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Environmental Noise Impact Assessment

New Education Campus – Minarah College
268 – 278 Catherine Fields Road, Catherine Field, NSW

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7280-1.2R

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Prepared For:
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1.0 INTRODUCTION

1.1 Overview

This Environmental Noise Impact Assessment Report has been prepared by Day Design Pty Ltd on behalf of the Minarah College (the Applicant). It accompanies an Environmental Impact Statement (EIS) in support of State Significant Development Application (SSD-30759158) for Minarah College Catherine Field at 268 and 278 Catherine Fields Road, Catherine Field, NSW (the site).

1.2 The Proposal

Minarah College Catherine Field will be a co-educational K-12 school accommodating 1,580 students, 840 in primary school and 660 in high school. There will also be an Early Learning Centre (ELC) for 60 students and a School for Specific Purpose (SSP) for 20 students. The new school will be constructed in stages, growing in line with growth in the local population.

The proposal seeks consent for:

- Demolition of the existing dwellings and ancillary structures on-site;
- The construction of the following:
    - One-storey early learning centre with attached two-storey administration building to service the high school and early learning centre;
    - Two-storey primary school building comprising of primary school classrooms, SPP classrooms, primary school hall which attached outside school hours care (OSHC);
    - Two-storey high school building comprising high school classrooms;
    - Two-storey high school hall;
    - Shared one-storey canteen adjoining the high school building; and
    - Shared library located on the second storey above administration building below.
- Site access from Catherine Fields Road at two points with a bus zone, 30 kiss and drop car parking spaces, and car parking;
- Consolidation of the allotments;
- Associated site landscaping and public domain improvements;
- An on-site car park for 138 parking spaces; and
- Construction of ancillary infrastructure and utilities as required.

The purpose of this Environmental Noise Impact Assessment Report is to assess the potential noise impact the proposal may have on the acoustic amenity of the adjacent developments and the local neighbourhood.

1.3 Response to SEARS

The Environmental Noise Impact Assessment Report is required by the Secretary's Environmental Assessment Requirements (SEARs) for **SSD-30759158**. This table identifies the SEARs and relevant reference within this report.

Table 1 SEARS & Relevant Reference

SEARs Item	Report Reference
11. Noise and Vibration • *Provide a noise and vibration assessment prepared in accordance with the relevant NSW Environment Protection Authority (EPA) guidelines. The assessment must detail construction and operational noise (including any public-address system, events, and out of hours use of school facilities) and vibration impacts on nearby sensitive receivers and structures, considers noise intrusion, and outline the proposed management and mitigation measures that would be implemented.*	*See Sections 2.0 to 10.0 of this report for operational noise assessment.* *The assessment of construction noise and vibration emissions during the construction phase of the development are addressed in Day Design's 'Construction Noise and Vibration Management Plan' Report, Report No. 7280-1.3R, dated 14 April 2022, submitted as part of this application.*

2.0 CONSULTING BRIEF

Day Design Pty Ltd was engaged by Midson Group on behalf of Minarah College to carry out an acoustic assessment of the proposed new education campus to be known as Minarah College Catherine Field at 268-278 Catherine Fields Road, Catherine Field, NSW. This commission involves the following:

Scope of Work:

- Inspect the site and environs
- Measure the background noise levels at critical locations and times
- Establish acceptable noise level criteria
- Quantify noise emissions from the proposed education campus
- Calculate the level of noise emission, taking into account building envelope transmission, screen walls and distance attenuation
- Prepare a site plan identifying the development and nearby noise sensitive locations
- Provide recommendations for acoustical treatment (if necessary)
- Prepare an Environmental Noise Impact Assessment Report.

3.0 PROJECT DESCRIPTION & SUMMARY OF FINDINGS

Minarah College propose to submit a State Significant Development Application (SSDA) to construct a new education campus, to be known as Minarah College Catherine Field(the College) at 268-278 Catherine Fields Road, Catherine Field, NSW (the Site).

The Site is situated on land zoned *RU4: Primary Production Small Lots* under Camden Local Environmental Plan (CLEP) 2010, and comprises of two Lots being Lot 11 in DP 833983 (268 Catherine Fields Road) and Lot 12 in DP 833784 (278 Catherine Fields Road). Each of the Lots currently contain a residential dwelling, with associated sheds and auxiliary structures.

The Site is bounded by land zoned *RU4: Primary Production Small Lots* to the north, east and west, and *R5: Large Lot Residential* to the south. Residential dwellings are located on the Lots to the north, north-east, south and west (on the opposite side of Catherine Fields Road). The Lots to the east of the Site contain light industrial type buildings.

The nearest noise sensitive receptors to the Site, in various directions, are shown on Figure 1 and as follows in Table 2.

Table 2 Noise Sensitive Receptors

Receptor and Type	Address	Direction from site
R1 – Residential	286 Catherine Fields Rd	North
R2 – Residential	227-235 Deepfields Rd	North-East
R3 – Light Industrial	225 Deepfields Rd	East
R4 – Residential	16 Heatherfield Cl	South
R5 – Residential	14 Heatherfield Cl	South
R6 – Residential	12 Heatherfield Cl	South
R7 – Residential	260 Catherine Fields Rd	South
R8 – Residential	265 Catherine Fields Rd	South-West
R9 – Residential	271 Catherine Fields Rd	West
R10 – Residential	277 Catherine Fields Rd	West
R11 – Residential	285 Catherine Fields Rd	North-West

The proposal seeks approval for the following:

- Construction of an independent Islamic co-educational school catering for 1520 students from Kindergarten to Year 12, consisting of:
  - 840 place Primary School (PS) with school hall;
  - 660 place High School (HS); and
  - 20 place School for Specific Purposes (SSP) – 10 place PS & 10 place HS.

- Construction of a 60 place Early Learning Centre (ELC).
- Construction of shared facilities including – administration building with offices and staff break-out areas, amenities, multi-purpose hall, COLA, landscaped outdoor areas, resource centre (library), sports field, parking areas and drop off/pick up area/ driveway.

140 staff will be employed across the PS, HS, ELC and SSP.

Mechanical plant, including but not limited to air conditioning condenser units, will be required to serve the College buildings.

The proposed operating hours for College are:

PS:

- Monday – Friday: 8.20 am – 3.20 pm.

HS:

- Monday – Friday: 8.20 am – 3.20 pm.

SSP:

- Monday – Friday: 8.20 am – 3.20 pm.

ELC:

- Monday – Friday: 7.00 am – 6.00 pm.

PS Hall:

- Monday – Friday: 8.20 am – 3.20 pm.

Multi-Purpose Hall:

- Monday – Friday: 8.20 am – 3.20 pm & 5.00 pm – 9.00 pm; and
- Saturday – Sunday: 9.00 am – 10.00 pm.

Sports Field:

- Monday – Friday: 8.20 am – 3.20 pm & 5.00 pm – 9.00 pm; and
- Saturday – Sunday: 9.00 am – 9.00 pm.

The proposal is a State Significant Development (*SSD -30759158*) and has been issued by the NSW Department of Planning and Environment with the Secretary's Environmental Assessment Requirements (SEARs). The SEARs require an assessment against '*the relevant NSW Environment Protection Authority (EPA) guidelines'.* Generally, for educational developments, an assessment against the EPA's *Noise Policy for Industry 2017* and the NSW Department of Planning's (DoP) *Development Near Rail Corridors and Busy Roads – Interim Guideline,* are required.

As the proposal contains an ELC - defined as a *centre-based child care facility* in the CLEP - an assessment against the Association of Australasian Acoustical Consultant's *Guideline for Child Care Centre Acoustic Assessment* and the NSW EPA's *Road Noise Policy* has also been undertaken.

An acoustic assessment of the noise from the outdoor areas, general learning areas (GLAs), public address system and school bell, mechanical plant, halls, sports field and car parks/ driveway has been carried out to ensure the noise impact of the College, will not adversely affect the acoustic amenity of the nearby noise sensitive receptors. In addition, an acoustic assessment of the potential intrusive noise the College may be exposed to, such as from road traffic on Catherin Fields Road has been carried out.

Calculations show that, provided the recommendations in Section 8 of this report are implemented and adhered to, the level of noise emission – with the exception of noise emissions from students in the outdoor areas during active play - from the College will meet the acoustic requirements in Camden Council's *Environmental Noise Policy 2018*, the NSW Department of Planning and Environment's *SEPP (Educational Establishments and Child Care Facilities) 2017* and *Child Care Planning Guideline*, NSW Environment Protection Authority's (EPA) *Noise Policy for Industry* and *NSW Road Noise Policy* and the Association of Australasian Acoustical Consultants (AAAC) *Guideline for Child Care Centre Acoustic Assessment*.

Calculations also show that, noise emissions from students in the outdoor areas during active play will exceed the acoustic requirements in Camden Council's *Environmental Noise Policy 2018* causing a marginal increase to the existing ambient noise levels at adjacent developments and the local neighbourhood, which may just be noticeable to some listeners.

Also, although not applicable to this site, the proposal will also comply with the requirements of the State Environment Planning Policy (SEPP) (Transport and Infrastructure) 2021 and the Department of Planning and Environment's (DoPE) *Development Near Rail Corridors and Busy Roads – Interim Guideline.*

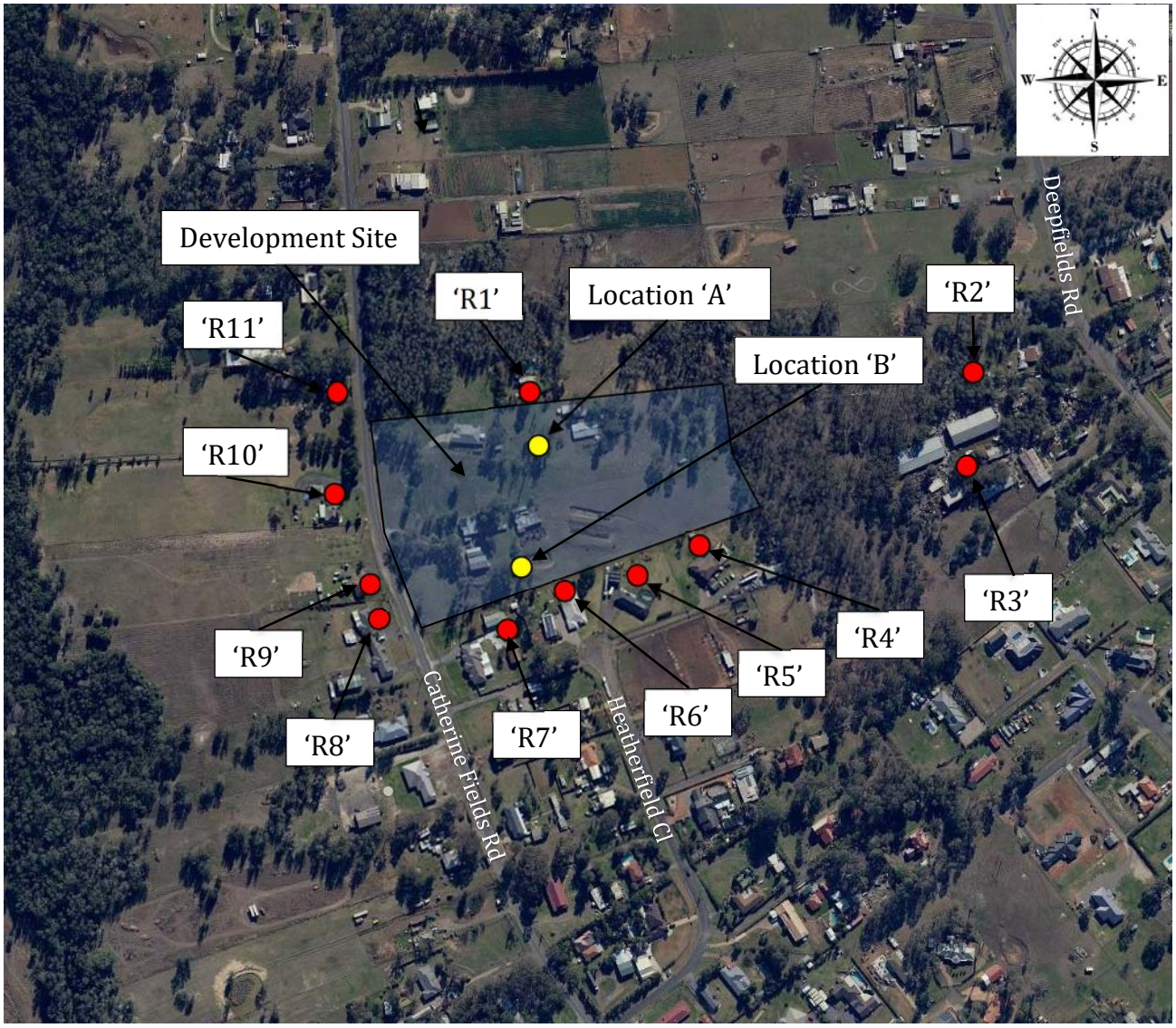


Figure 1 - Location Plan, 268 – 278 Catherine Fields Road, Catherine Field, NSW.

4.0 MEASURED NOISE LEVELS

4.1 Existing Ambient Noise Levels

4.1.1 Measured Ambient Noise Levels

In order to assess the severity of a possible environmental noise problem in a residential area it is necessary to measure the ambient background noise level at the times and locations of worst possible annoyance. The lower the background noise level, the more perceptible the intrusive noise becomes and the more potentially annoying.

The ambient L_{90} background noise level is a statistical measure of the sound pressure level that is exceeded for 90% of the measuring period (typically 15 minutes).

The Rating Background Level (RBL) is defined by the Environment Protection Authority (NSW) as the median value of the (lower) tenth percentile of L_{90} ambient background noise levels for day, evening or night periods, measured over a number of days during the proposed days and times of operation.

The places of worst possible annoyance are the nearby residential dwellings. These locations are shown in the Site Plan on Figure 1 as 'R1' to 'R2' and 'R4' to 'R11'. The times of worst possible annoyance will be during the day or evening when the College is operating.

Ambient noise levels were measured in 278 and 268 Catherine Fields Road, shown as Locations 'A' and 'B', respectively, on Figure 1, for the following periods:

- Location 'A'
  - Friday 15 October to Friday 22 October 2021.
- Location 'B'
  - Wednesday 25 August to Wednesday 1 September 2021;
  - Thursday 2 September to Friday 10 September 2021; and
  - Friday 15 October to Friday 22 October 2021.

Note, a noise logger was placed near Location 'A' (circa 25 meters to the north) on Wednesday 25 August 2021. During an inspection on 2 September 2021 to replace the batteries, it was discovered the noise logger had been removed by a third party – at the time of writing this report, the noise logger and associated data have not been recovered.

The early morning, day and evening ambient noise levels are presented in the attached Appendix B1, B2, B3 and B4, and also below in Table 3.

Table 3 Ambient Noise Levels – 268 – 278 Catherine Fields Rd, Catherine Field

Noise Measurement Location	Date & Time Period	L_{90} Rating Background Level	Existing L_{eq} Noise Level
Location 'A' - 278 Catherine Fields Road	*15/10 to 22/10/2021*		
	Early Morning (6.30 am to 7 am)	**45 dBA**	**n/a**
	Day (7 am to 6 pm)	**39 dBA**	**60 dBA**
	Evening (6 pm to 10 pm)	**41 dBA**	**61 dBA**
Location 'B' - 268 Catherine Fields Road	*25/08 to 01/09/2021*		
	Early Morning (6.30 am to 7 am)	**44 dBA**	**n/a**
	Day (7 am to 6 pm)	**36 dBA**	**49 dBA**
	Evening (6 pm to 10 pm)	**35 dBA**	**48 dBA**
	2/09 to 10/09/2021		
	Early Morning (6.30 am to 7 am)	**41 dBA**	**n/a**
	Day (7 am to 6 pm)	**38 dBA**	**49 dBA**
	Evening (6 pm to 10 pm)	**34 dBA**	**44 dBA**
	15/10 to 22/10/2021		
	Early Morning (6.30 am to 7 am)	**42 dBA**	**n/a**
	Day (7 am to 6 pm)	**36 dBA**	**51 dBA**
	Evening (6 pm to 10 pm)	**40 dBA**	**54 dBA**
	25/08 to 01/09/2021, 2/09 to 10/09/2021 & 15/10 to 22/10/2021		
	Early Morning (6.30 am to 7 am)	**42 dBA**	**n/a**
	Day (7 am to 6 pm)	**36 dBA**	**50 dBA**
	Evening (6 pm to 10 pm)	**36 dBA**	**49 dBA**

Meteorological conditions during the monitoring typically consisted of clear skies. Where applicable, rain or wind affected data has been removed from the assessment period. Temperatures ranged from 2 to 27°C from *25/08 to 01/09/2021,* 0 to 28°C from *2/09 to 10/09/2021* and 7 to 27°C from *15/10 to 22/10/2021*. Atmospheric conditions were generally ideal for noise monitoring. Noise measurements were therefore considered reliable and typical for the receptor areas. Meteorological data was gathered from weather station ID 068192 (Camden Airport AWS NSW) circa 9.13 kms away.

Fact Sheet A: Determining existing noise levels, Section A1 of the NPI states the following in relation to determining background noise levels:

Background noise levels need to be determined before intrusive noise can be assessed. The background noise levels to be measured are those that are present at the time of the noise assessment and without the subject development operating. For the assessment of modifications to existing premises, the noise from the existing premises should be excluded from background noise measurements. The exception is where the premises has been operating for a significant period of time and is considered a normal part of the acoustic environment; it may be included in the background noise assessment under the following circumstances:

- *the development must have been operating for a period in excess of 10 years in the assessment period/s being considered and is considered a normal part of the acoustic environment; and*
- *the development must be operating in accordance with noise limits and requirements imposed in a consent or licence and/or be applying best practice.*

Therefore, considering the above, ambient noise measurements should include the noise contribution from the nearby light industrial premises and local agriculture within the local area, as it forms part of the existing acoustic environment – noise from the operation of industrial premises and local agriculture is typical/expected in this area.

Section B1.1 'Instrument requirements and siting', paragraph 2 of the *NPI* requires monitoring to take place at a 'site that is truly representative of the noise environment at the residence'. A representative location with a similar noise environment was selected to conduct the ambient noise measurements on the Site, being adjacent to the potentially and reasonably most affected receiver locations.

Section B1.2 'Measurement procedure', point 2, of the *NPI* specifies that monitoring should take place for 'each day of the week the proposed development will be operating and over the proposed operating hours'.

Section B1.3, under 'Exception' states, '*re-monitoring may not be required, where monitoring contains weather-affected data, if it can be ascertained that the affected samples are not within the expected 'quieter' times of an assessment period (day/evening/night); that is, those time periods where the lowest 10th percentile background noise level might occur.'* Detailed analysis of the weather affected data, shown in Appendix B1 to B4, concluded that majority of the 10th percentile background noise levels occurred during the quieter time periods – being 7 am to 9 am Saturday and Sunday and 9 am to 3 pm Monday to Friday - and were not affected by adverse weather.

In accordance with Fact Sheet A and Fact Sheet B of the NPI, Day Design is of the opinion the measured RBLs in Location 'B' are representative of the noise environment at the most affected residential receivers 'R1' to 'R2' and 'R4' to 'R11', and have been adopted as the assessment RBLs in this report.

4.1.2 Description of Existing Acoustic Environment at Location 'B'

Site inspections of the residential areas surrounding Location 'B' were conducted by the author with the following observations made:

- the area is dominated by local road traffic, local fauna, local light industrial and local agriculture noise;
- through traffic on Catherine Fields Road is intermittent; and
- the area is predominantly large rural residential Lots.

4.2 Measured Road Traffic Noise Levels

The College is directly affected by road traffic noise from Catherine Fields Road, which carries moderately low traffic volumes.

The ambient noise levels measured at Location 'B' are presented in the attached **Appendix B2, B3 and B4**.

Based on the long term measurements from Locations 'B', and the calculation method shown in Appendix B, Section B3 of the NSW Road Noise Policy for the 'overall $L_{Aeq, (1\ hour)}$', the calculated day time traffic noise levels used in the calculations in Sections 6.8.8 and 7.0 of this report are shown in Table 4.

Table 4 Calculated $L_{Aeq, 1\ hour}$ Road Traffic Sound Pressure Levels

Description	dBA
Location 'B' – Daytime $L_{Aeq, 1\text{-}hour}$ (7 am – 10 pm)	**50.3**

Note: where the existing road traffic noise level already exceeds the Road Traffic Noise Assessment Criterion shown in Table 6 (Section 5.2.2) below at the residential receiver, an increase of 2 dB is considered negligible – see Section 3.4 of the RNP.

We are of the opinion that the noise levels above in Table 4 are typical for this area, and have adopted these values in the design of noise insulation for the proposed development.

5.0 ACOUSTIC CRITERIA

This Section presents the noise guidelines applicable to this proposal and establishes the project noise trigger levels.

5.1 NSW Department of Planning and Environment

5.1.1 Planning Secretary's Environmental Assessment Requirements (SEARs)

The NSW Department of Planning and Environment (DoPE) issued the Planning Secretary's Environmental Assessment Requirements (SEARs) for the preparation of an Environmental Impact Statement (EIS) for the Minarah College development, 268-278 Catherine Fields Road, Catherine Field, NSW (*SSD -30759158, 29 October 2021*). As part of the SEARs, the following requirements relating to acoustics must be satisfied:

'11. Noise and Vibration

> *Provide a noise and vibration assessment prepared in accordance with the relevant NSW Environment Protection Authority (EPA) guidelines. The assessment must detail construction and operational noise (including any public-address system, events, and out of hours use of school facilities) and vibration impacts on nearby sensitive receivers and structures, considers noise intrusion, and outline the proposed management and mitigation measures that would be implemented.'*

Note, considering the distances to the nearest potentially affected receivers and the general operation and use of the College, ie students, staff, passenger vehicles, school buses and standard mechanical plant and equipment, is not expected to emit vibration at a level that may cause human discomfort and/or structural damage. Noise and vibration emissions from construction activities on the site are addressed in Day Design's *'Construction Noise and Vibration Management Plan'* Report, Report No. 7280-1.3R, dated 14 April 2022, submitted as part of this application.

