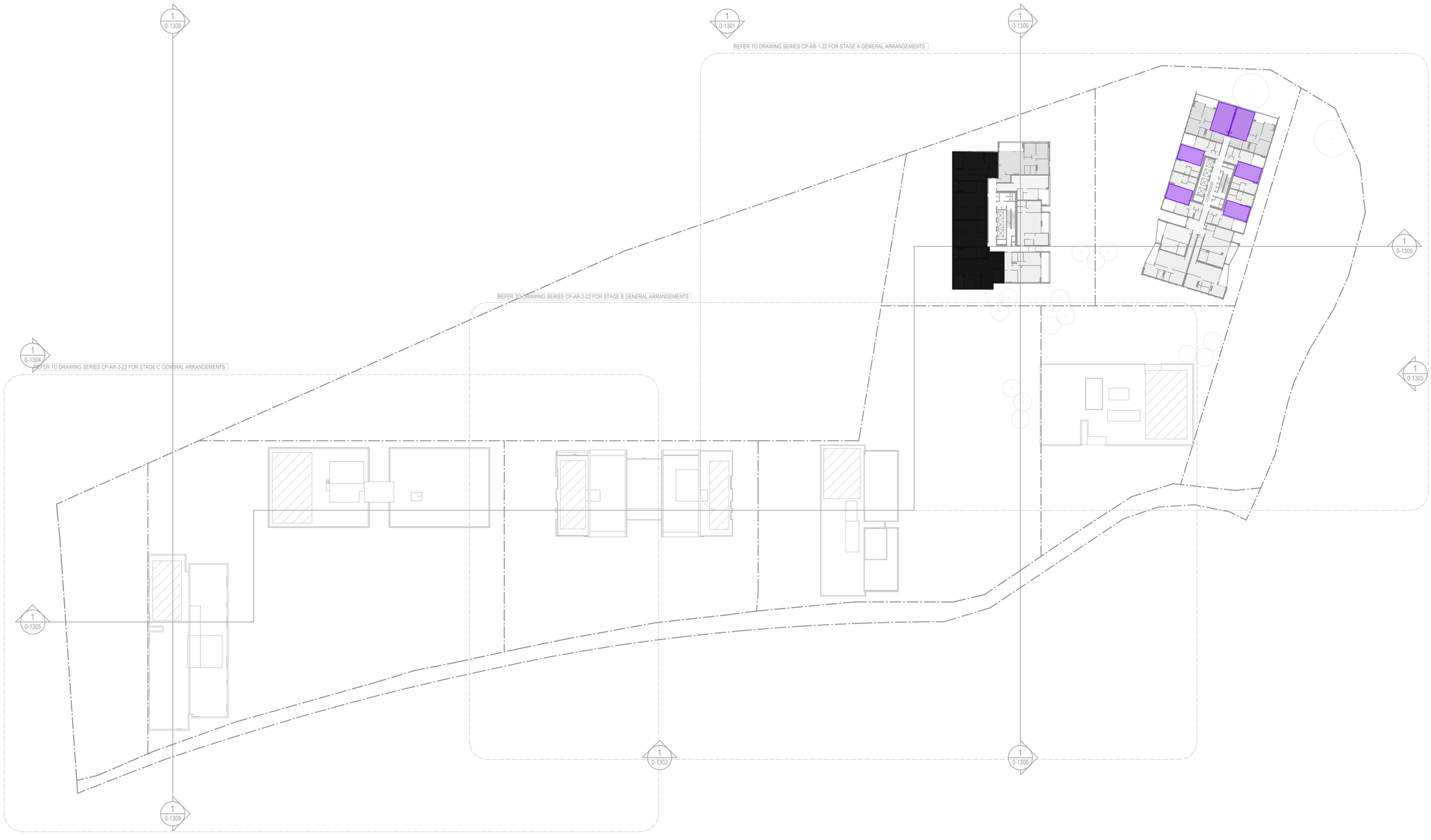
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DAYTIME ALTERNATIVE MEANS OF VENTILATION

LEVEL 24-33

DISCIPLINE
ACOUSTICS

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PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

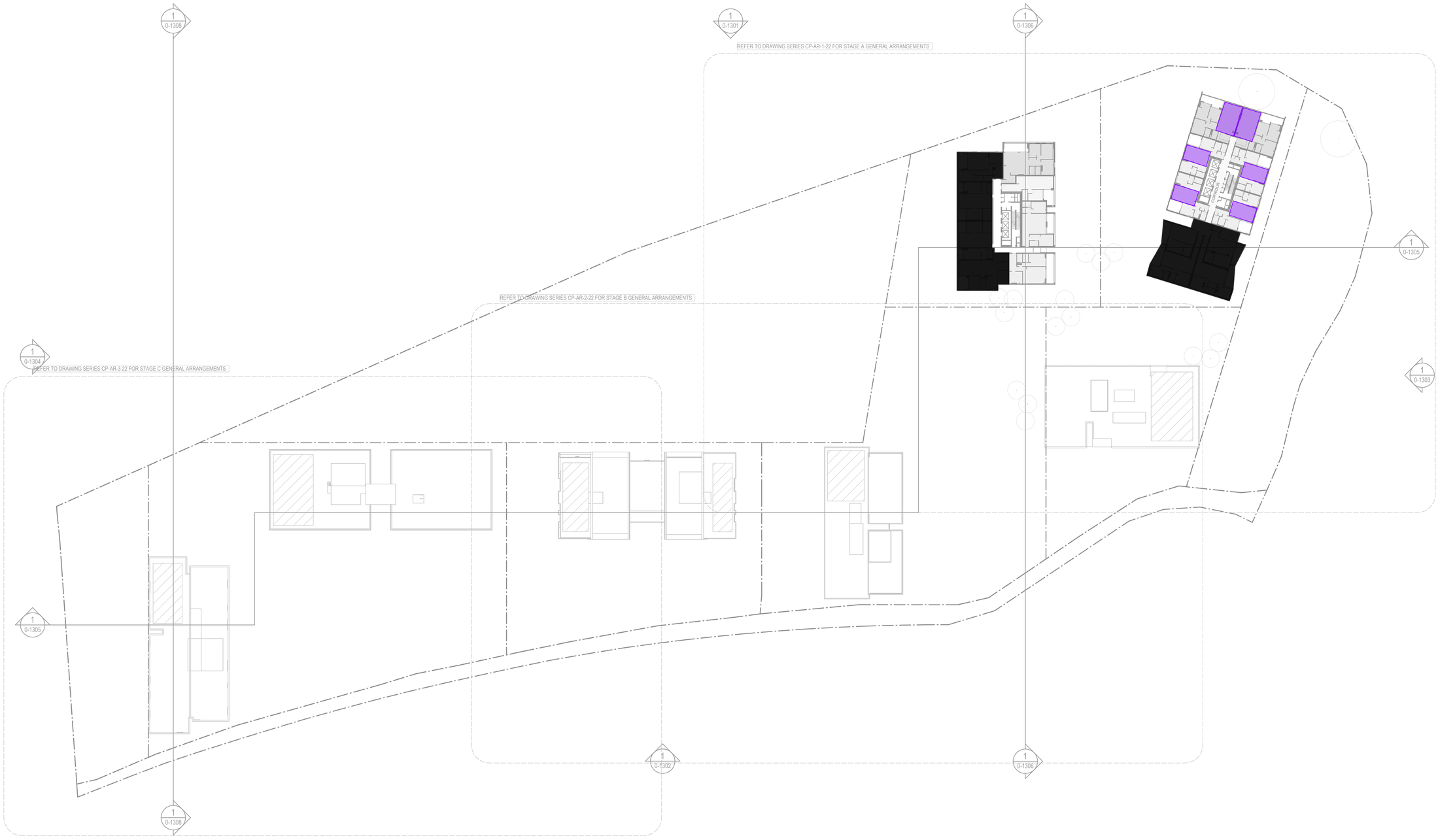
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FOR INFORMATION

DRAWING
DAYTIME ALTERNATIVE MEANS OF VENTILATION

LEVEL 34

DISCIPLINE
ACOUSTICS

DRAWING NUMBER	REVISION
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NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

