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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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1.0 INTRODUCTION

1.1 Overview

This Environmental Noise Impact Assessment Report has been prepared by Day Design Pty Ltd on behalf of Minarah College (the Applicant). It accompanies an amended State Significant Development Application (SSDA) for the construction of a new school, Minarah College (the project) at 268-278 Catherine Fields Road, Catherine Field (the Site).

The legal description of the site is outlined in Table 1 below.

Table 1 Site Details

Property Address	Title Description
268 Catherine Fields Road	Lot 11 in DP 833983
278 Catherine Fields Road	Lot 12 in DP 833784
Site Area	4.50ha

The Amended Development Report (**ADR**) was lodged with the Department of Planning, Housing and Infrastructure in September 2024. The amended SSDA sought consent for the construction of a co-educational establishment (Minarah College) accommodating 980 students.

The ADR was placed on public exhibition between 17 September 2024 and 28 October 2024. During this time approximately 400 submissions were received from special interest groups, members of the local community, individuals and Council. A further eight (8) submissions were received from NSW Agencies and public authorities.

This report has been prepared to address the Department's request for a written response to issues raised in the submissions, as required under section 59(2) of the Environmental Planning and Assessment Regulation 2021.

This Report specifically relates to the following key matters raised during public exhibition:

Item	Description of key issue	Response	Section Reference
Department of Planning, Housing and Infrastructure (DPHI)			
7. Noise	• The Construction Noise and Vibration Management Plan (CNVMP) concludes that predicted demolition, excavation and construction noise would exceed established noise levels provided in section 5.5. Recommended noise control mitigation measures provided in section 7.1 are detailed with provided dB noise reduction values of 3 control types. However, no comparative data between 'before noise controls and 'after noise control' is provided. • Provide details of noise exceedance levels after the application of noise controls and evaluate the effectiveness of the proposed noise control measures.	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 Rev F, dated 8 May 2025, submitted as part of this amended application.	Sections 1 to 9 of the CNVMP.
16. Documentation	**Noise reports:** • Inconsistencies across the Noise reports, design reports, architectural plans, staging report in regard to the heights of the sound barrier walls. • Roof plans per stage are requested to be provided that depict the heights of the sounds barrier walls around rooftop mechanical plant and equipment.	The ENIA and CNVMP have been updated to include information provided by the project manager to ensure consistency across all documents. Day Design understand the architectural plans have been amended to include the depict the heights of the sound barrier wall around the rooftop mechanical plant and equipment for each stage of the development.	Section 8.2 & Appendix C Section 8.2 & Appendix C
Additional (DPHI) Comments (via email)			
	Inconsistencies with the heights of the noise walls identified in the Noise Impact Assessment and	The ENIA and CNVMP have been updated to include information provided by the	Section 8.2 & Appendix C

Item	Description of key issue	Response	Section Reference
	the heights recorded in the Staging Report, Architectural Reports and Design Report.	project manager to ensure consistency across all documents.	
	Confirmation of the proposed operating hours of each component of the development. The operating hours of the Halls are recommended to be restricted between 9 am and 9:30 pm on page 116 of the Environmental Noise Impact Assessment (ENIA) report.	The ENIA and CNVMP have been updated to include information provided by the project manager to ensure consistency across all documents. Assessment of OSHC area included in this ENIA.	Section 3.0, 6.1.7, 6.2.8, 6.3.8 & 6.4.8
	The department have requested that the further information is provided on the type and intensity of the use of the sports field outside of school hours and that the traffic, WMA and Acoustic reports are reflective of the uses.	The ENIA and CNVMP have been updated to include information provided by the project manager to ensure consistency across all documents, including information about the type and intensity of the use of the sports field outside of school hours	Section 3.0, 6.1.4, 6.1.8.3, 6.2.5, 6.2.9.4, 6.3.5, 6.3.9.4, 6.4.5, 6.4.9.4 & 8.1.1
Camden Council			
Noise Impact	***Noise associated with school operation*** The Environmental Noise Impact Assessment Report submitted as part of the Amended SSDA demonstrates that acoustic compliance is only achieved during Stage 1 of the development. To reduce the acoustic impact on the neighbouring residential receivers, acoustic walls ranging from 1.5 m to 2.4 m are required within the proposed school and along the boundary. The proposed acoustic walls, which includes a 1.8 m to 2 m high colorbond fence extending along the entire length of the side and rear property boundaries, will	This report has been carried out in accordance with the provisions of the NSW Department of Planning and Environment's (DoPE) State Environmental Planning Policy (SEPP) (Transport and Infrastructure) 2021 (formerly Educational Establishments and Child Care Facilities 2017). This report identifies that the noise from children participating in **outdoor play (only)**, will at times, exceed the numerical control detailed within the Camden DCP (and Environmental Noise Policy (2018) criteria). However,	Sections 6.1.8.1, 6.2.9.1, 6.3.9.1, 6.4.9.1, 8.1, 8.2, 9.1, 9.2 and 9.3.

Item	Description of key issue	Response	Section Reference
	have a negative impact on the visual amenity of the surrounding rural landscape. Furthermore, despite the proposed acoustic walls and façade treatments, the acoustic amenity of at least three residential receivers will be impacted by children during outdoor play by +1 dB to +6 dB.	according to Part 3.4, Section 3.36 (9) of the SEPP (Transport and Infrastructure) 2021 'a provision of a development control plan that specifies a requirement, standard or control in relation to development of a kind referred to in subsection (1), (2), (3) or (5) is of no effect, regardless of when the development control plan was made'. The proposed development (SSD-30759158) is development for the purpose of an educational establishment which is within a prescribed zone. Therefore, the proposed development is of a kind referred to in subsection (1) and as such the SEPP prevails over the requirements of the Camden DCP. The numerical control provided in Camden Council's DCP 2019 is therefore adopted for guidance only, and is not a mandatory target. Further the note to Control 2.12 of Camden DCP 2019 states – "If there is an inconsistency between the SEPP (Transport and Infrastructure) 2021 (and Child Care Planning Guidelines) and the DCP, the SEPP will take precedence." The SEPP (Schedule 8, Principle 5) requires any application **to consider the amenity of adjacent development and the local neighbourhood**. This report **considers the amenity of adjacent**	

Item	Description of key issue	Response	Section Reference
		development and the local neighbourhood via noise level predictions, noise controls recommendations, and an Offensive Noise Test in Sections 6.1.8.1, 6.2.9.1, 6.3.9.1, 6.4.9.1, 8.1, 8.2, 9.1, 9.2 and 9.3 for the use of the outdoor play areas. Day Design consider that the requirements of the SEPP have been satisfied. With reference to *‘2 m high colorbond fence extending along the entire length of the side and rear property boundaries’*, no such fence(s) is recommended in the ENIA(s) with the visual amenity impact being outside of Day Design’s area of expertise.	
	Construction noise The Construction Noise & Vibration Management Plan submitted as part of the Amended SSDA outlines the noise emissions from works to be undertaken over the various stages of the proposed development. The main source of noise will be from heavy machinery such as excavators, dump trucks, cranes, cement mixers and rock breakers. Noice exceedances (without controls) for residential receivers range from +3 dB up to +40 dB. Section 7.2 of the Report outlines noise management controls aimed at managing the impacts on neighbours and include:	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 Rev F, dated 8 May 2025, submitted as part of this amended application.	Sections 1 to 9 of the CNVMP.

Item	Description of key issue	Response	Section Reference
	• Periods of respite – noisy construction activities only operate for 2 to 3 hours at a time. • Work practices – workers and contractors be trained in work practices to minimise noise emissions. • Heavy vehicles and staff vehicles – keep truck drivers informed of designated vehicle routes, parking location, acceptable delivery hours etc. • Community relations – a Community Liaison Officer be appointed to ensure communication is maintained with neighbours prior to and throughout the construction process. • Managing a noise complaint – the Community Liaison Officer should receive and manage all noise complaints. Despite the proposed controls, acoustic exceedances will still be encountered by several adjoining residential receivers. Based on the proposed timeframes for the construction of the four stages of the development, it is unreasonable for the acoustic amenity of residents to be impacted for a period of approximately 3.3 years. Furthermore, given the proposed 'periods of respite' (to limit noise generating construction works to 2 to 3 hours a day), it is likely that development works will take longer than the timeframe(s) outlined in Section 4.2 of the report.		

Item	Description of key issue	Response	Section Reference
	Overall, the proposed development is considered to have an unreasonable impact on the amenity of the surrounding area, both during construction and ongoing operation.	In accordance with the requirements of the SEPP *(Transport and Infrastructure) 2021* for the ENIA, and Australian Standard AS2436:2010 *"Guide to noise and vibration control on construction, demolition and maintenance sites"* and the EPA's *Interim Construction Noise Guideline 2009* and *Assessing Vibration: a technical guideline 2006* for the CNVMP, reasonable and feasible mitigation measures have been recommended within the ENIA and CNVMP with **consideration to the acoustic amenity of adjacent developments and the local neighbourhood**.	Sections 1 to 10 of the ENIA and Sections 1 to 9 of the CNVMP.

This Report concludes that the proposed educational establishment as amended is suitable and warrants approval subject to the implementation of the mitigation measures recommended in Section 8.0.

Following the implementation of the above mitigation measures, the remaining impacts are appropriate.

1.2 The Proposal

The amended application seeks consent for the construction of a co-educational establishment (Minarah College) accommodating 980 students. The school will comprise of an Early Learning Centre (ELC) for 60 students, a School for Specific Purpose (SSP) for 30 students, a primary school accommodating 505 students and a high school for 385 students. The new school will be constructed in four stages, growing in line with growth in the local population. Specifically, consent is sought for:

- Demolition of the existing dwellings and ancillary structures on-site;
- Bulk earthworks across the site;
- The construction of the following:
  - One-storey early learning centre;
  - Two-storey administration building, with attached outside school hours care (OSHC), and wellbeing room;
  - Two-storey primary school building comprising of primary school classrooms;
  - School for Specific Purpose classrooms;
  - Primary school hall;
  - Two-storey high school building comprising high school classrooms;
  - Two-storey high school hall;
  - Shared one-storey canteen adjoining the high school building;
  - Shared library located on the second storey above the ELC and Food and Textiles building below; and
  - A full sized sport field.
- Site access from Catherine Fields Road at two points;
- Works within Catherine Fields Road to allow for a right-turn bay from Catherine Fields Road and bus bays on the eastern side of Catherine Fields Road;
- Removal of trees and replacement planting and landscaping;
- Associated site landscaping and public domain improvements;
- On-site car parking; 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 The Site

The site is located at 268-278 Catherine Fields Road, Catherine Field, Dharawal Country, NSW and is legally described as Lot 11 in DP 833983 and Lot 12 in DP 833784. The site is located within Camden local government area (LGA) and has a site area of approximately 4.50 ha.

The site is in a typical large lot rural residential subdivision area. The site has a gentle fall from the east to west with a minor ridgeline along the east to west axis. Diagonal falls lead to the southwest and north west areas of the site. The northern and eastern boundaries of the site are characterised by remnant regenerating bushland, whilst majority of the site is former pastureland with sparsely scattered trees.

Both lots contain rural residential dwellings with ancillary farm structures including numerous sheds, farm buildings and water tanks. Lot 11 contains two prominent dams.

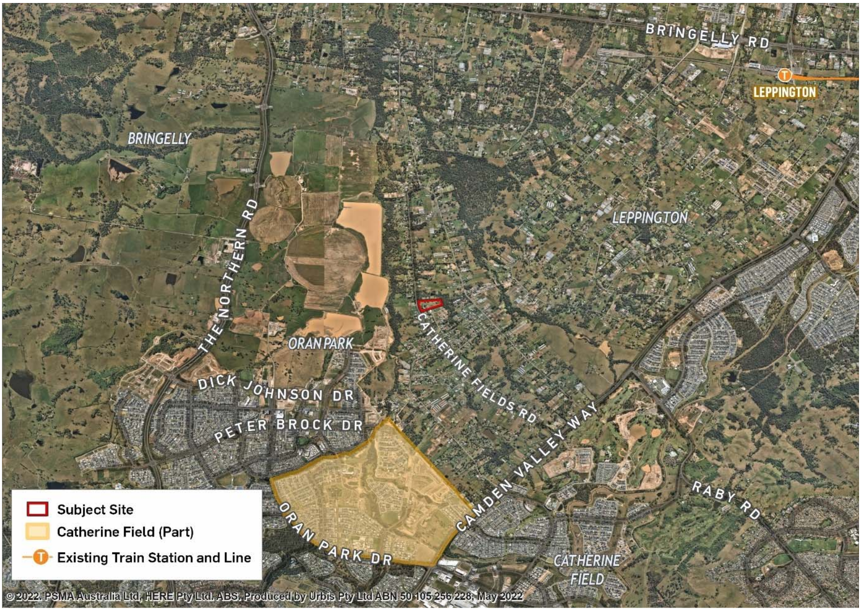
BRINGELLY RD
LEPPINGTON
BRINGELLY
LEPPINGTON
THE NORTHERN RD
ORAN PARK
CATHERINE FIELDS RD
DICK JOHNSON DR
PETER BROCK DR
CAMDEN VALLEY WAY
RABY RD
ORAN PARK DR
CATHERINE FIELD
Subject Site
Catherine Field (Part)
Existing Train Station and Line

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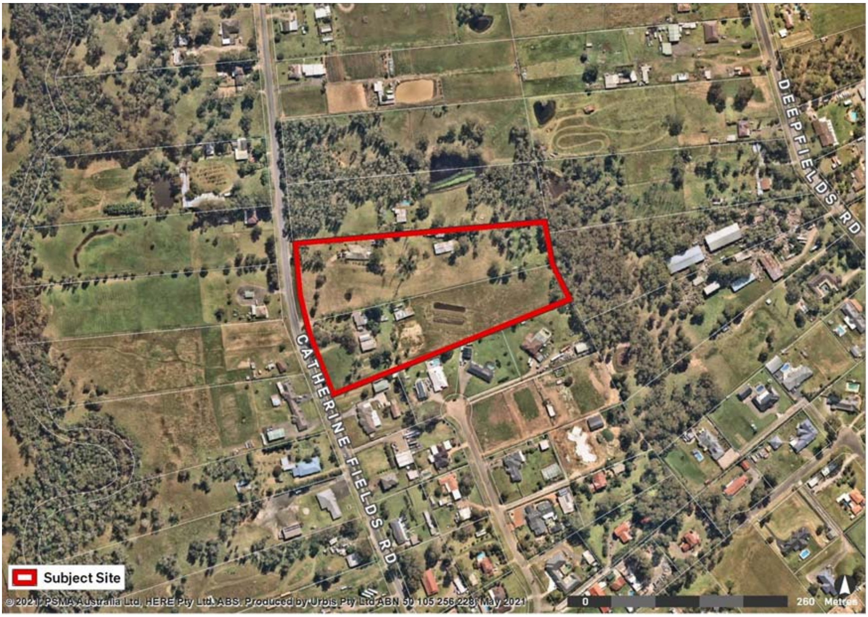
Figure 1 – Site Context Map 1


DEEPFIELDS RD
CATHERINE FIELDS RD
🟥 Subject Site
0
260 Metres

© 2021, PSMA Australia Ltd, HERE Pty Ltd, ABS. Produced by Urbis Pty Ltd ABN 50 105 256 228, May 2021

Figure 2 – Site Context Map 2

1.4 Response to SEARS

This 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 2 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 Rev F, dated 8 May 2025, submitted as part of this amended 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 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 an amended State Significant Development Application (SSDA) to construct a new education campus, to be known as Minarah College (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 3 and as follows in Table 3.

Table 3 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 980 students from Kindergarten to Year 12, consisting of:
    - 505 place Primary School (PS) with school hall;
    - 385 place High School (HS); and
    - 30 place School for Specific Purposes (SSP) – 15 place PS & 15 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), 60 place OSHC area, sports field, parking areas and drop off/pick up area/driveway.

The development is to be constructed in four stages. The school will be operating at full capacity from Stage 3. A breakdown of the student and staff numbers across each stage is as follows:

- Stage 1: 2026, 318 students (18 ELC, 290 School, 10, SSP), 15 FTE staff
- Stage 2: 2031, 652 students (42 ELC, 600 School, 10 SSP), 33 FTE Staff
- Stage 3, 2035, 980 students (60 ELC, 890 School, 30 SSP), 51 FTE Staff
- Stage 4, 2037, 980 students (60 ELC, 890 School, 30 SSP), 51 FTE Staff

The total student population at Stage 3 will be 980 students, the staff population will total 45 FTE and 6 SSP staff.

Outside school hours care (OSHC) will be provided from Stage 1, reaching full capacity from Stage 3 and be located in the lower ground level of the administration building (southern side) or primary hall and adjacent primary school outdoor play area, as follows:

- Stage 1: 18 students, lower ground level of the administration building (southern side);
- Stage 2: 42 students, lower ground level of the administration building (southern side) and primary hall and adjacent primary school outdoor play area;
- Stage 3: 60 students, lower ground level of the administration building (southern side) and primary hall and adjacent primary school outdoor play area; and
- Stage 4: 60 students, lower ground level of the administration building (southern side) and primary hall and adjacent primary school outdoor play area.

The full sized sport field is proposed to be used for:

- Minarah sports teams approximately two times a week for training/matches – 5 pm to 9 pm;
- External sports teams for training when not used by Minarah sports teams, outside of school hours;
- Predominantly for school competition, however on occasion may be used by an external club on a weekend;
- On occasion one-off events such as the annual school fete.

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.

OSHC:

- Monday – Friday: 7.00 am – 6.30 pm.

PS Hall:

- Monday – Friday: 7.00 am – 6.30 pm.

Multi-Purpose Hall:

- Monday – Friday: 8.20 am – 9.00 pm; and
- Saturday – Sunday: 9.00 am – 9.30 pm.

Sports Field:

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

Minarah College has provided a *'Proposed Schedule of Regular Events/Meetings'*, attached in Appendix E, to inform the SEARs. Day Design has reviewed Appendix E and note that considering the proposed times, frequencies, limited number of people attending and the nature of the events/meetings, the events/meetings will have a negligible impact on the acoustic amenity of the local neighbourhood. Notwithstanding, worst-case *out of hours* events have been assessed for the use(s) of the multi-purpose hall (Sections 6.2.4, 6.2.9.3, 6.3.4, 6.3.9.3, 6.4.4 & 6.4.9.3) and sports field (Sections 6.1.4, 6.1.8.3, 6.2.5, 6.2.9.4, 6.3.5, 6.3.9.4, 6.4.5 & 6.4.9.4).