5.1.2 SEPP (Educational Establishments and Child Care Facilities) 2017

The NSW DoPE published the State Environmental Planning Policy (SEPP) (Educational Establishments and Child Care Facilities) 2017 on 1 September 2017. The relevant parts of the SEPP to this proposal have been extracted and are revised below.

Part 3 – Early education and care facilities – specific development controls,

'26 Centre-based child care facility—development control plans

(1) A provision of a development control plan that specifies a requirement, standard or control in relation to any of the following matters (including by reference to ages, age ratios, groupings, numbers or the like, of children) does not apply to development for the purpose of a centre-based child care facility:

(a) operational or management plans or arrangements (including hours of operation),

(b) demonstrated need or demand for child care services,

(c) proximity of facility to other early childhood education and care facilities,

(d) any matter relating to development for the purpose of a centre-based child care facility contained in:

(i) the design principles set out in Part 2 of the Child Care Planning Guideline, or

(ii) the matters for consideration set out in Part 3 or the regulatory requirements set out in Part 4 of that Guideline (other than those concerning building height, side and rear setbacks or car parking rates).

(2) This clause applies regardless of when the development control plan was made.'

Part 4 Schools - specific development controls

35 Schools – development permitted with consent

(1) Development for the purpose of a school may be carried out by any person with development consent on land in a prescribed zone.

(9) A provision of a development control plan that specifies a requirement, standard or control in relation to development of a kind referred to in subclause (1), (2), (3) or (5) is of no effect, regardless of when the development control plan was made.

Also, 'Schedule 4 Schools – design quality principles' of the SEPP requires the following:

'Principle 5. Amenity

Schools should provide pleasant and engaging spaces that are accessible for a wide range of educational, informal and community activities, while also considering the amenity of adjacent development and the local neighbourhood.'

5.1.3 SEPP (Transport and Infrastructure) 2021 - Clause 2.119

The NSW DoPE published the *"Development Near Rail Corridors and Busy Roads – Interim Guidelines"* in 2008. The Guidelines refer to Clause 102 (Road) of the SEPP (Infrastructure) 2007 for the noise criteria for developments affected by road traffic noise. The SEPP (Infrastructure) 2007 was replaced by the SEPP (Transport and Infrastructure) 2021 on 1 March 2022

Chapter 2, Part 2.2, Division 17, Subdivision 2, Clause 2.119 of the SEPP (Transport and Infrastructure) 2021 details the following in with regards to road noise and vibration:

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.

It is unlikely that the AADT will reach 20,000 on roads surrounding the College site, therefore the SEPP is not applicable.

5.1.4 Child Care Planning Guideline

The NSW Department of Planning and Environment (DoPE) published the Child Care Planning Guideline (CCPG) in September 2021 as a supplement to the State Environmental Planning Policy (SEPP) (Educational Establishments and Child Care Facilities) 2017.

The SEPP states that "*a consent authority must take into consideration this Guideline* [CCPG] *when assessing a development application (DA) for a centre-based child care facility.*" The SEPP also determines the Guideline "*will take precedence over a Development Control Plan (DCP), with some exceptions, where the two overlap in relation to a child care facility."*

The Guideline was introduced to *'inform state and local government, industry and the community about how good design can maximise the safety, health and overall care of young children. At the same time, it aims to deliver attractive buildings that are sympathetic to the streetscape and appropriate for the setting while minimising any adverse impacts on surrounding areas. It will*

help achieve a high level of design that is practical and aligned with the National Quality Framework.'

Section 3, *Matters for Consideration*, Subsection 3.5 *Visual and acoustic privacy*, contains the following considerations:

'Considerations

Objective: To minimise the impact of child care facilities on the acoustic privacy of neighboring residential developments.

C22

A new development, or development that includes alterations to more than 50 per cent of the existing floor area, and is located adjacent to residential accommodation should:

- *provide an acoustic fence along any boundary where the adjoining property contains a residential use. An acoustic fence is one that is a solid, gap free fence.*
- *ensure that mechanical plant or equipment is screened by solid, gap free material and constructed to reduce noise levels e.g. acoustic fence, building, or enclosure.*

C23

A suitably qualified acoustic professional should prepare an acoustic report which will cover the following matters:

- *identify an appropriate noise level for a child care facility located in residential and other zones*
- *determine an appropriate background noise level for outdoor play areas during times they are proposed to be in use*
- *determine the appropriate height of any acoustic fence to enable the noise criteria to be met.'*

Subsection 3.6 *Noise and air pollution*, contains the following consideration:

'Considerations

Objective: To ensure that outside noise levels on the facility are minimised to acceptable levels.

C24

Adopt design solutions to minimise the impacts of noise, such as:

- *creating physical separation between buildings and the noise source*
- *orienting the facility perpendicular to the noise source and where possible buffered by other uses*
- *using landscaping to reduce the perception of noise*
- *limiting the number and size of openings facing noise sources*

- *using double or acoustic glazing, acoustic louvres or enclosed balconies (wintergardens)*
- *using materials with mass and/or sound insulation or absorption properties, such as solid balcony balustrades, external screens and soffits*
- *locating cot rooms, sleeping areas and play areas away from external noise sources.*

C25

An acoustic report should identify appropriate noise levels for sleeping areas and other non-play areas and examine impacts and noise attenuation measures where a child care facility is proposed in any of the following locations:

- *On industrial zoned land*
- *Where the ANEF contour is between 20 and 25*
- *Along a railway or mass transit corridor, as defined by State Environmental Planning Policy (infrastructure) 2007*
- *On a major or busy road*
- *Other land that is impacted by a substantial external noise.'*

5.2 NSW Environment Protection Authority

5.2.1 Noise Policy for Industry

The NSW Environment Protection Authority (EPA) published the *Noise Policy for Industry* (NPI) in October 2017. The *NPI* is specifically aimed at assessing noise from industrial noise sources listed in Schedule 1 of the Protection of the Environment Operations Act 1997 (POEO, 1997).

The *NPI* provides a framework to assess noise emission from a premises, and whether that premises produces intrusive or non-intrusive noise and/or maintains the acoustic amenity.

Section 1.4 of the *NPI* specifies the types of industrial noise sources the policy is designed for, such as mechanical plant and equipment and vehicle movements within the premises and/or on private roads, etc. In addition, Section 1.5 of the *NPI* lists the type of noise sources to which the policy does not apply to, which includes *'noise sources covered by regulation (domestic/neighbourhood uses)'.*

The *NPI* **is not** applicable (Section 1.5 of the NPI - see above) to noise associated with students engaged in active/passive play in the outdoor/indoor areas of an educational establishment. However, the amenity noise levels may be used as a screening test to establish whether further investigation into the likely effects, if any, on the acoustic amenity (as per the *SEPP*) of the local area is warranted.

Section 2.1 of the *NPI* states the following:

"Intrusive noise levels are only applied to residential receivers (residences). For other receiver types identified in Table 2.2, only the amenity levels apply."

5.2.1.1 Project Intrusiveness Noise Levels

The EPA states in Section 2.3 of its NSW *NPI* (October 2017) that the intrusiveness of an industrial noise source may generally be considered acceptable if the level of noise from the source (represented by the L_{Aeq} descriptor), measured over a 15-minute period, does not exceed the rating background noise level by more than 5 dB when beyond a minimum threshold (EPA *NPI*, 2017, Section 2.3).

The Rating Background Level at Logger Location 'B', was 42 dBA in the early morning and 36 dBA during the day and in the evening (see Table 3). Therefore, the acceptable $L_{eq,\ 15\ minute}$ noise intrusiveness criteria in this area is:

- (42 + 5 =) 47 dBA $L_{eq,\ 15\ minute}$ in the early morning; and
- (36 + 5 =) 41 dBA $L_{eq,\ 15\ minute}$ during the day and in the evening.

5.2.1.2 Project Amenity Noise Levels

Depending on the type of area in which the noise is being made, there is a certain reasonable expectancy for noise amenity. The NSW *NPI* provides a schedule of recommended L_{eq} industrial noise levels that under normal circumstances should not be exceeded. If successive developments occur near a residential area, each one allowing a criterion of background noise level plus 5 dB, the ambient noise level will gradually creep higher.

Section 2.4, Table 2.3 of the *NPI* provides guidance on assigning residential receiver noise categories. Site inspections of the residential areas surrounding Location 'B' were conducted by the author during the day period, see Section 4.1.2 for observations.

The observations in Section 4.1.2 and the measured ambient noise levels in Table 3 indicate the residential area around Location 'B' is considered 'Rural', as per Table 2.3 of the *NPI*.

Table 5 Amenity Noise Levels

Receiver	Noise Amenity Area	Time of Day	L_{eq}, dBA, Recommended Amenity Noise Level
Residential	Rural	Day	50
		Evening	45
		Night	40
Industrial premises	All	When in use	70

The L_{Aeq} is determined over a 15-minute period for the project intrusiveness noise level and over an assessment period (day, evening and night) for the project amenity noise level. This leads to the situation where, because of the different averaging periods, the same numerical value does not necessarily represent the same amount of noise heard by a person for different time periods. To standardise the time periods for the intrusiveness and amenity noise levels,

the *NPI* assumes that the **$L_{Aeq,15min}$** will be taken to be equal to the **$L_{Aeq,\ period}$ + 3 decibels (dB)** (Section 2.2, NPI).

Compliance with the amenity criteria will limit ambient noise creep. **Section 2.4** of the *NPI* states the following:

*'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 for industrial developments = recommended amenity noise level (Table 2.2) minus 5 dB (A)".***

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

3. *Where the resultant project amenity noise level is 10 dB or more lower than the existing industrial noise level. In this case the project amenity noise levels can be set at 10 dB below existing industrial noise levels if it can be demonstrated that existing industrial noise levels are unlikely to reduce over time.'*

In addition, the level of transport noise, road traffic noise in particular, may be high enough to make noise from an industrial source effectively inaudible, even though the L_{Aeq} noise level from that industrial noise source may exceed the project amenity noise level. In such cases the project amenity noise level may be derived from the $L_{Aeq,\ period\ (traffic)}$ minus 15 dBA.

The existing L_{eq} noise level at Location 'B' was 50 dBA during the day and 49 dBA in the evening (see Table 3), In accordance with Table 2.3 of the *NPI*, Location 'B' is considered to be a 'Rural' Noise Amenity Area. Therefore, the acceptable amenity noise level for the residential receptors in this area, are:

- (50 – 5 + 3 =) 48 dBA $L_{eq,\ 15\ minute}$ during the day; and
- (45 – 5 + 3 =) 43 dBA $L_{eq,\ 15\ minute}$ in the evening.

The acceptable amenity criteria for the adjacent light industrial premises, 'R3', is:

- (70 – 5 + 3 =) 68 dBA $L_{eq,\ 15\ minute}$ when in use.

5.2.1.3 Sleep Disturbance Criteria

The EPA's *Noise Policy for Industry* states in Section 2.5 that the potential for sleep disturbance from maximum noise level events from premises during the night-time period needs to be considered. Sleep disturbance is considered to be both awakenings and disturbance to sleep stages.

Sleep may be disturbed if the subject development night-time noise levels at a residential location exceed the following:

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

Where either of the above criteria are triggered, a detailed maximum noise level event assessment should be undertaken.

The RBL at Location 'B' was 42 dBA in the early morning (see Table 3).

Therefore, the acceptable $L_{eq, 15\ minute}$ and L_{AFmax} noise sleep disturbance criteria in this area is:

- (42 + 5 =) 47 dBA $L_{eq, 15\ minute}$ in the early morning; and/or
- (42 + 15 =) 57 dBA L_{AFmax} in the early morning.

5.2.2 NSW Road Noise Policy

The NSW Road Noise Policy (RNP), in Section 2.3.1, sets out road traffic noise assessment criteria for residential land uses in Table 3. The information in that table is extracted below in Table 6.

Table 6 Road Traffic Noise Assessment Criterion - Residential

Road Category	Type of project/land use	Assessment Criteria – dB(A) Day (7 am – 10 pm)
Local roads	6. Existing residences affected by **additional traffic** on existing local roads generated by land use developments	$L_{Aeq, (1\ hour)}$ 55 (external)

On-road traffic is to be assessed at 1 metre from the most affected façade of the potentially most affected residential receiver locations

5.3 Camden Council Environmental Noise Policy 2018

Camden Council, in their Environmental Noise Policy 2018, require an acoustic report to accompany Development Applications for child care centres and educational establishments, as extracted below:

'Noise from Child Care Centres and Educational Establishments

1. *Development applications for child care centres and educational establishments must be accompanied by an acoustic report.*
2. *Child care centres and educational establishments are to be designed to not exceed the following noise levels:*
   - $L_{Aeq\ (15\ minutes)}$ *noise level from children in the outdoor areas of the site must not exceed the background* L_{A90} *sound level by more than 10 dBA when measured at the boundary of the nearest or most affected residential premises (or if the boundary is more than 30 metres from a residential dwelling, at the most affected point within 30 metres of a residence).*
   - $L_{Aeq\ (15\ minutes)}$ *noise levels from all other operations (ie car park, plant) must not exceed the background* L_{A90} *sound level by more than 5 dB(A) when measured at the boundary of the nearest or most affected residential premises.*

   Note: If there is an inconsistency between the SEPP (Education Establishment and Child Care Facilities) 2017 (and Child Care Planning Guidelines) and the DCP, the SEPP will take precedence.'

5.4 AAAC – Guideline for Child Care Centres Acoustic Assessment

The AAAC published a guideline relating to the assessment of noise from Child Care Centres called "Guideline for Child Care Centre Acoustic Assessment", first in May 2008, again in October 2013 and most recently updated in September 2020.

Section 3 of the AAAC Guideline states the following in relation to noise attenuation and generation for Child Care Centres:

3.2 Criteria - Residential Receptors

3.2.1 Outdoor Play Area

The noise impact from children at play in a child care centre differs from the domestic situation in that it is a business carried out for commercial gain, the number of children can be far greater than in a domestic situation and the age range of the children at the centre does not significantly vary over time as it would in a domestic situation. However, the noise from children is vastly different, in both character and duration, from industrial, commercial or even domestic machine noise. The sound from children at play, in some circumstances, can be pleasant, with noise emission generally only audible during the times

the children play outside. Night time, weekend or public holiday activity is not typical and child care centres have considerable social and community benefit.

***Base Criteria** – With the development of child care centres in residential areas, the background noise level within these areas can at certain times, be low. Thus, a base criterion of a contributed $L_{eq,15min}$ 45 dB(A) for the assessment of outdoor play is recommended in locations where the background noise level is less than 40 dB(A).*

***Background Greater Than 40 dB(A)** – The contributed $L_{eq,15min}$ noise level emitted from an outdoor play and internal activity areas shall not exceed the background noise level by more than 5 or 10 dB at the assessment location, depending on the usage of the outdoor play area. AAAC members regard that a total time limit of approximately 2 hours outdoor play per morning and afternoon period should allow an emergence above the background of 10 dB (ie background +10 dB if outdoor play is limited to 2 hours in the morning and 2 hours in the afternoon).*

***Up to 4 hours (total) per day** – If outdoor play is limited to no more than 2 hours in the morning and 2 hours in the afternoon, the contributed $L_{eq,15min}$ noise level emitted from the outdoor play shall not exceed the background noise level by more than 10 dB at the assessment location.*

***More than 4 hours (total) per day** – If outdoor play is not limited to no more than 2 hours in the morning and 2 hours in the afternoon, the contributed $L_{eq,\ 15min}$ noise level emitted from the outdoor play area shall not exceed the background noise level by more than 5 dB at the assessment location.*

The assessment location is defined as the most affected point on or within any residential receiver property boundary. Examples of this location may be:

- *1.5 m above ground level;*
- *On a balcony at 1.5 m above floor level;*
- *Outside a window on the ground or higher floors.*

3.2.2 Indoor Play Area, Mechanical Plant, Pick up and Drop off

The cumulative $L_{eq,\ 15\ minute}$ noise emission level resulting from the use and operation of the child care centre, with the exception of noise emission from outdoor play discussed above, shall not exceed the background noise level by more than 5 dB at the assessment location as defined above. This includes the noise emission resulting from:

- *Indoor play;*
- *Mechanical plant;*
- *Drop off and pick up;*
- *Other activities/operations (not including outdoor play).*

3.2.3 Sleep Disturbance

The noise impact of staff arrivals, setup, cleaning or other on-site activities prior to 7 am or during night-time hours should be assessed at nearby residential premises. The L_{Amax} noise level emitted from vehicles arriving and parking, depending on the requirements of the state or territory where the centre is located shall not exceed the background noise level by more than 15 dB outside the nearest habitable room window.

Section 5 of the AAAC Guideline states the following in relation to external noise impact on children within Child Care Centres.

5.1 Road, Rail Traffic and Industry

The $L_{Aeq,1hr}$ noise level from road traffic, rail or industry at any location within the outdoor play or activity area during the hours when the Centre is operating should not exceed 55 dB(A).

The $L_{Aeq,1hr}$ noise level from road traffic, rail or industry at any location within the indoor activity or sleeping areas of the Centre during the hours when the centre is operating shall be capable (ie with doors and/or windows closed) of achieving 40 dB(A) within indoor activity areas and 35 dB(A) in sleeping areas.

5.5 Project Noise Trigger Levels

Noise emissions from the use of the outdoor play areas, indoor general learning areas (GLAs), mechanical plant, halls, sports fields and car parks are assessed against Camden Council's Environmental Noise Policy 2018, potential sleep disturbance impacts that may arise from staff arriving at the ELC in the early mornings at the residential receivers are assessed against the EPA's NPI, as follows in Section 5.5.1.1 and 5.5.1.2. On - road traffic at the residential receivers has been assessed against the EPA's *RNP*, as follows in Section 5.5.1.3. Noise emissions from outdoor play areas, indoor general learning areas, mechanical plant, halls, sports fields and car parks at the industrial receiver are assessed against the EPA's NPI, as follows in Section 5.5.1.4.

Noise intrusion from local sources (road traffic) to the ELC are assessed against the *AAAC's Guideline,* as follows in Section 5.5.2.

5.5.1 Noise Emission Criteria

When all the above factors are considered, we find that the most stringent noise criteria are:

5.5.1.1 Residential Receivers

The following criteria will be applied for students playing in the outdoor play areas and the noise impact from the use of all other noise sources including the GLAs, mechanical plant, halls, sports field and car parks during the day period (7 am to 6 pm).

Residential Receivers – 'R1' to 'R2' & 'R4' to 'R11' – based on measured noise levels at Location 'B'

- (36 + 10 =) **46 dBA** $L_{Aeq,\ 15\ minute}$ during the day for outdoor play;
- (42 + 5 =) **47 dBA** $L_{Aeq,\ 15\ minute}$ in the early morning for all other noise sources; and
- (36 + 5 =) **41 dBA** $L_{Aeq,\ 15\ minute}$ during the day and evening for all other noise sources;

These criteria apply at the most-affected point on or within the residential property boundary – or, if that is more than 30 metres from the residence, at the most-affected point within 30 metres of the residence. For upper floors, the noise is assessed outside the nearest window.

5.5.1.2 Sleep Disturbance

Sleep disturbance will be assessed at 1 metre from the most affected façade of the potentially most affected residential receivers 'R1' and 'R7' to 'R11', for sleep disturbance. Compliance at the potentially most affected residential receiver locations will ensure compliance with the noise criteria at all other residential receiver locations.

The following criterion will be applied at 1 metre from the most affected façade of the residential receivers, for sleep disturbance:

'R1' and 'R7' to 'R11'– *Based on measured noise levels in Location 'B'*

- (42 + 15 =) **57 dBA** L_{AFmax} between 6.30 am and 7 am (staff arriving at ELC).

5.5.1.3 On – Road Traffic Noise Criteria

The following criterion will be applied at 1 metre from the most affected façade of the potentially most affected residential receiver locations 'R1' and 'R6' to 'R11'; compliance at the potentially most affected residential receiver locations will ensure compliance with the noise criteria at all other residential receiver locations, as follows:

- **55 dBA** (external) $L_{eq,\ 1\ hour}$ between 7 am and 6 pm.

Note: where the existing road traffic noise level already exceeds the Road Traffic Noise Assessment Criterion shown in Table 6 of this report at the residential receiver, an increase of 2 dB is considered negligible – see Section 3.4 of the RNP.

5.5.1.4 Industrial Receiver

The following criteria will be applied for students playing in the outdoor play areas and the noise impact from the use of all other noise sources including the GLAs, mechanical plant, halls, sports field and car parks during the day period (7 am to 6 pm) at the industrial receiver 'R3'.

- **68 dBA** (external) $L_{eq,\ 15\ minute}$ between 7 am and 6 pm.

The assessment location is defined as the most affected point on or within any commercial receiver property boundary.

5.5.2 Noise Intrusion Criteria - ELC

Road Traffic Intrusion - in accordance with the AAAC's Guideline:

- Internal traffic noise levels within the indoor play areas of the Centre should not exceed $L_{eq,\ 1\ hour}$ **40 dBA** during operating hours.
- External traffic noise levels in any outdoor play or activity area of the Centre should not exceed $L_{eq,\ 1\ hour}$ **55 dBA** during operating hours.

6.0 SCHOOL NOISE EMISSION

The main sources of noise from the College, will be as follows:

- Students engaged in active play in the outdoor play areas;
- Students inside the GLAs (including ELC rooms);
- Public address system and school bell;
- Mechanical plant;
- Use of the PS Hall and Multi-Purpose Hall;
- Use of the Sports Fields;
- Use of the Car Parks and Driveways.

The noise assessment was based on the drawings by Tonkin Zulaikha Greer Architects, for project number #21019, dated 31 March 2022, attached as Appendix C.

6.1 Outdoor Play Areas

Students will be outside for a range of times, including before school, recess, lunch, PE classes and after school, however the outdoor areas are only likely to be at capacity during recess and lunch.