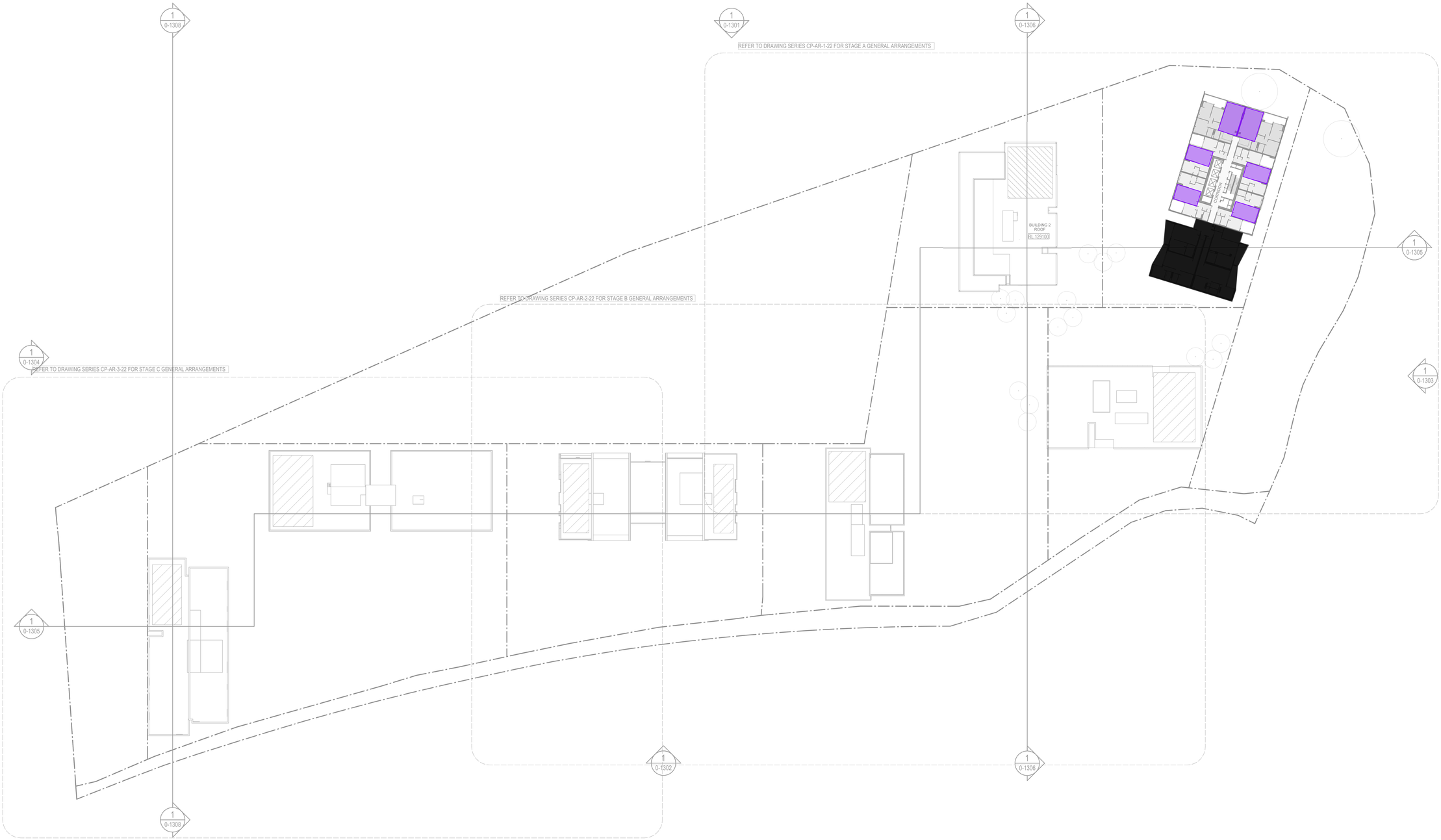
STATUS
FOR INFORMATION

DRAWING
DAYTIME ALTERNATIVE MEANS OF VENTILATION

LEVEL 35

DISCIPLINE
ACOUSTICS

DRAWING NUMBER	REVISION
AC-DWG-900-01-25	001



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LEGEND

Alternative Means of Ventilation Required

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

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LEVEL 36

DISCIPLINE
ACOUSTICS

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Alternative Means of Ventilation Required

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

STATUS
FOR INFORMATION

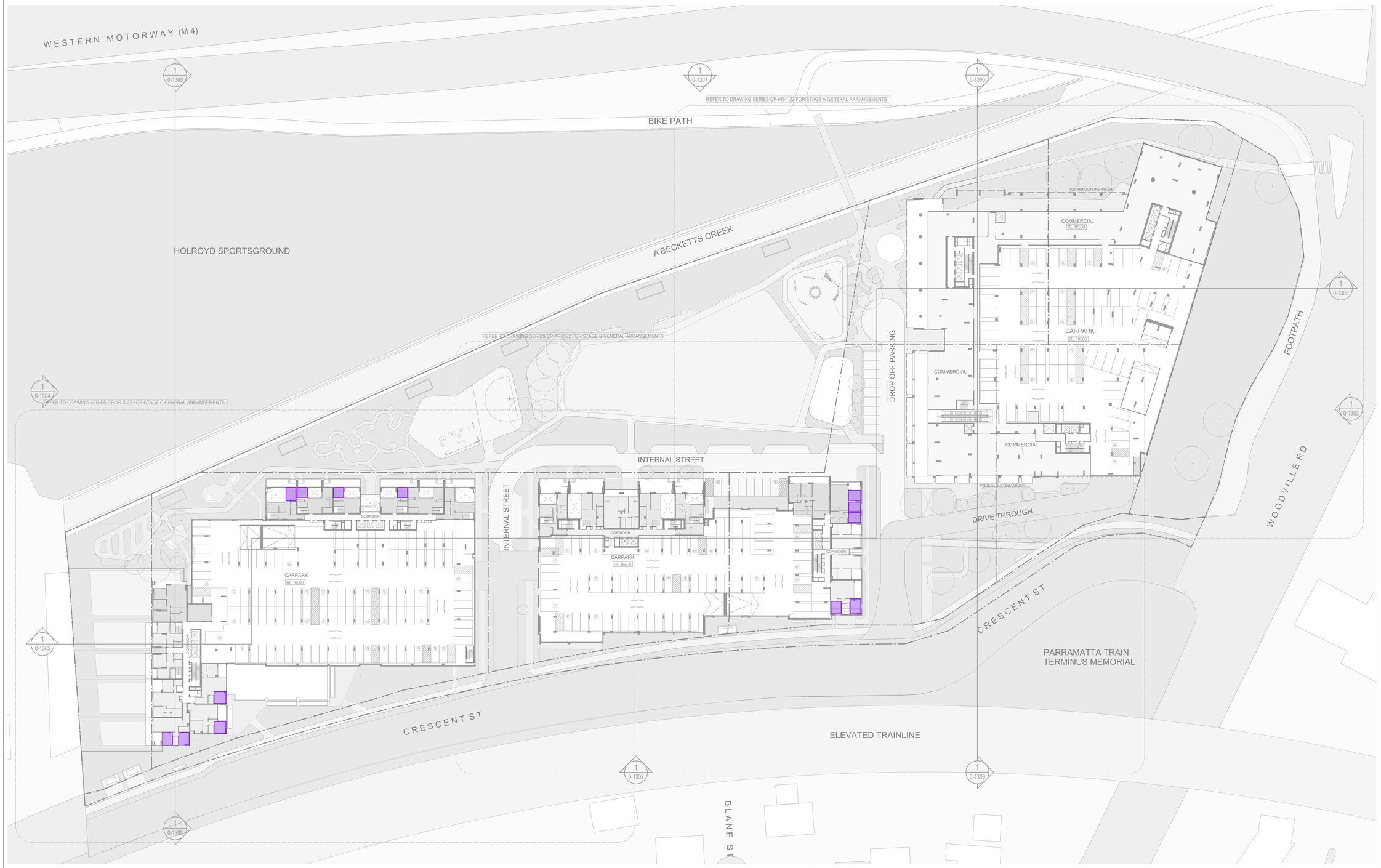
DRAWING
NIGHTTIME ALTERNATIVE MEANS OF VENTILATION

GROUND FLOOR

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PROJECT
1 CRESCENT STREET, HOLROYD

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P00485

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WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

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LEVEL 1

DISCIPLINE
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NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

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LEVEL 2

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1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

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LEVEL 3

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1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

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WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

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LEVEL 4

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1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

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WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

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LEVEL 5

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1 CRESCENT STREET, HOLROYD

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P00485

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WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

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LEVEL 6

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P00485

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WOODS BAGOT

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TIBERIUS (HOLROYD) PTY LTD.

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LEVEL 7

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1 CRESCENT STREET, HOLROYD

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WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