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 and Environment's (DoPE) *State Environmental Planning Policy (SEPP) (Educational Transport and Infrastructure) 2021* and *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, OSHC, mechanical plant, halls (including *out of hours use*), sports field (including *out of hours use*) 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 (Stages 2, 3 & 4) – from the College will meet the acoustic requirements in Camden Council's *Camden Development Control Plan 2019* and *Environmental Noise Policy 2018*, the NSW Department of Planning and Environment's *SEPP (Educational Transport and Infrastructure) 2021* 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 (Stages 2, 3 & 4) will exceed the numerical control provided in Camden Council's *Camden Development Control Plan 2019* and *Environmental Noise Policy 2018* - considered in this report for guidance only - causing a moderate 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.*

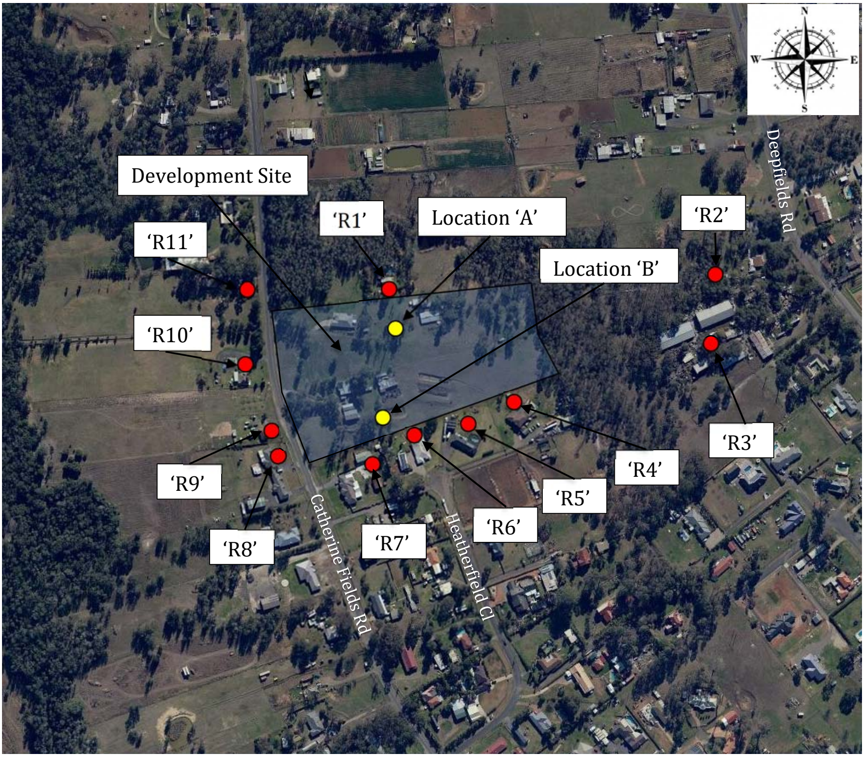

Development Site
'R1'
Location 'A'
'R2'
Deepfields Rd
'R11'
Location 'B'
'R10'
'R3'
'R4'
'R9'
'R5'
'R6'
'R8'
'R7'
Catherine Fields Rd
Heatherfield Cl
N
E
S
W

Figure 3 - 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 3 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 at 278 and 268 Catherine Fields Road, shown as Locations 'A' and 'B', respectively, on Figure 3, 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 4.

Table 4 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 6.1.8.6, 6.2.9.7, 6.3.9.8, 6.4.9.8 and 7.0 of this report are shown in Table 5.

Table 5 Calculated $L_{Aeq, 1 hour}$ Road Traffic Sound Pressure Levels

Description	dBA
Location 'B' – Daytime $L_{Aeq, 1-hour}$ (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 7 (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 5 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 method adopted to establish 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 Rev F, dated 8 May 2025, submitted as part of this amended application.

5.1.2 SEPP (Transport and Infrastructure) 2021 – Chapter 3

The NSW DoPE published the State Environmental Planning Policy (SEPP) (Educational Transport and Infrastructure) 2021 on 1 March 2022. The relevant parts of the SEPP to this proposal have been extracted and are revised below.

Part 3.3 Early education and care facilities – specific development controls,

'3.27 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 3.4 Schools - specific development controls

3.36 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.

(6) Before determining a development application for development of a kind referred to in subsection (1), (3) or (5), the consent authority must take into consideration—

(a) the design quality of the development when evaluated in accordance with the design quality principles set out in Schedule 8, and

(b) whether the development enables the use of school facilities (including recreational facilities) to be shared with the community.

> *(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 8 Design quality principles in schools – Chapter 3' 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.***

Schools located near busy roads or near rail corridors should incorporate appropriate noise mitigation measures to ensure a high level of amenity for occupants.

Schools should include appropriate, efficient, stage and age appropriate indoor and outdoor learning and play spaces, access to sunlight, natural ventilation, outlook, visual and acoustic privacy, storage and service areas.'

5.1.3 SEPP (Transport and Infrastructure) 2021 - Clause 2.120

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 2.120 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 eg 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 4). 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 6 indicate the residential area around Location 'B' is considered 'Rural', as per Table 2.3 of the *NPI*.

Table 6 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 $\mathbf{L_{Aeq,15min}}$ will be taken to be equal to the $\mathbf{L_{Aeq,\ period}}$ **+ 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 4), 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 4).

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 7.

Table 7 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

5.3.1 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**.'*

5.3.2 Camden Council – Development Control Plan 2019

Camden Council, in their Camden Development Control Plan (DCP) 2019, require an acoustic report to accompany Development Applications for child care centres and educational establishments, as extracted below:

'2.12 Acoustic Amenity

'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 (Transport and Infrastructure) 2021 (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 and DCP 2019, 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.

*For the use of school outdoor play areas there is no state wide agreed (by acoustical consultants) numerical noise criterion.

As detailed in Section 5.1.2 of this report, '*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)* (of the SEPP) ***is of no effect****, regardless of when the development control plan was made'.* Therefore, any numerical noise limit provided in a DCP is of no effect.

Controls, or numerical criteria, provided in a DCP can be used for guidance (only), however are not a mandatory target.

The SEPP (Educational Transport and Infrastructure) 2021, Chapter 3, Part 3.1, states:

'3.1 Aims of Chapter

> *The aim of this Chapter is to facilitate the effective delivery of educational establishments and early education and care facilities across the State by—*
>
> *(c) establishing consistent State-wide assessment requirements and design considerations for educational establishments and early education and care facilities to improve the quality of infrastructure delivered and to minimise impacts on surrounding areas.'*

Considering 3.1 (c) above, adopting Camden DCP 2019's numerical control(s) would not permit a consistent State-wide assessment requirement - to Day Design's knowledge there is only one other LGA in the state that has a similar numerical control. Further the note to Control 2.12 of Camden DCP 2019 states – "*If there is an inconsistency between the SEPP (Transport and Infrastructure) 2021 (and Child Care Planning Guidelines) and the DCP,* ***the SEPP will take precedence****."*

The SEPP (Educational Transport and Infrastructure) 2021 in 'Schedule 8 Design quality principles in schools – Chapter 3', requires the consideration of ***the amenity of adjacent development and the local neighbourhood*** when assessing schools. This establishes a consistent State-wide assessment requirement and design consideration where an acoustical consultant must consider the noise emission associated with the outdoor play areas of a school and the effect it may have on the amenity of the local neighbourhood.

Considering the above - the method adopted in this report - where Camden DCP 2019's numerical control is exceeded, even after reasonable and feasible noise controls are implemented, the significance of the exceedance and the impact it may have on the acoustic amenity of the local neighbourhood is discussed and assessed in detail – see Section 9.1.2, 9.2.2 and 9.3.2.

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, OSHC, 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 (guidance only);
- (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 7 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;
- Use of OSHC.

Stages 1 to 4 are assessed below. Where needed the Stages are abbreviated as STG1, STG2, STG3 or STG4.

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

6.1 Stage 1 – School Noise Emission

6.1.1 Stage 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 (290 + 10 =) 300 PS students (200) will engage in active play at the one time, with half (100 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 18 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 students engaged in active play were previously measured for other similar projects and are presented below in Table 8. 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 8 and used in this assessment.

Table 8 STG1 - $L_{eq,\,15\ minute}$ 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 children, 3 to 5 years	**87**	64	70	75	81	83	80	76	72
200 x PS students engaged in active play (100 students making noise)	**99**	74	84	89	93	96	93	88	85
18 x ELC students engaged in active play	**90**	67	73	78	84	86	83	79	75

6.1.2 Stage 1 - General Learning Areas

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

- ELC – 18 students;
- SSP – 5 students; and
- PS – 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 9 as well as the AAAC's range of A-weighted sound power levels per ELC aged child.

Table 9 STG1 - $L_{eq,\,15\,minute}$ 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

6.1.3 Stage 1 - 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, 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 10.

Table 10 STG1 - $L_{eq,\ 15\ minute}$ 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*									
- *REYQ8BYM*	**77**	87	85	80	75	70	62	62	52
- *REYQ12BYM*	**80**	93	84	84	78	74	67	60	55
- *REYQ14BYM*	**81**	90	90	88	82	77	68	63	56

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

6.1.4 Stage 1 - 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 or a sports team(s) playing on the proposed Sports Field (either during normal school hours or outside of school hours), we have assumed the following:

- A single football game, consisting of 22 students/players, 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 4 =) 88 spectators during a game, with 25% of the spectators making noise at any given time during a game.

Annual school fetes are typical one-off events that take place on most school's grounds and generally utilise several areas of a given campus. Annual school fetes are considered a typical community event and are not considered the worst case scenario for the use of a sports field/campus due to its limited occurrence (once a year). Due to this limited occurrence the impact to the acoustic amenity of the neighbourhood and community deemed to be minimal.

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 STG1 - $L_{eq,\,15\ minute}$ 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 person 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 Players and 88 x Spectators	**95**	73	75	84	91	91	88	82	75

6.1.5 Stage 1 - Vehicle Noise Emissions

The ELC, Staff and Student parking on the northern side of the College provides a total of 24 parking spaces (5 x ELC, 3 x Student, 15 x Staff & 1 x Spare) for vehicles.

One lane of kiss and drop with 17 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 17 April 2024.

Section 6.1.4 of the TAIA provides a traffic assessment which includes the projected net trip generation for Stage 1 (Table 18), as follows:

- Total AM peak hour trip rate (314 x students inbound/outbound + 11 x staff inbound =) 325 vehicles entering/exiting the College.

This is equivalent to (325 / 4 =) 81 vehicles entering/exiting the College over any given 15 minutes during the AM peak hour.

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

- (11 / 4 =) 3 vehicles arrive and park in the northern car park;
- (314 / 4 =) 79 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 designated ELC 1 spaces.

The Sound Exposure Level[1] (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 STG1 - 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

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

6.1.6 Stage 1 - 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 eastern façade of the Stage 1 building adjacent to the internal courtyard/temporary outdoor play area, and in order to meet the residential noise criteria, the maximum sound pressure level should be no greater than the following:

- **Eastern Façade** **77 dBA $L_{eq,15\ minutes}$** at 3 metres from each speaker.

6.1.7 Stage 1 – OSHC

The College will provide an OSHC area for 18 students in the lower ground level of the administration building (southern side) for Stage 1 of the development. We have assumed that when not inside the OSHC room, students may play in the Stage 1 PS outdoor play area.

The acoustic impact from students within the OSHC room will be negligible at the residential receivers.

The acoustic impact from 200 PS students engaged in active outdoor play in the Stage 1 PS outdoor play area has been assessed in Sections 6.1.1 and 6.1.8.1 of this report. The acoustic impact from all (worst case) 18 students within the Stage 1 PS outdoor play area is calculated to be at least (10 * LOG [18 / 200] =) 10 dB less than the predicted level of noise from the 200 students engaged in active play in the Stage 1 PS outdoor area.

The calculated noise impact from 18 students in the Stage 1 OSHC complies with the guidance criteria in Section 5.5 of this report, and is acceptable.

6.1.8 Stage 1 - Predicted Noise Level at Receptor Locations

Knowing the sound power level of a noise source (See Tables 8 - 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 industrial 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*[2], 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 Stage 1 operation of the College.

Where applicable, calculations include acoustic shielding provided by the recommended sound barrier wall in Sections 8.2.1, 8.2.2, 8.2.3.1, 8.2.4 and 8.2.5 and the College buildings to the residential and industrial receptors.

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[2] *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.*

6.1.8.1 Stage 1 - Outdoor Play Areas

Based on a maximum of (200 x PS and 18 x ELC =) 218 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 218 students into groups throughout the outdoor play areas as follows:

- ELC Outdoor Play – 1 x group of 18 students; and
- PS Outdoor Play – 3 x groups of 67 students.

Table 13 STG1 - 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	46	46	Yes
R2 – 227-235 Deepfields Rd	28	46	Yes
R3 – 225 Deepfields Rd	29	68	Yes
R4 – 16 Heatherfield Cl	40	46	Yes
R5 – 14 Heatherfield Cl	43	46	Yes
R6 – 12 Heatherfield Cl	44	46	Yes
R7 – 260 Catherine Fields Rd	43	46	Yes
R8 – 265 Catherine Fields Rd	31	46	Yes
R9 – 271 Catherine Fields Rd	32	46	Yes
R10 – 277 Catherine Fields Rd	33	46	Yes
R11 – 285 Catherine Fields Rd	40	46	Yes

Provided the recommended noise controls in Section 8.0 are implemented and adhered to, the predicted level of noise from the students engaged in active play in the Stage 1 outdoor area at the receptor locations ‘R1’ to ‘R11’ complies with the guidance criteria in Section 5.5 of this report, and is acceptable.

6.1.8.2 Stage 1 - 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 Stage 1 of the College are summarised and shown in Table 14.

Table 14 STG1 - 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	27		
- Mechanical plant	35		
Cumulative Noise Level	36	41	Yes
R2 – 227-235 Deepfields Rd			
- GLAs	19		
- Mechanical plant	25		
Cumulative Noise Level	26	41	Yes
R3 – 225 Deepfields Rd			
- GLAs	19		
- Mechanical plant	18		
Cumulative Noise Level	21	68	Yes
R4 – 16 Heatherfield Cl			
- GLAs	23		
- Mechanical plant	24		
Cumulative Noise Level	27	41	Yes
R5 – 14 Heatherfield Cl			
- GLAs	27		
- Mechanical plant	33		
Cumulative Noise Level	34	41	Yes
R6 – 12 Heatherfield Cl			
- GLAs	28		
- Mechanical plant	32		
Cumulative Noise Level	34	41	Yes

Table 14 STG1 - 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	29		
- Mechanical plant	31		
Cumulative Noise Level	33	41	Yes
R8 – 265 Catherine Fields Rd			
- GLAs	25		
- Mechanical plant	37		
Cumulative Noise Level	37	41	Yes
R9 – 271 Catherine Fields Rd			
- GLAs	18		
- Mechanical plant	38		
Cumulative Noise Level	38	41	Yes
R10 – 277 Catherine Fields Rd			
- GLAs	23		
- Mechanical plant	38		
Cumulative Noise Level	38	41	Yes
R11 – 285 Catherine Fields Rd			
- GLAs	37		
- Mechanical plant	33		
Cumulative Noise Level	39	41	Yes

The predicted cumulative level of noise from the GLAs and mechanical plant at the receptor locations ‘R1’ to ‘R11’ and ‘R7’ to ‘R11’, complies with the criteria in Section 5.5 of this report.

Notwithstanding, 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.

6.1.8.3 Stage 1 - Sports Field

The noise impact from the use of the Sports Field is summarised and shown in Table 15.

Table 15 STG1 - Predicted $L_{eq, 15 minute}$ Noise Levels – Outdoor Play/Sports Field

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	31	46	Yes
R3 – 225 Deepfields Rd	34	68	Yes
R4 – 16 Heatherfield Cl	45	46	Yes
R5 – 14 Heatherfield Cl	43	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 ‘R11’ complies with the criteria in Section 5.5 of this report.

Notwithstanding, recommendations are provided in Sections 8.0 of this report to ensure the noise emissions from the future use of the Sports Field complies with the Project Noise Trigger Levels.

6.1.8.4 Stage 1 - 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 16.

Table 16 STG1 - 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	16	41	Yes
R2 – 227-235 Deepfields Rd	< 10	41	Yes
R3 – 225 Deepfields Rd	< 10	68	Yes
R4 – 16 Heatherfield Cl	15	41	Yes
R5 – 14 Heatherfield Cl	16	41	Yes
R6 – 12 Heatherfield Cl	17	41	Yes
R7 – 260 Catherine Fields Rd	22	41	Yes
R8 – 265 Catherine Fields Rd	29	41	Yes
R9 – 271 Catherine Fields Rd	31	41	Yes
R10 – 277 Catherine Fields Rd	30	41	Yes
R11 – 285 Catherine Fields Rd	26	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.

6.1.8.5 Stage 1 - 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 staff spaces between 6.30 am and 7 am are calculated to be as shown below in Table 17.

Table 17 STG1 - 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	<10	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 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.

6.1.8.6 Stage 1 - 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 17 April 2024.

Figure 40, in Section 6.2 of the TAIA states that the traffic distribution from the Site is assumed to be as follows:

- Departing - 70/30% 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 5 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 18 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 18 STG1 - 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			
R1: 325 trips	27.2	56.7	56.7	0.0	55	Yes
R6: 325 trips	33.8	56.7	56.7	0.0	55	Yes
R7: 325 trips	45.2	56.7	57.0	0.3	55	Yes
R8: 325 trips	47.9	56.7	57.2	0.5	55	Yes
R9: 325 trips	47.5	56.7	57.2	0.5	55	Yes
R10: 325 trips	46.0	56.7	57.1	0.4	55	Yes
R11: 325 trips	45.0	56.7	57.0	0.3	55	Yes

Table 18 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), however, the existing on road traffic noise level exceeds the *RNP On Road Traffic Noise Criteria*.

Table 18 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 Stage 1 of the development is considered acceptable and is not likely to be perceptible to the average person.

6.2 Stage 2 – School Noise Emission

6.2.1 Stage 2 - 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 160 HS students (107) and 2/3 of the (440 + 10 =) 450 PS students (300) will engage in active play at the one time, with half (53 HS and 150 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 42 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 19. 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 19 and used in this assessment.

Table 19 STG2 - $L_{eq,\ 15\ minute}$ 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
300 x PS students engaged in active play (150 students making noise)	**101**	76	86	91	95	98	95	90	87
107 x HS students engaged in active play (53 students making noise)	**97**	76	78	87	94	93	89	82	73
42 x ELC students engaged in active play	**93**	70	76	81	87	89	86	82	78

6.2.2 Stage 2 - General Learning Areas

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

- ELC – 21 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 20 as well as the AAAC's range of A-weighted sound power levels per ELC aged child.

Table 20 STG2 - $L_{eq,\ 15\ minute}$ 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

6.2.3 Stage 2 - 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 PS 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 21.

Table 21 STG2 - $L_{eq,\ 15\ minute}$ 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*									
- *REYQ8BYM*	**77**	87	85	80	75	70	62	62	52
- *REYQ12BYM*	**80**	93	84	84	78	74	67	60	55
- *REYQ14BYM*	**81**	90	90	88	82	77	68	63	56
Packaged air conditioners - *Temperzone*									
- *OPA 855*	**79**	92	90	75	74	73	71	65	57

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

6.2.4 Stage 2 - Hall Usage

There is a possibility that the PS 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 will have capacity for up to 386 people. 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 PS Hall may operate at full capacity during a performance.
- 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[3] and in our noise level database gathered over many years, we calculate the sound power levels shown below in Table 22.