In order to model the worst case scenario of noise emission from students outdoors at play, we have assumed that 2/3 of the (660 + 10 =) 670 HS students (447) and 2/3 of the (840 + 10 =) 850 PS students (567) will engage in active play at the one time, with half (223 HS and 283 PS) of those students engaged in active play (making noise) at any given time. It is assumed that the remainder of the students may be in internal areas or engaged in conversation and/or other quiet activities (reading, etc).

We have also assumed that all 60 of the ELC students will be outside engaged in active play during the same period. We have been advised the ELC students will be in the 3-5 year old age range, only.

Sound power levels of PS and HS students engaged in active play were previously measured for other similar projects and are presented below in Table 7. We believe these levels represent the typical $L_{eq,\ 15\ minute}$ maximum noise levels of student in outdoor areas and will be used in this noise assessment.

In addition, the AAAC has presented a range of A-weighted sound power levels per child in Table 1 of its '*Guideline for Child Care Centre Acoustic Assessment*'. The sound power levels for each group are presented in Table 7 and used in this assessment.

Table 7 $L_{eq,\ 15\ minute}$ Sound Power Levels – Students Playing in Outdoor Areas

Description	Sound Power Levels (dB) at Octave Band Centre Frequencies (Hz)								
	dBA	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
10 x students at play – PS	**89**	64	74	79	83	86	83	78	75
10 x students at play – HS	**90**	69	71	80	87	86	82	75	66
10 x children, 3 to 5 years	**87**	64	70	75	81	83	80	76	72
567 x PS students engaged in active play (283 students making noise)	**104**	79	89	94	98	101	98	93	90
447 x HS students engaged in active play (223 students making noise)	**103**	82	84	93	100	99	95	88	79
60 x ELC students engaged in active play	**95**	72	78	83	89	91	88	84	80

6.2 General Learning Areas

We have been advised that the maximum class size will be as follows:

- ELC – 20 students;
- SSP – 5 students;
- PS – 30 Students; and
- HS – 30 students.

During normal classroom activities, the main source of noise will be from the teachers and students talking. We have assumed that there may be a maximum of 1/3 (10) of the students talking normally. We have also assumed that the teacher in each classroom may be talking loudly.

Calculations assume students are distributed evenly throughout the inside of the GLAs and windows and doors are partially open (10 % of floor area).

Day Design Pty Ltd has previously measured and quantified the Octave Band Centre Frequency sound power level of teachers and students talking at different noise levels. The $L_{eq,\ 15\ minute}$ sound power levels of teachers and students are shown below in Table 8 as well as the AAAC's range of A-weighted sound power levels per ELC aged child.

Table 8 $L_{eq,\ 15\ minute}$ Sound Power Levels – Teacher & Students – GLAs

Description	Sound Power Levels (dB) at Octave Band Centre Frequencies (Hz)								
	dBA	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
General Learning Areas									
Teacher talking loudly	**79**	60	70	75	80	73	70	62	55
School student talking normally	**63**	53	53	60	63	58	53	52	47
1 teacher and 30 students	**80**	65	71	76	81	74	71	65	59
10 x children, 3 to 5 years	**87**	64	70	75	81	83	80	76	72

6.3 Mechanical Plant & Equipment

The architectural drawings show that the mechanical plant and equipment areas will be located on roof top of the new buildings, throughout the development site.

The location and type of mechanical plant and equipment have not yet been selected and/or finalised. We have therefore been provided with a preliminary schedule and layout plan.

The proposed mechanical plant and equipment will typically only operate during the operation of the college (see Section 3.0).

We have been advised that the roof top mechanical plant and equipment areas will be bounded by minimum 1.8 metre high sound barrier walls, with the exception of the Multi-Purpose Hall roof top mechanical plant and equipment area which will be bounded by 2.4 metre high sound barrier walls, as shown in the attached Appendix C.

The $L_{eq,\ 15\ minute}$ sound power levels for the preliminary mechanical plant and equipment proposed for the College are presented in Table 9.

Table 9 $L_{eq,\ 15\ minute}$ Sound Power Levels – Typical Mechanical Plant

Description	Sound Power Levels (dB) at Octave Band Centre Frequencies (Hz)								
	dBA	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
VRF air conditioners – *Daikin*									
- *REYQ8TY1*	**77**	82	80	80	76	70	64	56	50
- *REYQ10TY1*	**78**	81	83	79	77	71	66	62	53
- *REYQ12TY1*	**80**	84	85	79	79	74	72	64	58
- *REYQ14TY1*	**81**	85	85	82	80	75	69	64	58
- *REYQ16TY1*	**82**	89	87	85	80	75	71	64	61
- *REYQ18TY1*	**83**	86	84	85	81	78	71	69	63
- *REYQ20TY1*	**86**	86	85	87	85	80	77	73	66
Packaged air conditioners - *Temperzone*									
- *OPA 855*	**79**	92	90	75	74	73	71	65	57
- *OPA 1370*	**84**	96	94	83	80	78	75	68	60

Once mechanical plant selection has been finalised, a final assessment should be made, prior to the issue of a Construction Certificate/detailed design stage.

6.4 Hall Usage

There is a possibility that the PS Hall or Multi-Purpose Hall may be used outside of standard school hours on the weekend or during the evening by the College or other community groups.

We have been advised that the proposed PS Hall and Multi-Purpose Hall will have capacity for up to 386 and 1086 people, respectively. From our observations of other sites, we have modelled the noise emission from the Hall as follows:

- People talking loudly (10%), people talking with a raised voice (20%), people talking normally (20%) and the rest are not talking or listening (50%).
- Amplified music may be played during performances and will consist predominantly of either pre-recorded amplified music or live performances.
- We have assumed as a worst case scenario the Public School Hall or Multi-Purpose Hall may operate at full capacity during a performance.
- We have assumed that the eastern and southern doors of the Multi-Purpose Hall will be open (10% of the floor area) during performances.
- We have assumed that the northern and southern doors of the PS Hall will be open (10% of the floor area) during performances.
- We have assumed the ceiling/roof system consists of a metal deck roof, 75 mm thick glasswool insulation installed in the cavity and standard plasterboard lining beneath (R_w 43).
- We have assumed the lower half of the walls will be constructed with 140 mm thick concrete block with 13 mm cement render to each side (R_w 46).
- We have assumed the upper half of the walls will be constructed with 92 mm steel studs, with 9 mm fibre cement fixed to either side of the studs (R_w 41).

Based on information in Harris[1] and in our noise level database gathered over many years, we calculate the sound power levels shown below in Tables 10.

Table 10 $L_{eq,\ 15\ minute}$ Sound Power Levels - Proposed Halls – People & Music

Description	L_{eq} Sound Power Level dBA
One Man Talking Loudly	**80**
One Man Talking with Raised Voice	**69**
One Man Talking Normally	**63**
Amplified Live Band	**102**
386 People	**96**
386 People with Amplified Live Band	**103**
1086 People	**101**
1086 People with Amplified Live Band	**104**

[1] *Handbook of Acoustical Measurements and Noise Control, Third Edition, Cyril M. Harris, McGraw-Hill Inc, New York, (Page 16.2)*

6.5 Sports Field

A Sports Field is proposed to be constructed on the eastern side of the College.

In order to model the worst case scenario of noise emission from students playing on the proposed Sports Field, we have assumed the following:

- A single football game, consisting of 22 students, will be played on the Sports Field. We have assumed that 25% of the participants may be making noise at any given time during a game.
- We have also assumed there may be up to (22 x 2 =) 44 spectators during a game, with 25% of the spectators making noise at any given time during a game.

The $L_{eq,\ 15\ minute}$ sound power level and spectra of people and spectators engaging in active sport are shown below in Table 11 and is based on previous measurements by Day Design.

Table 11 $L_{eq,\ 15\ minute}$ Sound Power Levels – Active Sport On Sports Ground

Description	Sound Power Levels (dB) at Octave Band Centre Frequencies (Hz)								
	dBA	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
One child engaged in active sport	**82**	56	59	64	69	79	77	72	66
One adult spectator talking with a loud voice	**80**	59	61	70	77	76	72	65	56
Active sport match with 22 x Students and 44 x Spectators	**93**	70	73	81	88	89	87	81	74

6.6 Vehicle Noise Emissions

The ELC, SSP, Staff and Student parking on the northern side of the College provides a total of 74 parking spaces for vehicles with the SSP and Staff parking on the southern side of the college providing a total of 64 parking spaces for vehicles.

Two lanes of kiss and drop with 30 spaces is also proposed on the western side of the College.

Information pertaining to vehicle movements to and from the College and also on the College site has been taken from the ASON Group *'Transport and Accessibility Impact Assessment'* (TAIA), Ref: P1769, dated 1 April 2022.

Section 6 of the TAIA provides a traffic assessment which includes the projected student trip generation for the College, as follows:

- peak hour student trip rate 0.50 (0.496) trips per student.

We have assumed, based on a similar College, the following staff trip generation for the College

- peak hour staff trip rate 0.67 trips per staff member.

This is equivalent to the following vehicle trip rates over a 15 minute period during the peak periods (AM and PM):

- peak hour student trip rate (0.50 x 1580 = 790 / 4 =) 198 student vehicles entering/exiting the College; and
- peak hour staff trip rate (0.67 x 140 = 94 / 4 =) 23 staff member vehicles entering/exiting the College.

We have assumed the following distribution of trips throughout the available parking areas on the College site during a peak 15 minute period:

- (65 / 4 =) 16 students arrive and park in the northern car park;
- (56 / 4 =) 14 staff members arrive and park in the southern car park; and
- 68 students are dropped in the kiss and drop zone.

For the assessment of staff arriving at the ELC prior to 7 am, we have assumed two staff members may arrive and park in the spaces marked ELC 1 or ELC 15.

The College will also operate five buses, to be parked in the 'bus parking' area in the south-eastern corner of the site. We have assumed that during any given 15 minute period during school hours the five buses may either arrive at or exit the 'bus parking' area.

The Sound Exposure Level[2] (SEL) sound power level and spectra of vehicle noise is shown below in Table 12 and is based on previous measurements by Day Design.

Table 12 SEL Sound Power Levels - Vehicles

Description	Sound Power Levels (dB) at Octave Band Centre Frequencies (Hz)								
	dBA	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
SEL level of car drive by at approximately 20 km/h (flat road)	**84**	99	92	83	79	79	74	73	65
SEL level of car drive by at approximately 50 km/h (flat road)	**93**	95	93	90	89	91	83	73	66
L_{AFmax} level of car door slam	**92**	98	92	90	88	88	83	80	76
SEL level of bus drive by at approximately 20 km/h (flat road)	**95**	102	98	91	91	90	90	84	78

6.7 Public Address System & School Bell

The College will be provided with a public address system and a bell to signal the start and end of classes. The location of the new speakers has not yet been determined, however assuming speakers will be located on the northern, eastern, and southern sides and the internal courtyard, and in order to meet the residential noise criteria, the maximum sound pressure level should be no greater than the following:

- **Northern & Southern Façade** **62 dBA $L_{eq,15\ minutes}$** at 3 metres from each speaker.
- **Internal Courtyard** **79 dBA $L_{eq,15\ minutes}$** at 3 metres from each speaker.

[2] *SEL is the total sound energy of a single noise event condensed into a one second duration.*

6.8 Predicted Noise Level at Receptor Locations

Knowing the sound power level of a noise source (See Tables 7 - 12), the sound pressure level (as measured with a sound level meter) can be calculated at a remote location using suitable formulae to account for distance losses, sound barriers, building envelope transmission, etc. The predicted noise level at the residential and educational receptors from the various noise producing facets of the development are shown below.

Calculations for noise emissions from the College have been carried out using Day Design Pty Ltd's proprietary Microsoft Excel calculation spreadsheets which incorporate the methods specified in *ISO 9613.1/2*[3], designed for noise emissions from indoor and outdoor spaces to a nearby outdoor receiver location. The noise emissions have been calculated to determine the noise level at each industrial and residential receptor location due to the future operation of the College.

Where applicable, calculations include acoustic shielding provided by the College buildings to the residential and industrial receptors.

[3] *ISO9613-1 - Acoustics – Attenuation of sound during propagation outdoors, Parts 1 - Calculation of the absorption of sound by the atmosphere and Part 2 - General method of calculation.*

6.8.1 Outdoor Play Areas

Based on a maximum of (567 x PS, 447 x HS and 60 x ELC =)1073 students engaged in active play in the outdoor play areas at any one time, the predicted $L_{eq\ 15\ minute}$ noise level is calculated to be as shown below in Table 13. The noise prediction was determined by placing all 1073 students into groups throughout the outdoor play areas as follows:-

- ELC Outdoor Play – 1 x group of 60 students;
- PS Outdoor Play – 3 x groups of 189 students; and
- HS Outdoor Play – 3 x groups of 149 students.

Table 13 Predicted $L_{eq,\ 15\ minute}$ Noise Levels – Active Play in Outdoor Areas

Receptor Location	Predicted Noise Level (dBA)	Noise Criterion (dBA)	Compliance (Yes/No)
R1 – 286 Catherine Fields Rd	57	46	**No (+ 11 dB)**
R2 – 227-235 Deepfields Rd	40	46	Yes
R3 – 225 Deepfields Rd	42	68	Yes
R4 – 16 Heatherfield Cl	59	46	**No (+ 13 dB)**
R5 – 14 Heatherfield Cl	58	46	**No (+ 12 dB)**
R6 – 12 Heatherfield Cl	59	46	**No (+ 13 dB)**
R7 – 260 Catherine Fields Rd	55	46	**No (+ 9 dB)**
R8 – 265 Catherine Fields Rd	47	46	**No (+ 1 dB)**
R9 – 271 Catherine Fields Rd	46	46	Yes
R10 – 277 Catherine Fields Rd	36	46	Yes
R11 – 285 Catherine Fields Rd	45	46	Yes

The predicted level of noise from the students engaged in active play in the outdoor areas at the receptor locations 'R2' to 'R3' and 'R9' to 'R11' complies with the criteria in Section 5.5 of this report. However, the predicted level of noise from the students engaged in active play in the outdoor areas at the receptor locations 'R1' and 'R4' to 'R8' exceeds the criteria in Section 5.5 of this report, and will therefore require noise controls, as recommended in Section 8.0.

6.8.2 Cumulative Noise Level – GLAs & Mechanical Plant

The mechanical plant associated with a school is generally run at capacity during classes. As such, to ensure a worst-case scenario, we have assessed the cumulative noise impact from the use of the GLAs and mechanical plant.

The cumulative noise impact from the GLAs and mechanical plant within the College are summarised and shown in Table 14.

Table 14 Predicted Cumulative $L_{eq,\ 15\ minute}$ Noise Levels – GLAs & Mechanical Plant

Receptor Location	Predicted L_{eq} Noise Level (dBA)	Acceptable L_{eq} Noise Level (dBA)	Compliance
R1 – 286 Catherine Fields Rd			
- GLAs	35		
- Mechanical plant	41		
Cumulative Noise Level	42	41	**No (+ 1 dB)**
R2 – 227-235 Deepfields Rd			
- GLAs	19		
- Mechanical plant	24		
Cumulative Noise Level	25	41	Yes
R3 – 225 Deepfields Rd			
- GLAs	20		
- Mechanical plant	26		
Cumulative Noise Level	27	68	Yes
R4 – 16 Heatherfield Cl			
- GLAs	33		
- Mechanical plant	29		
Cumulative Noise Level	35	41	Yes
R5 – 14 Heatherfield Cl			
- GLAs	40		
- Mechanical plant	35		
Cumulative Noise Level	41	41	Yes
R6 – 12 Heatherfield Cl			
- GLAs	40		
- Mechanical plant	39		
Cumulative Noise Level	43	41	**No (+ 2 dB)**

Table 14 Predicted Cumulative $L_{eq,\ 15\ minute}$ Noise Levels – GLAs & Mechanical Plant - Continued

Receptor Location	Predicted L_{eq} Noise Level (dBA)	Acceptable L_{eq} Noise Level (dBA)	Compliance
R7 – 260 Catherine Fields Rd			
- GLAs	35		
- Mechanical plant	38		
Cumulative Noise Level	40	41	Yes
R8 – 265 Catherine Fields Rd			
- GLAs	25		
- Mechanical plant	36		
Cumulative Noise Level	36	41	Yes
R9 – 271 Catherine Fields Rd			
- GLAs	18		
- Mechanical plant	37		
Cumulative Noise Level	37	41	Yes
R10 – 277 Catherine Fields Rd			
- GLAs	25		
- Mechanical plant	36		
Cumulative Noise Level	37	41	Yes
R11 – 285 Catherine Fields Rd			
- GLAs	38		
- Mechanical plant	35		
Cumulative Noise Level	39	41	Yes

The predicted cumulative level of noise from the GLAs and mechanical plant at the receptor locations 'R2' to 'R5' and 'R7' to 'R11', complies with the criteria in Section 5.5 of this report.

However, the predicted cumulative level of noise from the GLAs and mechanical plant at the receptor locations 'R1' and 'R6', exceeds the criteria in Section 5.5 of this report, and will therefore require noise controls as recommended in Section 8.0.

Recommendations are provided in Sections 8.2.5 and 8.4 of this report to ensure the noise emissions from the future use of any mechanical plant associated with the College complies with the Project Noise Trigger Levels.

6.8.3 College Halls

The noise impact from the Halls are summarised and shown in Table 15.

Table 15 Predicted $L_{eq,\ 15\ minute}$ Noise Levels – Halls

Receptor Location	Predicted L_{eq} Noise Level (dBA)	Acceptable L_{eq} Noise Level (dBA)	Compliance
Day & Evening– 7.00 am to 10.00 pm			
R1 – 286 Catherine Fields Rd			
- PS Hall Live Performance	34	41	Yes
- Multi-Purpose Hall Live Performance	40		Yes
R2 – 227-235 Deepfields Rd			
- PS Hall Live Performance	27	41	Yes
- Multi-Purpose Hall Live Performance	43		**No (+ 2 dB)**
R3 – 225 Deepfields Rd			
- PS Hall Live Performance	27	68	Yes
- Multi-Purpose Hall Live Performance	44		Yes
R4 – 16 Heatherfield Cl			
- PS Hall Live Performance	33	41	Yes
- Multi-Purpose Hall Live Performance	52		**No (+ 11 dB)**
R5 – 14 Heatherfield Cl			
- PS Hall Live Performance	43	41	**No (+ 2 dB)**
- Multi-Purpose Hall Live Performance	54		**No (+ 13 dB)**
R6 – 12 Heatherfield Cl			
- PS Hall Live Performance	49	41	**No (+ 8 dB)**
- Multi-Purpose Hall Live Performance	40		Yes
R7 – 260 Catherine Fields Rd			
- PS Hall Live Performance	52	41	**No (+ 11 dB)**
- Multi-Purpose Hall Live Performance	38		Yes
R8 – 265 Catherine Fields Rd			
- PS Hall Live Performance	38	41	Yes
- Multi-Purpose Hall Live Performance	29		Yes
R9 – 271 Catherine Fields Rd			
- PS Hall Live Performance	27	41	Yes
- Multi-Purpose Hall Live Performance	30		Yes

Table 15 Predicted $L_{eq,\ 15\ minute}$ Noise Levels – Halls - Continued

Receptor Location	Predicted L_{eq} Noise Level (dBA)	Acceptable L_{eq} Noise Level (dBA)	Compliance
Day & Evening– 7.00 am to 10.00 pm			
R10 – 277 Catherine Fields Rd			
- PS Hall Live Performance	32	41	Yes
- Multi-Purpose Hall Live Performance	29		Yes
R11 – 285 Catherine Fields Rd			
- PS Hall Live Performance	32	41	Yes
- Multi-Purpose Hall Live Performance	30		Yes

The predicted cumulative level of noise from the use of the Halls at the receptor locations 'R1', 'R3' and 'R8' to 'R11', complies with the criteria in Section 5.5 of this report.

However, the predicted cumulative level of noise from the use of the Halls at the receptor locations 'R2', 'R4' and 'R7', exceeds the criteria in Section 5.5 of this report, and will therefore require noise controls as recommended in Section 8.0.

6.8.4 Sports Field

The noise impact from the use of the Sports Field is summarised and shown in Table 16.

Table 16 Predicted $L_{eq,\ 15\ minute}$ Noise Levels – Outdoor Play

Receptor Location	Predicted Noise Level (dBA)	Noise Criterion (dBA)	Compliance (Yes/No)
R1 – 286 Catherine Fields Rd	38	46	Yes
R2 – 227-235 Deepfields Rd	30	46	Yes
R3 – 225 Deepfields Rd	31	68	Yes
R4 – 16 Heatherfield Cl	48	46	**No (+ 2 dB)**
R5 – 14 Heatherfield Cl	44	46	Yes
R6 – 12 Heatherfield Cl	38	46	Yes
R7 – 260 Catherine Fields Rd	32	46	Yes
R8 – 265 Catherine Fields Rd	21	46	Yes
R9 – 271 Catherine Fields Rd	21	46	Yes
R10 – 277 Catherine Fields Rd	21	46	Yes
R11 – 285 Catherine Fields Rd	21	46	Yes

The predicted level of noise from the use of the Sports Field at the receptor locations 'R1' to 'R3' and 'R5' to 'R11' complies with the criteria in Section 5.5 of this report. However, the predicted level of noise from the use of the Sports Field at the receptor location 'R4' exceeds the criteria in Section 5.5 of this report, and will therefore require noise controls, as recommended in Section 8.0.

6.8.5 Vehicles in Parking Areas

The noise impact from the use of the ELC, SSP, Student and Staff Parking and kiss and drop areas is summarised and shown in Table 17.

Table 17 Predicted $L_{eq,\ 15\ minute}$ Noise Levels – Car Parks & Kiss & Drop Areas

Receptor Location	Predicted Noise Level (dBA)	Noise Criterion (dBA)	Compliance (Yes/No)
R1 – 286 Catherine Fields Rd	21	41	Yes
R2 – 227-235 Deepfields Rd	< 10	41	Yes
R3 – 225 Deepfields Rd	< 10	68	Yes
R4 – 16 Heatherfield Cl	17	41	Yes
R5 – 14 Heatherfield Cl	18	41	Yes
R6 – 12 Heatherfield Cl	23	41	Yes
R7 – 260 Catherine Fields Rd	30	41	Yes
R8 – 265 Catherine Fields Rd	29	41	Yes
R9 – 271 Catherine Fields Rd	30	41	Yes
R10 – 277 Catherine Fields Rd	28	41	Yes
R11 – 285 Catherine Fields Rd	25	41	Yes

The predicted level of noise from the use of the ELC, SSP, Student and Staff Parking and kiss and drop areas at the receptor locations 'R1' to 'R11' complies with the criteria in Section 5.5 of this report, and is therefore acceptable.