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P00485

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WOODS BAGOT

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LEVEL 10

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P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
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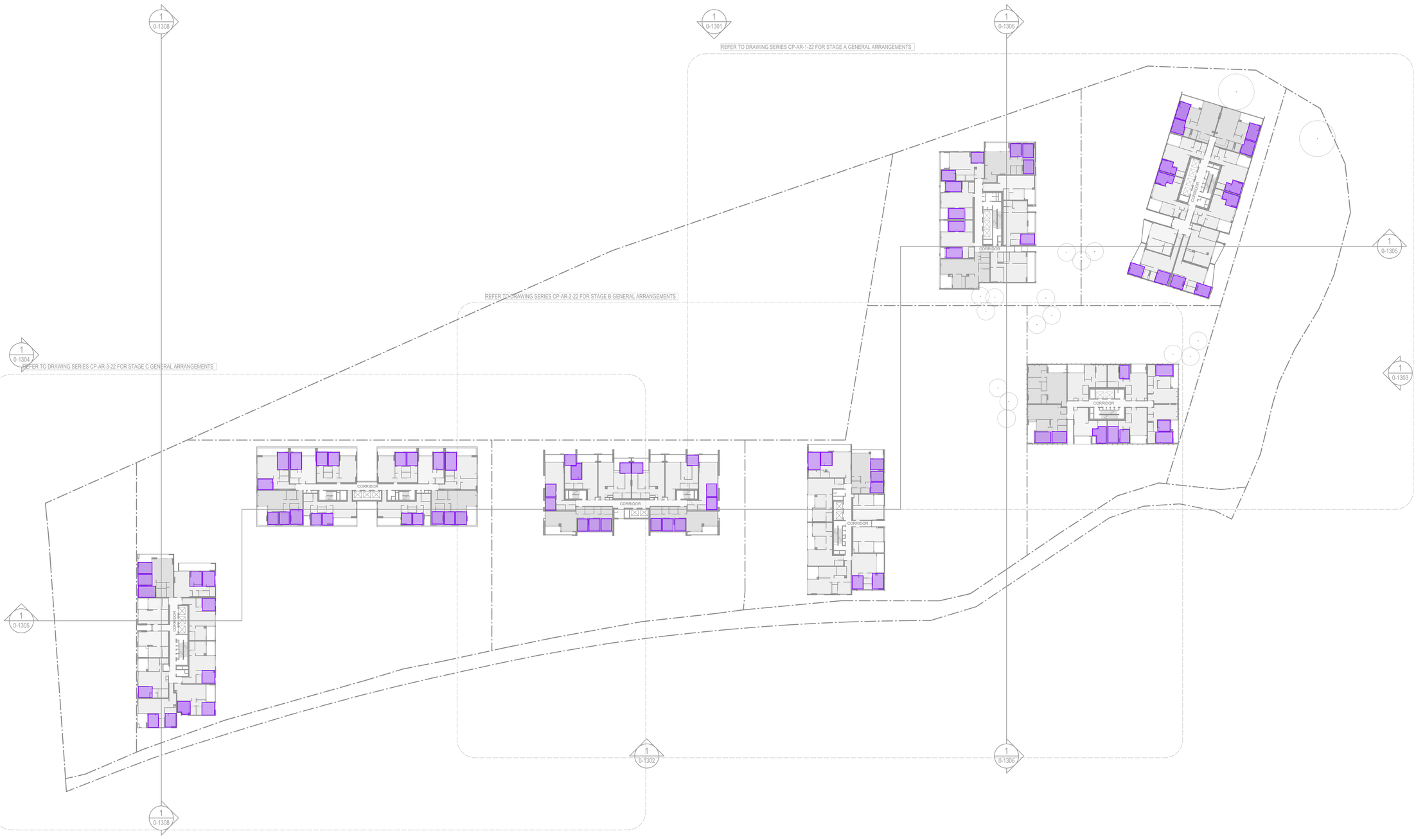
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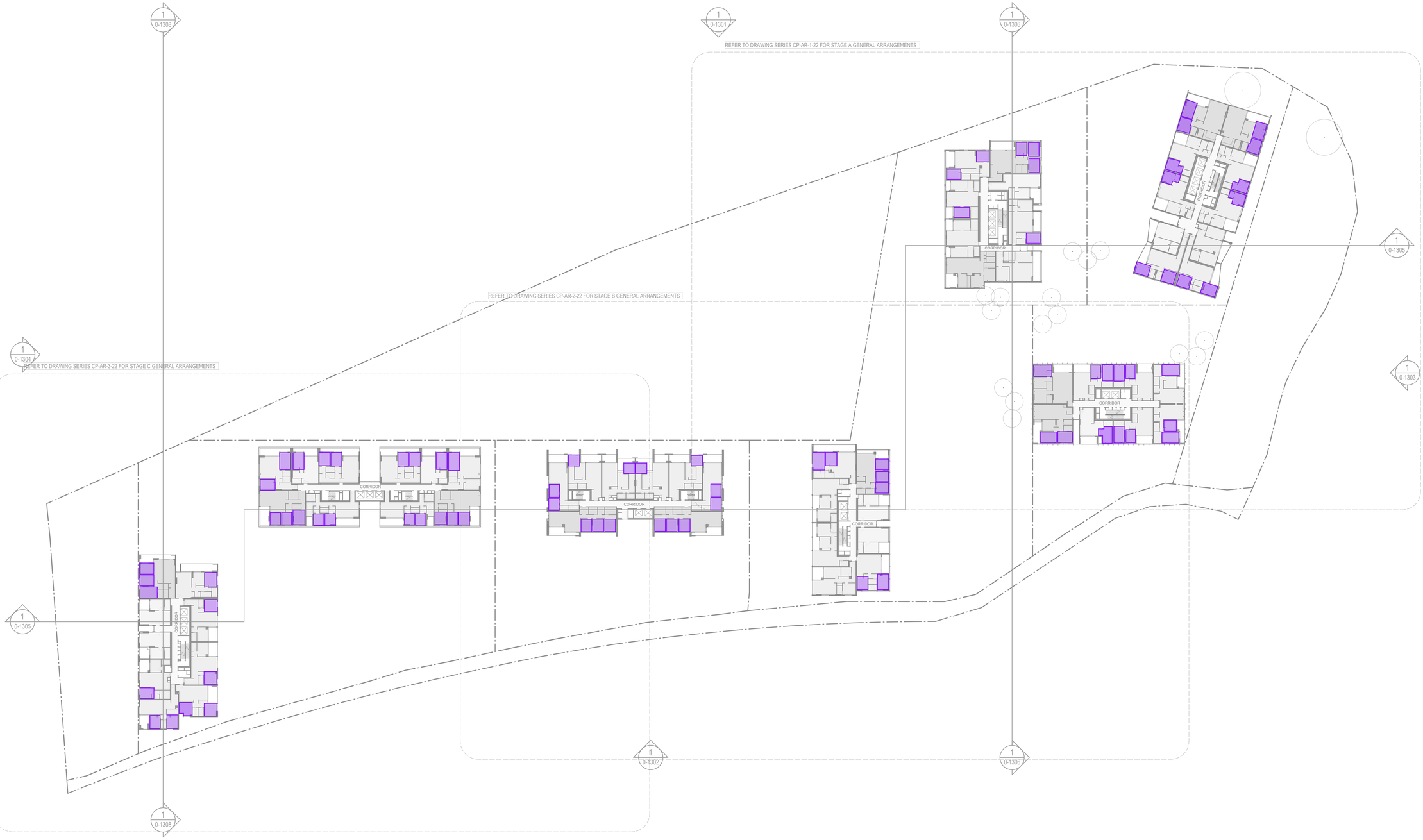
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SCALE
NTS