Table 22 STG2 - $L_{eq, 15 minute}$ 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**

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

6.2.5 Stage 2 - 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 or a sports team(s) playing on the proposed Sports Field (either during normal school hours or outside of school hours), we have assumed the following:

- A single football game, consisting of 22 students/players, 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 4 =) 88 spectators during a game, with 25% of the spectators making noise at any given time during a game.

Annual school fetes are typical one-off events that take place on most school's grounds and generally utilise several areas of a given campus. Annual school fetes are considered a typical community event and are not considered the worst case scenario for the use of a sports field/campus due to its limited occurrence (once a year). Due to this limited occurrence the impact to the acoustic amenity of the neighbourhood and community deemed to be minimal.

The $L_{eq, 15 minute}$ sound power level and spectra of people and spectators engaging in active sport are shown below in Table 23 and is based on previous measurements by Day Design.

Table 23 STG2 - $L_{eq, 15 minute}$ 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 person 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 Players and 88 x Spectators	**95**	73	75	84	91	91	88	82	75

6.2.6 Stage 2 - Vehicle Noise Emissions

The ELC, SSP, Staff and Student parking on the northern side of the College provides a total of 24 parking spaces for vehicles (11 x ELC & 13 Student) with the student and staff parking on the southern side of the college providing a total of 62 parking spaces for vehicles (33 x Staff & 29 x spare).

Two lanes of kiss and drop with (17 + 13 =) 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 17 April 2024.

Section 6.1.4 of the TAIA provides a traffic assessment which includes the projected net trip generation for Stage 2 (Table 17), as follows:

- Total AM peak hour trip rate (640 x students inbound/outbound + 24 x staff inbound =) 664 vehicles entering/exiting the College.

This is equivalent to (664 / 4 =) 166 vehicles entering/exiting the College over any given 15 minutes during the AM peak hour.

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

- (24 / 4 =) 6 vehicles arrive (staff) and park in the southern car park;
- (13 / 4 =) 3 vehicles arrive (student) and park in the northern car park; and
- (627 / 4 =) 157 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 in the northern car park.

The Sound Exposure Level[4] (SEL) sound power level and spectra of vehicle noise is shown below in Table 24 and is based on previous measurements by Day Design.

Table 24 STG2 - 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

6.2.7 Stage 2 - 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 eastern façade of the Stage 1 building and norther and southern façade of the Stage 2 building, and in order to meet the residential noise criteria, the maximum sound pressure level should be no greater than the following:

- **Eastern Façade Stage 1** **77 dBA $L_{eq,15\ minutes}$** at 3 metres from each speaker;
- **Northern Façade Stage 2** **77 dBA $L_{eq,15\ minutes}$** at 3 metres from each speaker;
- **Southern Façade Stage 2** **62 dBA $L_{eq,15\ minutes}$** at 3 metres from each speaker.

6.2.8 Stage 2 – OSHC

The College will provide an OSHC area for 42 students in the lower ground level of the administration building (southern side) and PS Hall and adjacent PS outdoor play area for Stage 2 of the development. We have been advised that when not inside the OSHC room or PS Hall, students may play in the Stage 2 PS outdoor play area.

The acoustic impact from students within the OSHC room and PS Hall will be negligible at the residential receivers.

The acoustic impact from 300 PS students engaged in active outdoor play in the Stage 2 PS outdoor play area has been assessed in Sections 6.2.1 and 6.2.9.1 of this report. The acoustic impact from all (worst case) 42 students within the Stage 2 PS outdoor play area is calculated to be at least (10 * LOG [42 / 300] =) 9 dB less than the predicted level of noise from the 300 students engaged in active play in the Stage 2 PS outdoor area.

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

The calculated noise impact from 42 students in the Stage 2 OSHC complies with the guidance criteria in Section 5.5 of this report, and is acceptable.

6.2.9 Stage 2 - Predicted Noise Level at Receptor Locations

Knowing the sound power level of a noise source (See Tables 19 - 24), 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 industrial 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*[5], 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 Stage 2 operation of the College.

Where applicable, calculations include acoustic shielding provided by the recommended sound barrier wall in Sections 8.2.1, 8.2.2, 8.2.3.2, 8.2.4 and 8.2.5 and the College buildings to the residential and industrial receptors.

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[5] *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.*

6.2.9.1 Stage 2 - Outdoor Play Areas

Based on a maximum of (300 x PS, 107 x HS and 42 x ELC =) 449 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 25. The noise prediction was determined by placing all 449 students into groups throughout the outdoor play areas as follows:

- ELC Outdoor Play – 1 x group of 42 students;
- PS Outdoor Play – 3 x groups of 100 students; and
- HS Outdoor Play – 3 x groups of 36 students.

Table 25 STG2 - 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	45	46	Yes
R2 – 227-235 Deepfields Rd	35	46	Yes
R3 – 225 Deepfields Rd	35	68	Yes
R4 – 16 Heatherfield Cl	49	46	**No (+ 3 dB)**
R5 – 14 Heatherfield Cl	52	46	**No (+ 6 dB)**
R6 – 12 Heatherfield Cl	51	46	**No (+ 5 dB)**
R7 – 260 Catherine Fields Rd	46	46	Yes
R8 – 265 Catherine Fields Rd	44	46	Yes
R9 – 271 Catherine Fields Rd	42	46	Yes
R10 – 277 Catherine Fields Rd	34	46	Yes
R11 – 285 Catherine Fields Rd	37	46	Yes

The predicted level of noise from the students engaged in active play in the outdoor areas at the receptor locations ‘R1’ to ‘R3’ and ‘R7’ to ‘R11’ complies with the guidance 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 ‘R4’ to ‘R6’ exceeds the guidance criteria in Section 5.5 of this report, and will therefore require noise controls, as recommended in Section 8.0.

6.2.9.2 Stage 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 26.

Table 26 STG2 - 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	28		
- Mechanical plant	39		
Cumulative Noise Level	39	41	Yes
R2 – 227-235 Deepfields Rd			
- GLAs	19		
- Mechanical plant	22		
Cumulative Noise Level	23	41	Yes
R3 – 225 Deepfields Rd			
- GLAs	20		
- Mechanical plant	23		
Cumulative Noise Level	24	68	Yes
R4 – 16 Heatherfield Cl			
- GLAs	30		
- Mechanical plant	31		
Cumulative Noise Level	34	41	Yes
R5 – 14 Heatherfield Cl			
- GLAs	40		
- Mechanical plant	33		
Cumulative Noise Level	40	41	Yes
R6 – 12 Heatherfield Cl			
- GLAs	35		
- Mechanical plant	39		
Cumulative Noise Level	41	41	Yes

Table 26 STG2 - 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	31		
- Mechanical plant	40		
Cumulative Noise Level	41	41	Yes
R8 – 265 Catherine Fields Rd			
- GLAs	25		
- Mechanical plant	37		
Cumulative Noise Level	37	41	Yes
R9 – 271 Catherine Fields Rd			
- GLAs	18		
- Mechanical plant	38		
Cumulative Noise Level	38	41	Yes
R10 – 277 Catherine Fields Rd			
- GLAs	25		
- Mechanical plant	38		
Cumulative Noise Level	38	41	Yes
R11 – 285 Catherine Fields Rd			
- GLAs	37		
- Mechanical plant	37		
Cumulative Noise Level	40	41	Yes

The predicted cumulative level of noise from the GLAs and mechanical plant at the receptor locations ‘R1’ to ‘R11’, complies with the criteria in Section 5.5 of this report.

Notwithstanding, 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.

6.2.9.3 Stage 2 - College Halls

The noise impact from the Halls are summarised and shown in Table 27.

Table 27 STG2 - 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
R2 – 227-235 Deepfields Rd			
- PS Hall Live Performance	27	41	Yes
R3 – 225 Deepfields Rd			
- PS Hall Live Performance	27	68	Yes
R4 – 16 Heatherfield Cl			
- PS Hall Live Performance	33	41	Yes
R5 – 14 Heatherfield Cl			
- PS Hall Live Performance	43	41	**No (+ 2 dB)**
R6 – 12 Heatherfield Cl			
- PS Hall Live Performance	49	41	**No (+ 8 dB)**
R7 – 260 Catherine Fields Rd			
- PS Hall Live Performance	52	41	**No (+ 11 dB)**
R8 – 265 Catherine Fields Rd			
- PS Hall Live Performance	38	41	Yes
R9 – 271 Catherine Fields Rd			
- PS Hall Live Performance	27	41	Yes
R10 – 277 Catherine Fields Rd			
- PS Hall Live Performance	32	41	Yes
R11 – 285 Catherine Fields Rd			
- PS Hall Live Performance	32	41	Yes

The predicted cumulative level of noise from the use of the Halls at the receptor locations ‘R1’ to ‘R4’ 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 ‘R5’ to ‘R7’, exceeds the criteria in Section 5.5 of this report, and will therefore require noise controls as recommended in Section 8.0.

6.2.9.4 Stage 2 - Sports Field

The noise impact from the use of the Sports Field is summarised and shown in Table 28.

Table 28 STG2 - Predicted $L_{eq,\,15\,minute}$ Noise Levels – Outdoor Play/Sports Field

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	32	46	Yes
R3 – 225 Deepfields Rd	32	68	Yes
R4 – 16 Heatherfield Cl	46	46	Yes
R5 – 14 Heatherfield Cl	44	46	Yes
R6 – 12 Heatherfield Cl	34	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 ‘R11’ complies with the criteria in Section 5.5 of this report.

Notwithstanding, recommendations are provided in Sections 8.0 of this report to ensure the noise emissions from the future use of the Sports Field complies with the Project Noise Trigger Levels.

6.2.9.5 Stage 2 - 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 29.

Table 29 STG2 - 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	16	41	Yes
R2 – 227-235 Deepfields Rd	<10	41	Yes
R3 – 225 Deepfields Rd	15	68	Yes
R4 – 16 Heatherfield Cl	16	41	Yes
R5 – 14 Heatherfield Cl	17	41	Yes
R6 – 12 Heatherfield Cl	19	41	Yes
R7 – 260 Catherine Fields Rd	25	41	Yes
R8 – 265 Catherine Fields Rd	32	41	Yes
R9 – 271 Catherine Fields Rd	34	41	Yes
R10 – 277 Catherine Fields Rd	31	41	Yes
R11 – 285 Catherine Fields Rd	27	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.

6.2.9.6 Stage 2 - 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 staff spaces between 6.30 am and 7 am are calculated to be as shown below in Table 30.

Table 30 STG2 - 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	<10	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.

6.2.9.7 Stage 2 - 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 17 April 2024.

Figure 40, in Section 6.2 of the TAIA states that the traffic distribution from the Site is assumed to be as follows:

- Departing - 70/30% 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 5 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 31 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 31 STG2 - 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						
R1: 664 trips	29.3	56.7	56.7	0.0	55	Yes
R6: 664 trips	35.0	56.7	56.7	0.0	55	Yes
R7: 664 trips	46.4	56.7	57.1	0.4	55	Yes
R8: 664 trips	49.0	56.7	57.4	0.7	55	Yes
R9: 664 trips	48.9	56.7	57.4	0.7	55	Yes
R10: 664 trips	47.7	56.7	57.2	0.5	55	Yes
R11: 664 trips	46.7	56.7	57.1	0.4	55	Yes

Table 31 shows that while the predicted total $L_{eq,\ 1\ hour}$ noise levels at residential receivers ‘R1’ 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 31 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.

6.3 Stage 3 – School Noise Emission

6.3.1 Stage 3 - 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 (385 + 15 =) 400 HS students (267) and 2/3 of the (505 + 15 =) 520 PS students (347) will engage in active play at the one time, with half (133 HS and 173 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 32. We believe these levels represent the typical $L_{eq, 15 \text{ minute}}$ 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 32 and used in this assessment.

Table 32 STG3 - $L_{eq,\,15\ minute}$ 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 (173 students making noise)	**104**	79	89	94	98	101	98	93	90
447 x HS students engaged in active play (133 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

6.3.2 Stage 3 - 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 33 as well as the AAAC's range of A-weighted sound power levels per ELC aged child.

Table 33 STG3 - $L_{eq,\ 15\ minute}$ 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

6.3.3 Stage 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 34.

Table 34 STG3 - $L_{eq,\ 15\ minute}$ 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*									
- *REYQ8BYM*	**77**	87	85	80	75	70	62	62	52
- *REYQ12BYM*	**80**	93	84	84	78	74	67	60	55
- *REYQ14BYM*	**81**	90	90	88	82	77	68	63	56
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.

6.3.4 Stage 3 - Hall Usage

There is a possibility that the PS 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 will have capacity for up to 386 people. 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 PS Hall may operate at full capacity during a performance.
- 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[6] and in our noise level database gathered over many years, we calculate the sound power levels shown below in Table 35.

Table 35 STG3 - $L_{eq, 15 minute}$ 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**

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

6.3.5 Stage 3 - 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 or a sports team(s) playing on the proposed Sports Field (either during normal school hours or outside of school hours), we have assumed the following:

- A single football game, consisting of 22 students/players, 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 4 =) 88 spectators during a game, with 25% of the spectators making noise at any given time during a game.

Annual school fetes are typical one-off events that take place on most school's grounds and generally utilise several areas of a given campus. Annual school fetes are considered a typical community event and are not considered the worst case scenario for the use of a sports field/campus due to its limited occurrence (once a year). Due to this limited occurrence the impact to the acoustic amenity of the neighbourhood and community deemed to be minimal.

The $L_{eq, 15\ minute}$ sound power level and spectra of people and spectators engaging in active sport are shown below in Table 36 and is based on previous measurements by Day Design.

Table 36 STG3 - $L_{eq, 15\ minute}$ 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 person 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 Players and 88 x Spectators	**95**	73	75	84	91	91	88	82	75

6.3.6 Stage 3 - Vehicle Noise Emissions

The ELC, SSP, Staff and Student parking on the northern side of the College provides a total of 33 parking spaces for vehicles (15 x ELC & 18 x Student) with the student and Staff parking on the southern side of the college providing a total of 63 parking spaces for vehicles (51 x Staff, 3 x Student & 9 spare).

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 17 April 2024.

Section 6.1.4 of the TAIA provides a traffic assessment which includes the projected net trip generation for Stage 3 (Table 17), as follows:

- Total AM peak hour trip rate (964 x students inbound/outbound + 36 x staff inbound =) 1,000 vehicles entering/exiting the College.

This is equivalent to (1,000 / 4 =) 250 vehicles entering/exiting the College over any given 15 minutes during the AM peak hour.

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

- (36 / 4 =) 9 vehicles arrive (staff) and park in the southern car park;
- (18 / 4 =) 5 vehicles arrive (student) and park in the northern car park; and
- (946 / 4 =) 237 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 in the northern car park.

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[7] (SEL) sound power level and spectra of vehicle noise is shown below in Table 37 and is based on previous measurements by Day Design.

Table 37 STG3 - 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

6.3.7 Stage 3 - 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.

6.3.8 Stage 3 – OSHC

The College will provide an OSHC area for 60 students in the lower ground level of the administration building (southern side) and PS Hall and adjacent PS outdoor play area for Stage 3 of the development. We have been advised that when not inside the OSHC room or PS Hall, students may play in the Stage 3 PS outdoor play area.

The acoustic impact from students within the OSHC room and PS Hall will be negligible at the residential receivers.

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

The acoustic impact from 347 PS students engaged in active outdoor play in the Stage 3 PS outdoor play area has been assessed in Sections 6.3.1 and 6.3.9.1 of this report. The acoustic impact from all (worst case) 60 students within the Stage 3 PS outdoor play area is calculated to be at least (10 * LOG [60 / 347] =) 8 dB less than the predicted level of noise from the 347 students engaged in active play in the Stage 3 PS outdoor area.

The calculated noise impact from 60 students in the Stage 3 OSHC complies with the guidance criteria in Section 5.5 of this report, and is acceptable.

6.3.9 Stage 3 - Predicted Noise Level at Receptor Locations

Knowing the sound power level of a noise source (See Tables 32 - 37), 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 industrial 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*[8], 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 the Stage 3 operation of the College.

Where applicable, calculations include acoustic shielding provided by the recommended sound barrier wall in Sections 8.2.1, 8.2.2, 8.2.3.3, 8.2.4 and 8.2.5 and the College buildings to the residential and industrial receptors.

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[8] *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.*

6.3.9.1 Stage 3 - Outdoor Play Areas

Based on a maximum of (347 x PS, 267 x HS and 60 x ELC =) 674 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 38. The noise prediction was determined by placing all 674 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 116 students; and
- HS Outdoor Play – 3 x groups of 89 students.

Table 38 STG3 - 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	48	46	**No (+ 2 dB)**
R2 – 227-235 Deepfields Rd	38	46	Yes
R3 – 225 Deepfields Rd	39	68	Yes
R4 – 16 Heatherfield Cl	53	46	**No (+ 7 dB)**
R5 – 14 Heatherfield Cl	52	46	**No (+ 6 dB)**
R6 – 12 Heatherfield Cl	49	46	**No (+ 3 dB)**
R7 – 260 Catherine Fields Rd	45	46	Yes
R8 – 265 Catherine Fields Rd	40	46	Yes
R9 – 271 Catherine Fields Rd	40	46	Yes
R10 – 277 Catherine Fields Rd	34	46	Yes
R11 – 285 Catherine Fields Rd	36	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 'R7' to 'R11' complies with the guidance 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 'R6' exceeds the guidance criteria in Section 5.5 of this report, and will therefore require noise controls, as recommended in Section 8.0.

6.3.9.2 Stage 3 - 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 39.

Table 39 STG3 - 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	30		
- Mechanical plant	41		
Cumulative Noise Level	41	41	Yes
R2 – 227-235 Deepfields Rd			
- GLAs	19		
- Mechanical plant	20		
Cumulative Noise Level	23	41	Yes
R3 – 225 Deepfields Rd			
- GLAs	20		
- Mechanical plant	21		
Cumulative Noise Level	23	68	Yes
R4 – 16 Heatherfield Cl			
- GLAs	30		
- Mechanical plant	30		
Cumulative Noise Level	33	41	Yes
R5 – 14 Heatherfield Cl			
- GLAs	40		
- Mechanical plant	33		
Cumulative Noise Level	40	41	Yes
R6 – 12 Heatherfield Cl			
- GLAs	35		
- Mechanical plant	39		
Cumulative Noise Level	41	41	Yes

Table 39 STG3 - 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	31		
- Mechanical plant	40		
Cumulative Noise Level	41	41	Yes
R8 – 265 Catherine Fields Rd			
- GLAs	25		
- Mechanical plant	37		
Cumulative Noise Level	37	41	Yes
R9 – 271 Catherine Fields Rd			
- GLAs	18		
- Mechanical plant	38		
Cumulative Noise Level	38	41	Yes
R10 – 277 Catherine Fields Rd			
- GLAs	25		
- Mechanical plant	38		
Cumulative Noise Level	38	41	Yes
R11 – 285 Catherine Fields Rd			
- GLAs	37		
- Mechanical plant	35		
Cumulative Noise Level	40	41	Yes

The predicted cumulative level of noise from the GLAs and mechanical plant at the receptor locations ‘R1’ to ‘R11’, complies with the criteria in Section 5.5 of this report.