6.8.6 College Buses on Internal Driveway

The noise impact from the use of the College buses on the internal southern driveway on the southern side of the site is summarised and shown in Table 18.

Table 18 Predicted $L_{eq,\ 15\ minute}$ Noise Levels – College Bus Use

Receptor Location	Predicted Noise Level (dBA)	Noise Criterion (dBA)	Compliance (Yes/No)
R1 – 286 Catherine Fields Rd	<10	41	Yes
R2 – 227-235 Deepfields Rd	14	41	Yes
R3 – 225 Deepfields Rd	15	68	Yes
R4 – 16 Heatherfield Cl	43	41	**No (+ 2 dB)**
R5 – 14 Heatherfield Cl	43	41	**No (+ 2 dB)**
R6 – 12 Heatherfield Cl	43	41	**No (+ 2 dB)**
R7 – 260 Catherine Fields Rd	36	41	Yes
R8 – 265 Catherine Fields Rd	29	41	Yes
R9 – 271 Catherine Fields Rd	27	41	Yes
R10 – 277 Catherine Fields Rd	23	41	Yes
R11 – 285 Catherine Fields Rd	17	41	Yes

The predicted level of noise from the use of the College buses on the internal southern driveway at the receptor locations 'R1' to 'R3' and 'R7' to 'R11' complies with the criteria in Section 5.5 of this report. However, the predicted level of noise from the use of the College buses on the internal southern driveway at the receptor location 'R4' to 'R6' exceeds the criteria in Section 5.5 of this report, and will therefore require noise controls, as recommended in Section 8.0.

6.8.7 Sleep Disturbance

The external $L_{AF, max}$ noise levels at the potentially most affected residential receiver locations, from the noise associated with staff arriving at the College in their vehicle and parking in the ELC 1 or ELC 15 staff spaces between 6.30 am and 7 am are calculated to be as shown below in Table 19.

Table 19 Predicted $L_{AF, max}$ Noise Levels – Sleep Disturbance

Receiver Location	Predicted Noise Level (dBA)	Noise Criterion (dBA)	Compliance (Yes/No)
R1 – 286 Catherine Fields Rd	41	57	Yes
R7 – 260 Catherine Fields Rd	13	57	Yes
R8 – 265 Catherine Fields Rd	39	57	Yes
R9 – 271 Catherine Fields Rd	40	57	Yes
R10 – 277 Catherine Fields Rd	44	57	Yes
R11 – 285 Catherine Fields Rd	46	57	Yes

The predicted external levels of noise from staff arriving at the College in their vehicle and parking in the ELC 1 or ELC 15 staff spaces between 6.30 am and 7 am are within the noise criteria in Section 5.5.1 at 'R1' and 'R7' to 'R11', and are therefore acceptable.

6.8.8 Predicted On Road Traffic Noise

Calculations of the on-road traffic noise generated by vehicles associated with the use of the College are based on information provided by ASON Group *'Transport and Accessibility Impact Assessment'* (TAIA), Ref: P1769, dated 1 April 2022.

Figure 38, in Section 6.2 of the TAIA states that the traffic distribution from the Site is assumed to be as follows:

- Departing - 80/20% split to the south (left turn to Catherine Fields Road)/north (right to Catherine Fields Road) from the Site; and
- Arriving - 70/30% split from the south (right turn in from Catherine Fields Road)/north (left turn in from Catherine Fields Road) to the Site.

The calculated daytime $L_{Aeq,\ 1\text{-hour}}$ shown in Table 4 at Location 'B' has been extrapolated from 100 metres from the curb of Catherine Fields Road to approximately 23 metres from the curb, which is equivalent to the approximate minimum setback of the neighboring receiver location. The calculated $L_{Aeq,\ 1\text{-hour}}$ noise level 23 metres from the curb of 268 Catherine Fields Road is 56.7 dBA.

Table 20 shows the assessment of on-road traffic for the residential receiver, 'R1' and 'R6' to 'R11' against the RNP's 'Road Traffic Noise Assessment Criteria'.

Table 20 Predicted $L_{eq,\ 1\ hour}$ Noise Levels at Residential Receivers - On Road Traffic

Receiver Location	Predicted Noise Level (dBA)	Existing Traffic Noise Level (dBA)	Total Traffic Noise Level (dBA)	Relative Increase (dB)	RNP On Road Traffic Noise Criteria (dBA)	Complies
Day – 7 am to 10 pm						
Arrivals						
R1: 221 x cars	27.3	56.7	56.7	0.0	55	Yes
R6: 221 x cars	30.8	56.7	56.7	0.0	55	Yes
R7: 221 x cars	41.7	56.7	56.8	0.1	55	Yes
R8: 221 x cars	44.6	56.7	57.0	0.3	55	Yes
R9: 221 x cars	45.6	56.7	57.0	0.3	55	Yes
R10: 221 x cars	44.6	56.7	57.0	0.3	55	Yes
R11: 221 x cars	43.4	56.7	56.9	0.2	55	Yes

Table 20 Predicted $L_{eq,\ 1\ hour}$ Noise Levels at Residential Receivers - On Road Traffic - Continued

Receiver Location	Predicted Noise Level (dBA)	Existing Traffic Noise Level (dBA)	Total Traffic Noise Level (dBA)	Relative Increase (dB)	RNP On Road Traffic Noise Criteria (dBA)	Complies
Day – 7 am to 10 pm						
Departing						
R1: 221 x cars	22.4	56.7	56.7	0.0	55	Yes
R6: 221 x cars	31.7	56.7	56.7	0.0	55	Yes
R7: 221 x cars	43.3	56.7	56.9	0.2	55	Yes
R8: 221 x cars	45.2	56.7	57.0	0.3	55	Yes
R9: 221 x cars	43.2	56.7	56.9	0.2	55	Yes
R10: 221 x cars	41.0	56.7	56.8	0.1	55	Yes
R11: 221 x cars	39.7	56.7	56.8	0.1	55	Yes

Table 20 shows that while the predicted total $L_{eq,\ 1\ hour}$ noise levels at residential receivers 'R7' to 'R11' exceeds the *RNP On Road Traffic Noise Criteria* (see Section 5.5.1.3), the existing on road traffic noise level also exceeds the *RNP On Road Traffic Noise Criteria*.

Table 20 also shows that the calculated $L_{eq,\ 1\ hour}$ total traffic noise level results in a relative increase to the existing $L_{Aeq,\ 1\ hour}$ total traffic noise level at the receiver location of less than 2 dB during the day periods, and is therefore considered acceptable. As per Section 3.4, paragraph 3 of the RNP, *'in assessing feasible and reasonable mitigation measures, an increase of up to 2 dB represents a minor impact that is considered barely perceptible to the average person'* and Section 3.4.1, Step 4, paragraph 2, *'for existing residences and other sensitive land uses affected by* ***additional traffic on existing roads generated by land use developments****, any increase in the total traffic noise level should be limited to 2 dB above that of the corresponding 'no build option'*.

Considering the above, the road traffic noise associated with the development is considered acceptable and is not likely to be perceptible to the average person.

7.0 NOISE INTRUSION TO ELC - ROAD TRAFFIC NOISE

7.1 External Road Traffic Noise Levels – ELC Outdoor Play Areas

The existing external road traffic noise level was measured at Location 'B'. The area is exposed to moderately low levels of traffic noise from Catherine Fields Road.

The measured $L_{Aeq,\ 1\ hour\ (traffic)}$ noise level at Location 'B' was 50 dBA, as shown in Table 4, which is representative of the external road traffic noise levels in the outdoor play area of the ELC. The measured $L_{Aeq,\ 1\ hour\ (traffic)}$ noise level at Location 'B' complies with the AAAC external noise limit for Child Care Centres of $L_{eq,\ 1\ hour}$ 55 dBA, and is therefore acceptable.

7.2 Road Traffic Noise Intrusion Assessment – ELC Indoor Activity Rooms

We note that the indoor play areas are not directly exposed to road traffic on Catherine Fields Road.

The measured $L_{Aeq,\ 1\ hour\ (traffic)}$ external road traffic noise levels was Location 'B' 50 dBA.

Standard building construction such as concrete block, brick or lightweight stud walls and metal-deck, concrete or ceramic tile roof with plasterboard ceiling, and 4 mm thick standard glazing can achieve a minimum 20 dB reduction with windows and doors closed, which would reduce an outdoor noise level of 50 dBA to 30 dBA for traffic noise inside an indoor play area.

Considering the proposed location of the indoor activity areas, the internal noise levels will comply with the AAAC's internal noise limit for Child Care Centres of $L_{Aeq,\ 1\ hour}$ 40 dBA for indoor activity area, and are therefore acceptable.

8.0 NOISE CONTROL RECOMMENDATIONS

8.1 Noise Management Plan

We recommend the College's management implement a Noise Management Plan that should include, but not be limited to the following:

8.1.1 General Noise Management Strategies

- We recommend that any deliveries, such as food for the canteen, to the College or garbage pickup from the school occur between the hours of 7 am and 6 pm.
- We recommend that any ground maintenance, such as leaf blowing or grass cutting, that may be required on the College grounds occur between the hours of 7 am and 6 pm.
- We recommend the usage of the Halls is restricted to the hours of 9 am and 9.30 pm.
- We recommend all external doors / windows to the Halls be closed during noisy activities, including, but not limited to, live music performances, band practise, the use of pre-recorded amplified music (dances, etc,) large sporting events.

8.1.2 Permissible Outdoor Play Area Scenarios

To ensure the acoustic amenity of adjacent developments and the local neighbourhood is considered, we recommend the use of the outdoor play areas is staggered throughout the day, as follows:

To be implemented in conjunction with the recommendations in Sections 8.1.1, 8.2 and 8.3.

Scenario 1 –

- PS School Students = No;
- HS School Students = Yes; and
- ELC Students = Yes.

Scenario 2 –

- PS School Students = Yes;
- HS School Students = No; and
- ELC Students = Yes.

8.2 Sound Barrier Walls

8.2.1 General Sound Barrier Wall Construction

The proposed sound barrier walls specified within this report may be constructed from 3 rail 'solid capped and lapped' timber, 6 mm thick fibrous cement sheets, 10 mm thick solid polycarbonate (not hollow), 6.38 mm thick laminated glass or masonry. The construction shall be free of visible air gaps to provide an impervious sound barrier.

Sound barrier wall locations are shown on the attached Appendix C.

We recommend the following sound barrier walls be constructed:

8.2.2 Site Boundary Sound Barrier Walls

We recommend a 1.8 metre high sound barrier walls be constructed along the entire northern and southern boundary of the site, approximately in line with the eastern side of the eastern kiss and drop lane to the eastern boundary of the Site.

To ensure in the event of flooding that the overland water flow is not obstructed, a gap of 100 to 200 mm may be left at the bottom of the sound barrier wall on the southern boundary.

8.2.3 Outdoor Area Sound Barrier Walls

We recommend a 2.4 metre high sound barrier wall be constructed along the entire northern boundary and a 1.8 metre high sound barrier wall be constructed along the entire eastern boundary of the HS outdoor area.

We recommend a 2.4 metre high sound barrier wall be constructed along the entire southern boundary and a 1.5 metre high sound barrier wall be constructed along the entire western boundary of the PS outdoor area.

8.2.4 ELC Sound Barrier Walls

We recommend 1.5 metre high sound barrier walls be constructed along the entire northern, eastern and western boundary of the ELC's outdoor play area.

8.2.5 Rooftop Mechanical Plant & Equipment Areas

We recommend the proposed sound barrier walls to be constructed around the rooftop mechanical plant and equipment areas be constructed to a minimum height of 1.8 metres, with the exception of the Multi-Purpose Hall rooftop mechanical plant and equipment area which should be constructed to a height of 2.4 metres.

8.3 Hall Construction

8.3.1 Hall Glazing Construction

- We recommend any external glazing (windows/doors) be constructed with minimum 6.38 mm thick laminated glass, to achieve a minimum weighted sound reduction index (R_w) of 32.

8.3.2 Hall General Construction

- We recommend the ceiling/roof system consist of a metal deck roof, with 75 mm thick glasswool insulation installed in the cavity and standard plasterboard lining beneath, to achieve a minimum of R_w 43.
- We recommend the lower half of the walls will be constructed with 140 mm thick concrete block with 13 mm cement render to each side, to achieve a minimum of R_w 46.
- We recommend the upper half of the walls will be constructed with 92 mm steel studs, with 9 mm fibre cement fixed to either side of the studs, to achieve a minimum of R_w 41.

8.4 Mechanical Plant

The specifications for the mechanical plant have not yet been finalised for this development. For typical mechanical plant equipment with sound power levels not exceeding those listed in Table 9, it is reasonable and feasible to locate the plant area or equipment itself so that noise will not impact the neighbouring properties.

Once mechanical plant and its location has been finalised, a detailed acoustic assessment should be made, prior to the issue of a Construction Certificate (or during the detailed design stage of each Stage). We recommend that the mechanical services engineers select mechanical plant equipment with the lowest sound power levels to reduce the amount of acoustic treatment necessary to achieve the noise criteria at nearby residential receivers.

We offer to provide detailed noise controls when specifications of the mechanical plant equipment have been finalised.

8.5 Public Address System & School Bell

We recommend the maximum sound pressure level of the speakers associated with the public address system and school bell be no greater than the following:

- **Northern & Southern Façade** **62 dBA $L_{eq,15\ minutes}$** at 3 metres from each speaker.
- **Internal Courtyard** **79 dBA $L_{eq,15\ minutes}$** at 3 metres from each speaker.

8.6 Construction Disclaimer

Recommendations made in this report are intended to resolve acoustical problems only. We make no claim of expertise in other areas and draw your attention to the possibility that our recommendations may not meet the structural, fire, thermal or other aspects of building construction.

We encourage clients to check with us before using materials or equipment that are alternative to those specified in our Acoustical Report.

The integrity of acoustic structures is very dependent on installation techniques. Therefore the use of contractors that are experienced in acoustic construction is encouraged. Furthermore, two insulation products may have the same thermal R rating but the sound absorption of one may be entirely deficient, therefore the use of materials and equipment that are supported by acoustic laboratory test data is encouraged.

9.0 PREDICTED NOISE LEVELS - AFTER NOISE CONTROLS

9.1 Outdoor Play Areas – After Noise Controls

9.1.1 Predicted Noise Levels

The cumulative noise impact from the students engaged in active play in the outdoor areas within the College, following the implementation of noise controls (see Section 8), are summarised and shown in Table 21.

Table 21 Predicted $L_{eq,\ 15\ minute}$ Noise Levels – Active Play in Outdoor Areas – After Noise Controls

Receptor Location	Predicted Noise Level (dBA)	Noise Criterion (dBA)	Compliance (Yes/No)
Outdoor Play Scenario 1			
R1 – 286 Catherine Fields Rd	50	46	**No (+ 4 dB)**
R4 – 16 Heatherfield Cl	49	46	**No (+ 3 dB)**
R5 – 14 Heatherfield Cl	50	46	**No (+ 4 dB)**
R6 – 12 Heatherfield Cl	36	46	Yes
R7 – 260 Catherine Fields Rd	34	46	Yes
R8 – 265 Catherine Fields Rd	32	46	Yes
Outdoor Play Scenario 2			
R1 – 286 Catherine Fields Rd	42	46	Yes
R4 – 16 Heatherfield Cl	54	46	**No (+ 8 dB)**
R5 – 14 Heatherfield Cl	53	46	**No (+ 7 dB)**
R6 – 12 Heatherfield Cl	51	46	**No (+ 5 dB)**
R7 – 260 Catherine Fields Rd	47	46	**No (+ 1 dB)**
R8 – 265 Catherine Fields Rd	42	46	Yes

Once the noise controls in Section 8 have been implemented, the predicted level of noise from the students engaged in active play in the outdoor areas will still have the potential to exceed the criteria in Section 5.5 of this report at receptor locations 'R1' to 'R7'.

A discussion/detailed analysis of these potential exceedances and their impact on the acoustic amenity of the neighbouring receivers is provided in Section 9.1.2.

9.1.2 Discussion of Potential Outdoor Play Noise Level Exceedances at Receptor Locations

The predicted level of noise from students engaged in active play in the outdoor areas during recess and lunch has the potential to adversely affect the acoustic amenity of the local neighbourhood (*residential receptors locations 'R1' and 'R4' to 'R7').*

9.1.2.1 Residential Receptors 'R1' and 'R4' to 'R7'

For the use of the outdoor areas at the College for active play, we have calculated a maximum L_{eq} noise level exceedance of the Project Noise Trigger Levels of 8 dB (see Table 21, *Outdoor Play Scenario 2,* 'R4').

As shown in Table 3, the existing L_{eq} noise levels at Logger Location 'B' is 50 dBA during the day, 4 dB above the Project Noise Trigger Levels shown in Section 5.5. For the use of the outdoor areas at the College for active play, the calculated L_{eq} noise level is 4 dB (see Table 21, *Outdoor Play Scenario 2,* 'R4') above the existing L_{eq} noise levels at 'R4'. The calculated increase to the existing L_{eq} noise level during the limited usage of the outdoor areas is 5 dB (50 dBA + 54 dBA = 55 dBA) at 'R4'. An increase of 5 dB is considered marginal, with an overall noise level of 55 dBA being considered comparable to normal conversation or a moderate level of rainfall.

We also note that due to the significant growth (existing and future) in the local area it is highly likely that the ambient noise levels will increase by the time the final Stage of the College is proposed to be completed in the year 2041.

9.1.2.2 Offensive Noise Assessment

The NSW Environment Protection Authority published the Noise Guide for Local Government (NGLG) in May 2013. The policy is specifically aimed at assessing noise from light industry, shops, entertainment, public buildings, air conditioners, pool pumps and other noise sources in residential areas.

The NGLG contains an offensive noise checklist (Section 2.1.4) which provide useful guidance in determining whether a particular noise is considered offensive or not as defined by the POEO Act 1997.

We offer the following responses to the questions in the checklist:

Q1: Is the noise loud in an absolute sense? Is it loud relative to other noise in the area?

No – the predicted noise level from students using the outdoor areas is marginally above the existing ambient noise level in the area during recess and lunch time. The increase to the existing L_{eq} ambient noise level from the site is calculated to be 5 dB.

A noise level of 54 dBA is considered moderate to quiet and is comparable to normal conversation or a moderate level of rainfall.

Yes – The noise is likely to be loud relative to other noise in the area which is generally dominated by local road traffic, local fauna, local light industrial and local agriculture noise.

Q2: Does the noise include characteristics that make it particular irritating?

No – noise from students does not generally include characteristics that may be irritating to some listeners (tonality, etc).

Q3: Does the noise occur at times when people expect to enjoy peace and quiet?

No – noise from the operation of outdoor areas will generally be for recess and lunch, only, typically during the noisiest part of any given (week) day – between 10 am and 2 pm. It is generally accepted that if noise is to occur on a site, the middle of the day is the ideal time. The use of the outdoor areas will not affect people on weekends when peace and quiet may be expected for the whole of the day.

The overall increase in contribution of the noise from the outdoor play areas during recess and lunch, should not affect a reasonable person's peace and quiet in this acoustic environment, as it is considered marginal (see Section 9.1.2.1) when compared to the existing noise levels during recess and lunch time.

Q4: Is the noise atypical for the area?

Yes – Noise from the operation of a College, including recess and lunch, will be atypical in this area as no other similar developments exist.

Q5: Does the noise occur often?

Yes. Students are generally permitted outside for recess and lunch on school days – approximately 2 - 3 hours total each school day.

Q6: Are a number of people affected by the noise?

Yes – 'R1' and 'R4' to 'R8' are the potentially most affected residential premises. As discussed in Q1 above, the maximum noise level increase is expected to be marginal (+ 5 dB) when compared to the existing noise levels. Any other residential receptor locations will be even less affected.

Notwithstanding, the author is of the opinion that as the noise levels outside of the most affected resident will be even lower, no other people will likely be affected.

9.1.2.3 Conclusion

With consideration to Sections 9.1.2.1 and 9.1.2.2, given the limited duration of outdoor area use by the College (recess and lunch), and the highly likely growth (and increase of existing ambient noise levels) of the local area, we are of the opinion any increase in noise levels from students engaged in active play in the outdoor areas at the nearby residential receptor locations 'R1' and 'R4' to 'R8' will be marginal**,** and that the acoustic amenity of the majority of the

neighbourhood will be maintained as per the *State Environmental Planning Policy (Educational Establishments and Child Care Facilities) 2017*.

9.2 Cumulative Noise Level – GLAs & Mechanical Plant – After Noise Controls

The cumulative noise impact from the GLAs and mechanical plant within the College, following the implementation of noise controls (see Section 8), are summarised and shown in Table 22.

Table 22 Predicted Cumulative $L_{eq,\ 15\ minute}$ Noise Levels – GLAs & Mechanical Plant – After Noise Controls

Receptor Location	Predicted L_{eq} Noise Level (dBA)	Acceptable L_{eq} Noise Level (dBA)	Compliance
R1 – 286 Catherine Fields Rd			
- GLAs	30		
- Mechanical plant	41		
Cumulative Noise Level	41	41	Yes
R6 – 12 Heatherfield Cl			
- GLAs	35		
- Mechanical plant	39		
Cumulative Noise Level	41	41	Yes

The predicted cumulative level of noise, once the noise controls in Section 8 have been implemented, from the GLAs and mechanical plant at the receptor locations 'R1' and 'R6', complies with the criteria in Section 5.5 of this report, and is therefore acceptable.