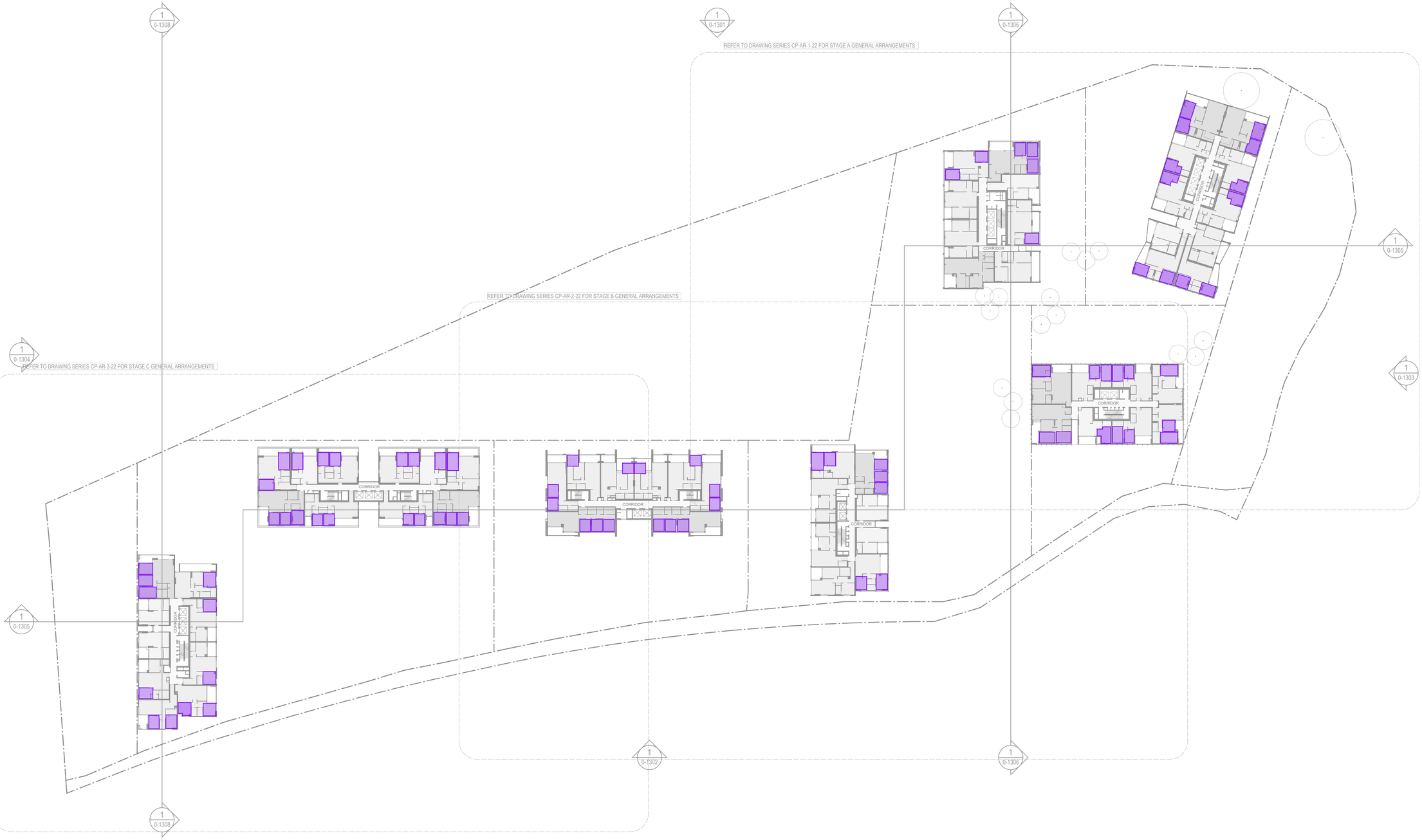
STATUS
FOR INFORMATION

DRAWING
NIGHTTIME ALTERNATIVE MEANS OF VENTILATION

LEVEL 15

DISCIPLINE
ACOUSTICS

DRAWING NUMBER	REVISION
AC-DWG-900-02-16	001



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	30/09/2025	For Information

LEGEND

Alternative Means of Ventilation Required

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

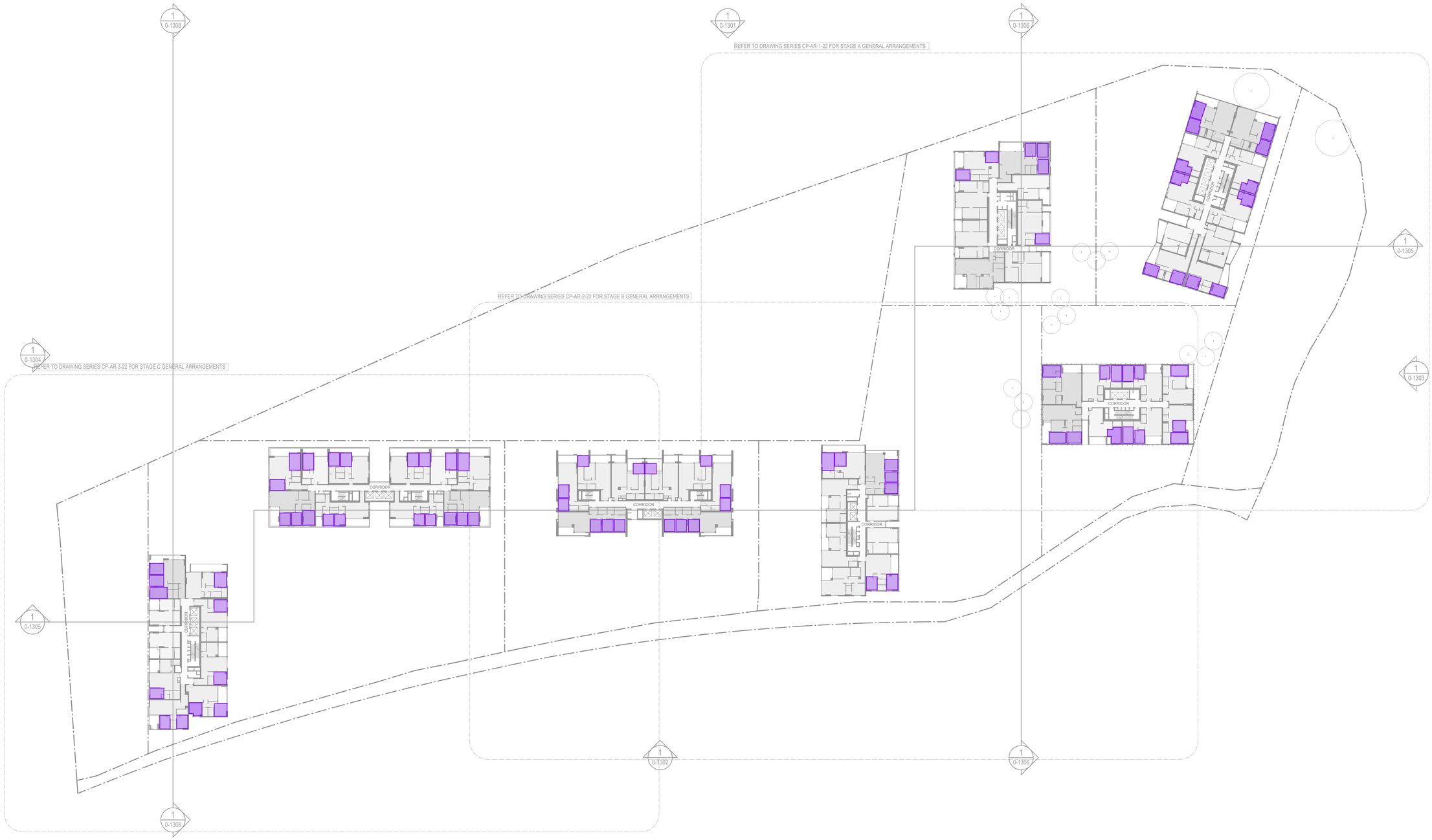
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FOR INFORMATION

DRAWING
NIGHTTIME ALTERNATIVE MEANS OF VENTILATION

LEVEL 16

DISCIPLINE
ACOUSTICS

DRAWING NUMBER	REVISION
AC-DWG-900-02-17	001



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	30/09/2025	For Information

LEGEND

Alternative Means of Ventilation Required

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

STATUS
FOR INFORMATION

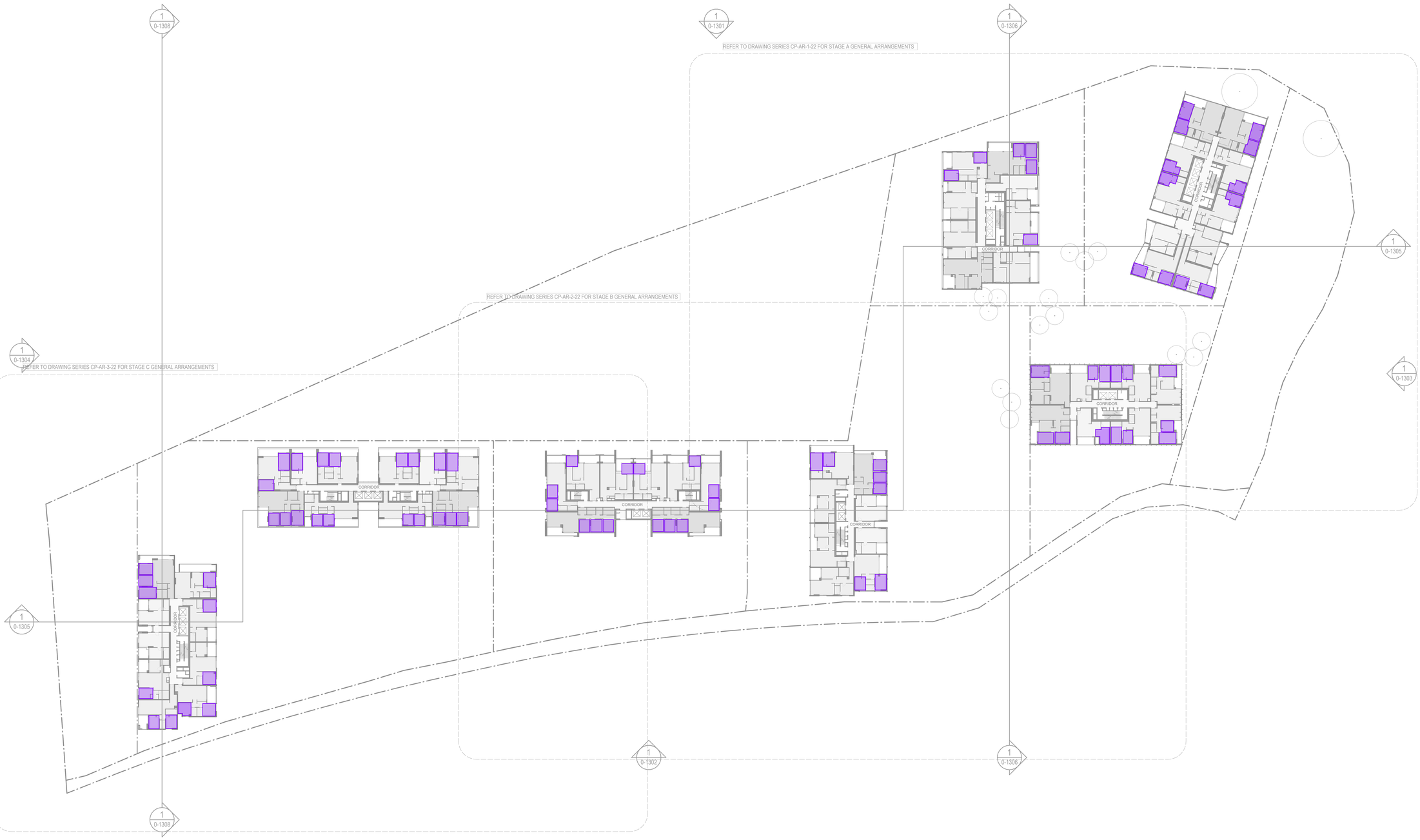
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LEVEL 17

DISCIPLINE
ACOUSTICS

DRAWING NUMBER
AC-DWG-900-02-18

REVISION
001



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	30/09/2025	For Information

LEGEND

Alternative Means of Ventilation Required

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

STATUS
FOR INFORMATION

DRAWING
NIGHTTIME ALTERNATIVE MEANS OF VENTILATION

LEVEL 18

DISCIPLINE
ACOUSTICS

DRAWING NUMBER	REVISION
AC-DWG-900-02-19	001



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	30/09/2025	For Information

LEGEND

Alternative Means of Ventilation Required

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

STATUS
FOR INFORMATION

DRAWING
NIGHTTIME ALTERNATIVE MEANS OF VENTILATION

LEVEL 19

DISCIPLINE
ACOUSTICS

DRAWING NUMBER	REVISION
AC-DWG-900-02-20	001



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	30/09/2025	For Information

LEGEND

Alternative Means of Ventilation Required

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

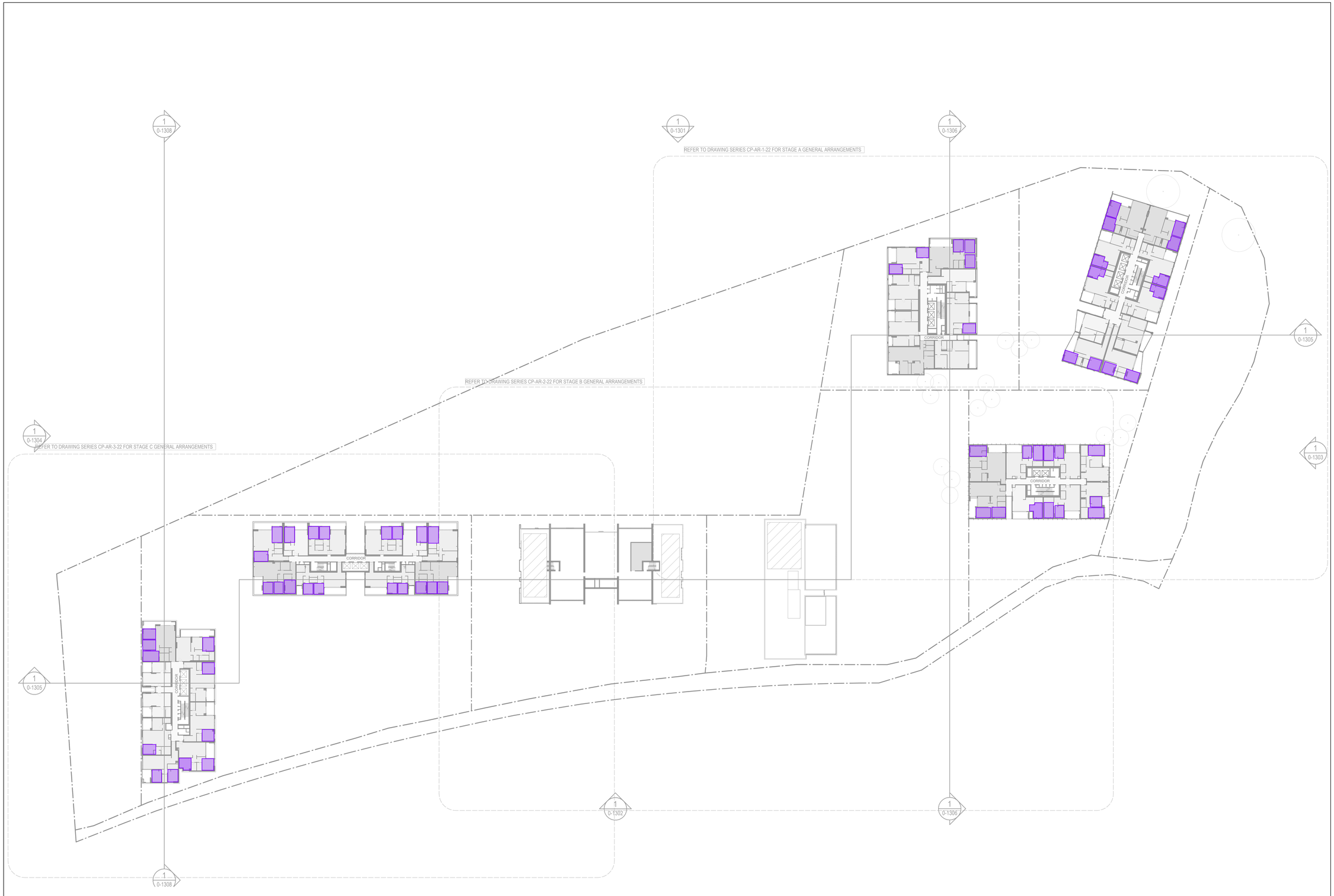
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NIGHTTIME ALTERNATIVE MEANS OF VENTILATION