Notwithstanding, 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.

6.3.9.3 Stage 3 - College Halls

The noise impact from the Halls are summarised and shown in Table 40.

Table 40 STG3 - 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
R2 – 227-235 Deepfields Rd			
- PS Hall Live Performance	27	41	Yes
R3 – 225 Deepfields Rd			
- PS Hall Live Performance	27	68	Yes
R4 – 16 Heatherfield Cl			
- PS Hall Live Performance	33	41	Yes
R5 – 14 Heatherfield Cl			
- PS Hall Live Performance	43	41	**No (+ 2 dB)**
R6 – 12 Heatherfield Cl			
- PS Hall Live Performance	49	41	**No (+ 8 dB)**
R7 – 260 Catherine Fields Rd			
- PS Hall Live Performance	52	41	**No (+ 11 dB)**
R8 – 265 Catherine Fields Rd			
- PS Hall Live Performance	38	41	Yes
R9 – 271 Catherine Fields Rd			
- PS Hall Live Performance	27	41	Yes
R10 – 277 Catherine Fields Rd			
- PS Hall Live Performance	32	41	Yes
R11 – 285 Catherine Fields Rd			
- PS Hall Live Performance	32	41	Yes

The predicted cumulative level of noise from the use of the Halls at the receptor locations ‘R1’ to ‘R4’ 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 ‘R5’ to ‘R7’, exceeds the criteria in Section 5.5 of this report, and will therefore require noise controls as recommended in Section 8.0.

6.3.9.4 Stage 3 - Sports Field

The noise impact from the use of the Sports Field is summarised and shown in Table 41.

Table 41 STG3 - Predicted $L_{eq, 15\ minute}$ Noise Levels – Outdoor Play/Sports Field

Receptor Location	Predicted Noise Level (dBA)	Noise Criterion (dBA)	Compliance (Yes/No)
R1 – 286 Catherine Fields Rd	36	46	Yes
R2 – 227-235 Deepfields Rd	31	46	Yes
R3 – 225 Deepfields Rd	33	68	Yes
R4 – 16 Heatherfield Cl	46	46	Yes
R5 – 14 Heatherfield Cl	42	46	Yes
R6 – 12 Heatherfield Cl	36	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 ‘R11’ complies with the criteria in Section 5.5 of this report.

Notwithstanding, recommendations are provided in Sections 8.0 of this report to ensure the noise emissions from the future use of the Sports Field complies with the Project Noise Trigger Levels.

6.3.9.5 Stage 3 - 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 42.

Table 42 STG3 - 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	16	41	Yes
R2 – 227-235 Deepfields Rd	<10	41	Yes
R3 – 225 Deepfields Rd	16	68	Yes
R4 – 16 Heatherfield Cl	17	41	Yes
R5 – 14 Heatherfield Cl	18	41	Yes
R6 – 12 Heatherfield Cl	21	41	Yes
R7 – 260 Catherine Fields Rd	27	41	Yes
R8 – 265 Catherine Fields Rd	34	41	Yes
R9 – 271 Catherine Fields Rd	36	41	Yes
R10 – 277 Catherine Fields Rd	33	41	Yes
R11 – 285 Catherine Fields Rd	29	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.

6.3.9.6 Stage 3 - 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 43.

Table 43 STG3 - 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	38	41	Yes
R5 – 14 Heatherfield Cl	38	41	Yes
R6 – 12 Heatherfield Cl	38	41	Yes
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 ‘R11’ complies with the criteria in Section 5.5 of this report.

Notwithstanding, recommendations are provided in Sections 8.0 of this report to ensure the noise emissions from the future use of the College Buses complies with the Project Noise Trigger Levels.

6.3.9.7 Stage 3 - 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 44.

Table 44 STG3 - 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	<10	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.

6.3.9.8 Stage 3 - 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 17 April 2024.

Figure 40, in Section 6.2 of the TAIA states that the traffic distribution from the Site is assumed to be as follows:

- Departing - 70/30% 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 5 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 45 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 45 STG3 - 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			
R1: 1,000 trips	30.7	56.7	56.7	0.0	55	Yes
R6: 1,000 trips	35.9	56.7	56.7	0.0	55	Yes
R7: 1,000 trips	47.4	56.7	57.2	0.5	55	Yes
R8: 1,000 trips	49.9	56.7	57.5	0.8	55	Yes
R9: 1,000 trips	49.9	56.7	57.5	0.8	55	Yes
R10: 1,000 trips	48.8	56.7	57.4	0.7	55	Yes
R11: 1,000 trips	47.9	56.7	57.2	0.5	55	Yes

Table 45 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 45 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.

6.4 Stage 4 – School Noise Emission

6.4.1 Stage 4 - 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 (385 + 15 =) 400 HS students (267) and 2/3 of the (505 + 15 =) 520 PS students (347) will engage in active play at the one time, with half (133 HS and 173 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 46. 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 46 and used in this assessment.

Table 46 STG4 - $L_{eq, 15\ minute}$ 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 (173 students making noise)	**104**	79	89	94	98	101	98	93	90
447 x HS students engaged in active play (133 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

6.4.2 Stage 4 - 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 $L_{eq, 15 \text{ minute}}$ sound power levels of teachers and students are shown below in Table 47 as well as the AAAC's range of A-weighted sound power levels per ELC aged child.

Table 47 STG4 - $L_{eq, 15 \text{ minute}}$ 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

6.4.3 Stage 4 - 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 48.

Table 48 STG4 - $L_{eq,\ 15\ minute}$ 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*									
- *REYQ8BYM*	**77**	87	85	80	75	70	62	62	52
- *REYQ12BYM*	**80**	93	84	84	78	74	67	60	55
- *REYQ14BYM*	**81**	90	90	88	82	77	68	63	56
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.

6.4.4 Stage 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[9] and in our noise level database gathered over many years, we calculate the sound power levels shown below in Table 49.

Table 49 STG4 - $L_{eq,\ 15\ minute}$ 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**

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

6.4.5 Stage 4 - 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 or a sports team(s) playing on the proposed Sports Field (either during normal school hours or outside of school hours), we have assumed the following:

- A single football game, consisting of 22 students/players, 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 4 =) 88 spectators during a game, with 25% of the spectators making noise at any given time during a game.

Annual school fetes are typical one-off events that take place on most school's grounds and generally utilise several areas of a given campus. Annual school fetes are considered a typical community event and are not considered the worst case scenario for the use of a sports field/campus due to its limited occurrence (once a year). Due to this limited occurrence the impact to the acoustic amenity of the neighbourhood and community deemed to be minimal.

The $L_{eq, 15 minute}$ sound power level and spectra of people and spectators engaging in active sport are shown below in Table 50 and is based on previous measurements by Day Design.

Table 50 STG4 - $L_{eq, 15 minute}$ 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 person 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 Players and 88 x Spectators	**95**	73	75	84	91	91	88	82	75

6.4.6 Stage 4 - Vehicle Noise Emissions

The ELC, SSP, Staff and Student parking on the northern side of the College provides a total of 33 parking spaces for vehicles (15 x ELC & 18 x Student) with the student and Staff parking on the southern side of the college providing a total of 63 parking spaces for vehicles (51 x Staff, 3 x Student & 9 spare).

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 17 April 2024.

Section 6.1.4 of the TAIA provides a traffic assessment which includes the projected net trip generation for Stage 3 (Table 17), as follows:

- Total AM peak hour trip rate (964 x students inbound/outbound + 36 x staff inbound =) 1,000 vehicles entering/exiting the College.

This is equivalent to (1,000 / 4 =) 250 vehicles entering/exiting the College over any given 15 minutes during the AM peak hour.

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

- (36 / 4 =) 9 vehicles arrive (staff) and park in the southern car park;
- (18 / 4 =) 5 vehicles arrive (student) and park in the northern car park; and
- (946 / 4 =) 237 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 in the northern car park.

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[10] (SEL) sound power level and spectra of vehicle noise is shown below in Table 51 and is based on previous measurements by Day Design.

Table 51 STG4 - 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

6.4.7 Stage 4 - 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.

6.4.8 Stage 4 – OSHC

The College will provide an OSHC area for 60 students in the lower ground level of the administration building (southern side) and PS Hall and adjacent PS outdoor play area for Stage 4 of the development. We have been advised that when not inside the OSHC room or PS Hall, students may play in the Stage 4 PS outdoor play area.

The acoustic impact from students within the OSHC room and PS Hall will be negligible at the residential receivers.

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

The acoustic impact from 347 PS students engaged in active outdoor play in the Stage 4 PS outdoor play area has been assessed in Sections 6.4.1 and 6.4.9.1 of this report. The acoustic impact from all (worst case) 60 students within the Stage 4 PS outdoor play area is calculated to be at least (10 * LOG [60 / 347] =) 8 dB less than the predicted level of noise from the 347 students engaged in active play in the Stage 4 PS outdoor area.

The calculated noise impact from 60 students in the Stage 4 OSHC complies with the guidance criteria in Section 5.5 of this report, and is acceptable.

6.4.9 Stage 4 - Predicted Noise Level at Receptor Locations

Knowing the sound power level of a noise source (See Tables 46 - 51), 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*[11], 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 recommended sound barrier wall in Sections 8.2.1, 8.2.2, 8.2.3.3, 8.2.4 and 8.2.5 and the College buildings to the residential and industrial receptors.

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[11] *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.*

6.4.9.1 Stage 4 - Outdoor Play Areas

Based on a maximum of (347 x PS, 267 x HS and 60 x ELC =) 674 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 52. The noise prediction was determined by placing all 674 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 116 students; and
- HS Outdoor Play – 3 x groups of 89 students.

Table 52 STG4 - 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	48	46	**No (+ 2 dB)**
R2 – 227-235 Deepfields Rd	38	46	Yes
R3 – 225 Deepfields Rd	39	68	Yes
R4 – 16 Heatherfield Cl	53	46	**No (+ 7 dB)**
R5 – 14 Heatherfield Cl	52	46	**No (+ 6 dB)**
R6 – 12 Heatherfield Cl	49	46	**No (+ 3 dB)**
R7 – 260 Catherine Fields Rd	45	46	Yes
R8 – 265 Catherine Fields Rd	40	46	Yes
R9 – 271 Catherine Fields Rd	40	46	Yes
R10 – 277 Catherine Fields Rd	34	46	Yes
R11 – 285 Catherine Fields Rd	36	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 ‘R7’ to ‘R11’ complies with the guidance 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 ‘R6’ exceeds the guidance criteria in Section 5.5 of this report, and will therefore require noise controls, as recommended in Section 8.0.

6.4.9.2 Stage 4 - 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 53.

Table 53 STG4 - Predicted Cumulative $L_{eq, 15 \text{ minute}}$ 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	30		
- Mechanical plant	41		
Cumulative Noise Level	41	41	Yes
R2 – 227-235 Deepfields Rd			
- GLAs	19		
- Mechanical plant	22		
Cumulative Noise Level	24	41	Yes
R3 – 225 Deepfields Rd			
- GLAs	20		
- Mechanical plant	23		
Cumulative Noise Level	24	68	Yes
R4 – 16 Heatherfield Cl			
- GLAs	30		
- Mechanical plant	31		
Cumulative Noise Level	34	41	Yes
R5 – 14 Heatherfield Cl			
- GLAs	40		
- Mechanical plant	33		
Cumulative Noise Level	40	41	Yes
R6 – 12 Heatherfield Cl			
- GLAs	35		
- Mechanical plant	39		
Cumulative Noise Level	41	41	Yes

Table 53 STG4 - 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	31		
- Mechanical plant	40		
Cumulative Noise Level	41	41	Yes
R8 – 265 Catherine Fields Rd			
- GLAs	25		
- Mechanical plant	37		
Cumulative Noise Level	37	41	Yes
R9 – 271 Catherine Fields Rd			
- GLAs	18		
- Mechanical plant	38		
Cumulative Noise Level	38	41	Yes
R10 – 277 Catherine Fields Rd			
- GLAs	25		
- Mechanical plant	38		
Cumulative Noise Level	38	41	Yes
R11 – 285 Catherine Fields Rd			
- GLAs	38		
- Mechanical plant	35		
Cumulative Noise Level	40	41	Yes

The predicted cumulative level of noise from the GLAs and mechanical plant at the receptor locations ‘R1’ to ‘R11’, complies with the criteria in Section 5.5 of this report.

Notwithstanding, 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.

6.4.9.3 Stage 4 - College Halls

The noise impact from the Halls are summarised and shown in Table 54.

Table 54 STG4 - 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 54 STG4 - 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.

6.4.9.4 Stage 4 - Sports Field

The noise impact from the use of the Sports Field is summarised and shown in Table 55.

Table 55 STG4 - Predicted $L_{eq,\ 15\ minute}$ Noise Levels – Outdoor Play/Sports Field

Receptor Location	Predicted Noise Level (dBA)	Noise Criterion (dBA)	Compliance (Yes/No)
R1 – 286 Catherine Fields Rd	35	46	Yes
R2 – 227-235 Deepfields Rd	31	46	Yes
R3 – 225 Deepfields Rd	33	68	Yes
R4 – 16 Heatherfield Cl	46	46	Yes
R5 – 14 Heatherfield Cl	42	46	Yes
R6 – 12 Heatherfield Cl	36	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 ‘R11’ complies with the criteria in Section 5.5 of this report.

Notwithstanding, recommendations are provided in Sections 8.0 of this report to ensure the noise emissions from the future use of the Sports Field complies with the Project Noise Trigger Levels.

6.4.9.5 Stage 4 - 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 56.

Table 56 STG4 - 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	16	41	Yes
R2 – 227-235 Deepfields Rd	<10	41	Yes
R3 – 225 Deepfields Rd	16	68	Yes
R4 – 16 Heatherfield Cl	17	41	Yes
R5 – 14 Heatherfield Cl	18	41	Yes
R6 – 12 Heatherfield Cl	21	41	Yes
R7 – 260 Catherine Fields Rd	27	41	Yes
R8 – 265 Catherine Fields Rd	34	41	Yes
R9 – 271 Catherine Fields Rd	36	41	Yes
R10 – 277 Catherine Fields Rd	33	41	Yes
R11 – 285 Catherine Fields Rd	29	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.

6.4.9.6 Stage 4 - 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 57.

Table 57 STG4 - 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	38	41	Yes
R5 – 14 Heatherfield Cl	38	41	Yes
R6 – 12 Heatherfield Cl	38	41	Yes
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 ‘R11’ complies with the criteria in Section 5.5 of this report.

Notwithstanding, recommendations are provided in Sections 8.0 of this report to ensure the noise emissions from the future use of the College Buses complies with the Project Noise Trigger Levels.

6.4.9.7 Stage 4 - 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 58.

Table 58 STG4 - 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	<10	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.

6.4.9.8 *Stage 4 - 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 17 April 2024.

Figure 40, in Section 6.2 of the TAIA states that the traffic distribution from the Site is assumed to be as follows:

- Departing - 70/30% 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 5 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 59 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 59 STG4 - 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						
R1: 1,000 trips	30.7	56.7	56.7	0.0	55	Yes
R6: 1,000 trips	35.9	56.7	56.7	0.0	55	Yes
R7: 1,000 trips	47.4	56.7	57.2	0.5	55	Yes
R8: 1,000 trips	49.9	56.7	57.5	0.8	55	Yes
R9: 1,000 trips	49.9	56.7	57.5	0.8	55	Yes
R10: 1,000 trips	48.8	56.7	57.4	0.7	55	Yes
R11: 1,000 trips	47.9	56.7	57.2	0.5	55	Yes

Table 59 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 59 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 5, 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.
- Neighbours should be notified in advance of any one-off events such as an annual school fete.

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 and 8.2.

8.1.2.1 Stage 1 - Permissible Outdoor Play Area Scenarios

Scenario 1 –

- PS School Students = Yes; and
- ELC Students = Yes.

8.1.2.2 Stage 2 - Permissible Outdoor Play Area Scenarios

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.

8.1.2.3 Stages 3 & 4 - Permissible Outdoor Play Area Scenarios

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 Stage 1, 2, 3 & 4 - 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 Stage 1, 2, 3 & 4 - 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 Stage 1, 2, 3 & 4 - Outdoor Area Sound Barrier Walls

8.2.3.1 Stage 1 - Outdoor Area Sound Barrier Walls

We recommend a 2.4 metre high sound barrier wall be constructed along the entire northern boundary, a 2.1 metre high sound barrier wall be constructed along the entire eastern boundary and a 1.8 metre high sound barrier wall be constructed along the entire southern boundary of the PS outdoor area.

8.2.3.2 Stage 2 - 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 and southern boundary of the HS outdoor area.

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

8.2.3.3 Stage 3 & 4 - 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 and eastern 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 Stage 1, 2, 3 & 4 - ELC Sound Barrier Walls

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

8.2.5 Stage 1, 2, 3 & 4 - 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 PS Hall and 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 10, Table 21, Table 34 and Table 48 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:

8.5.1 Stage 1 - Public Address System & School Bell

- **Eastern Façade** **77 dBA $L_{eq,15\ minutes}$** at 3 metres from each speaker.

8.5.2 Stage 2 - Public Address System & School Bell

- **Eastern Façade Stage 1** **77 dBA $L_{eq,15\ minutes}$** at 3 metres from each speaker.
- **Northern Façade Stage 2** **77 dBA $L_{eq,15\ minutes}$** at 3 metres from each speaker.
- **Southern Façade Stage 2** **62 dBA $L_{eq,15\ minutes}$** at 3 metres from each speaker.

8.5.3 Stage 3 & 4 - Public Address System & School Bell

- **Northern & Southern Façades** **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 Stage 2 - Outdoor Play Areas – After Noise Controls

9.1.1 Stage 2 - 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 60.

Table 60 STG2 - 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			
R4 – 16 Heatherfield Cl	40	46	Yes
R5 – 14 Heatherfield Cl	39	46	Yes
R6 – 12 Heatherfield Cl	31	46	Yes
Outdoor Play Scenario 2			
R4 – 16 Heatherfield Cl	48	46	**No (+ 2 dB)**
R5 – 14 Heatherfield Cl	52	46	**No (+ 6 dB)**
R6 – 12 Heatherfield Cl	51	46	**No (+ 5 dB)**

**Note and exceedance of up to 2 dB is considered to be negligible and is generally not be discernible to the human ear.*

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 ‘R4’ to ‘R6’.

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 Stage 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 'R4' to 'R6').*

9.1.2.1 Stage 2 - Residential Receptors 'R4' to 'R6'

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 6 dB (see Table 60, *Outdoor Play Scenario 2,* 'R5').