9.3 College Halls – After Noise Controls

The noise impact from the Halls, following the implementation of noise controls (see Section 8), are summarised and shown in Table 23.

Table 23 Predicted $L_{eq,\ 15\ minute}$ Noise Levels – Halls – After Noise Controls

Receptor Location	Predicted L_{eq} Noise Level (dBA)	Acceptable L_{eq} Noise Level (dBA)	Compliance
Day & Evening– 7.00 am to 10.00 pm			
R2 – 227-235 Deepfields Rd			
- PS Hall Live Performance	15	41	Yes
- Multi-Purpose Hall Live Performance	27		Yes
R4 – 16 Heatherfield Cl			
- PS Hall Live Performance	16	41	Yes
- Multi-Purpose Hall Live Performance	36		Yes
R5 – 14 Heatherfield Cl			
- PS Hall Live Performance	20	41	Yes
- Multi-Purpose Hall Live Performance	37		Yes
R6 – 12 Heatherfield Cl			
- PS Hall Live Performance	24	41	Yes
- Multi-Purpose Hall Live Performance	29		Yes
R7 – 260 Catherine Fields Rd			
- PS Hall Live Performance	27	41	Yes
- Multi-Purpose Hall Live Performance	27		Yes

The predicted cumulative level of noise, once the noise controls in Section 8 have been implemented, from the use of the Halls at the receptor locations 'R2', and 'R4' to 'R7', complies with the criteria in Section 5.5 of this report, and is therefore acceptable.

9.4 Sports Field – After Noise Controls

The noise impact from the use of the Sports Field, following the implementation of noise controls (see Section 8), is summarised and shown in Table 24.

Table 24 Predicted $L_{eq,\ 15\ minute}$ Noise Levels – Outdoor Play – After Noise Controls

Receptor Location	Predicted Noise Level (dBA)	Noise Criterion (dBA)	Compliance (Yes/No)
R4 – 16 Heatherfield Cl	44	46	Yes

The predicted level of noise, once the noise controls in Section 8 have been implemented, from the use of the Sports Field at the receptor location 'R4' complies with the criteria in Section 5.5 of this report, and is therefore acceptable

9.5 College Buses on Internal Driveway – After Noise Controls

The noise impact from the use of the College buses, following the implementation of noise controls (see Section 8), on the internal southern driveway on the southern side of the site is summarised and shown in Table 25.

Table 25 Predicted $L_{eq,\ 15\ minute}$ Noise Levels – College Bus Use – After Noise Controls

Receptor Location	Predicted Noise Level (dBA)	Noise Criterion (dBA)	Compliance (Yes/No)
R4 – 16 Heatherfield Cl	38	41	Yes
R5 – 14 Heatherfield Cl	38	41	Yes
R6 – 12 Heatherfield Cl	38	41	Yes

The predicted level of noise, once the noise controls in Section 8 have been implemented, from the use of the College buses on the internal southern driveway at the receptor locations 'R4' to 'R6' complies with the criteria in Section 5.5 of this report, and is therefore acceptable.

10.0 NOISE IMPACT STATEMENT

Day Design Pty Ltd was engaged by Midson Group on behalf of Minarah College to carry out an acoustic assessment of the proposed new education campus to be known as Minarah College Catherine Field at 268-278 Catherine Fields Road, Catherine Field, NSW

Calculations show that provided the recommendations in Section 8 of this report are implemented and adhered to, the level of noise emitted – with the exception of noise emissions from students in the outdoor areas during active play – from the Minarah College a 268-278 Catherine Fields Road, Catherine Field, will meet the acoustic requirements in Camden Council's *Environmental Noise Policy 2018*, the NSW Department of Planning and Environment's *SEPP (Educational Establishments and Child Care Facilities) 2017* and *Child Care Planning Guideline*, NSW Environment Protection Authority's (EPA) *Noise Policy for Industry* and *NSW Road Noise Policy* and the Association of Australasian Acoustical Consultants (AAAC) *Guideline for Child Care Centre Acoustic Assessment*, as detailed in Section 5 of this report, and be considered acceptable.

Calculations also show that, noise emissions from students in the outdoor areas during active play will exceed the acoustic requirements in Camden Council's *Environmental Noise Policy 2018* causing a marginal increase to the existing ambient noise levels at adjacent developments and the local neighbourhood.

The acoustic amenity of adjacent developments and the local neighbourhood has been considered, and will be maintained for the majority.

Also, although not applicable to this site, the proposal will also comply with the requirements of the State Environment Planning Policy (SEPP) (Transport and Infrastructure) 2021 and the Department of Planning's (DoP) *Development Near Rail Corridors and Busy Roads – Interim Guideline.*

Adam Shearer, BCT (Audio), MDesSc (Audio and Acoustics), MAAS
Senior Acoustical Consultant
for and on behalf of Day Design Pty Ltd

AAAC MEMBERSHIP

Day Design Pty Ltd is a member company of the Association of Australasian Acoustical Consultants, and the work herein reported has been performed in accordance with the terms of membership.

APPENDICES

- Appendix A – Noise Survey Instrumentation
- Appendix B1 to B4 – Ambient Noise Surveys
- Appendix C – Proposed Site Layout
- AC108 – Glossary of Acoustical Terms

APPENDIX A – NOISE SURVEY INSTRUMENTATION

Noise level measurements and analysis were made with instrumentation as follows in Table A:

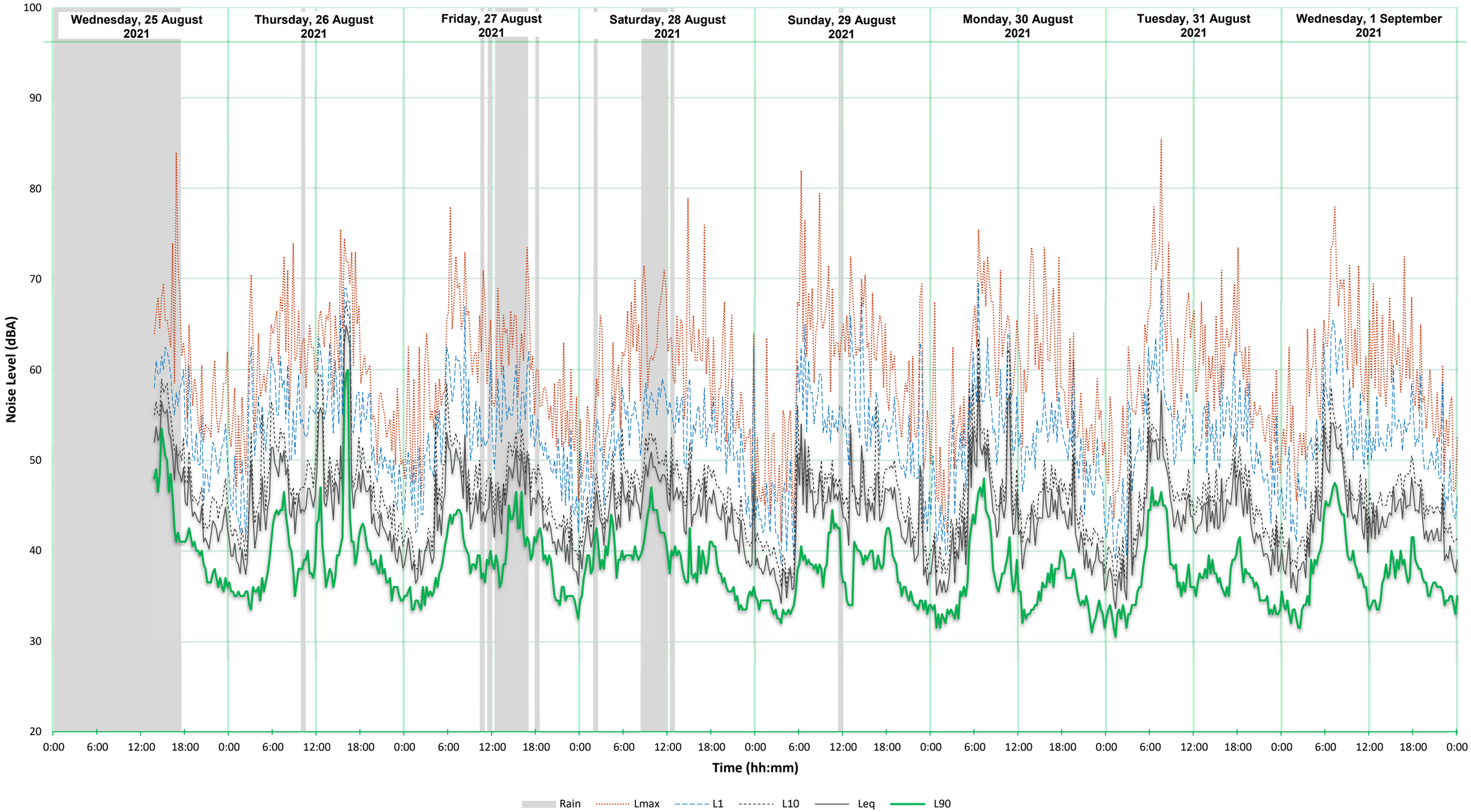
Table A Noise Instrumentation

Description	Model No.	Serial No.
Infobyte Noise Logger (Type 1) Condenser Microphone 0.5" diameter	iM4 MK 250	103 7371
Infobyte Noise Logger (Type 1) Condenser Microphone 0.5" diameter	iM4 MK 250	105 7112
Infobyte Noise Logger (Type 2) Condenser Microphone 0.5" diameter	iM4 MK 250	123 123

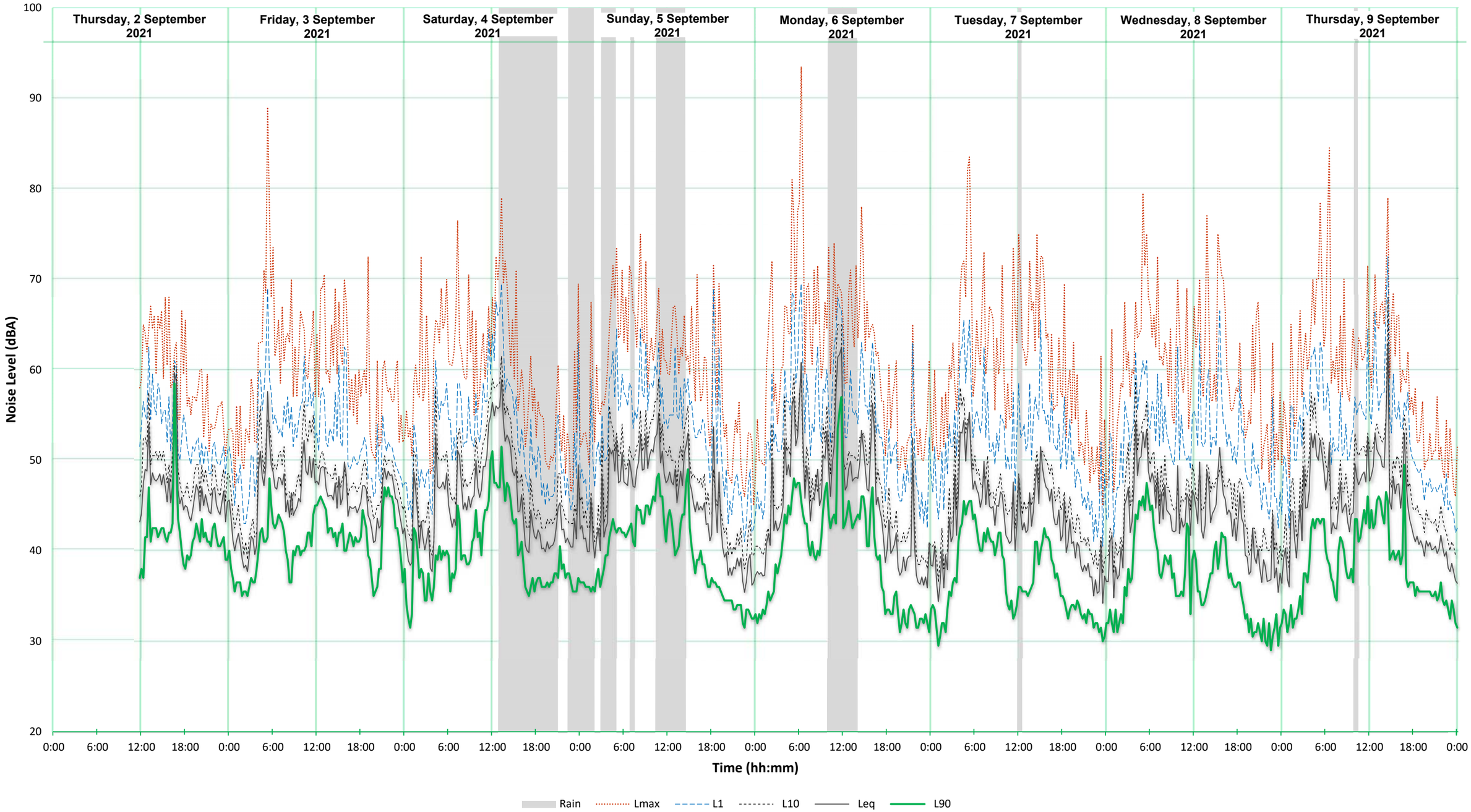
An environmental noise logger is used to continuously monitor ambient noise levels and provide information on the statistical distribution of noise during an extended period of time. The Infobyte Noise Monitors iM4 #103, #105 and #123 are Type 1 or Type 2 precision environmental noise monitor meeting all the applicable requirements of AS1259 for an integrating-averaging sound level meter.

All instrument systems had been laboratory calibrated using instrumentation traceable to Australian National Standards and certified within the last two years thus conforming to Australian Standards. The measurement system was also field calibrated prior to and after noise surveys. Calibration drift was found to be within 1 dB for long-term measurements. No adjustments for instrument drift during the measurement period were warranted.

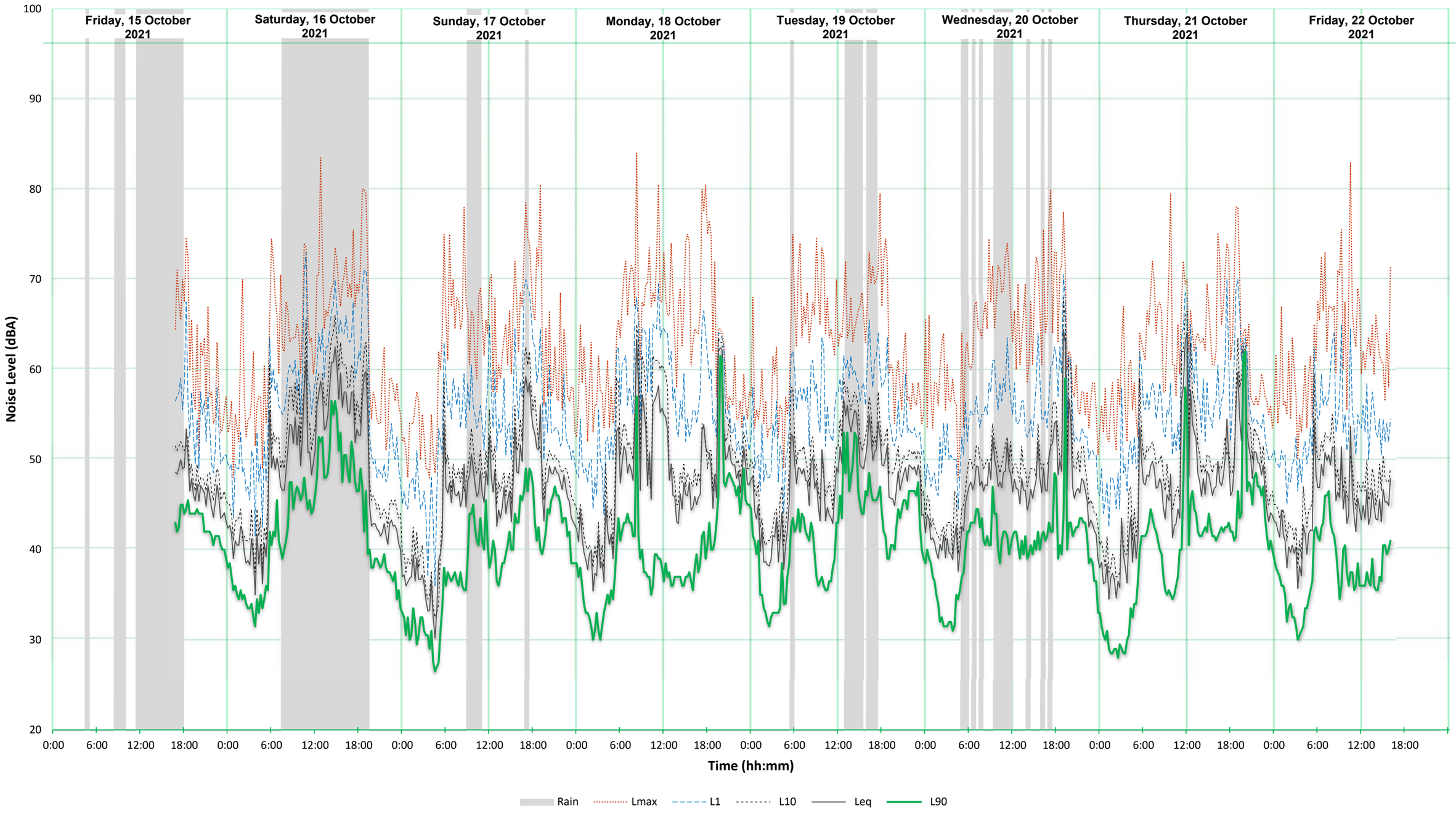
Located at 268 Catherine Fields Rd, Catherine Fields, NSW



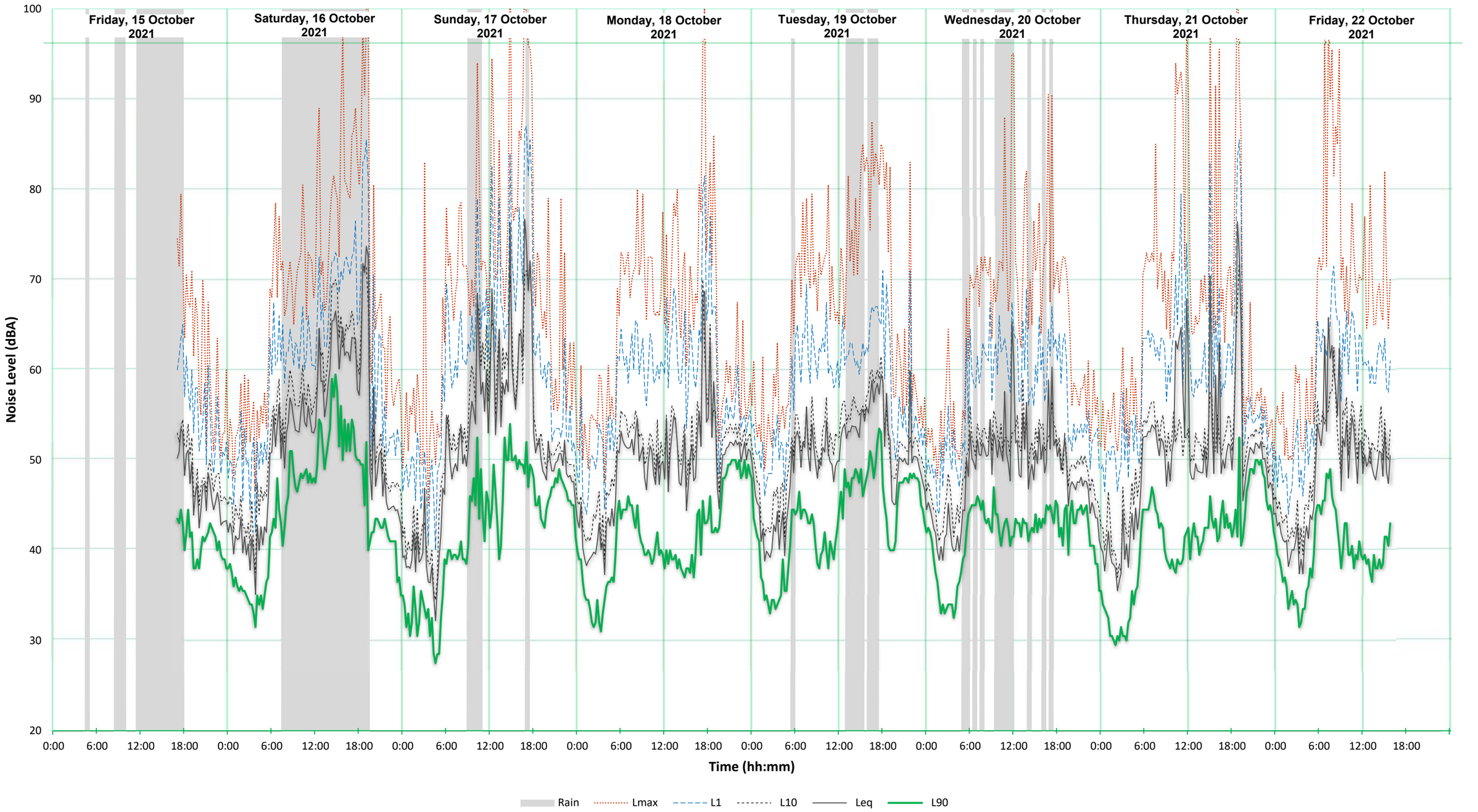
Located at 268 Catherine Fields Rd, Catherine Fields, NSW



Located at 268 Catherine Fields Rd, Catherine Fields, NSW



Located at 278 Catherine Fields Rd, Catherine Fields, NSW



MINARAH COLLEGE
268-278 CATHERINE FIELDS ROAD, CATHERINE FIELD

7280-1.2R Appendix C

LOCATION PLAN: NTS

CONTEXT PLAN: NTS

DRAWING LIST- DEVELOPMENT APPLICATION

EXTERNAL FINISHES LEGEND

AGD - ALUMINIUM GLASS DOOR
AW - ALUMINIUM WINDOW
BR - FACE BRICKWORK
BRHM - HIT AND MISS FACE BRICKWORK
CS - CONCRETE SLAB
FC - FC SHEETING
GSD - GLASS SECTIONAL DOOR
MB - METAL BALUSTRADE
MF- METAL FASICA
MLF - METAL LOUVRE
MPF - METAL PAILING FENCE
MR - METAL ROOF
PAS - PERFORATED ALUMINIUM SCREEN
RD - ROLLER DOOR
SB - STEEL BEAM