LEVEL 20

DISCIPLINE
ACOUSTICS

DRAWING NUMBER	REVISION
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E-LAB CONSULTING

ISSUE	DATE	STATUS
1	30/09/2025	For Information

LEGEND

Alternative Means of Ventilation Required

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

STATUS
FOR INFORMATION

DRAWING
NIGHTTIME ALTERNATIVE MEANS OF VENTILATION

LEVEL 21

DISCIPLINE
ACOUSTICS

DRAWING NUMBER	REVISION
AC-DWG-900-02-22	001



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	30/09/2025	For Information

LEGEND

Alternative Means of Ventilation Required

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

STATUS
FOR INFORMATION

DRAWING
NIGHTTIME ALTERNATIVE MEANS OF VENTILATION

LEVEL 22

DISCIPLINE
ACOUSTICS

DRAWING NUMBER	REVISION
AC-DWG-900-02-23	001



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	30/09/2025	For Information

LEGEND

Alternative Means of Ventilation Required

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

STATUS
FOR INFORMATION

DRAWING
NIGHTTIME ALTERNATIVE MEANS OF VENTILATION

LEVEL 23

DISCIPLINE
ACOUSTICS

DRAWING NUMBER	REVISION
AC-DWG-900-02-24	001



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	30/09/2025	For Information

LEGEND

Alternative Means of Ventilation Required

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

STATUS
FOR INFORMATION

DRAWING
NIGHTTIME ALTERNATIVE MEANS OF VENTILATION

LEVEL 24

DISCIPLINE
ACOUSTICS

DRAWING NUMBER	REVISION
AC-DWG-900-02-25	001



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	30/09/2025	For Information

LEGEND

Alternative Means of Ventilation Required

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

STATUS
FOR INFORMATION

DRAWING
NIGHTTIME ALTERNATIVE MEANS OF VENTILATION

LEVEL 25

DISCIPLINE
ACOUSTICS

DRAWING NUMBER	REVISION
AC-DWG-900-02-26	001



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	30/09/2025	For Information

LEGEND

Alternative Means of Ventilation Required

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

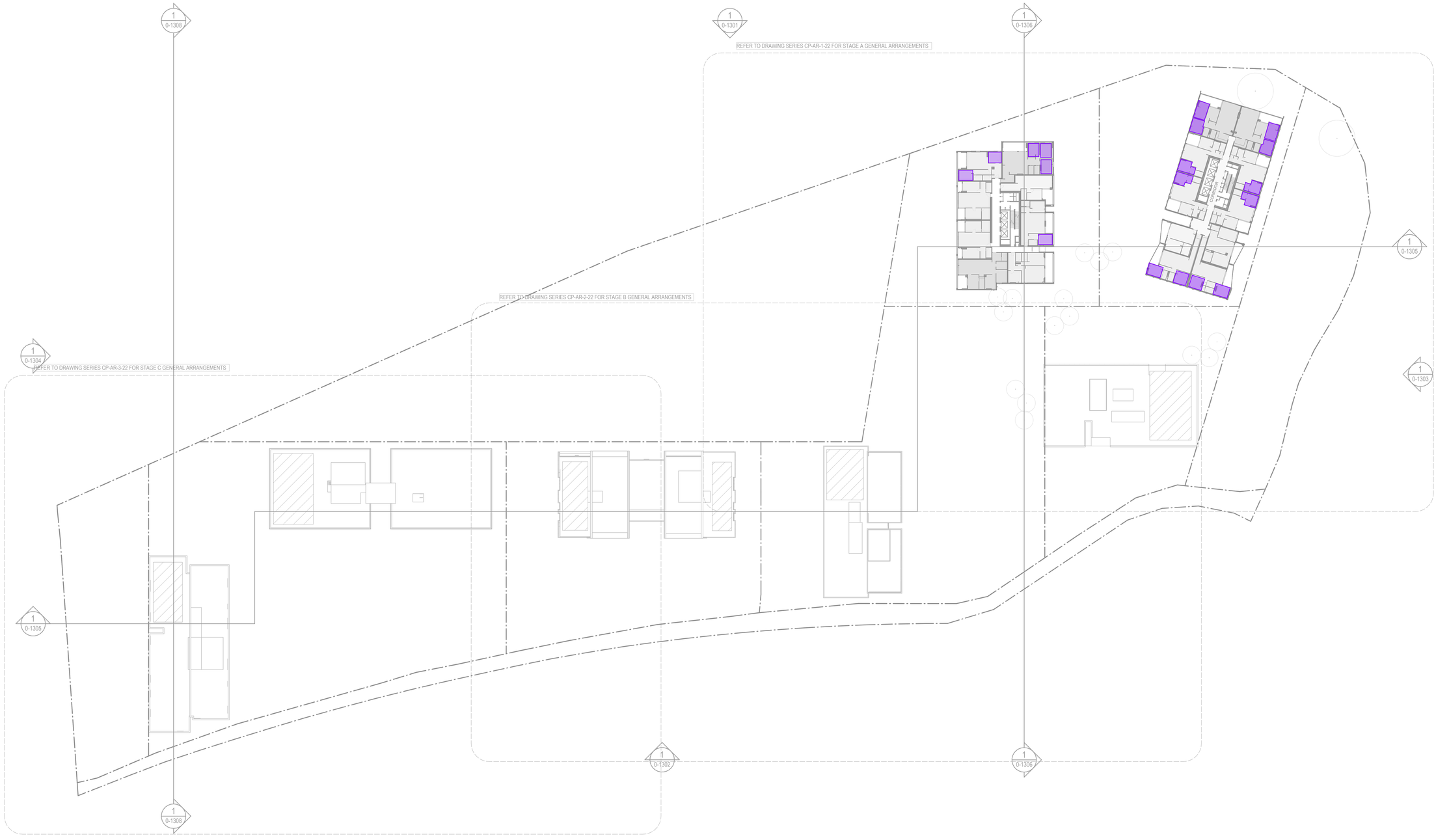
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DRAWING
NIGHTTIME ALTERNATIVE MEANS OF VENTILATION

LEVEL 26

DISCIPLINE
ACOUSTICS

DRAWING NUMBER	REVISION
AC-DWG-900-02-27	001



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	30/09/2025	For Information

LEGEND

Alternative Means of Ventilation Required

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

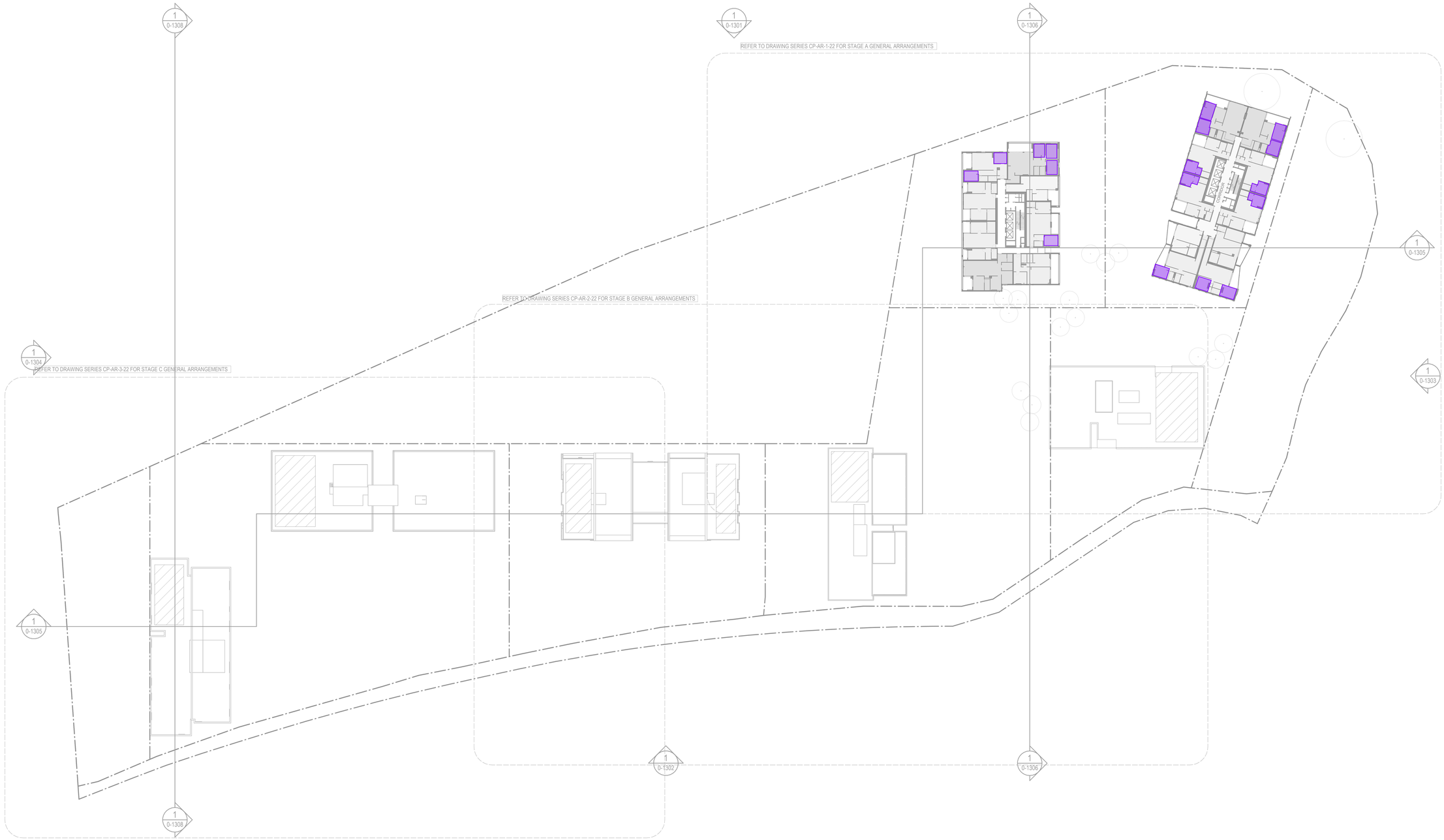
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DRAWING
NIGHTTIME ALTERNATIVE MEANS OF VENTILATION