As shown in Table 4, the existing L_{eq} noise levels at Logger Location 'B' is 50 dBA during the day, 4 dB above the Project Noise Trigger Levels used for guidance purposes in Section 5.5. For the use of the outdoor areas at the College for active play, the calculated L_{eq} noise level is 2 dB (see Table 60, *Outdoor Play Scenario 2,* 'R5') above the existing L_{eq} noise levels at 'R5'. The calculated increase to the existing L_{eq} noise level during the limited usage of the outdoor areas is 4 dB (50 dBA + 52 dBA = 54 dBA) at 'R5'. An increase of 4 dB is considered moderate, with an overall noise level of 54 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 Stage 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 moderately 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 4 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 moderate (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 – 'R4' to 'R6' are the potentially most affected residential premises. As discussed in Q1 above, the maximum noise level increase is expected to be moderate (+ 4 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 Stage 2 - 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 'R4' to 'R6' will be moderate, and that the acoustic amenity of the majority of the neighbourhood will be maintained as per the *State Environmental Planning Policy (Transport and Infrastructure) 2021*.

9.1.3 Stage 2 - 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 61.

Table 61 STG2 - 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
R4 – 16 Heatherfield Cl			
- PS Hall Live Performance	16	41	Yes
R5 – 14 Heatherfield Cl			
- PS Hall Live Performance	20	41	Yes
R6 – 12 Heatherfield Cl			
- PS Hall Live Performance	24	41	Yes
R7 – 260 Catherine Fields Rd			
- PS Hall Live Performance	27	41	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.

9.2 Stage 3 - Outdoor Play Areas – After Noise Controls

9.2.1 Stage 3 - 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 62.

Table 62 STG3 - 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	48	46	**No (+ 2 dB)**
R4 – 16 Heatherfield Cl	47	46	**No (+ 1 dB)**
R5 – 14 Heatherfield Cl	48	46	**No (+ 2 dB)**
R6 – 12 Heatherfield Cl	34	46	Yes
Outdoor Play Scenario 2			
R1 – 286 Catherine Fields Rd	41	46	Yes
R4 – 16 Heatherfield Cl	52	46	**No (+ 6 dB)**
R5 – 14 Heatherfield Cl	51	46	**No (+ 5 dB)**
R6 – 12 Heatherfield Cl	49	46	**No (+ 3 dB)**

**Note and exceedance of up to 2 dB is considered to be negligible and is generally not be discernible to the human ear.*

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’ and ‘R4’ to ‘R6’.

A discussion/detailed analysis of these potential exceedances and their impact on the acoustic amenity of the neighbouring receivers is provided in Section 9.2.2.

9.2.2 Stage 3 - 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 'R6').*

9.2.2.1 Stage 3 - Residential Receptors 'R1' and 'R4' to 'R6'

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 6 dB (see Table 62, *Outdoor Play Scenario 2,* 'R4').

As shown in Table 4, the existing L_{eq} noise levels at Logger Location 'B' is 50 dBA during the day, 4 dB above the Project Noise Trigger Levels used for guidance purposes in Section 5.5. For the use of the outdoor areas at the College for active play, the calculated L_{eq} noise level is 2 dB (see Table 62, *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 4 dB (50 dBA + 52 dBA = 54 dBA) at 'R4'. An increase of 4 dB is considered moderate, with an overall noise level of 54 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.

9.2.2.2 Stage 3 - 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 moderately 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 4 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 moderate (see Section 9.2.2.1) 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 'R6' are the potentially most affected residential premises. As discussed in Q1 above, the maximum noise level increase is expected to be moderate (+ 4 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.

9.2.2.3 Stage 3 - Conclusion

With consideration to Sections 9.2.2.1 and 9.2.2.2, 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 'R6' will be moderate, and that the acoustic amenity of the majority of the neighbourhood will be maintained as per the *State Environmental Planning Policy (Transport and Infrastructure) 2021*.

9.2.3 Stage 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 63.

Table 63 STG3 - 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
R4 – 16 Heatherfield Cl			
- PS Hall Live Performance	16	41	Yes
R5 – 14 Heatherfield Cl			
- PS Hall Live Performance	20	41	Yes
R6 – 12 Heatherfield Cl			
- PS Hall Live Performance	24	41	Yes
R7 – 260 Catherine Fields Rd			
- PS Hall Live Performance	27	41	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.

9.3 Stage 4 - Outdoor Play Areas – After Noise Controls

9.3.1 Stage 4 - 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 64.

Table 64 STG4 - 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	48	46	**No (+ 2 dB)**
R4 – 16 Heatherfield Cl	47	46	**No (+ 1 dB)**
R5 – 14 Heatherfield Cl	48	46	**No (+ 2 dB)**
R6 – 12 Heatherfield Cl	34	46	Yes
Outdoor Play Scenario 2			
R1 – 286 Catherine Fields Rd	41	46	Yes
R4 – 16 Heatherfield Cl	52	46	**No (+ 6 dB)**
R5 – 14 Heatherfield Cl	51	46	**No (+ 5 dB)**
R6 – 12 Heatherfield Cl	49	46	**No (+ 3 dB)**

**Note and exceedance of up to 2 dB is considered to be negligible and is generally not be discernible to the human ear.*

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’ and ‘R4’ to ‘R6’.

A discussion/detailed analysis of these potential exceedances and their impact on the acoustic amenity of the neighbouring receivers is provided in Section 9.3.2.

9.3.2 *Stage 4 - 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 'R6').*

9.3.2.1 Stage 4 - Residential Receptors 'R1' and 'R4' to 'R6'

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 6 dB (see Table 64, *Outdoor Play Scenario 2,* 'R4').

As shown in Table 4, the existing L_{eq} noise levels at Logger Location 'B' is 50 dBA during the day, 4 dB above the Project Noise Trigger Levels used for guidance purposes in Section 5.5. For the use of the outdoor areas at the College for active play, the calculated L_{eq} noise level is 2 dB (see Table 64, *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 4 dB (50 dBA + 52 dBA = 54 dBA) at 'R4'. An increase of 4 dB is considered moderate, with an overall noise level of 54 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.

9.3.2.2 Stage 4 - 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 moderately 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 4 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 moderate (see Section 9.3.2.1) 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 'R6' are the potentially most affected residential premises. As discussed in Q1 above, the maximum noise level increase is expected to be moderate (+ 4 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.

9.3.2.3 Stage 4 - Conclusion

With consideration to Sections 9.3.2.1 and 9.3.2.2, 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 moderate, and that the acoustic amenity of the majority of the neighbourhood will be maintained as per the *State Environmental Planning Policy (Transport and Infrastructure) 2021*.

9.4 Stage 4 - 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 65.

Table 65 STG4 - 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.

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 (Transport and Infrastructure) 2021* 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 numerical controls in Camden Council's *Camden Development Control Plan 2019* and *Environmental Noise Policy 2018* - considered in this report for guidance only - causing a moderate increase to the existing ambient noise levels at adjacent developments and the local neighbourhood.

In accordance with the requirements of the SEPP *(Transport and Infrastructure) 2021*, 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
- Appendix D – Adam Shearer - *Curriculum Vitae*
- Appendix E – Minarah College – *'Proposed Schedule of Regular Events/Meetings'*
- 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

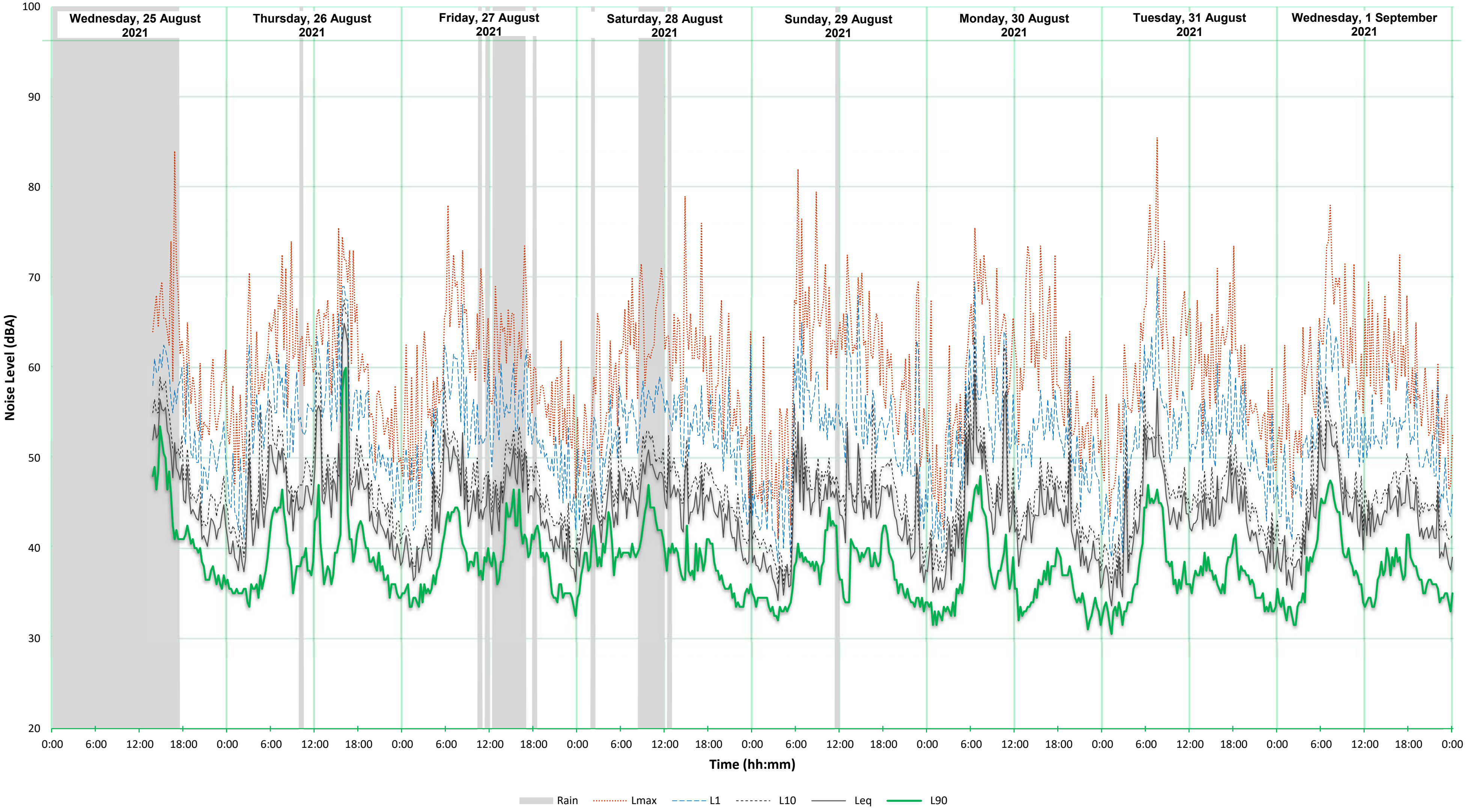
Description	Model No.	Serial No.
Infobyte Noise Logger (Type 1) Condenser Microphone 0.5" diameter	iM4 MK 250	103 7371
Infobyte Noise Logger (Type 1) Condenser Microphone 0.5" diameter	iM4 MK 250	105 7112
Infobyte Noise Logger (Type 2) Condenser Microphone 0.5" diameter	iM4 MK 250	123 123

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.