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PROJECT :
MINARAH COLLEGE
268-278 CATHERINE FIELDS RD
CATHERINE FIELD

PROJECT NO : #21019

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CATHERINE FIELD

PROJECT NO : #21019

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DEMOLITION PLAN LEGEND

- EXISTING TREE
- DEMOLISHED TREE
- EXISTING STRUCTURE RETAINED
- DEMOLISHED STRUCTURE
- EXISTING ROAD OR DRIVEWAY
- DEMOLISHED LAND FEATURE

285 CATHERINE FIELDS ROAD LOT 160 DP 27602

277 CATHERINE FIELDS ROAD LOT 159 DP 27602

271 CATHERINE FIELDS ROAD LOT 158 DP 27602

265A CATHERINE FIELDS ROAD LOT 157 DP 27602

CATHERINE FIELDS RD

286 CATHERINE FIELDS ROAD LOT 231 DP 27602

BOUNDARY

LINE OF APZ

BRICK HOUSE TILE ROOF

METAL SHED METAL ROOF

CLAD SHED

METAL SHED METAL ROOF

LOT 12/DP 833784

227-229 DEEPFIELDS ROAD LOT 208 DP 27602

225 DEEPFIELDS ROAD LOT 209 DP 27602

BRICK HOUSE METAL ROOF

CONCRETE CAR PORT METAL ROOF

METAL SHED METAL ROOF

EXISTING BRICK AND CLAD SHED

CONTAINER

CONTAINER

EXISTING BRICK AND CLAD SHED

LOT 11/DP 833983

DAM

DAM

260 CATHERINE FIELDS RD LOT 1288 DP 793983

12 HEATHERFIELD CLOSE LOT 91 DP 875025

14 HEATHERFIELD CLOSE LOT 92 DP 875025

16 HEATHERFIELD CLOSE LOT 93 DP 875025

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REV

285 CATHERINE FIELDS ROAD LOT 160 DP 27602

277 CATHERINE FIELDS ROAD LOT 159 DP 27602

271 CATHERINE FIELDS ROAD LOT 158 DP 27602

CATHERINE FIELDS RD

286 CATHERINE FIELDS ROAD LOT 231 DP 27602

227-229 DEEPFIELDS ROAD LOT 208 DP 27602

225 DEEPFIELDS ROAD LOT 209 DP 27602

260 CATHERINE FIELDS RD LOT 1288 DP 793983

265A CATHERINE FIELDS ROAD LOT 157 DP 27602

12 HEATHERFIELD CLOSE LOT 91 DP 875025

14 HEATHERFIELD CLOSE LOT 92 DP 875025

16 HEATHERFIELD CLOSE LOT 93 DP 875025

BOUNDARY

1800mm COLORBOND FENCE

1800 COLORBOND FENCE WITH MIN 1000mm MAX 200mm OPENING AT BASE

VEHICLE ENTRY

ENTRY

EXIT

PARKING

PASSING BAY RFS

PEDESTRIAN PATH TO ACCESS FIELD

WASTE VEHICLE LOADING/ UNLOADING AREA

LINE OF APZ

SSP HS OUTDOOR

LC OUTDOOR

HS PLAY

SSP OUTDOOR

PS PLAY

STAFF OUTDOOR AREA

BIKE STORE

KISS AND DROP

PEDESTRIAN CROSSING

SOCCER FIELD

BUS PARKING BAY 1

BUS PARKING BAY 2

BUS PARKING BAY 3

BUS PARKING BAY 4

BUS PARKING BAY 5

FIRE HYDRANT

FIRE HOSE REEL

PLANT ON ROOF

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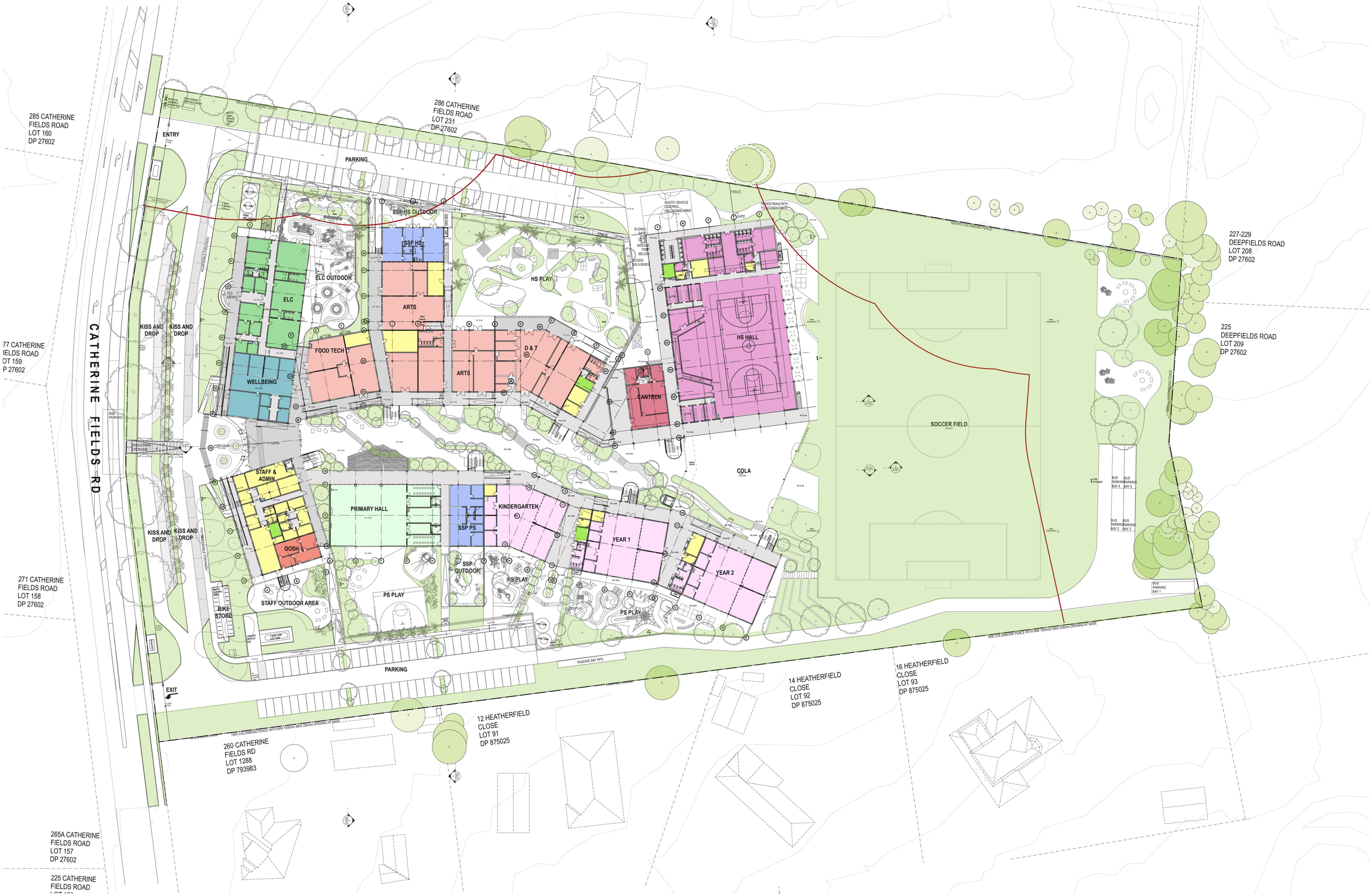

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CATHERINE FIELD

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MINARAH COLLEGE

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REV

285 CATHERINE FIELDS ROAD LOT 160 DP 27602

277 CATHERINE FIELDS ROAD LOT 159 DP 27602

271 CATHERINE FIELDS ROAD LOT 158 DP 27602

260 CATHERINE FIELDS RD LOT 1288 DP 793983

286 CATHERINE FIELDS ROAD LOT 231 DP 27602

227-229 DEEPFIELDS ROAD LOT 208 DP 27602

225 DEEPFIELDS ROAD LOT 209 DP 27602

12 HEATHERFIELD CLOSE LOT 91

14 HEATHERFIELD CLOSE

16 HEATHERFIELD CLOSE LOT 93

CATHERINE FIELDS RD

24 CAR PARKING
5 ELC
3 STUDENT
15 STAFF
(INC 3 ACCESSIBLE)
(1) SPARE

TEMPORARY COLA

TEMPORARY CANTEEN

TEMPORARY OUTDOOR PLAY AREA WITH TEMPORARY FENCING. PLAY AREA WITH DDA ACCESS AS REQUIRED.
2,941 m²

TEMPORARY HARDSTAND FOR MRV AND BUS PARKING

TEMPORARY WASTE SHED

TEMPORARY ROADBASE FOR RFDS ACCESS TBC

KISS AND DROP 10 SPACES

BUS LOADING 2 SPACES

KISS AND DROP 7 SPACES

FRONT GATED ENTRY

ELC ENTRY

ELC OUTDOOR

TEMP ROAD BASE

PASSING BAY RFS

BUS PARKING BAY 1

BUS PARKING BAY 2

BUS PARKING BAY 3

BUS PARKING BAY 4

BUS PARKING BAY 5

BOUNDARY FENCE

ACCESSIBLE FOOTPATH

SCHOOL INDOOR ZONES LEGEND:

ELC		LIBRARY		OOSH	
PRIMARY		PRIMARY HALL		SSP	
HIGH		HIGH HALL		MULTIFUNCTIONAL	
STAFF		WELLBEING		CANTEEN	

AMENITY CALCULATIONS

X NOTES AMUBULANT X NOTES ACCESSIBLE	CLOSET PANS	URINALS	WASHBASINS
ELC STUDENTS TOTAL	3	0	3
ELC STAFF TOTAL	2 (2)	0	2 (2)
STAFF TOTAL	4 (4)	0	4 (4)
PS STUDENT BOY TOTAL	8 (2) (2)	2	8 (2)
PS STUDENT GIRL TOTAL	8 (2) (2)	0	8 (2)
HS STUDENT BOY TOTAL	0	0	0
HS STUDENT GIRL TOTAL	0	0	0

STAGING WORKS LEGEND

TEMPORARY INTERNAL FIT OUT	
OUTLINE OF FUTURE DEVELOPMENT	
PARKING AND CIVIL WORKS	
OUTDOOR PLAY AREA TEMPORARY LANDSCAPING WORKS	
OUTDOOR PLAY AREA PERMANENT LANDSCAPING WORKS	
PERMANENT FENCE	
TEMPORARY FENCE	

	STAGE 1	STAGE 2	STAGE 3	STAGE 4	STAGE 5
GFA:	3080m2				
FSR:	0.077:1				
ELC ENROLMENT:	18				
SSP ENROLMENT:	0				
PRIMARY ENROLMENT:	300				
SECONDARY ENROLMENT:	0				
STAFF PERMANENT:	15				
STAFF CASUAL:	2				
KISS AND DROP REQUIRED:	42				
KISS AND DROP PROVIDED :	17				
PARKING REQUIRED:	23				
PARKING PROVIDED:	24				

STAGE 1 GROUND FLOOR - POST CONSTRUCTION PLAN

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PROJECT :
MINARAH COLLEGE
268-278 CATHERINE FIELDS RD
CATHERINE FIELD

PROJECT NO : #21019

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PHASE: SCHEMATIC DESIGN
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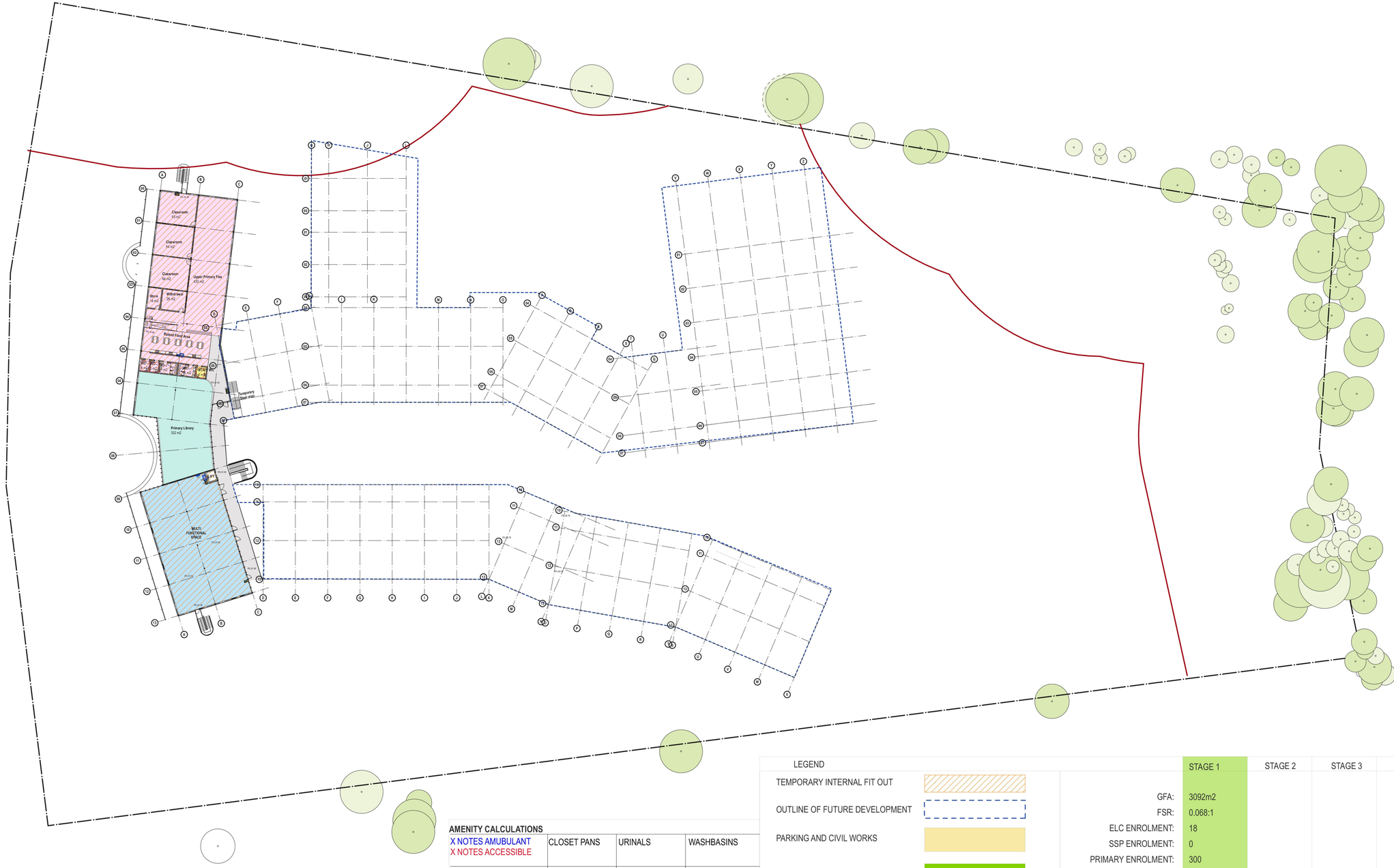

SCHOOL INDOOR ZONES LEGEND:

ELC		LIBRARY		OOSH	
PRIMARY		PRIMARY HALL		SSP	
HIGH		HIGH HALL		MULTIFUNCTIONAL	
STAFF		WELLBEING		CANTEEN	

AMENITY CALCULATIONS

X NOTES AMUBULANT X NOTES ACCESSIBLE	CLOSET PANS	URINALS	WASHBASINS
ELC STUDENTS TOTAL	3	0	3
ELC STAFF TOTAL	2 (2)	0	2 (2)
STAFF TOTAL	4 (4)	0	4 (4)
PS STUDENT BOY TOTAL	8 (2) (2)	2	8 (2)
PS STUDENT GIRLTOTAL	8 (2) (2)	0	8 (2)
HS STUDENT BOY TOTAL	0	0	0
HS STUDENT GIRL TOTAL	0	0	0

LEGEND

- TEMPORARY INTERNAL FIT OUT
- OUTLINE OF FUTURE DEVELOPMENT
- PARKING AND CIVIL WORKS
- OUTDOOR PLAY AREA TEMPORARY LANDSCAPING WORKS
- OUTDOOR PLAY AREA PERMANENT LANDSCAPING WORKS
- PERMANENT FENCE
- TEMPORARY FENCE

	STAGE 1	STAGE 2	STAGE 3	STAGE 4	STAGE 5
GFA:	3092m2				
FSR:	0.068:1				
ELC ENROLMENT:	18				
SSP ENROLMENT:	0				
PRIMARY ENROLMENT:	300				
SECONDARY ENROLMENT:	0				
STAFF PERMANENT:	15				
STAFF CASUAL:	2				
KISS AND DROP REQUIRED:	42				
KISS AND DROP PROVIDED :	17				
PARKING REQUIRED:	28				
PARKING PROVIDED:	28				

STAGE 1 FIRST FLOOR - POST CONSTRUCTION PLAN

WORK IN PROGRESS - FOR INFORMATION - 07 DEC 2021

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MINARAH COLLEGE
268-278 CATHERINE FIELDS RD
CATHERINE FIELD

PROJECT NO : #21019

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PHASE	SCHEMATIC DESIGN
DRAWING NO	
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285 CATHERINE FIELDS ROAD LOT 160 DP 27602

277 CATHERINE FIELDS ROAD LOT 159 DP 27602

271 CATHERINE FIELDS ROAD LOT 158 DP 27602

265A CATHERINE FIELDS ROAD

260 CATHERINE FIELDS RD LOT 1288 DP 793983

286 CATHERINE FIELDS ROAD LOT 231 DP 27602

227-229 DEEPFIELDS ROAD LOT 208 DP 27602

225 DEEPFIELDS ROAD LOT 209 DP 27602

12 HEATHERFIELD CLOSE LOT 91

14 HEATHERFIELD CLOSE

16 HEATHERFIELD CLOSE LOT 93

CATHERINE FIELDS RD

74 CAR PARKING
6 STUDENT
11 ELC
33 STAFF
(INCLUDING 3 ACCESSIBLE)
24 SPARE

COMPLETION OF NORTHERN CARPARK

TEMPORARY COLA

TEMPORARY CANTEEN

TEMPORARY OUTDOOR PLAY AREA WITH TEMPORARY FENCING. PLAY AREA WITH DDA ACCESS AS REQUIRED.
6,349 m²

ELC OUTDOOR

PS PLAY

TEMPORARY SSP PARKING TBC

TEMP ROAD BASE

WASTE VEHICLE LOADING BLOW/ROPSEA

TEMP WASTE TRASHED BELOW

SLIDING GATE

GREASE TRAP

GOODS DELIVERIES

KISS AND DROP 10 SPACES

BUS PARKING

BUS BAY

BUS PARKING BAY 1

BUS PARKING BAY 2

BUS PARKING BAY 3

BUS PARKING BAY 4

BUS PARKING BAY 5

SHARED ZONE

BOUNDARY FENCE

SCHOOL INDOOR ZONES LEGEND:

ELC		LIBRARY		OOSH	
PRIMARY		PRIMARY HALL		SSP	
HIGH		HIGH HALL		MULTIFUNCTIONAL	
STAFF		WELLBEING		CANTEEN	

AMENITY CALCULATIONS

X NOTES AMUBULANT X NOTES ACCESSIBLE	CLOSET PANS	URINALS	WASHBASINS
ELC STUDENTS TOTAL	3	0	3
ELC STAFF TOTAL	2 (2)	0	2 (2)
STAFF TOTAL	10 (2) (8)	0	10 (2) (8)
PS STUDENT BOY TOTAL	13 (3) (3)	4	13 (3)
PS STUDENT GIRL TOTAL	13 (3) (3)	0	13 (3)
HS STUDENT BOY TOTAL	0	0	0
HS STUDENT GIRL TOTAL	0	0	0

LEGEND

- TEMPORARY INTERNAL FIT OUT
- OUTLINE OF FUTURE DEVELOPMENT
- PARKING AND CIVIL WORKS
- OUTDOOR PLAY AREA TEMPORARY LANDSCAPING WORKS
- OUTDOOR PLAY AREA PERMANENT LANDSCAPING WORKS
- PERMANENT FENCE
- TEMPORARY FENCE

	STAGE 1	STAGE 2	STAGE 3	STAGE 4	STAGE 5
GFA:	3080m2	5389m2			
FSR:	0.077:1	0.13.5:1			
ELC ENROLMENT:	18	42			
SSP ENROLMENT:	0	10			
PRIMARY ENROLMENT:	300	600			
SECONDARY ENROLMENT:	0	0			
STAFF PERMANENT:	15	41			
STAFF CASUAL:	2	4			
KISS AND DROP REQUIRED:	42	84			
KISS AND DROP PROVIDED :	17	17			
PARKING REQUIRED:	23	50			
PARKING PROVIDED:	24	74			

STAGE 2 GROUND FLOOR - POST CONSTRUCTION PLAN

DATE	REV	DESCRIPTION:
31.03.22	A	ISSUE FOR SSDA

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PROJECT :
MINARAH COLLEGE
268-278 CATHERINE FIELDS RD
CATHERINE FIELD