LEVEL 27-30

DISCIPLINE
ACOUSTICS

DRAWING NUMBER	REVISION
AC-DWG-900-02-28	001



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	30/09/2025	For Information

LEGEND

Alternative Means of Ventilation Required

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

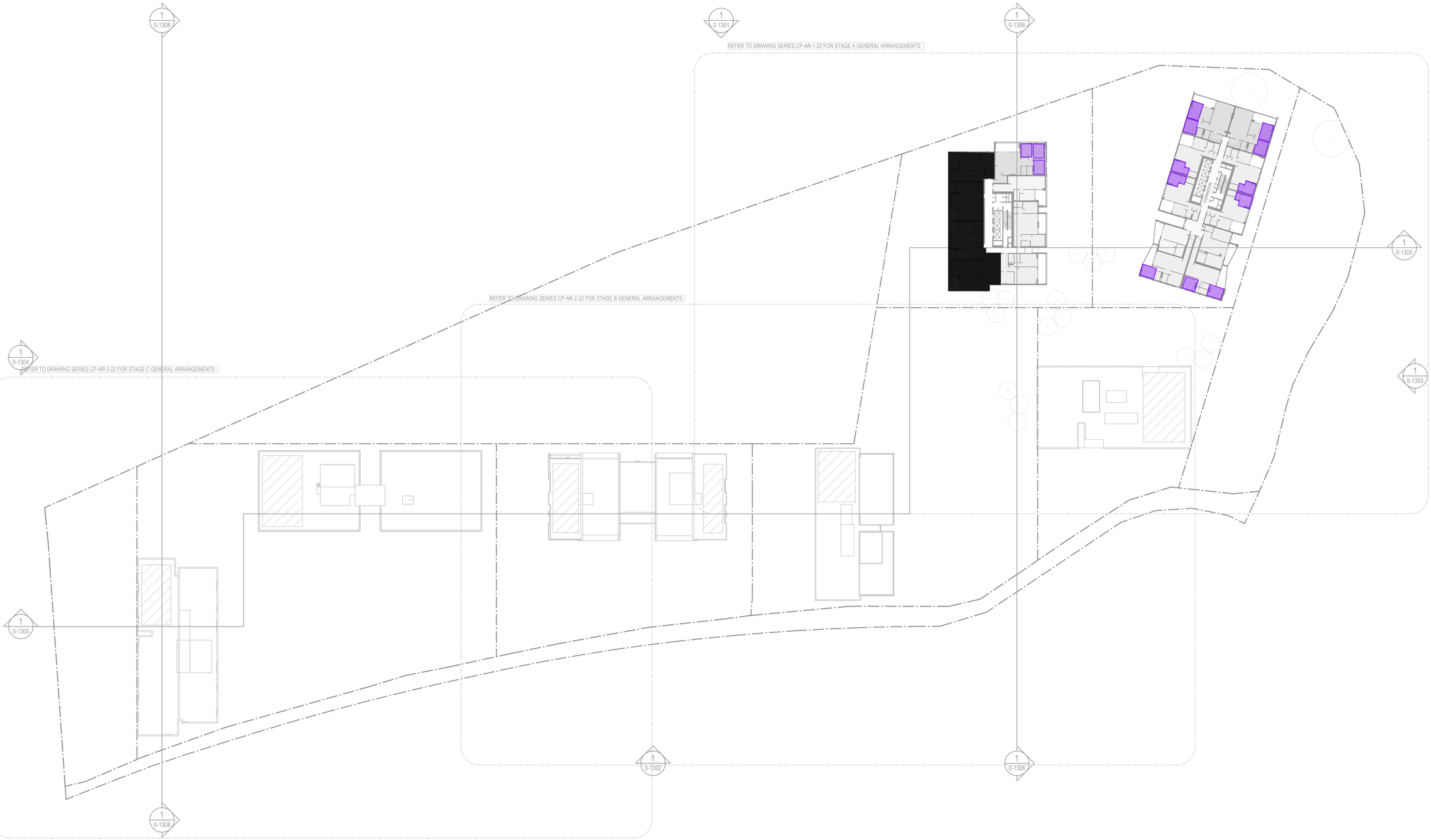
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DRAWING
NIGHTTIME ALTERNATIVE MEANS OF VENTILATION

LEVEL 31-33

DISCIPLINE
ACOUSTICS

DRAWING NUMBER	REVISION
AC-DWG-900-02-29	001



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	30/09/2025	For Information

LEGEND

Alternative Means of Ventilation Required

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

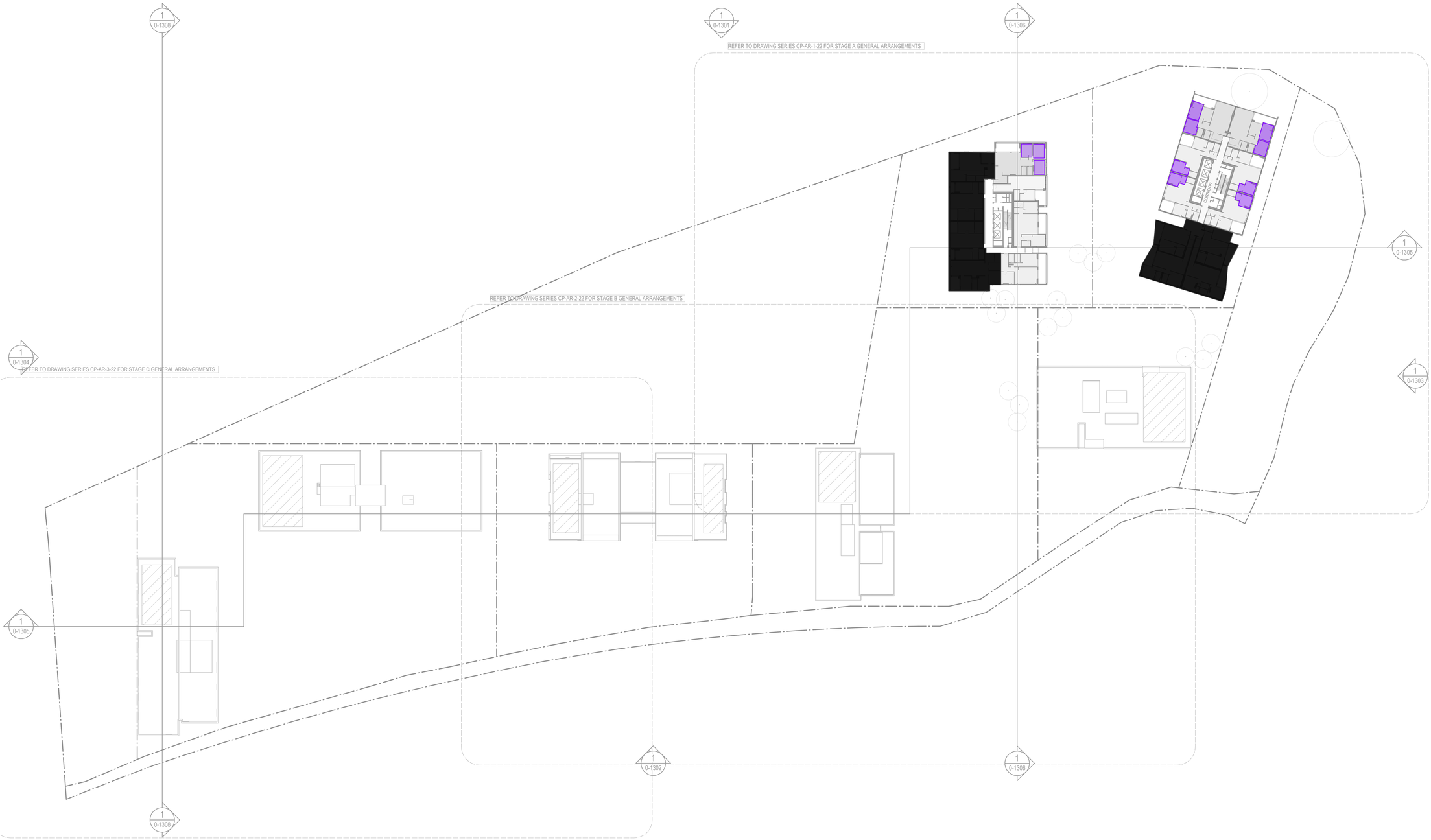
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DRAWING
NIGHTTIME ALTERNATIVE MEANS OF VENTILATION