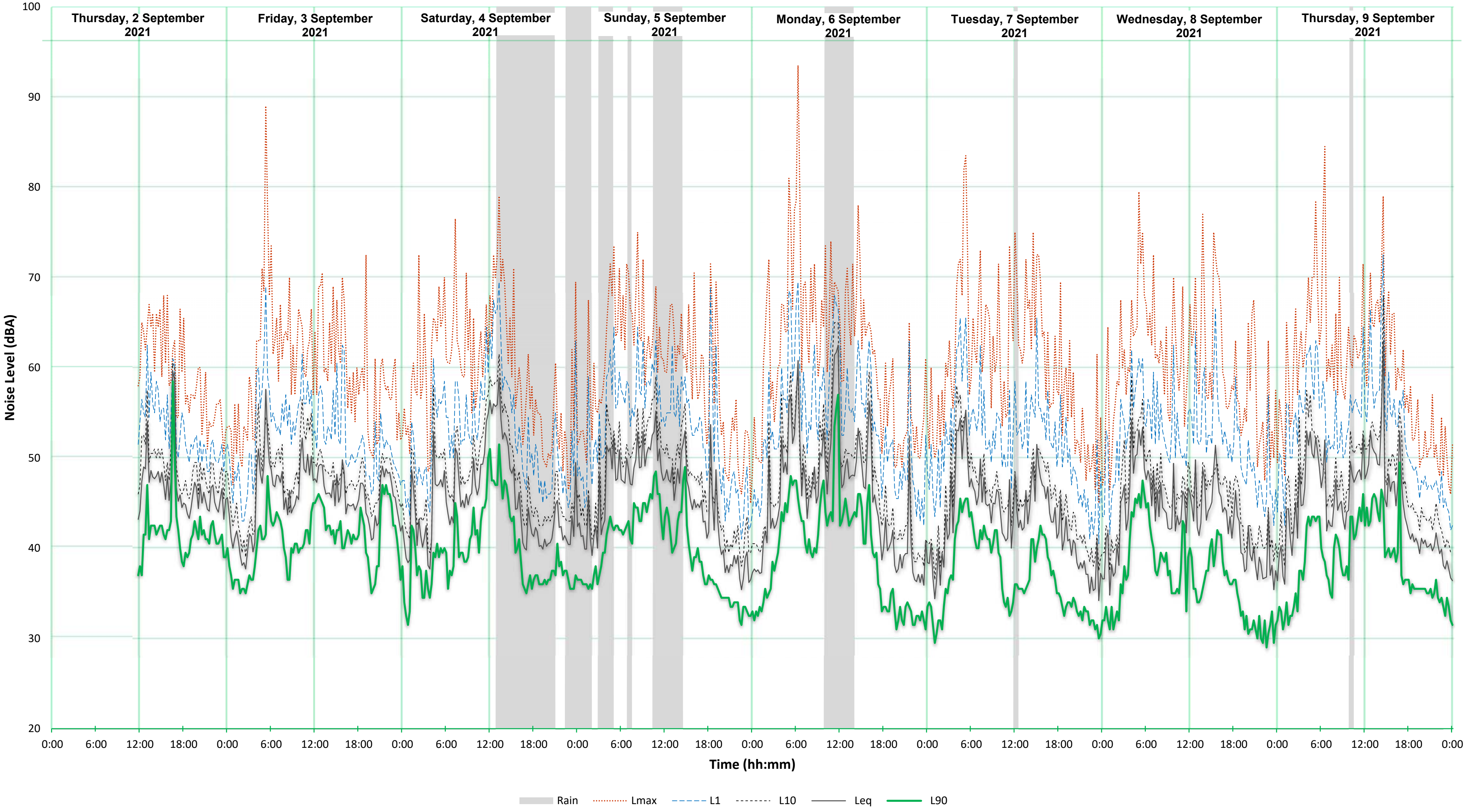
AMBIENT NOISE SURVEY

Located at 268 Catherine Fields Rd, Catherine Fields, NSW



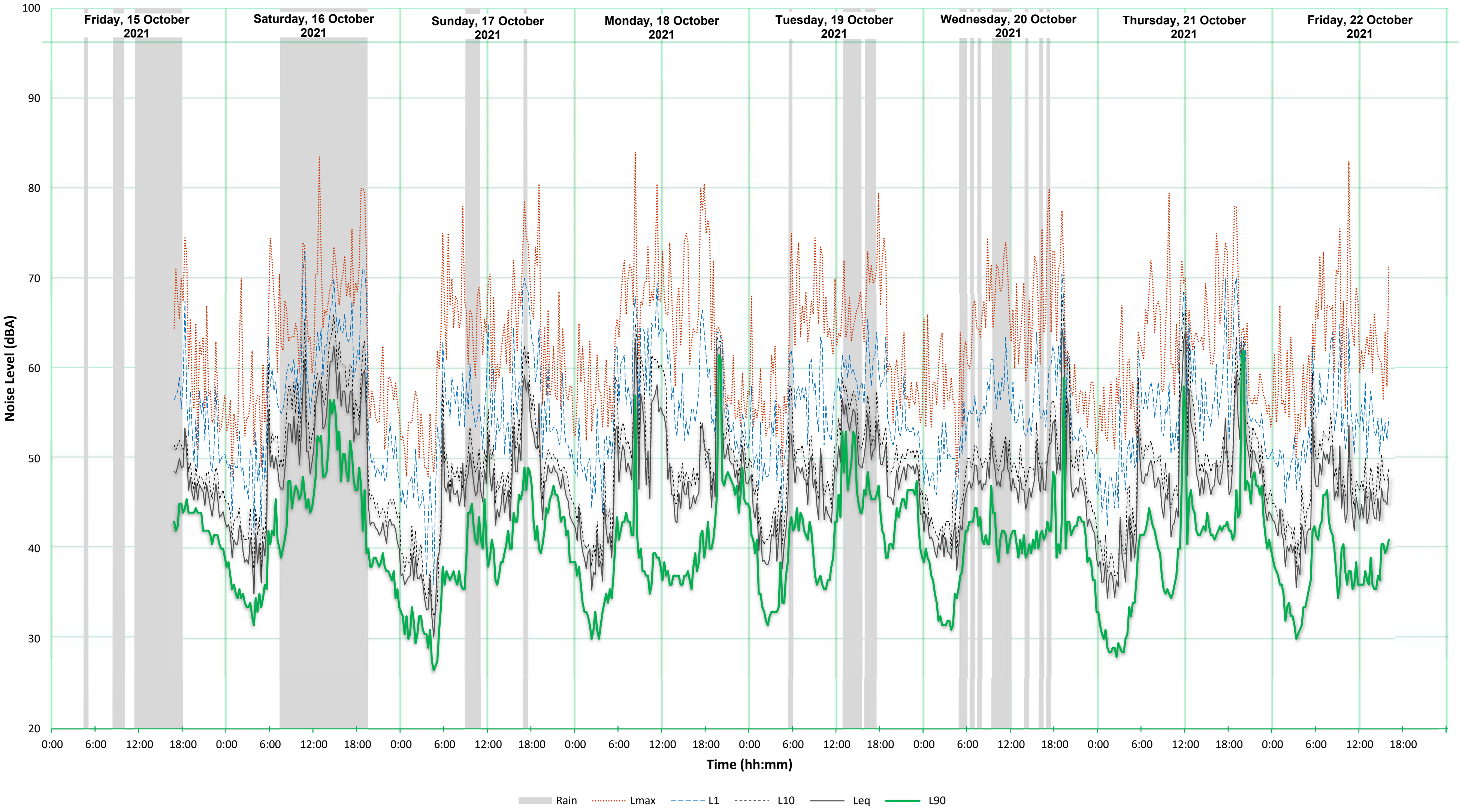
AMBIENT NOISE SURVEY

Located at 268 Catherine Fields Rd, Catherine Fields, NSW



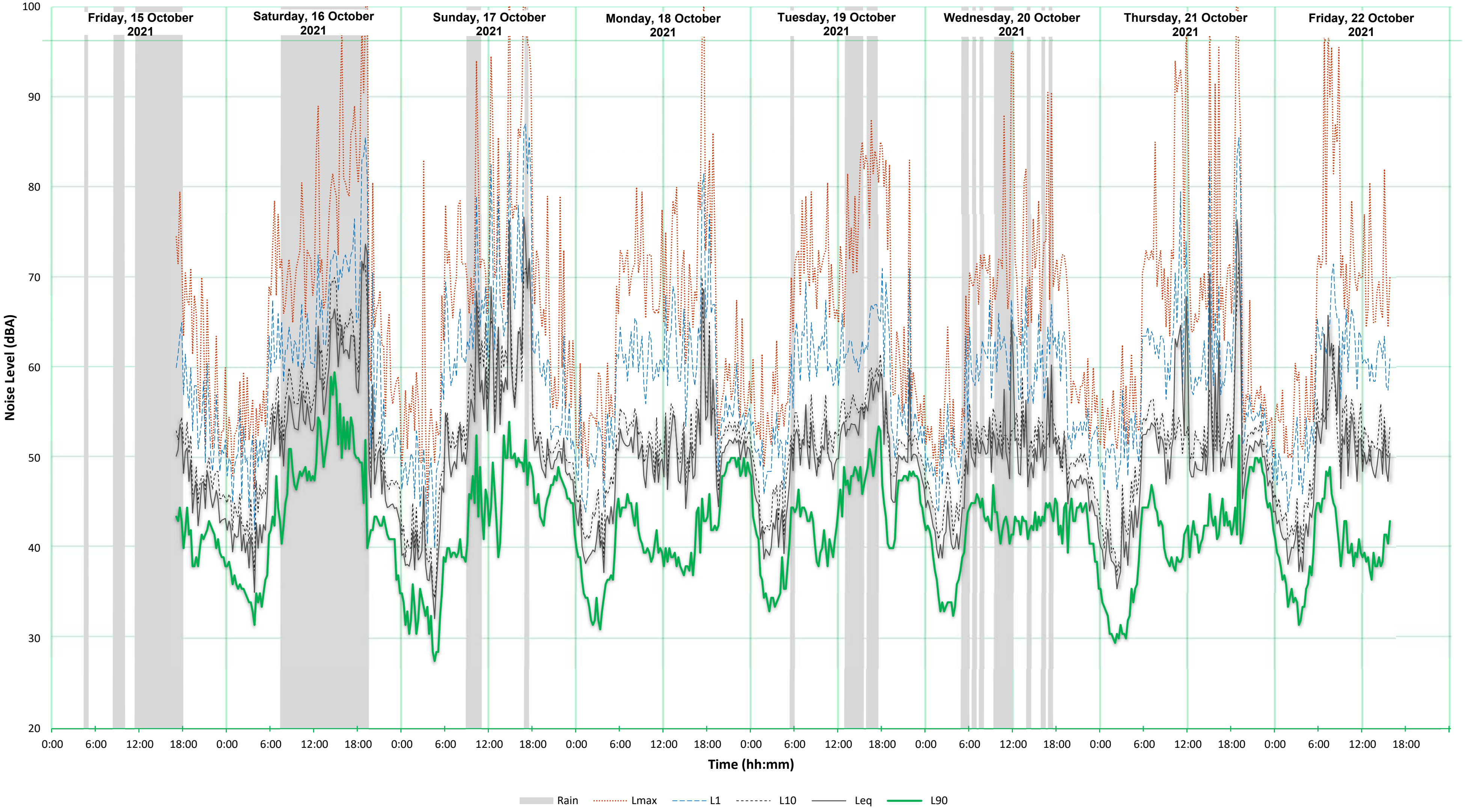
AMBIENT NOISE SURVEY

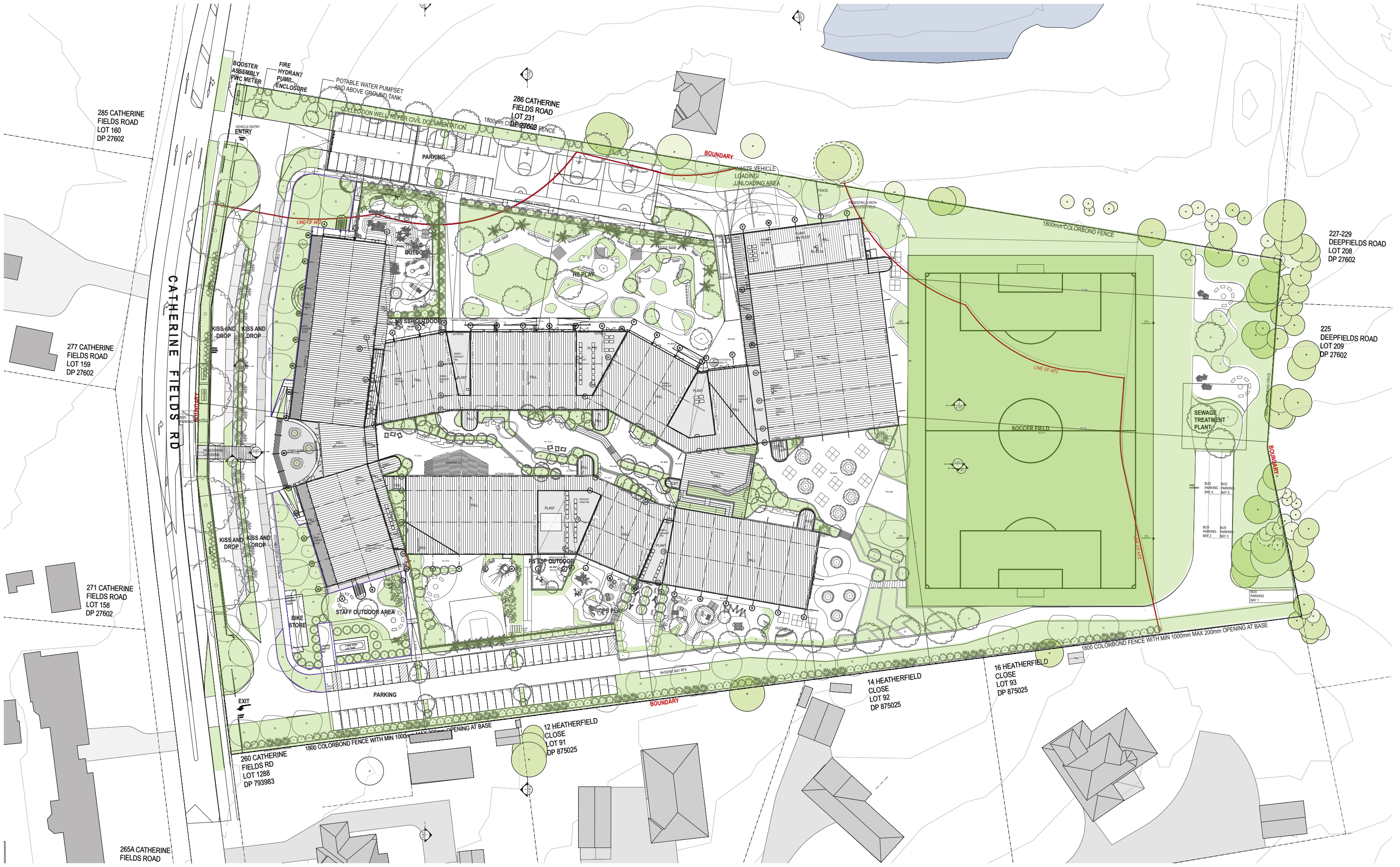
Located at 268 Catherine Fields Rd, Catherine Fields, NSW



AMBIENT NOISE SURVEY

Located at 278 Catherine Fields Rd, Catherine Fields, NSW




BOOSTER ASSEMBLY PWC METER
FIRE HYDRANT PUMP ENCLOSURE
POTABLE WATER PUMPSET AND ABOVE GROUND TANK
COLLECTION WELL REFER CIVIL DOCUMENTATION
1800mm COLORBOND FENCE
286 CATHERINE FIELDS ROAD LOT 231 DP 27602
285 CATHERINE FIELDS ROAD LOT 160 DP 27602
VEHICLE ENTRY
ENTRY
PARKING
BOUNDARY
WASTE VEHICLE LOADING/ UNLOADING AREA
LINE OF APZ
PEDESTRIAN PATH TO SPORTS FIELD
1800mm COLORBOND FENCE
227-229 DEEPFIELDS ROAD LOT 208 DP 27602
OUTDOOR
HS PLAY
HS SSP OUTDOOR
PLANT
FALL
CATHERINE FIELDS RD
277 CATHERINE FIELDS ROAD LOT 159 DP 27602
KISS AND DROP
KISS AND DROP
225 DEEPFIELDS ROAD LOT 209 DP 27602
LINE OF APZ
SOCCER FIELD
SEWAGE TREATMENT PLANT
BOUNDARY
BUS PARKING BAY 4
BUS PARKING BAY 5
BUS PARKING BAY 2
BUS PARKING BAY 3
BUS PARKING BAY 1
KISS AND DROP
KISS AND DROP
271 CATHERINE FIELDS ROAD LOT 158 DP 27602
BIKE STORE
STAFF OUTDOOR AREA
PS SSP OUTDOOR
PS PLAY
1800 COLORBOND FENCE WITH MIN 1000mm MAX 200mm OPENING AT BASE
PASSING BAY RFS
PARKING
EXIT
BOUNDARY
16 HEATHERFIELD CLOSE LOT 93 DP 875025
14 HEATHERFIELD CLOSE LOT 92 DP 875025
12 HEATHERFIELD CLOSE LOT 91 DP 875025
1800 COLORBOND FENCE WITH MIN 1000mm MAX 200mm OPENING AT BASE
260 CATHERINE FIELDS RD LOT 1288 DP 793983
265A CATHERINE FIELDS ROAD

DATE	REV	DESCRIPTION
31/03/22	A	ISSUE FOR SSDA
19/03/24	B	AMENDED ISSUE FOR SSDA
24/06/24	C	AMENDED ISSUE FOR SSDA
26/02/25	D	AMENDED ISSUE FOR SSDA

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PROJECT :
MINARAH COLLEGE
N
PROJECT NO : #21019

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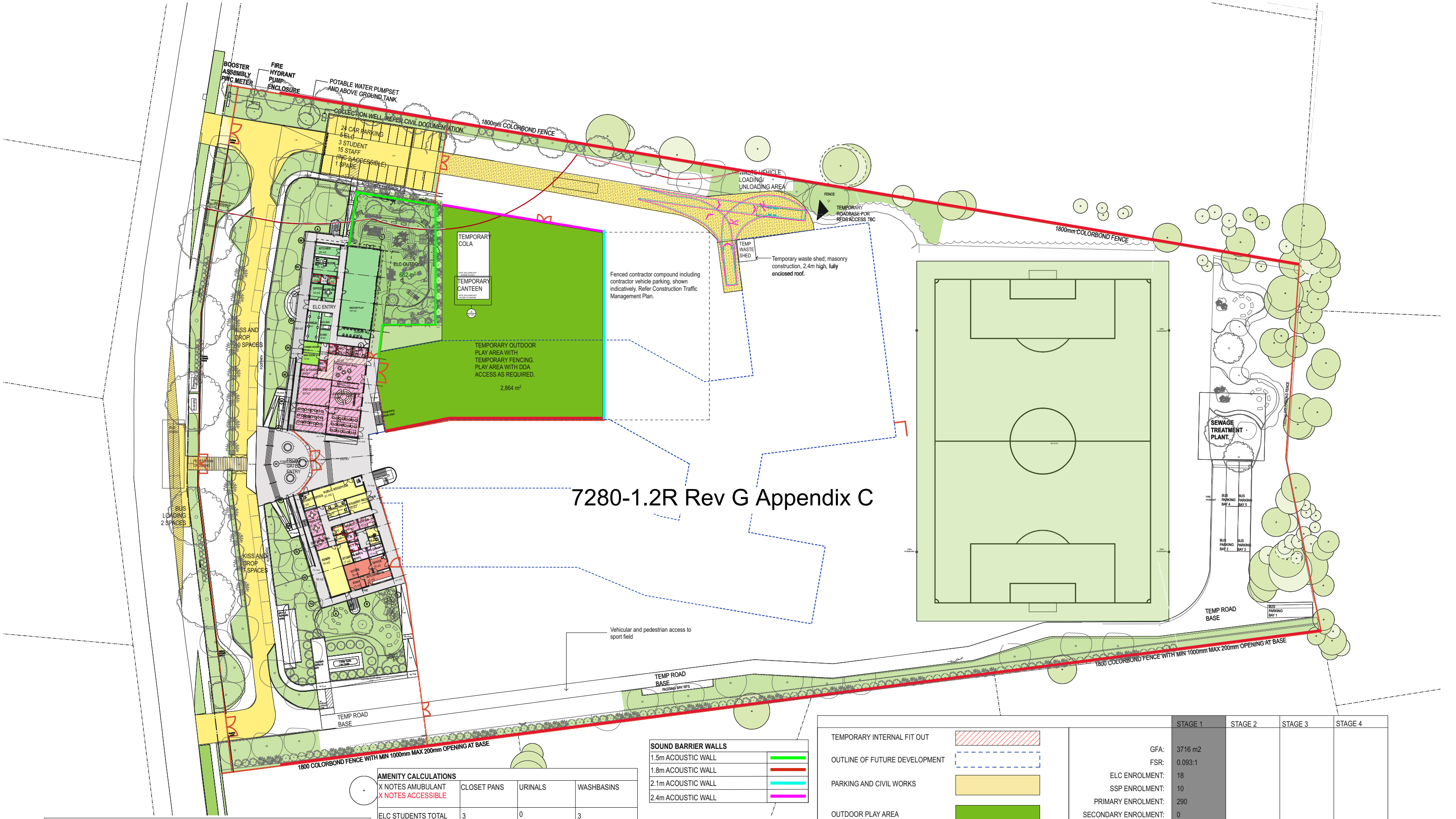
DRAWING TITLE SITE PLAN	**DRAWN BY** BS, RL, JD, WR
	CHECKED PT
SCALES 1:500	**DATE** 24.06.2024
PHASE AMENDED SSDA	**DRAWING NO** A 003
	REV D


BOOSTER ASSEMBLY PWC METER
FIRE HYDRANT PUMP ENCLOSURE
POTABLE WATER PUMPSET AND ABOVE GROUND TANK.
COLLECTION WELL, REFER CIVIL DOCUMENTATION.
1800mm COLORBOND FENCE
24 CAR PARKING
5 ELC
3 STUDENT
15 STAFF
(INC 2 ACCESSIBLE)
1 SPARE
ACCESSIBLE FOOTPATH
KITCHEN
OFFICE
MEETING
ELC ENTRY
INDOOR PLAY
ELC OUTDOOR
662 m²
COMMS ROOM
MSB ROOM
SSP CLASSROOM
STORE
TEMPORARY COLA
TEMPORARY CANTEEN
TEMPORARY OUTDOOR PLAY AREA WITH TEMPORARY FENCING. PLAY AREA WITH DDA ACCESS AS REQUIRED.
2,864 m²
Temporary Steel stair
KISS AND DROP 10 SPACES
FOOTPATH
PEDESTRIAN CROSSING
FRONT GATED ENTRY
ENTRY
PUBLIC RECEPTION
SECURITY OFFICE
STUDENT RECEPTION
ADMINISTRATION
PRINCIPAL
DEP PRINCIPAL
OFFICE
NURSE
BOYS
PS GIRLS
ADMIN
STORE
KITCHENETTE
STAFF
BUS LOADING 2 SPACES
KISS AND DROP 7 SPACES
BICYCLE PARKING SPACES
LOADING VEHICLE BAY
TEMP ROAD BASE
1800 COLORBOND FENCE WITH MIN 1000mm MAX 200mm OPENING AT BASE
WASTE VEHICLE LOADING/ UNLOADING AREA
FENCE
TEMPORARY ROADBASE FOR RFDS ACCESS TBC
TEMP WASTE SHED
Temporary waste shed; masonry construction, 2,4m high, fully enclosed roof.
Fenced contractor compound including contractor vehicle parking, shown indicatively. Refer Construction Traffic Management Plan.
Vehicular and pedestrian access to sport field
TEMP ROAD BASE
PASSING BAY RFS
OVAL FLOODLIGHT
SEWAGE TREATMENT PLANT.
1800mm COLORBOND FENCE
FIRE HYDRANT
BUS PARKING BAY 4
BUS PARKING BAY 5
BUS PARKING BAY 2
BUS PARKING BAY 3
BUS PARKING BAY 1
TEMP ROAD BASE

7280-1.2R Rev G Appendix C

SOUND BARRIER WALLS

1.5m ACOUSTIC WALL	🟩
1.8m ACOUSTIC WALL	🟥
2.1m ACOUSTIC WALL	🟦
2.4m ACOUSTIC WALL	🟪

PARKING CALCULATIONS

ELC:	5
STAFF:	15
STUDENT PARKING:	3
TOTAL:	23
SPARE:	1

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	7 (3) (3)	2	9 (3)
PS STUDENT GIRLTOTAL	9 (3) (3)	0	9 (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	🟥

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
GFA:	3716 m2			
FSR:	0.093:1			
ELC ENROLMENT:	18			
SSP ENROLMENT:	10			
PRIMARY ENROLMENT:	290			
SECONDARY ENROLMENT:	0			
STAFF PERMANENT:	15			
STAFF CASUAL:	2			
KISS AND DROP PROVIDED :	17			
PARKING REQUIRED:	23			
PARKING PROVIDED:	24			

STAGE 1 GROUND FLOOR - POST CONSTRUCTION PLAN

DATE	REV	DESCRIPTION:
31/03/22	A	ISSUE FOR SSDA
19/03/24	B	AMENDED ISSUE FOR SSDA
24/06/24	C	AMENDED ISSUE FOR SSDA
26/02/25	D	AMENDED ISSUE FOR SSDA

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2.5 0m 5 10 20

PROJECT :
MINARAH COLLEGE
N
PROJECT NO : #21019

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DRAWING TITLE
STAGE 1 GROUND FLOOR PLAN