PROJECT NO : #21019

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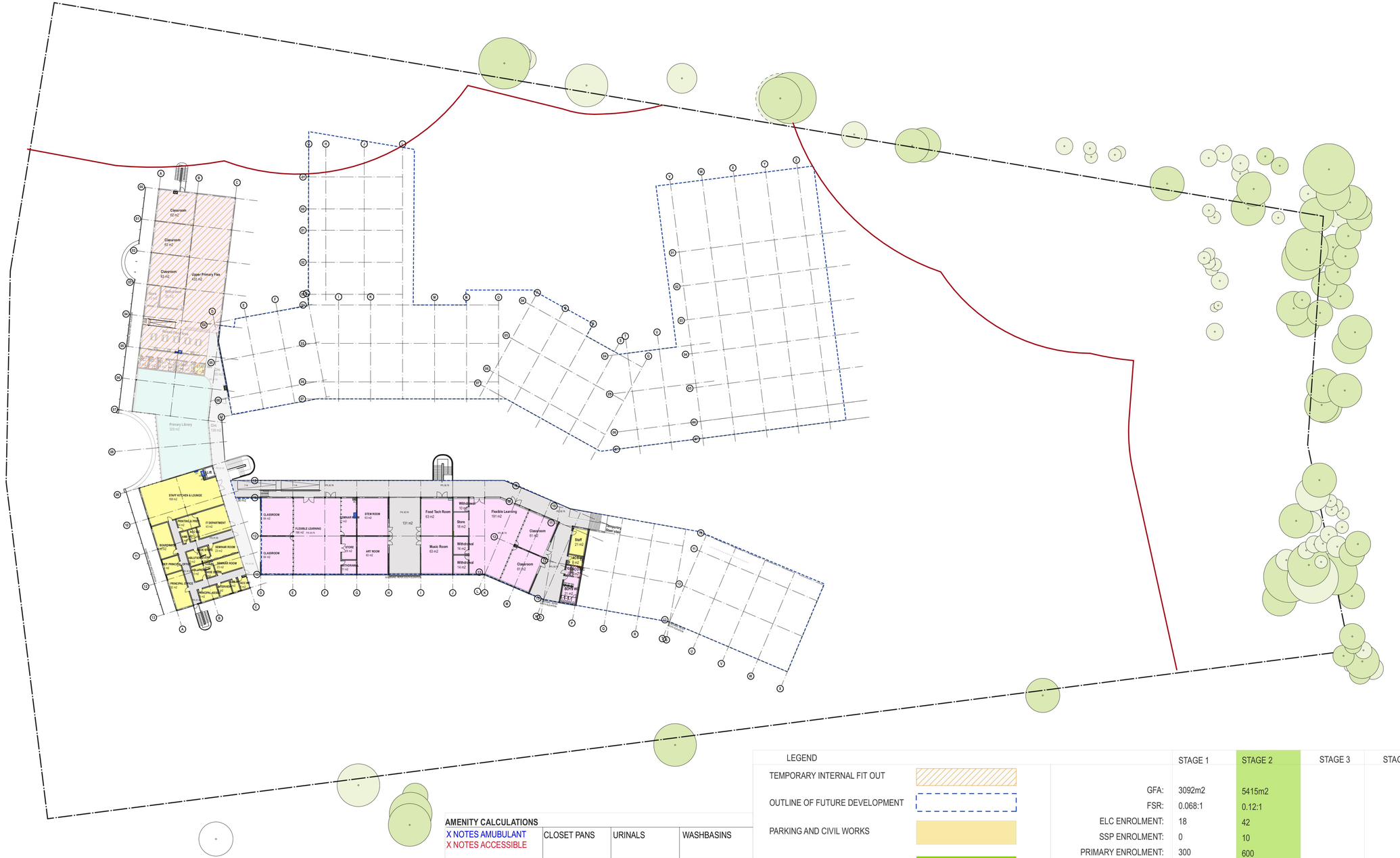
DRAWING TITLE
STAGE 2 GROUND FLOOR PLAN

DRAWN BY: BS, RL, JD, WR
CHECKED: PT
SCALES: 1:500
DATE: DD.MM.201X
PHASE: SCHEMATIC DESIGN
DRAWING NO: A 113
REV:



AMENITY CALCULATIONS X NOTES AMUBULANT X NOTES ACCESSIBLE	CLOSET PANS	URINALS	WASHBASINS
ELC STUDENTS TOTAL	3	0	3
ELC STAFF TOTAL	2 (2)	0	2 (2)
STAFF TOTAL	10 (2) (8)	0	10 (2) (8)
PS STUDENT BOY TOTAL	13 (3) (3)	4	13 (3)
PS STUDENT GIRL TOTAL	13 (3) (3)	0	13 (3)
HS STUDENT BOY TOTAL	0	0	0
HS STUDENT GIRL TOTAL	0	0	0

SCHOOL INDOOR ZONES LEGEND:

ELC		LIBRARY		OOSH	
PRIMARY		PRIMARY HALL		SSP	
HIGH		HIGH HALL		MULTIFUNCTIONAL	
STAFF		WELLBEING		CANTEEN	

LEGEND

- TEMPORARY INTERNAL FIT OUT
- OUTLINE OF FUTURE DEVELOPMENT
- PARKING AND CIVIL WORKS
- OUTDOOR PLAY AREA TEMPORARY LANDSCAPING WORKS
- OUTDOOR PLAY AREA PERMANENT LANDSCAPING WORKS
- PERMANENT FENCE
- TEMPORARY FENCE

	STAGE 1	STAGE 2	STAGE 3	STAGE 4	STAGE 5
GFA:	3092m2	5415m2			
FSR:	0.068:1	0.12:1			
ELC ENROLMENT:	18	42			
SSP ENROLMENT:	0	10			
PRIMARY ENROLMENT:	300	600			
SECONDARY ENROLMENT:	0	0			
STAFF PERMANENT:	15	41			
STAFF CASUAL:	2	4			
KISS AND DROP REQUIRED:	42	84			
KISS AND DROP PROVIDED :	17	17			
PARKING REQUIRED:	28	58			
PARKING PROVIDED:	28	73			

STAGE 2 FIRST FLOOR - POST CONSTRUCTION PLAN

WORK IN PROGRESS - FOR INFORMATION - 07 DEC 2021

DATE	REV	DESCRIPTION:
31.03.22	A	ISSUE FOR SSDA

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MINARAH COLLEGE
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CATHERINE FIELD

PROJECT NO : #21019

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DRAWING TITLE
STAGE 2 FIRST FLOOR COMPLETION PLAN

SCALES 1:500

PHASE SCHEMATIC DESIGN

DRAWING NO

REV

DRAWN BY BS, RL, JD, WR

CHECKED PT

DATE DD.MM.201X

SCHOOL INDOOR ZONES LEGEND:

ELC		LIBRARY		OOSH	
PRIMARY		PRIMARY HALL		SSP	
HIGH		HIGH HALL		MULTIFUNCTIONAL	
STAFF		WELLBEING		CANTEEN	

AMENITY CALCULATIONS

X NOTES AMUBULANT
X NOTES ACCESSIBLE

	CLOSET PANS	URINALS	WASHBASINS
ELC STUDENTS TOTAL	6	0	6
ELC STAFF TOTAL	2 (2)	0	2 (2)
STAFF TOTAL	11 (2) (9)	0	11 (9)
PS STUDENT BOY TOTAL	18 (4) (4)	7	12 (4)
PS STUDENT GIRL TOTAL	18 (4) (4)	0	12 (4)
HS STUDENT BOY TOTAL	0	0	0
HS STUDENT GIRL TOTAL	0	0	0

LEGEND

- TEMPORARY INTERNAL FIT OUT
- OUTLINE OF FUTURE DEVELOPMENT
- PARKING AND CIVIL WORKS
- OUTDOOR PLAY AREA TEMPORARY LANDSCAPING WORKS
- OUTDOOR PLAY AREA PERMANENT LANDSCAPING WORKS
- PERMANENT FENCE
- TEMPORARY FENCE

	STAGE 1	STAGE 2	STAGE 3	STAGE 4	STAGE 5
GFA:	3080m2	5389m2	7091m2		
FSR:	0.077:1	0.13.5:1	0.17.7:1		
ELC ENROLMENT:	18	42	60		
SSP ENROLMENT:	0	10	20		
PRIMARY ENROLMENT:	300	600	840		
SECONDARY ENROLMENT:	0	0	50		
STAFF PERMANENT:	15	41	59		
STAFF CASUAL:	2	4	6		
KISS AND DROP REQUIRED:	42	84	123		
KISS AND DROP PROVIDED :	17	17	30		
PARKING REQUIRED:	23	50	78		
PARKING PROVIDED:	24	74	83		

STAGE 3 GROUND FLOOR - POST CONSTRUCTION PLAN

DATE	REV	DESCRIPTION:
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MINARAH COLLEGE
268-278 CATHERINE FIELDS RD
CATHERINE FIELD

PROJECT NO : #21019

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DRAWING TITLE	STAGE 3 GROUND FLOOR PLAN
DRAWN BY	BS, RL, JD, WR
CHECKED	PT
SCALES	1:500, 1:2
DATE	DD.MM.201X
PHASE	SCHEMATIC DESIGN
DRAWING NO	A 115
REV	

206 m2

SCHOOL INDOOR ZONES LEGEND:

ELC		LIBRARY		OOSH	
PRIMARY		PRIMARY HALL		SSP	
HIGH		HIGH HALL		MULTIFUNCTIONAL	
STAFF		WELLBEING		CANTEEN	

AMENITY CALCULATIONS

X NOTES AMUBULANT X NOTES ACCESSIBLE	CLOSET PANS	URINALS	WASHBASINS
ELC STUDENTS TOTAL	6	0	6
ELC STAFF TOTAL	2 (2)	0	2 (2)
STAFF TOTAL	11 (2) (9)	0	11 (9)
PS STUDENT BOY TOTAL	18 (4) (4)	7	12 (4)
PS STUDENT GIRL TOTAL	18 (4) (4)	0	12 (4)
HS STUDENT BOY TOTAL	0	0	0
HS STUDENT GIRL TOTAL	0	0	0

LEGEND

- TEMPORARY INTERNAL FIT OUT
- OUTLINE OF FUTURE DEVELOPMENT
- PARKING AND CIVIL WORKS
- OUTDOOR PLAY AREA TEMPORARY LANDSCAPING WORKS
- OUTDOOR PLAY AREA PERMANENT LANDSCAPING WORKS
- PERMANENT FENCE
- TEMPORARY FENCE

	STAGE 1	STAGE 2	STAGE 3	STAGE 4	STAGE 5
GFA:	3092m2	5415m2	7103m2		
FSR:	0.068:1	0.12:1	0.157:1		
ELC ENROLMENT:	18	42	60		
SSP ENROLMENT:	0	10	20		
PRIMARY ENROLMENT:	300	600	840		
SECONDARY ENROLMENT:	0	0	50		
STAFF PERMANENT:	15	41	59		
STAFF CASUAL:	2	4	6		
KISS AND DROP REQUIRED:	42	84	123		
KISS AND DROP PROVIDED :	17	17	30		
PARKING REQUIRED:	28	58	92		
PARKING PROVIDED:	28	73	123		

STAGE 3 FIRST FLOOR - POST CONSTRUCTION PLAN

WORK IN PROGRESS - FOR INFORMATION - 07 DEC 2021

DATE	REV	DESCRIPTION:
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PROJECT :
MINARAH COLLEGE
268-278 CATHERINE FIELDS RD
CATHERINE FIELD

PROJECT NO : #21019

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DRAWING TITLE
STAGE 3 FIRST FLOOR PLAN
POST CONSTRUCTION

DRAWN BY BS, RL, JD, WR
CHECKED PT
SCALES 1:500
DATE DD.MM.201X
PHASE SCHEMATIC DESIGN
DRAWING NO
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285 CATHERINE FIELDS ROAD LOT 160 DP 27602

277 CATHERINE FIELDS ROAD LOT 159 DP 27602

271 CATHERINE FIELDS ROAD LOT 158 DP 27602

265A CATHERINE FIELDS ROAD

260 CATHERINE FIELDS RD LOT 1288 DP 793983

CATHERINE FIELDS RD

286 CATHERINE FIELDS ROAD LOT 231 DP 27602

74 CAR PARKING
24 STUDENT
15 ELC
22 STAFF
(INC 3 ACCESSIBLE)
(13 SPARE)

TEMPORARY COLA

TEMPORARY CANTEEN

903 m²

ADDITIONAL BUS BAYS FOR 7 TOTAL BUSES

RH TURNING LANE ADDED WITH ASSOCIATED ROAD WIDENING AND UPGRADES

64 PARKS
44 STAFF
(INC 2 ACCESSIBLE)
20 SPARE

PERMANENT ROAD BASE

1800 COLORBOND FENCE WITH MIN 1000mm MAX 200mm OPENING AT BASE

TEMPORARY LANDSCAPED AREA LINKING OVAL AND COURTYARD

PLAYING FIELD CONSTRUCTED WITH SYNTHETIC TURF

227-229 DEEPFIELDS ROAD LOT 208 DP 27602

225 DEEPFIELDS ROAD LOT 209 DP 27602

PERMANENT BUS PARKING 5 BUSES

BUS PARKING BAY 1

BUS PARKING BAY 2

BUS PARKING BAY 3

BUS PARKING BAY 4

BUS PARKING BAY 5

12 HEATHERFIELD CLOSE LOT 91

14 HEATHERFIELD CLOSE

16 HEATHERFIELD CLOSE LOT 93

SCHOOL INDOOR ZONES LEGEND:

ELC		LIBRARY		OOSH	
PRIMARY		PRIMARY HALL		SSP	
HIGH		HIGH HALL		MULTIFUNCTIONAL	
STAFF		WELLBEING		CANTEEN	

AMENITY CALCULATIONS

X NOTES AMUBULANT X NOTES ACCESSIBLE	CLOSET PANS	URINALS	WASHBASINS
ELC STUDENTS TOTAL	6	0	6
ELC STAFF TOTAL	2 (2)	0	2 (2)
STAFF TOTAL	12 (2) (10)	0	12 (10)
PS STUDENT BOY TOTAL	18 (4) (4)	6	12 (4)
PS STUDENT GIRL TOTAL	18 (4) (4)	0	12 (4)
HS STUDENT BOY TOTAL	10 (2) (2)	4	10 (2) (2)
HS STUDENT GIRL TOTAL	12 (3) (2)	0	10 (2)

LEGEND

- TEMPORARY INTERNAL FIT OUT
- OUTLINE OF FUTURE DEVELOPMENT
- PARKING AND CIVIL WORKS
- OUTDOOR PLAY AREA TEMPORARY LANDSCAPING WORKS
- OUTDOOR PLAY AREA PERMANENT LANDSCAPING WORKS
- PERMANENT FENCE
- TEMPORARY FENCE

	STAGE 1	STAGE 2	STAGE 3	STAGE 4	STAGE 5
GFA:	3080m2	5389m2	7091m2	9994m2	
FSR:	0.077:1	0.13.5:1	0.17.7:1	0.25:1	
ELC ENROLMENT:	18	42	60	60	
SSP ENROLMENT:	0	10	20	20	
PRIMARY ENROLMENT:	300	600	840	840	
SECONDARY ENROLMENT:	0	0	50	300	
STAFF PERMANENT:	15	41	59	74	
STAFF CASUAL:	2	4	6	8	
KISS AND DROP REQUIRED:	42	84	123	144	
KISS AND DROP PROVIDED :	17	17	30	30	
PARKING REQUIRED:	23	50	78	105	
PARKING PROVIDED:	24	74	83	138	

STAGE 4 GROUND FLOOR - POST CONSTRUCTION PLAN

DATE	REV	DESCRIPTION:
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PROJECT NO : #21019

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DRAWING TITLE
STAGE 4 GROUND FLOOR PLAN

DRAWN BY BS, RL, JD, WR
CHECKED PT
SCALES 1:500
DATE DD.MM.201X
PHASE SCHEMATIC DESIGN
DRAWING NO A 117
REV

SCHOOL INDOOR ZONES LEGEND:

ELC		LIBRARY		OOSH	
PRIMARY		PRIMARY HALL		SSP	
HIGH		HIGH HALL		MULTIFUNCTIONAL	
STAFF		WELLBEING		CANTEEN	

AMENITY CALCULATIONS

X NOTES AMUBULANT X NOTES ACCESSIBLE	CLOSET PANS	URINALS	WASHBASINS
ELC STUDENTS TOTAL	6	0	6
ELC STAFF TOTAL	2 (2)	0	2 (2)
STAFF TOTAL	12 (2) (10)	0	12 (10)
PS STUDENT BOY TOTAL	18 (4) (4)	6	12 (4)
PS STUDENT GIRL TOTAL	18 (4) (4)	0	12 (4)
HS STUDENT BOY TOTAL	10 (2) (2)	4	10 (2) (2)
HS STUDENT GIRL TOTAL	12 (3) (2)	0	10 (2)

LEGEND

- TEMPORARY INTERNAL FIT OUT
- OUTLINE OF FUTURE DEVELOPMENT
- PARKING AND CIVIL WORKS
- OUTDOOR PLAY AREA TEMPORARY LANDSCAPING WORKS
- OUTDOOR PLAY AREA PERMANENT LANDSCAPING WORKS
- PERMANENT FENCE
- TEMPORARY FENCE

	STAGE 1	STAGE 2	STAGE 3	STAGE 4	STAGE 5
GFA:	3092m2	5415m2	7103m2	10270m2	
FSR:	0.068:1	0.12:1	0.157:1	0.228:1	
ELC ENROLMENT:	18	42	60	60	
SSP ENROLMENT:	0	10	20	20	
PRIMARY ENROLMENT:	300	600	840	840	
SECONDARY ENROLMENT:	0	0	50	300	
STAFF PERMANENT:	15	41	59	74	
STAFF CASUAL:	2	4	6	8	
KISS AND DROP REQUIRED:	42	84	123	144	
KISS AND DROP PROVIDED :	17	17	30	30	
PARKING REQUIRED:	28	58	92	121	
PARKING PROVIDED:	28	73	123	123	

STAGE 4 FIRST FLOOR - POST CONSTRUCTION PLAN

WORK IN PROGRESS - FOR INFORMATION - 07 DEC 2021

DATE	REV	DESCRIPTION:
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PROJECT :
MINARAH COLLEGE

PROJECT NO : #21019

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DRAWING TITLE: STAGE 4 FIRST FLOOR PLAN POST CONSTRUCTION	DRAWN BY: BS, RL, JD, WR
	CHECKED: PT
SCALES: 1:500	DATE: DD.MM.201X
PHASE: SCHEMATIC DESIGN	DRAWING NO
	REV

SCHOOL INDOOR ZONES LEGEND:

ELC		LIBRARY		OOSH	
PRIMARY		PRIMARY HALL		SSP	
HIGH		HIGH HALL		MULTIFUNCTIONAL	
STAFF		WELLBEING		CANTEEN	

AMENITY CALCULATIONS

X NOTES AMUBULANT
X NOTES ACCESSIBLE

	CLOSET PANS	URINALS	WASHBASINS
ELC STUDENTS TOTAL	6	0	6
ELC STAFF TOTAL	2 (2)	0	2 (2)
STAFF TOTAL	14 (2) (12)	0	14 (12)
PS STUDENT BOY TOTAL	18 (4) (4)	6	12 (4)
PS STUDENT GIRL TOTAL	18 (4) (4)	0	12 (4)
HS STUDENT BOY TOTAL	16 (3) (3)	4	15 (2)
HS STUDENT GIRL TOTAL	18 (4) (3)	0	13 (2)

LEGEND

- TEMPORARY INTERNAL FIT OUT
- OUTLINE OF FUTURE DEVELOPMENT
- PARKING AND CIVIL WORKS
- OUTDOOR PLAY AREA TEMPORARY LANDSCAPING WORKS
- OUTDOOR PLAY AREA PERMANENT LANDSCAPING WORKS
- PERMANENT FENCE
- TEMPORARY FENCE

	STAGE 1	STAGE 2	STAGE 3	STAGE 4	STAGE 5
GFA:	3080m2	5389m2	7091m2	9994m2	13109m2
FSR:	0.077:1	0.13.5:1	0.17.7:1	0.25:1	0.32.8:1
ELC ENROLMENT:	18	42	60	60	60
SSP ENROLMENT:	0	10	20	20	20
PRIMARY ENROLMENT:	300	600	840	840	840
SECONDARY ENROLMENT:	0	0	50	300	550
STAFF PERMANENT:	15	41	59	74	94
STAFF CASUAL:	2	4	6	8	12
KISS AND DROP REQUIRED:	42	84	123	144	165
KISS AND DROP PROVIDED :	17	17	30	30	30
PARKING REQUIRED:	23	50	78	105	138
PARKING PROVIDED:	24	74	83	138	138

STAGE 5 GROUND FLOOR - POST CONSTRUCTION PLAN

DATE	REV	DESCRIPTION:
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PROJECT :
MINARAH COLLEGE
268-278 CATHERINE FIELDS RD
CATHERINE FIELD

PROJECT NO : #21019

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DRAWING TITLE	STAGE 5 GROUND FLOOR PLAN
DRAWN BY	BS, RL, JD, WR
CHECKED	PT
SCALES	1:500
DATE	DD.MM.201X
PHASE	SCHEMATIC DESIGN
DRAWING NO	A 119
REV	

SCHOOL INDOOR ZONES LEGEND:

ELC		LIBRARY		OOSH	
PRIMARY		PRIMARY HALL		SSP	
HIGH		HIGH HALL		MULTIFUNCTIONAL	
STAFF		WELLBEING		CANTEEN	

AMENITY CALCULATIONS

X NOTES AMUBULANT
X NOTES ACCESSIBLE

	CLOSET PANS	URINALS	WASHBASINS
ELC STUDENTS TOTAL	6	0	6
ELC STAFF TOTAL	2 (2)	0	2 (2)
STAFF TOTAL	14 (2) (12)	0	14 (12)
PS STUDENT BOY TOTAL	18 (4) (4)	6	12 (4)
PS STUDENT GIRL TOTAL	18 (4) (4)	0	12 (4)
HS STUDENT BOY TOTAL	16 (3) (3)	4	15 (2)
HS STUDENT GIRL TOTAL	18 (4) (3)	0	13 (2)

LEGEND

- TEMPORARY INTERNAL FIT OUT
- OUTLINE OF FUTURE DEVELOPMENT
- PARKING AND CIVIL WORKS
- OUTDOOR PLAY AREA TEMPORARY LANDSCAPING WORKS
- OUTDOOR PLAY AREA PERMANENT LANDSCAPING WORKS
- PERMANENT FENCE
- TEMPORARY FENCE