LEVEL 34

DISCIPLINE
ACOUSTICS

DRAWING NUMBER	REVISION
AC-DWG-900-02-30	001



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	30/09/2025	For Information

LEGEND

Alternative Means of Ventilation Required

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

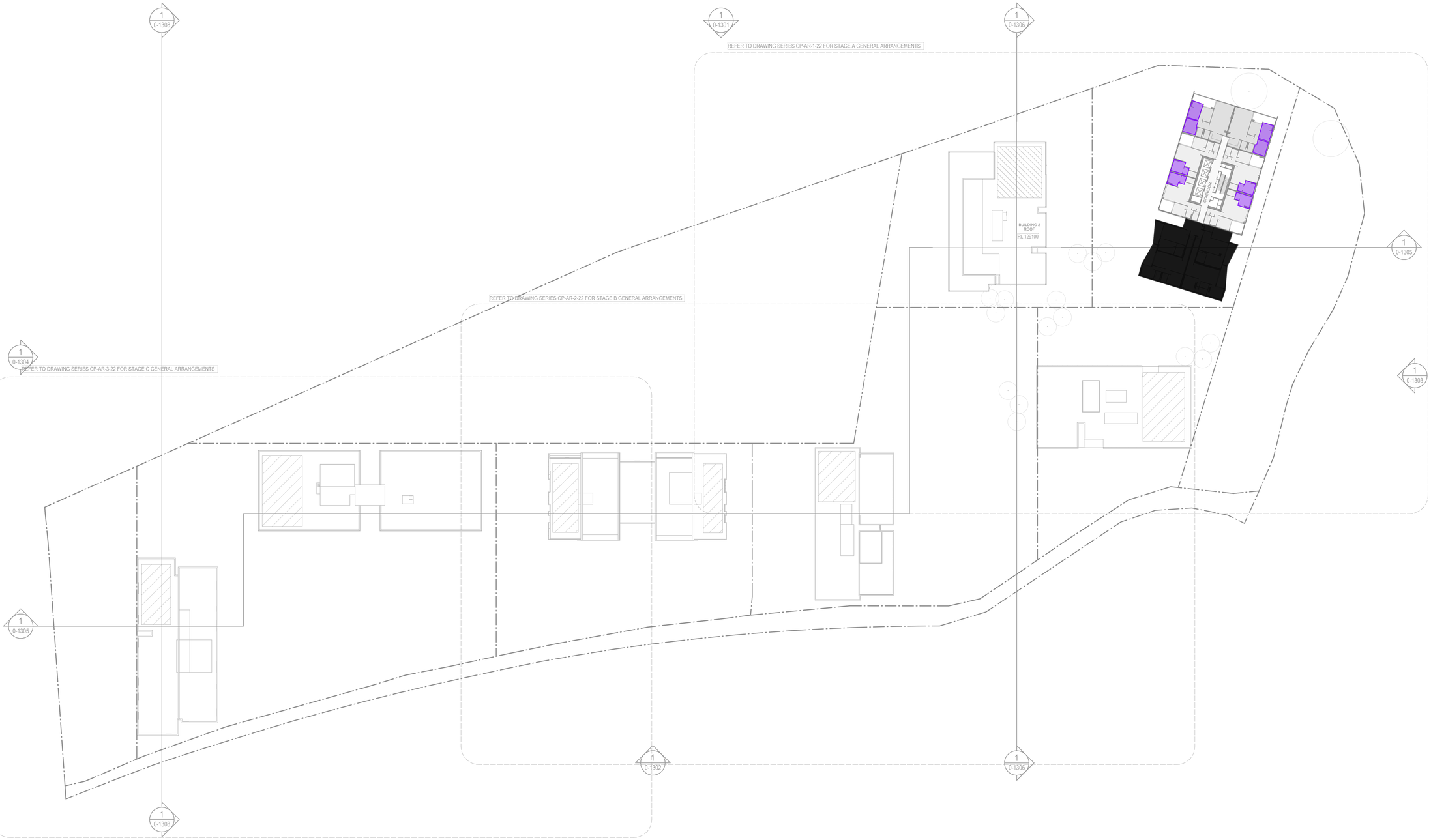
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FOR INFORMATION

DRAWING
NIGHTTIME ALTERNATIVE MEANS OF VENTILATION

LEVEL 35

DISCIPLINE
ACOUSTICS

DRAWING NUMBER	REVISION
AC-DWG-900-02-31	001



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	30/09/2025	For Information

LEGEND

Alternative Means of Ventilation Required

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

STATUS
FOR INFORMATION

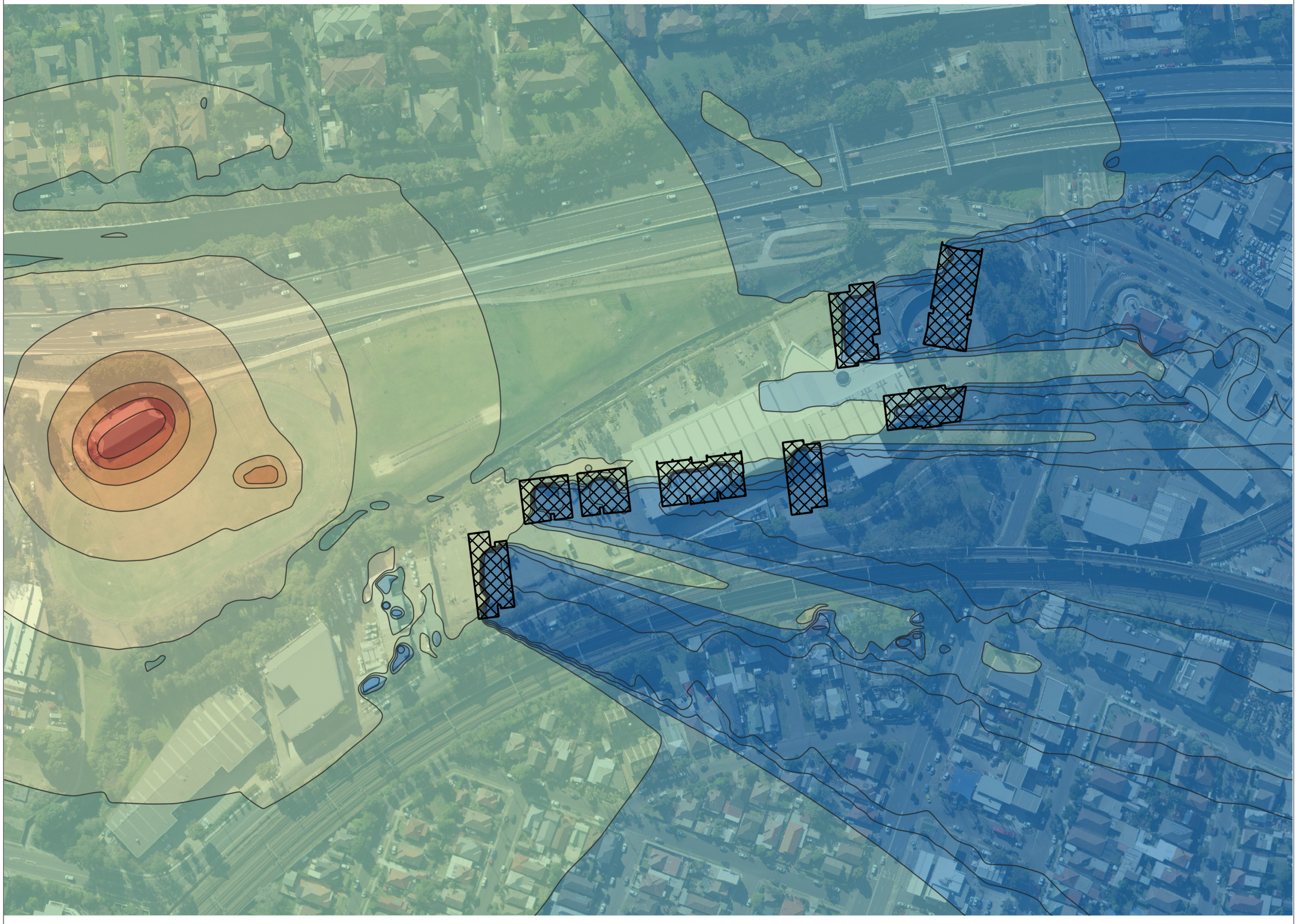
DRAWING
NIGHTTIME ALTERNATIVE MEANS OF VENTILATION

LEVEL 36

DISCIPLINE
ACOUSTICS

DRAWING NUMBER	REVISION
AC-DWG-900-02-32	001

Appendix D **Noise Contour Map – Sportsground Noise**



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	06/11/2024	For Information
2	22/11/2024	For Information

LEGEND

Noise Level, L_{eq} dBA

- ≤ 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- 70 - 75
- 75 - 80

Project Site

NOTES

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD

SCALE
NTS

STATUS
FOR INFORMATION

DRAWING
NOISE CONTOUR MAP

HOLROYD SPORTS GROUND

DISCIPLINE
ACOUSTICS

DRAWING NUMBER	REVISION
AC-DWG-700-01	001

Appendix E Noise Contour Maps – Construction Noise



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	06/11/2024	For Information
2	30/09/2025	For Information

LEGEND

Noise Level, L_{eq} dBA

- < 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- 70 - 75
- 75 - 80
- > 80

Project Site Boundary

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

STATUS
FOR INFORMATION

DRAWING
NOISE CONTOUR MAPS

PHASE 1 CIVIL CONSTRUCTION WORKS

DISCIPLINE
ACOUSTICS

DRAWING NUMBER	REVISION
ELAB-AC-DWG-800-01-01	002



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	06/11/2024	For Information
2	30/09/2025	For Information

LEGEND

Noise Level, L_{eq} dBA

- < 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- 70 - 75
- 75 - 80
- > 80

Project Site Boundary

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

STATUS
FOR INFORMATION

DRAWING
NOISE CONTOUR MAPS

PHASE 2 CIVIL CONSTRUCTION WORKS

DISCIPLINE
ACOUSTICS

DRAWING NUMBER
ELAB-AC-DWG-800-01-02

REVISION
002



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	06/11/2024	For Information
2	30/09/2025	For Information

LEGEND

Noise Level, L_{eq} dBA

- < 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- 70 - 75
- 75 - 80
- > 80

Project Site Boundary

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

STATUS
FOR INFORMATION

DRAWING
NOISE CONTOUR MAPS

PHASE 3 CIVIL CONSTRUCTION WORKS

DISCIPLINE
ACOUSTICS

DRAWING NUMBER	REVISION
ELAB-AC-DWG-800-01-03	002



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	06/11/2024	For Information
2	30/09/2025	For Information

LEGEND

Noise Level, L_{eq} dBA

- < 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- 70 - 75
- 75 - 80
- > 80

Project Site Boundary

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

STATUS
FOR INFORMATION

DRAWING
NOISE CONTOUR MAPS

PHASE 1 STRUCTURAL CONSTRUCTION WORKS

DISCIPLINE
ACOUSTICS

DRAWING NUMBER
ELAB-AC-DWG-800-01-04

REVISION
002



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	06/11/2024	For Information
2	30/09/2025	For Information

LEGEND

Noise Level, L_{eq} dBA

- < 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- 70 - 75
- 75 - 80
- > 80

Project Site Boundary

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

STATUS
FOR INFORMATION

DRAWING
NOISE CONTOUR MAPS

PHASE 2 STRUCTURAL CONSTRUCTION WORKS

DISCIPLINE
ACOUSTICS

DRAWING NUMBER
ELAB-AC-DWG-800-01-05

REVISION
002



E-LAB CONSULTING

ISSUE	DATE	STATUS
1	06/11/2024	For Information
2	30/09/2025	For Information

LEGEND

Noise Level, L_{eq} dBA

- < 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- 70 - 75
- 75 - 80
- > 80

Project Site Boundary

PROJECT
1 CRESCENT STREET, HOLROYD

PROJECT NO.
P00485

ARCHITECT
WOODS BAGOT

CLIENT
TIBERIUS (HOLROYD) PTY LTD.