SCALES
1:500

PHASE
AMENDED SSDA

DRAWING NO
A 111

DRAWN BY
BS, RL, JD, WR

CHECKED
PT

DATE
27.02.2025

REV
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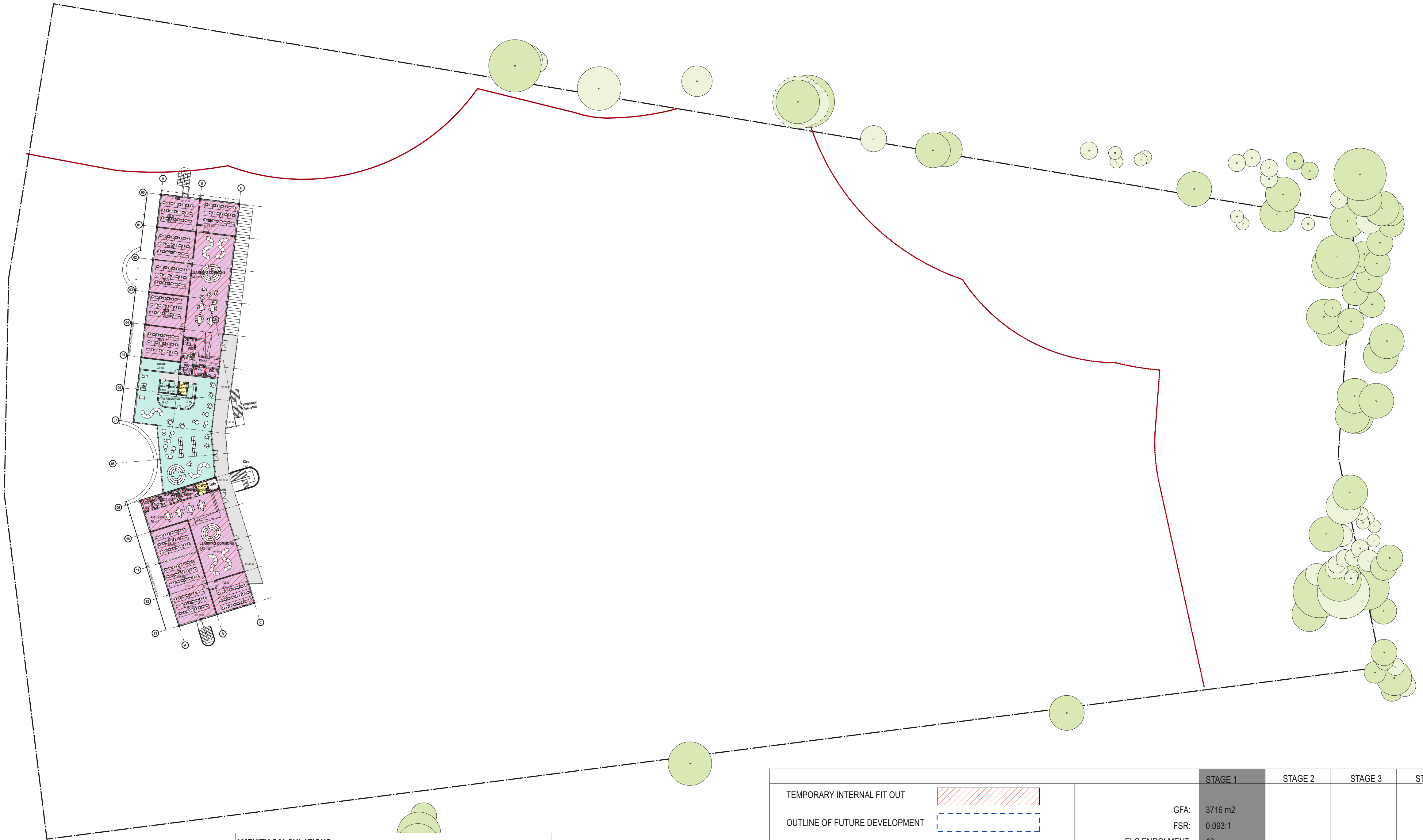
GLS 63 m2
GLS 63 m2
GLS
LEARNING COMMONS 249 m2
GLS 64 m2
GLS 66 m2
GLS 66 m2
WC 11 m2
Raised Floor Area
WC 11 m2
WC 5 m2
WC 5 m2
STORE 23 m2
ACC WC 5 m2
ACC WC 5 m2
ACC WC 5 m2
PS RESOURCE 18 m2
PS ADMIN 10 m2
Temporary Steel stair
Circ 180 m2
ACC WC
LIFT
BOYS 11 m2
ACC WC 5 m2
ART ZONE 75 m2
GLS 65 m2
LEARNING COMMONS 143 m2
GLS 65 m2
GLS 62 m2
GLS 65 m2
FFL 81.50
SCREENING. REFER WEST ELEVATION
A
B
C
D
00
01
02
03
04
05
06
07
08
09
10
11
12
13

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	7 (3) (3)	2	9 (3)
PS STUDENT GIRLTOTAL	9 (3) (3)	0	9 (3)
HS STUDENT BOY TOTAL	0	0	0
HS STUDENT GIRL TOTAL	0	0	0

PARKING CALCULATIONS

ELC:	5
STAFF:	15
STUDENT PARKING:	3
TOTAL:	23
SPARE:	1

SCHOOL INDOOR ZONES LEGEND:

ELC	🟩	LIBRARY	🟩	OOSH	🟥
PRIMARY	🟪	PRIMARY HALL	🟩	SSP	🟦
HIGH	🟥	HIGH HALL	⬛	MULTIFUNCTIONAL	⬜
STAFF	🟨	WELLBEING	🟦	CANTEEN	🟥

			STAGE 1	STAGE 2	STAGE 3	STAGE 4
TEMPORARY INTERNAL FIT OUT	▨					
OUTLINE OF FUTURE DEVELOPMENT	⬚	GFA:	3716 m2			
		FSR:	0.093:1			
PARKING AND CIVIL WORKS	🟨	ELC ENROLMENT:	18			
		SSP ENROLMENT:	10			
		PRIMARY ENROLMENT:	290			
OUTDOOR PLAY AREA TEMPORARY LANDSCAPING WORKS	🟩	SECONDARY ENROLMENT:	0			
		STAFF PERMANENT:	15			
OUTDOOR PLAY AREA PERMANENT LANDSCAPING WORKS	🟩	STAFF CASUAL:	2			
		KISS AND DROP PROVIDED :	17			
PERMANENT FENCE	───	PARKING REQUIRED:	23			
TEMPORARY FENCE	─·─·─	PARKING PROVIDED:	24			

STAGE 1 FIRST FLOOR - POST CONSTRUCTION PLAN

DATE	REV	DESCRIPTION:
31/03/22	A	ISSUE FOR SSDA
19/03/24	B	AMENDED ISSUE FOR SSDA
24/06/24	C	AMENDED ISSUE FOR SSDA

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SCALE 1:500
2.5 0m 5 10 20

PROJECT :
MINARAH COLLEGE
N
PROJECT NO : #21019

ARCHITECT
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DRAWING TITLE
STAGE 1 FIRST FLOOR PLAN

DRAWN BY
BS, RL, JD, WR

CHECKED
PT

SCALES
1:500

DATE
31.03.2022

PHASE
AMENDED SSDA

DRAWING NO
A 112

REV
C

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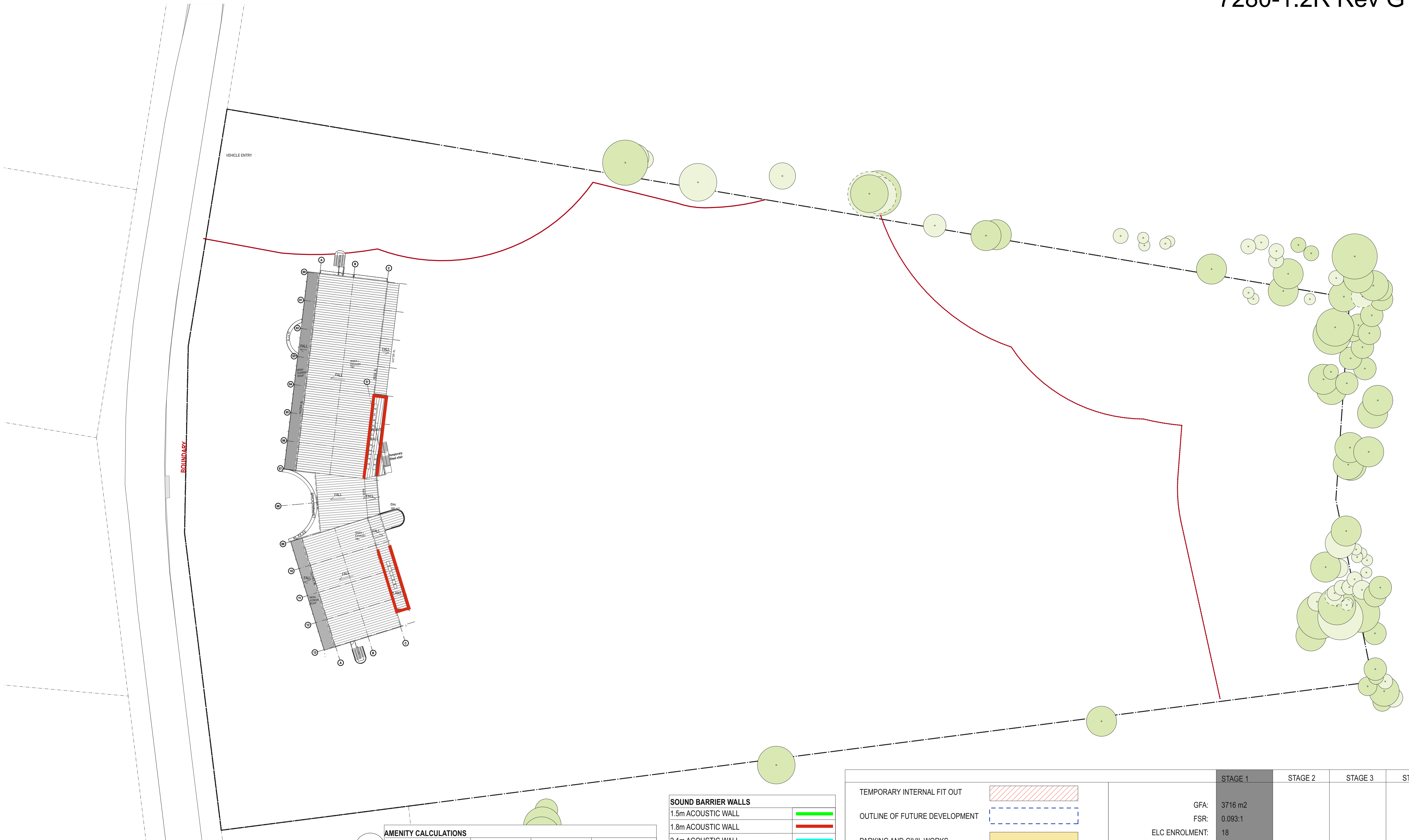

SOUND BARRIER WALLS

1.5m ACOUSTIC WALL	🟩
1.8m ACOUSTIC WALL	🟥
2.1m ACOUSTIC WALL	🟦
2.4m ACOUSTIC WALL	🟪

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	7 (3) (3)	2	9 (3)
PS STUDENT GIRLTOTAL	9 (3) (3)	0	9 (3)
HS STUDENT BOY TOTAL	0	0	0
HS STUDENT GIRL TOTAL	0	0	0

PARKING CALCULATIONS

ELC:	5
STAFF:	15
STUDENT PARKING:	3
TOTAL:	23
SPARE:	1

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
GFA:	3716 m2			
FSR:	0.093:1			
ELC ENROLMENT:	18			
SSP ENROLMENT:	10			
PRIMARY ENROLMENT:	290			
SECONDARY ENROLMENT:	0			
STAFF PERMANENT:	15			
STAFF CASUAL:	2			
KISS AND DROP PROVIDED :	17			
PARKING REQUIRED:	23			
PARKING PROVIDED:	24			

SCHOOL INDOOR ZONES LEGEND:

ELC	🟩	LIBRARY	🟩	OOSH	🟥
PRIMARY	🟪	PRIMARY HALL	🟩	SSP	🟦
HIGH	🟥	HIGH HALL	⬛	MULTIFUNCTIONAL	⬜
STAFF	🟨	WELLBEING	🟦	CANTEEN	🟥

STAGE 1 ROOF - POST CONSTRUCTION PLAN

DATE	REV	DESCRIPTION:
20/03/25	A	ISSUE FOR SSDA

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PROJECT :
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DRAWING TITLE
STAGE 1 ROOF PLAN

SCALES
1:500

PHASE
AMENDED SSDA

DRAWING NO
A 113

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BS, RL, JD, WR

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PT

DATE
31.03.2022

REV
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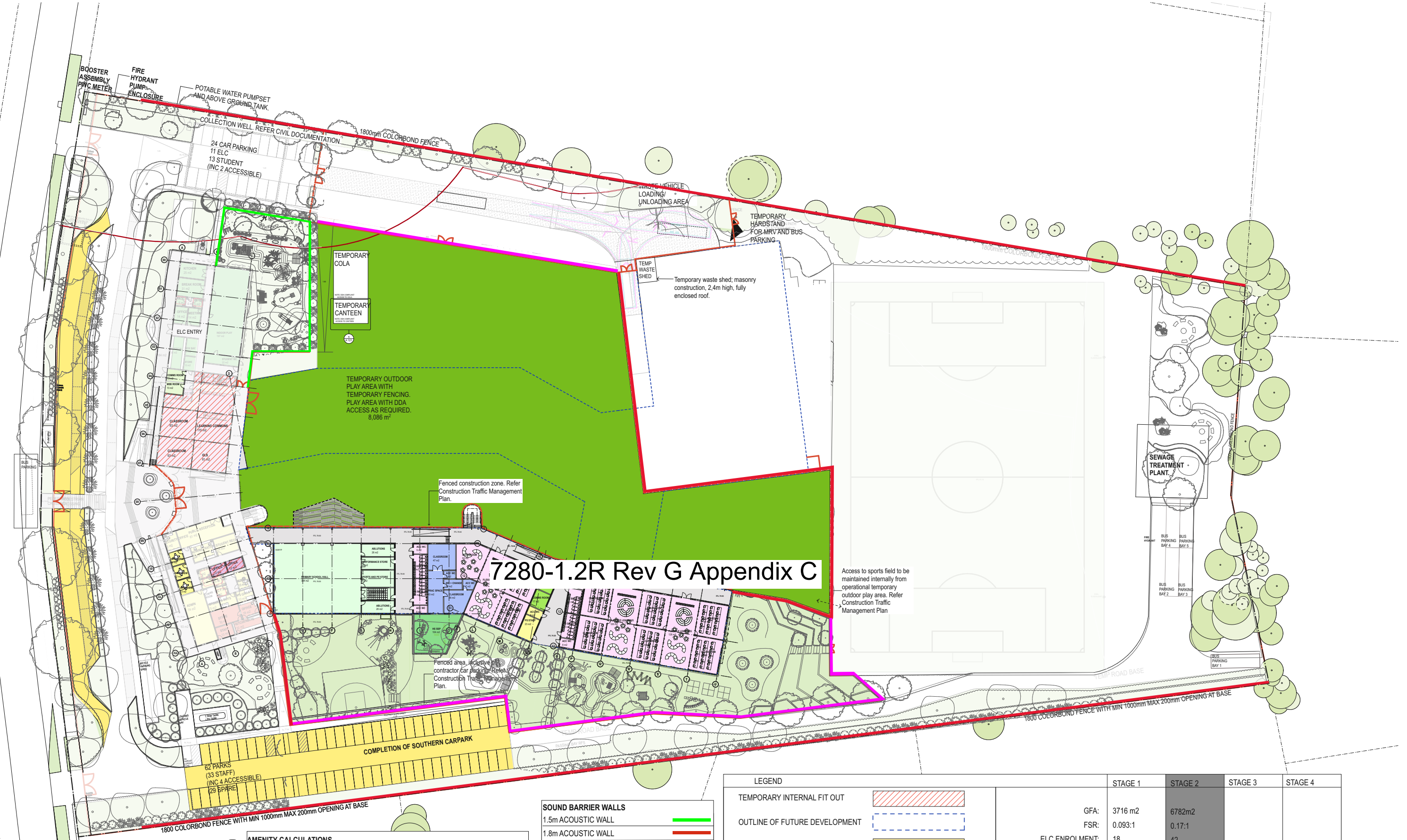
BOOSTER ASSEMBLY PWC METER
FIRE HYDRANT PUMP ENCLOSURE
POTABLE WATER PUMPSET AND ABOVE GROUND TANK.
COLLECTION WELL. REFER CIVIL DOCUMENTATION.
1800mm COLORBOND FENCE
24 CAR PARKING
11 ELC
13 STUDENT
(INC 2 ACCESSIBLE)
ELC ENTRY
TEMPORARY COLA
TEMPORARY CANTEEN
TEMPORARY OUTDOOR PLAY AREA WITH TEMPORARY FENCING. PLAY AREA WITH DDA ACCESS AS REQUIRED. 8,086 m²
WASTE VEHICLE LOADING/ UNLOADING AREA
TEMPORARY HARDSTAND FOR MRV AND BUS PARKING
TEMP WASTE SHED
Temporary waste shed; masonry construction, 2,4m high, fully enclosed roof.
1800mm COLORBOND FENCE
Fenced construction zone. Refer Construction Traffic Management Plan.
Access to sports field to be maintained internally from operational temporary outdoor play area. Refer Construction Traffic Management Plan
SEWAGE TREATMENT PLANT
Fenced area, inclusive of contractor car parking. Refer Construction Traffic Management Plan.
TEMP ROAD BASE
COMPLETION OF SOUTHERN CARPARK
62 PARKS
(33 STAFF)
(INC 4 ACCESSIBLE)
(29 SPARE)
1800 COLORBOND FENCE WITH MIN 1000mm MAX 200mm OPENING AT BASE
1800 COLORBOND FENCE WITH MIN 1000mm MAX 200mm OPENING AT BASE

7280-1.2R Rev G Appendix C

SOUND BARRIER WALLS

1.5m ACOUSTIC WALL	━
1.8m ACOUSTIC WALL	━
2.1m ACOUSTIC WALL	━
2.4m ACOUSTIC WALL	━

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	14 (2) (10)	0	14 (10)
PS STUDENT BOY TOTAL	29 (4) (7)	12	41 (7)
PS STUDENT GIRL TOTAL	41 (4) (7)	0	41 (7)
HS STUDENT BOY TOTAL	6 (3) (2)	2	6 (2)
HS STUDENT GIRL TOTAL	8 (3) (2)	0	6 (2)

PARKING CALCULATIONS

ELC:	11
STAFF:	33
STUDENT PARKING:	13
TOTAL:	57
SPARE:	29

SCHOOL INDOOR ZONES LEGEND:

ELC	🟩	LIBRARY	🟩	OOSH	🟥
PRIMARY	🟪	PRIMARY HALL	🟩	SSP	🟦
HIGH	🟥	HIGH HALL	⬛	MULTIFUNCTIONAL	⬜
STAFF	🟨	WELLBEING	🟦	CANTEEN	🟥

LEGEND			STAGE 1	STAGE 2	STAGE 3	STAGE 4
TEMPORARY INTERNAL FIT OUT	▨	GFA:	3716 m2	6782m2		
OUTLINE OF FUTURE DEVELOPMENT	⬚	FSR:	0.093:1	0.17:1		
PARKING AND CIVIL WORKS	🟨	ELC ENROLMENT:	18	42		
OUTDOOR PLAY AREA TEMPORARY LANDSCAPING WORKS	🟩	SSP ENROLMENT:	10	10		
OUTDOOR PLAY AREA PERMANENT LANDSCAPING WORKS	🟩	PRIMARY ENROLMENT:	290	440		
PERMANENT FENCE	—	SECONDARY ENROLMENT:	0	160		
TEMPORARY FENCE	–·–	STAFF PERMANENT:	15	33		
		STAFF CASUAL:	2	4		
		KISS AND DROP PROVIDED :	17	17		
		PARKING REQUIRED:	23	57		
		PARKING PROVIDED:	24	86		