	STAGE 1	STAGE 2	STAGE 3	STAGE 4	STAGE 5
GFA:	3092m2	5415m2	7103m2	10270m2	13901m2
FSR:	0.068:1	0.12:1	0.157:1	0.228:1	0.309:1
ELC ENROLMENT:	18	42	60	60	60
SSP ENROLMENT:	0	10	20	20	20
PRIMARY ENROLMENT:	300	600	840	840	840
SECONDARY ENROLMENT:	0	0	50	300	550
STAFF PERMANENT:	15	41	59	74	94
STAFF CASUAL:	2	4	6	8	12
KISS AND DROP REQUIRED:	42	84	123	144	165
KISS AND DROP PROVIDED :	17	17	30	30	30
PARKING REQUIRED:	28	58	92	121	165
PARKING PROVIDED:	28	73	123	123	123

STAGE 5 GROUND FLOOR - POST CONSTRUCTION PLAN

WORK IN PROGRESS - FOR INFORMATION - 07 DEC 2021

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PROJECT :
MINARAH COLLEGE
268-278 CATHERINE FIELDS RD
CATHERINE FIELD

PROJECT NO : #21019

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DRAWING TITLE
STAGE 5 FIRST FLOOR PLAN
POST CONSTRUCTION

SCALES 1:500

PHASE SCHEMATIC DESIGN

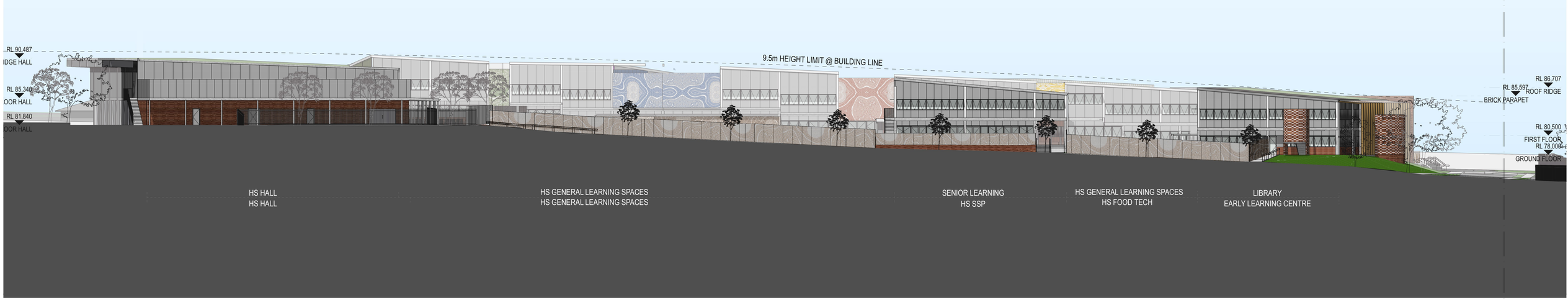
DRAWING NO

REV

DRAWN BY BS, RL, JD, WR

CHECKED PT

DATE DD.MM.201X



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31.03.22	A	ISSUE FOR SSDA

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DRAWING TITLE
ELEVATIONS

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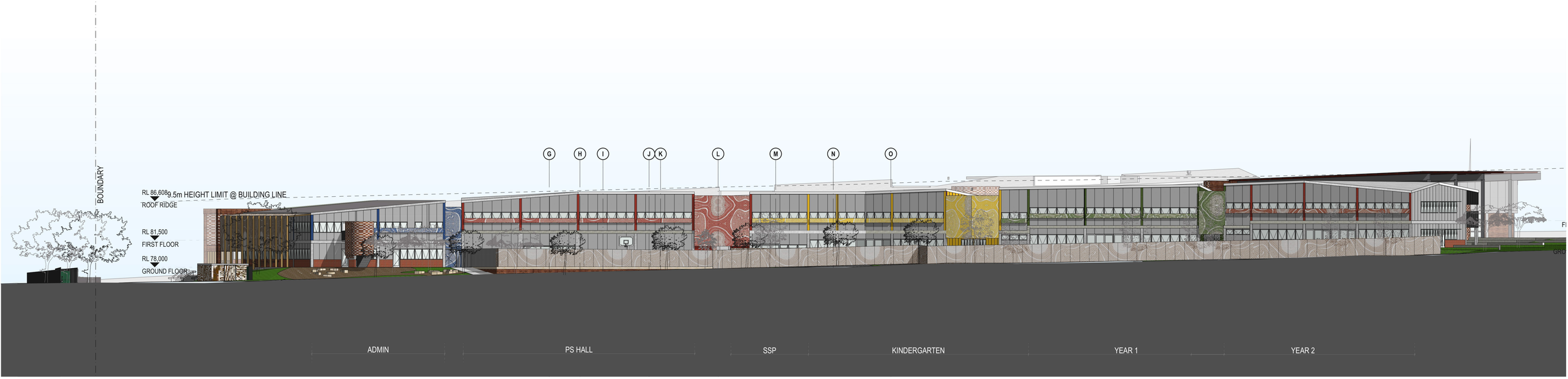
PHASE
SCHEMATIC DESIGN

DRAWING NO
A 201

REV



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ELEVATIONS

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DATE
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PHASE
SCHEMATIC DESIGN

DRAWING NO
A 202

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WORK IN PROGRESS - FOR INFORMATION - 07 DEC 2021

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DRAWING TITLE
SECTIONS

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DATE
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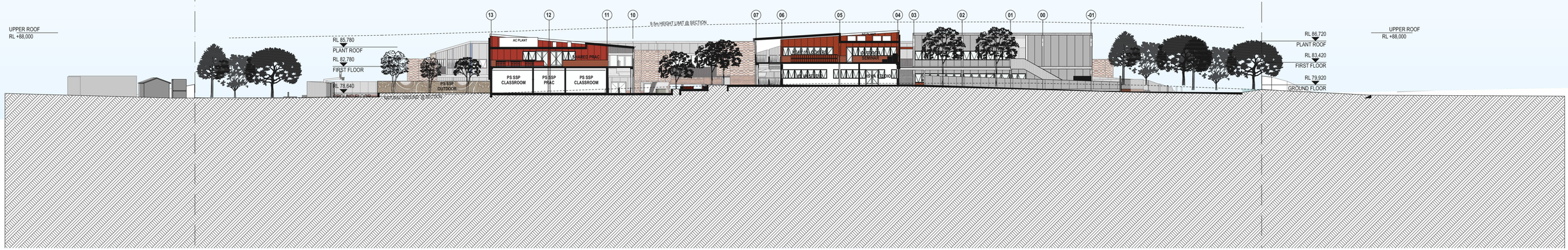
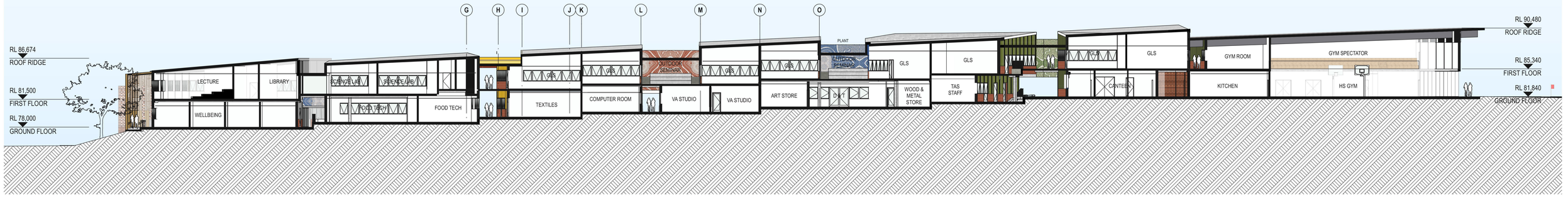
PHASE
SCHEMATIC DESIGN

DRAWING NO
A 301

REV





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DRAWING TITLE
SECTIONS

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PT

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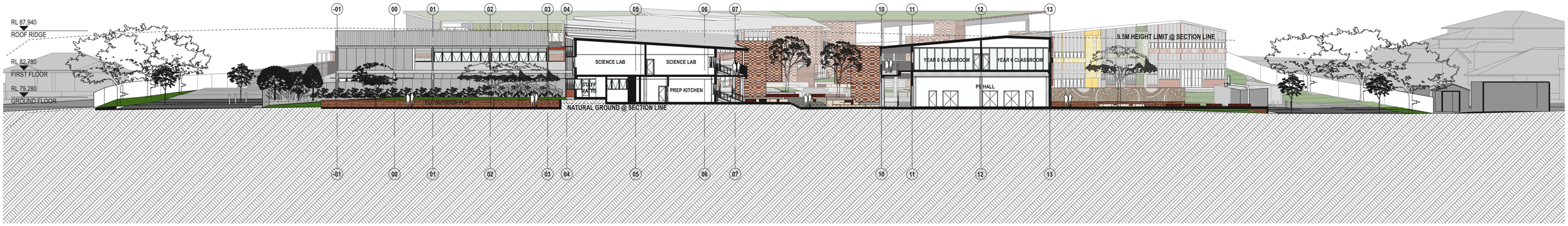
1:312.50, 1:250

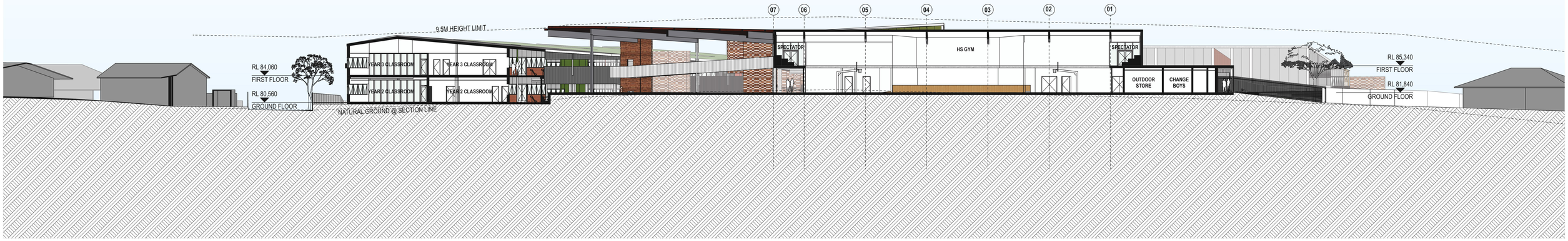
DATE
DD.MM.201X

PHASE
SCHEMATIC DESIGN

DRAWING NO
A 302

REV





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PHASE
SCHEMATIC DESIGN

DRAWING NO
A 303

REV

ACOUSTICAL – Pertaining to the science of sound, including the generation, propagation, effects and control of both noise and vibration.

AMBIENT NOISE – The ambient noise level at a particular location is the overall environmental noise level caused by all noise sources in the area, both near and far, including road traffic, factories, wind in the trees, birds, insects, animals, etc.

AUDIBLE – means that a sound can be heard. However, there are a wide range of audibility grades, varying from "barely audible" to "just audible", "clearly audible" and "prominent". Chapter 83 of the NSW Environment Protection Authority – Environmental Noise Control Manual (1985) states:
"noise from a particular source might be offensive if it is clearly audible, distinct from the prevailing background noise and of a volume or character that a reasonable person would be conscious of the intrusion and find it annoying or disruptive".

It follows that the word "audible" in an environmental noise context means "clearly audible".

BACKGROUND NOISE LEVEL – Silence does not exist in the natural or the built-environment, only varying degrees of noise. The Background Noise Level is the average minimum dBA level of noise measured in the absence of the noise under investigation and any other short-term noises such as those caused by cicadas, lawnmowers, etc. It is quantified by the L_{A90} or the dBA noise level that is exceeded for 90 % of the measurement period (usually 15 minutes).

- **Assessment Background Level (ABL)** is the single figure background level representing each assessment period – day, evening and night (ie three assessment background levels are determined for each 24hr period of the monitoring period). Determination of the assessment background level is by calculating the tenth percentile (the lowest tenth percent value) of the background levels (L_{A90}) for each period (refer: NSW Industrial Noise Policy, 2000).
- **Rating Background Level (RBL)** as specified by the Environment Protection Authority is the overall single figure (L_{A90}) background noise level representing an assessment period (day, evening or night) over a monitoring period of (normally) three to seven days.

  The RBL for an assessment period is the median of the daily lowest tenth percentile of L_{90} background noise levels.

  If the measured background noise level is less than 30 dBA, then the Rating Background Level (RBL) is considered to be 30 dBA.

DECIBEL – The human ear has a vast sound-sensitivity range of over a thousand billion to one. The decibel is a logarithmic unit that allows this same range to be compressed into a somewhat more comprehensible range of 0 to 120 dB. The decibel is ten times the logarithm of the ratio of a sound level to a reference sound level. See also Sound Pressure Level and Sound Power Level.

Decibel noise levels cannot be added arithmetically since they are logarithmic numbers. If one machine is generating a noise level of 50 dBA, and another similar machine is placed beside it, the level will increase to 53 dBA, not 100 dBA. Ten similar machines placed side by side increase the sound level by 10 dBA, and one hundred machines increase the sound level by 20 dBA.

dBA – The human ear is less sensitive to low frequency sound than high frequency sound. We are most sensitive to high frequency sounds, such as a child's scream. Sound level meters have an inbuilt weighting network, termed the dBA scale, that approximates the human loudness response at quiet sound levels (roughly approximates the 40 phon equal loudness contour).

However, the dBA sound level provides a poor indication of loudness for sounds that are dominated by low frequency components (below 250 Hz). If the difference between the "C" weighted and the "A" weighted sound level is 15 dB or more, then the NSW Industrial Noise Policy recommends a 5 dBA penalty be applied to the measured dBA level.

dBC – The dBC scale of a sound level meter is similar to the dBA scale defined above, except that at high sound intensity levels, the human ear frequency response is more linear. The dBC scale approximates the 100 phon equal loudness contour.

EQUIVALENT CONTINUOUS NOISE LEVEL, L_{Aeq} – Many noises, such as road traffic or construction noise, vary continually in level over a period of time. More sophisticated sound level meters have an integrating electronic device inbuilt, which average the A weighted sound pressure levels over a period of time and then display the energy average or L_{Aeq} sound level. Because the decibel scale is a logarithmic ratio the higher noise levels have far more sound energy, and therefore the L_{Aeq} level tends to indicate an average which is strongly influenced by short term, high level noise events. Many studies show that human reaction to level-varying sounds tends to relate closely to the L_{Aeq} noise level.

FREE FIELD – This is a sound field not subject to significant reflection of acoustical energy. A free field over a reflecting plane is usually outdoors with the noise source resting on hard flat ground, and not closer than 6 metres to any large flat object such as a fence or wall; or inside an anechoic chamber.

FREQUENCY – The number of oscillations or cycles of a wave motion per unit time, the SI unit being the Hertz, or one cycle per second.

IMPACT ISOLATION CLASS (IIC) – The American Society for Testing and Materials (ASTM) has specified that the IIC of a floor/ceiling system shall be determined by operating an ISO 140 Standard Tapping Machine on the floor and measuring the noise generated in the room below. The IIC is a number found by fitting a reference curve to the measured octave band levels and then deducting the sound pressure level at 500 Hz from 110 decibels. Thus the higher the IIC, the better the impact sound isolation.

IMPACT SOUND INSULATION ($L_{nT,w}$) – Australian Standard AS ISO 717.2 – 2004 has specified that the Impact Sound Insulation of a floor/ceiling system be quantified by operating an ISO 140 Standard Tapping Machine on the floor and measuring the noise generated in the room below. The Weighted Standardised Impact Sound Pressure Level ($L_{nT,w}$) is the sound pressure level at 500 Hz for a reference curve fitted to the measured octave band levels. Thus the lower $L_{nT,w}$ the better the impact sound insulation.

IMPULSE NOISE – An impulse noise is typified by a sudden rise time and a rapid sound decay, such as a hammer blow, rifle shot or balloon burst.

INTRUSIVE NOISE LEVEL, L_{Aeq} – The level of noise from a factory, place of entertainment, etc. in NSW is assessed on the basis of the average maximum noise level, or the $L_{Aeq\ (15\ min)}$. This is the energy average A weighted noise level measured over any 15 minute period.

LOUDNESS – The degree to which a sound is audible to a listener is termed the loudness. The human ear perceives a 10 dBA noise level increase as a doubling of loudness and a 20 dBA noise increase as a quadrupling of the loudness.

MAXIMUM NOISE LEVEL, L_{Amax} – The rms maximum sound pressure level measured on the "A" scale of a sound level meter during a noise survey is the L_{Amax} noise level. It may be measured using either the Fast or Slow response time of the meter. This should be stated.

NOISE RATING NUMBERS – A set of empirically developed equal loudness curves has been adopted as Australian Standard AS1469-1983. These curves allow the loudness of a noise to be described with a single NR number. The Noise Rating number is that curve which touches the highest level on the measured spectrum of the subject noise. For broadband noise such as fans and engines, the NR number often equals the dBA level minus five.

NOISE – Noise is unwanted sound. Sound is wave motion within matter, be it gaseous, liquid or solid. "Noise includes sound and vibration".

NOISE REDUCTION COEFFICIENT – See: "Sound Absorption Coefficient".

OFFENSIVE NOISE - (Reference: Dictionary of the Protection of the Environment Operations Act 1997). *"Offensive Noise means noise:*

(a) that, by reason of its level, nature, character or quality, or the time at which it is made, or any other circumstances:

(i) is harmful to (or likely to be harmful to) a person who is outside the premise from which it is emitted, or

(ii) interferes unreasonably with (or is likely to interfere unreasonably with) the comfort or repose of a person who is outside the premises from which it is emitted, or

(b) that is of a level, nature, character or quality prescribed by the regulations or that is made at a time, or in other circumstances prescribed by the regulations."

PINK NOISE – Pink noise is a broadband noise with an equal amount of energy in each octave or third octave band width. Because of this, Pink Noise has more energy at the lower frequencies than White Noise and is used widely for Sound Transmission Loss testing.

REVERBERATION TIME, T_{60} – The time in seconds, after a sound signal has ceased, for the sound level inside a room to decay by 60 dB. The first 5 dB decay is often ignored, because of fluctuations that occur while reverberant sound conditions are being established in the room. The decay time for the next 30 dB is measured and the result doubled to determine the T_{60}. The Early Decay Time (EDT) is the slope of the decay curve in the first 10 dB normalised to 60 dB.

SOUND ABSORPTION COEFFICIENT, α – α Sound is absorbed in porous materials by the viscous conversion of sound energy to heat energy as the sound waves pass through it. Sound is similarly absorbed by the flexural bending of internally damped panels. The fraction of incident energy that is absorbed is termed the Sound Absorption Coefficient, α. An absorption coefficient of 0.9 indicates that 90 % of the incident sound energy is absorbed. The average α from 250 to 2000 Hz is termed the Noise Reduction Coefficient (NRC).

SOUND ATTENUATION – If an enclosure is placed around a machine, or a silencer is fitted to a duct, the noise emission is reduced or attenuated. An enclosure that attenuates the noise level by 30 dBA, reduces the sound energy by one thousand times.

SOUND EXPOSURE LEVEL (SEL) – The total sound energy of a single noise event condensed into a one second duration or in other words it is an L_{eq} (1 sec).

SOUND PRESSURE LEVEL, L_p – The level of sound measured on a sound level meter and expressed in decibels, dB, dBA, dBC, etc. $L_p = 20 \times \log (P/P_o)$ ... dB

where P is the rms sound pressure in Pascal and P_o is a reference sound pressure of 20 µPa. L_p varies with distance from a noise source.

SOUND POWER LEVEL, L_w – The Sound Power Level of a noise source is an absolute that does not vary with distance or with a different acoustic environment.

$L_w = L_p + 10 \log A$ ... dB, re: 1pW,
where A is the measurement noise-emission area in square metres in a free field.

SOUND TRANSMISSION CLASS (STC) – An internationally standardised method of rating the sound transmission loss of partition walls to indicate the decibels of noise reduction of a human voice from one side to the other. (Refer: Australian Standard AS1276 – 1979)

SOUND TRANSMISSION LOSS – The amount in decibels by which a random sound is reduced as it passes through a sound barrier. A method for the measurement of airborne Sound Transmission Loss of a building partition is given in Australian Standard AS1191 - 2002.

STATISTICAL EXCEEDENCE SOUND LEVELS, L_{A90}, L_{A10}, L_{A1}, etc – Noise which varies in level over a specific period of time (usually 15 minutes) may be quantified in terms of various statistical descriptors:

The L_{A90} is the dBA level exceeded for 90 % of the time. In NSW the L_{A90} is measured over periods of 15 minutes, and is used to describe the average minimum or background noise level.

The L_{A10} is the dBA level that is exceeded for 10 % of the time. In NSW the L_{A10} measured over a period of 10 to 15 minutes. It was until recently used to describe the average maximum noise level, but has largely been replaced by the L_{Aeq} for describing level-varying noise.

The L_{A1} is the dBA level that is exceeded for 1 % of the time. In NSW the L_{A1} may be used for describing short-term noise levels such as could cause sleep arousal during the night.

STEADY NOISE – Noise, which varies in level by 6 dBA or less, over the period of interest with the time-weighting set to "Fast", is considered to be "steady". (Refer AS 1055.1 1997)

WEIGHTED SOUND REDUCTION INDEX, R_w – This is a single number rating of the airborne sound insulation of a wall, partition or ceiling. The sound reduction is normally measured over a frequency range of 100 to 3,150 Hertz and averaged in accordance with ISO standard weighting curves (Refer AS/NZS 1276.1:1999).

Internal partition wall $R_w + C$ ratings are frequency weighted to simulate insulation from human voice noise. The $R_w + C$ is always similar in value to the STC rating value. External walls, doors and windows may be $R_w + C_{tr}$ rated to simulate insulation from road traffic noise. This is normally a lower number than the STC rating value.

WHITE NOISE – White noise is broadband random noise whose spectral density is constant across its entire frequency range. The sound power is the same for equal bandwidths from low to high frequencies. Because the higher frequency octave bands cover a wider spectrum, white noise has more energy at the higher frequencies and sounds like a hiss.