SCALE
NTS

STATUS
FOR INFORMATION

DRAWING
NOISE CONTOUR MAPS

PHASE 3 STRUCTURAL CONSTRUCTION WORKS

DISCIPLINE
ACOUSTICS

DRAWING NUMBER
ELAB-AC-DWG-800-01-06

REVISION
002

Appendix F **ToA Response**

24 October 2025

Project No.: P00485

E-LAB Consulting
Level 11, 117 York Street,
SYDNEY NSW 2000

1 Crescent Street, Holroyd
Response to DPHI Comments on RtS Package

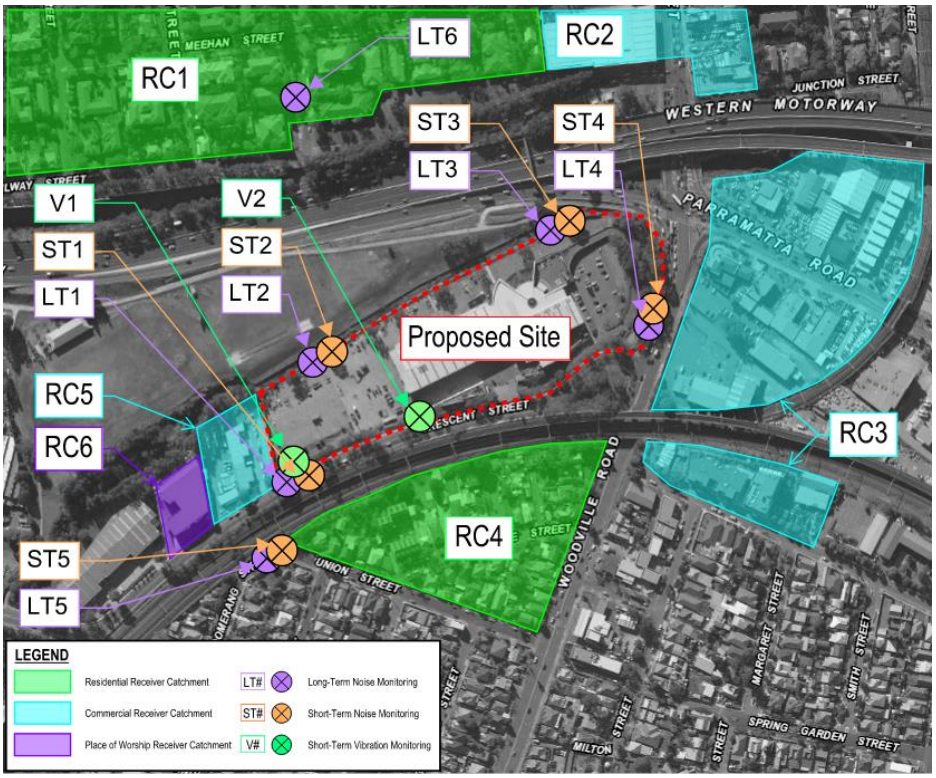
This letter has been provided by E-LAB Consulting on behalf of Tiberius (Holroyd) Pty Ltd in association with a State Significant Development Application (**SSDA**) for a proposed mixed-use development at 1 Crescent Street, Holroyd (**the site**).

The letter responds to matters raised by the Department of Planning, Housing and Infrastructure (**DPHI**) in relation to noise and vibration. Table 1 below identifies the relevant matter raised by DPHI and Applicant's response as part of the RtS package for Test of Adequacy submission dated 1st October 2025.

Table 1: Applicant Response to Submissions

ITEM	ISSUE RAISED	APPLICANT RESPONSE
DPHI-16 a	Clarify why a long or short term monitoring station (NVIA Figure 2) was not provided at the north-western side of Residential Receiver Catchment area RC4 (Bane Street) to measure the as-existing noise level(s), noting the proximity of this point to affected residences and that the NVIA recommends monitoring in this location (NVIA Figure 7) as part of the future noise management / mitigation measures	LT5 and ST5 monitoring location (refer to Figure 3) was used as the representative location for RC4. The north western side of RC4 was determined not suitable at the time of monitoring due to reflection effect from the residential boundary fencing and extraneous noise sources (i.e. construction noise) that was identified at the time of noise monitor install which would not provide representative background noise levels of the residential receiver catchment. Note that noise monitoring recommended in Figure 7 is related to mitigating construction noise impacts to receivers within the nominated catchments.

Figure 3 of SSDA Acoustic Report: Acoustic site plan identifying the surrounding noise-sensitive receivers and noise monitoring locations



Following Test of Adequacy, DPHI have returned comments back on the RtS package as provided in Table 2.

Table 2: DPHI Response to RtS submission

ITEM	DPHI COMMENT
DPHI-16 a	16(a) – the NVIA states that it did not include noise monitoring for one large residential receiver zone as construction works were occurring at the time. However, assuming these have stopped and noting there is no noise information for this receiver, the NVA must be updated to undertake the monitoring now.

We confirm that at the time of monitoring, noise monitoring location for LT5 and ST5 was selected as the location representative of receiver catchment RC4 for the following reasons:

- A site survey and was carried out at the time of noise monitor deployment to ensure background noise levels at LT5 and ST5 were similar to the other locations within RC4.
- Monitors were installed immediately west of RC4 due to access constraints and security of the noise monitor, i.e. low risk of vandalism or theft if located away from the front or behind residential properties.
- Installing along the north-western boundary of RC4 would not have been suitable given residential boundary fencing which provide reflection effects on the noise monitor and not provide representative background noise level as shown in Figure 2. However the location nominated provide same line of sight to the primary noise source (rail noise) that form part of the noise environment within this receiver catchment.

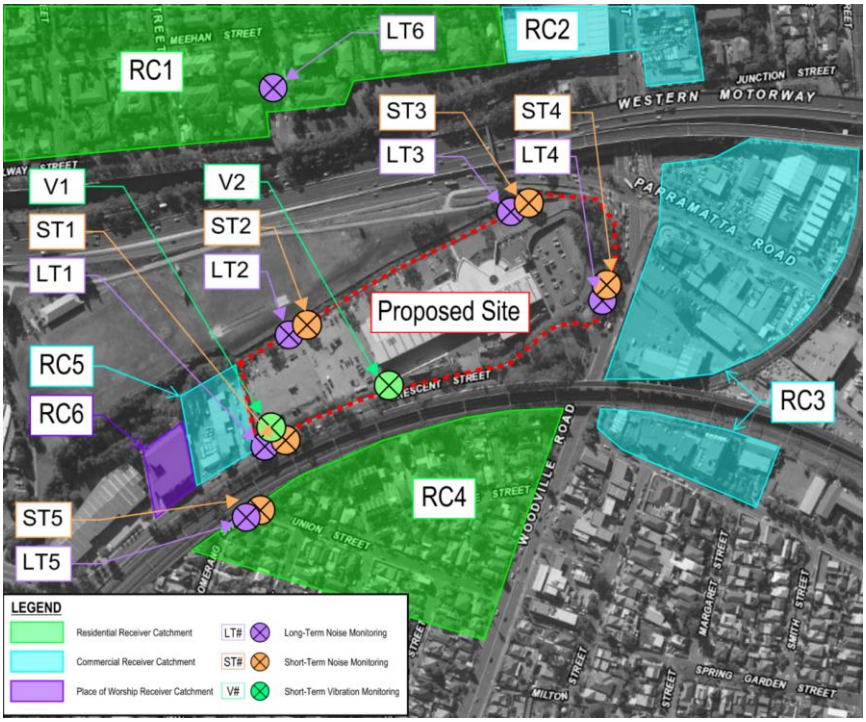
Figure 2: Residential boundary fence location



- Construction works were occurring towards Blane Street which would not provide accurate representation of the surrounding noise environment, therefore the monitoring location on Union Street was selected to provide sufficient shielding and no contribution from the construction works.
- Noise monitoring outside of receiver catchments is typically acceptable and has been approved on previous SSDA submissions. Project examples can be provided upon request.
- Noise monitoring approach as noted above has been carried out in line with the NSW EPA Noise Policy for Industry.

If DPHI prefer that the noise monitor location fall within RC4, the receiver catchment map can be revised so that RC4 can be extended past Union Street to capture the monitor within the catchment, see Figure 3. Note that this is update does not change the noise monitoring data and assessments within the SSDA Acoustic Report.

Figure 3: Proposed updated site map



We believe that further noise monitoring will have the same limitations on install locations, and should additional noise monitoring be carried out, the results of the monitoring will not impact the outcome of the assessments within the SSDA Acoustic report.

Please don’t hesitate to contact the undersigned if you have any questions on the content of this letter.

Kind Regards,

E-LAB Consulting



Teresa D Nguyen | Associate

Acoustics and Vibration

BEng (Mech, Hons), M.AAS



www.e-lab.com.au