STAGE 2 GROUND FLOOR - POST CONSTRUCTION PLAN

DATE	REV	DESCRIPTION:
31/03/22	A	ISSUE FOR SSDA
19/03/24	B	AMENDED ISSUE FOR SSDA
24/06/24	C	AMENDED ISSUE FOR SSDA
26/02/25	D	AMENDED ISSUE FOR SSDA

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SCALE 1:500
2.5 0m 5 10 20

PROJECT :
MINARAH COLLEGE
N
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 27.02.2025
PHASE AMENDED SSDA	DRAWING NO A 114	REV D

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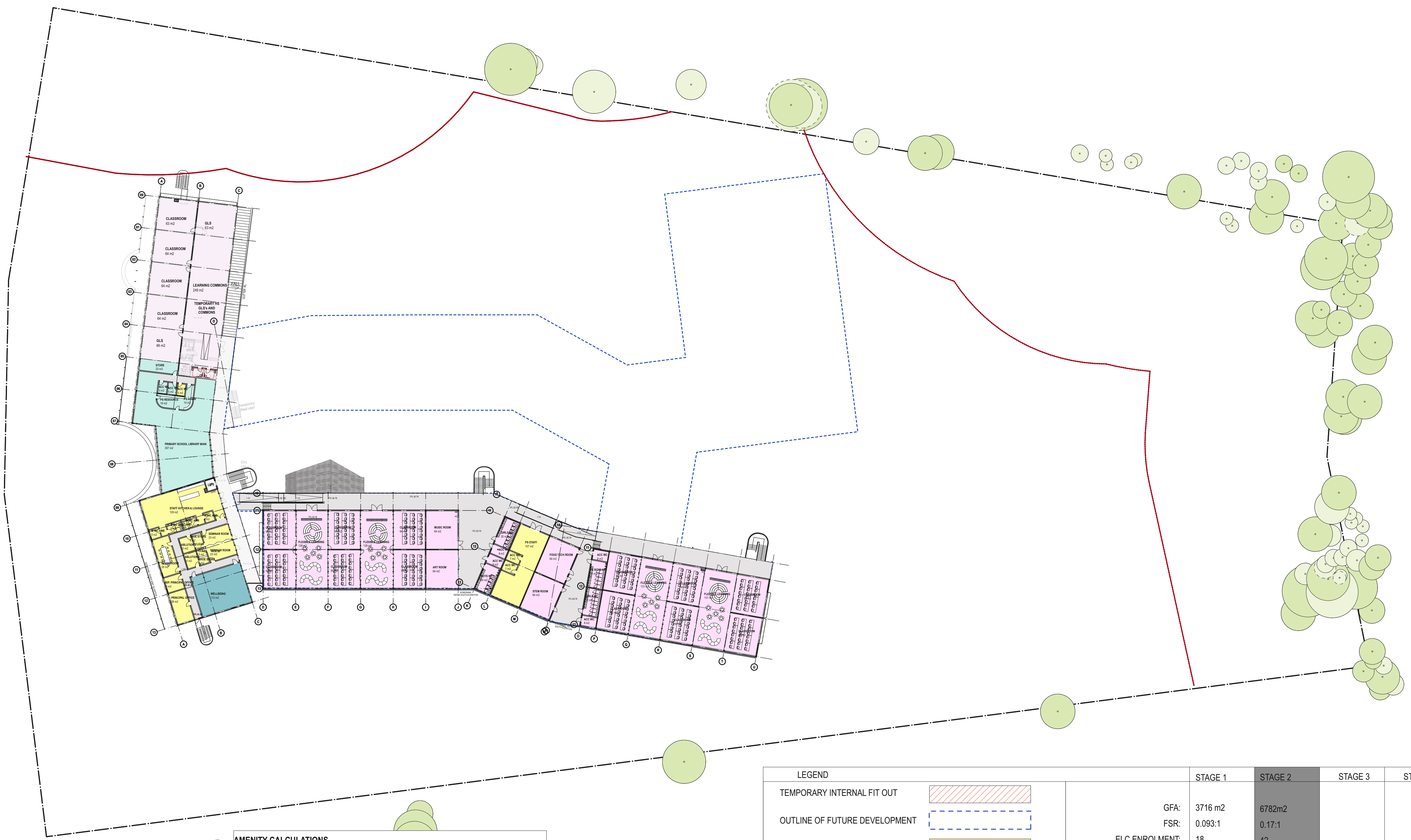
CLASSROOM 63 m2
GLS 63 m2
CLASSROOM 64 m2
CLASSROOM 64 m2
LEARNING COMMONS 249 m2
FALL
GUTTER RL
TEMPORARY HS GLS's AND COMMONS
CLASSROOM 64 m2
GLS 66 m2
STORE 23 m2
ACC WC
PS RESOURCE 18 m2
PS ADMIN 10 m2
Temporary Steel stair
PRIMARY SCHOOL LIBRARY MAIN 307 m2
LIFT
STAFF KITCHEN & LOUNGE 129 m2
SEMINAR ROOM 23 m2
SEMINAR ROOM 23 m2
ABLUTION
CLEAN
SHOE STORE
BOARDROOM 35 m2
DEP. PRINCIPAL OFFICE
PRINCIPAL OFFICE 28 m2
WELLBEING 112 m2
CLASSROOM
FLEXIBLE LEARNING 128 m2
FLEXIBLE LEARNING 129 m2
MUSIC ROOM 64 m2
ART ROOM 64 m2
GIRLS WC 25 m2
BOYS WC 24 m2
ACC WC 8 m2
ACC WC 7 m2
PS STAFF 107 m2
FOOD TECH ROOM 64 m2
STEM ROOM 64 m2
FLEXIBLE LEARNING 131 m2
ACC WC 8 m2
FFL 82.78
SCREENING, REFER SOUTH ELEVATION
00
01
02
03
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N
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P
Q
R
S
T
U

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	14 (2) (10)	0	14 (10)
PS STUDENT BOY TOTAL	29 (4) (7)	12	41 (7)
PS STUDENT GIRL TOTAL	41 (4) (7)	0	41 (7)
HS STUDENT BOY TOTAL	6 (3) (2)	2	6 (2)
HS STUDENT GIRL TOTAL	8 (3) (2)	0	6 (2)

PARKING CALCULATIONS

ELC:	11
STAFF:	33
STUDENT PARKING:	13
TOTAL:	57
SPARE:	29

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
GFA:	3716 m2	6782m2		
FSR:	0.093:1	0.17:1		
ELC ENROLMENT:	18	42		
SSP ENROLMENT:	10	10		
PRIMARY ENROLMENT:	290	440		
SECONDARY ENROLMENT:	0	160		
STAFF PERMANENT:	15	33		
STAFF CASUAL:	2	4		
KISS AND DROP PROVIDED :	17	17		
PARKING REQUIRED:	23	57		
PARKING PROVIDED:	24	86		

STAGE 2 FIRST FLOOR - POST CONSTRUCTION PLAN

DATE	REV	DESCRIPTION:
31/03/22	A	ISSUE FOR SSDA
19/03/24	B	AMENDED ISSUE FOR SSDA
24/06/24	C	AMENDED ISSUE FOR SSDA

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SCALE 1:500
2.5 0m 5 10 20

PROJECT :
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N
PROJECT NO : #21019

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DRAWING TITLE
STAGE 2 FIRST FLOOR PLAN

SCALES
1:500

PHASE
AMENDED SSDA

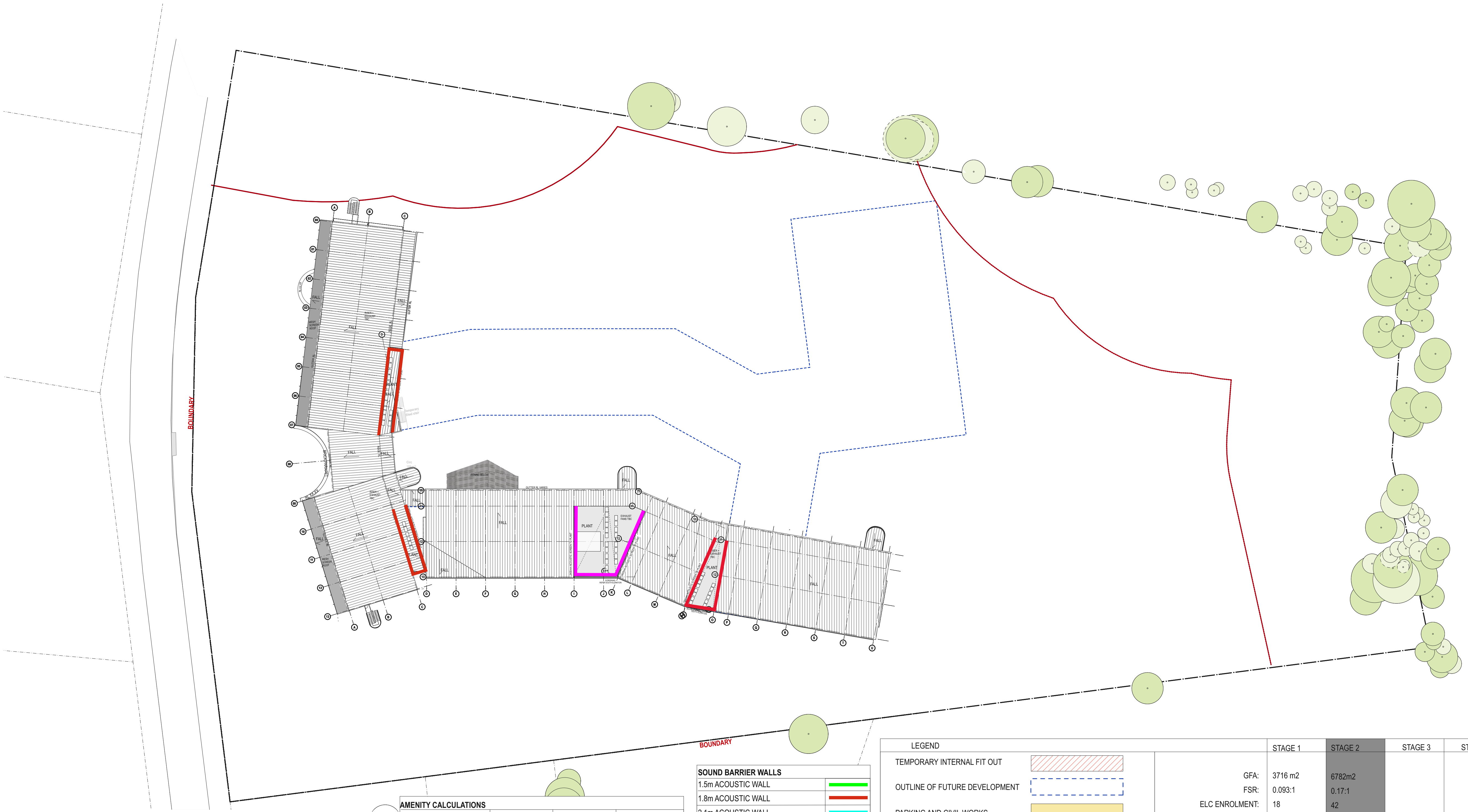
DRAWING NO
A 115

DRAWN BY
BS, RL, JD, WR

CHECKED
PT

DATE
19.03.2024

REV
C



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	14 (2) (10)	0	14 (10)
PS STUDENT BOY TOTAL	29 (4) (7)	12	41 (7)
PS STUDENT GIRL TOTAL	41 (4) (7)	0	41 (7)
HS STUDENT BOY TOTAL	6 (3) (2)	2	6 (2)
HS STUDENT GIRL TOTAL	8 (3) (2)	0	6 (2)

SOUND BARRIER WALLS

1.5m ACOUSTIC WALL	🟩
1.8m ACOUSTIC WALL	🟥
2.1m ACOUSTIC WALL	🟦
2.4m ACOUSTIC WALL	🟪

PARKING CALCULATIONS

ELC:	11
STAFF:	33
STUDENT PARKING:	13
TOTAL:	57
SPARE:	29

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
GFA:	3716 m2	6782m2		
FSR:	0.093:1	0.17:1		
ELC ENROLMENT:	18	42		
SSP ENROLMENT:	10	10		
PRIMARY ENROLMENT:	290	440		
SECONDARY ENROLMENT:	0	160		
STAFF PERMANENT:	15	33		
STAFF CASUAL:	2	4		
KISS AND DROP PROVIDED :	17	17		
PARKING REQUIRED:	23	57		
PARKING PROVIDED:	24	86		

STAGE 2 ROOF - POST CONSTRUCTION PLAN

DATE	REV	DESCRIPTION:
20/03/25	A	ISSUE FOR SSDA

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DRAWING TITLE
STAGE 2 ROOF PLAN

SCALES 1:500

PHASE AMENDED SSDA

DRAWING NO A 116

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DATE 19.03.2024

REV C

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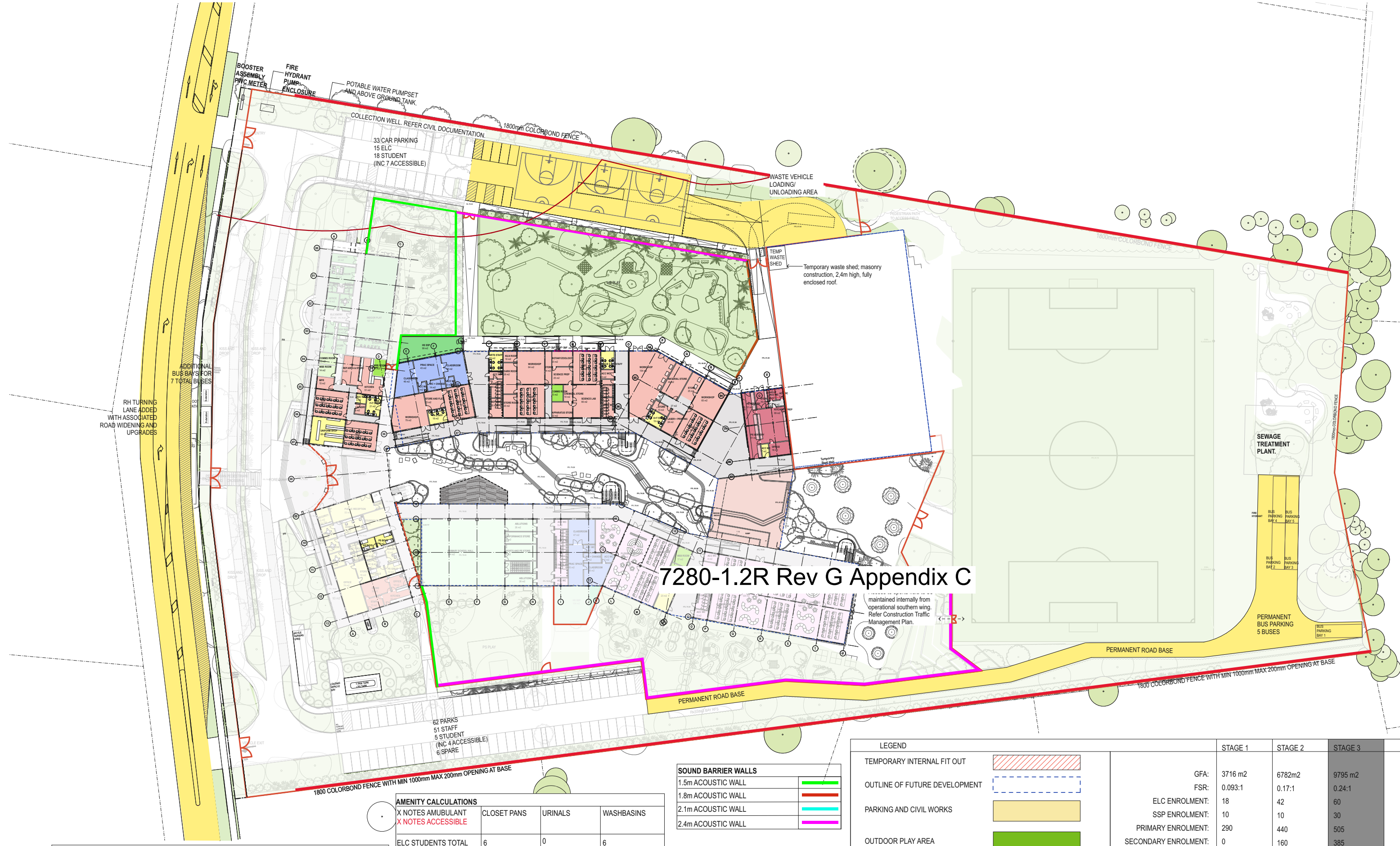
BOOSTER ASSEMBLY PWC METER
FIRE HYDRANT PUMP ENCLOSURE
POTABLE WATER PUMPSET AND ABOVE GROUND TANK
COLLECTION WELL. REFER CIVIL DOCUMENTATION
1800mm COLORBOND FENCE
33 CAR PARKING
15 ELC
18 STUDENT
(INC 7 ACCESSIBLE)
WASTE VEHICLE LOADING/ UNLOADING AREA
TEMP WASTE SHED
Temporary waste shed; masonry construction, 2.4m high, fully enclosed roof.
1800mm COLORBOND FENCE
ADDITIONAL BUS BAYS FOR 7 TOTAL BUSES
RH TURNING LANE ADDED WITH ASSOCIATED ROAD WIDENING AND UPGRADES
SEWAGE TREATMENT PLANT.
BUS PARKING BAY 4
BUS PARKING BAY 5
BUS PARKING BAY 2
BUS PARKING BAY 3
PERMANENT BUS PARKING 5 BUSES
BUS PARKING BAY 1
PERMANENT ROAD BASE
maintained internally from operational southern wing. Refer Construction Traffic Management Plan.
1800 COLORBOND FENCE WITH MIN 1000mm MAX 200mm OPENING AT BASE
PERMANENT ROAD BASE
62 PARKS
51 STAFF
5 STUDENT
(INC 4 ACCESSIBLE)
6 SPARE
1800 COLORBOND FENCE WITH MIN 1000mm MAX 200mm OPENING AT BASE

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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	6	0	6
ELC STAFF TOTAL	2 (2)	0	2 (2)
STAFF TOTAL	16 (2) (12)	0	16 (12)
PS STUDENT BOY TOTAL	29 (4) (7)	12	41 (7)
PS STUDENT GIRL TOTAL	41 (4) (7)	0	41 (7)
HS STUDENT BOY TOTAL	29 (4) (7)	12	41 (7)
HS STUDENT GIRL TOTAL	41 (4) (4)	0	41 (7)

SOUND BARRIER WALLS

1.5m ACOUSTIC WALL	🟩
1.8m ACOUSTIC WALL	🟥
2.1m ACOUSTIC WALL	🟦
2.4m ACOUSTIC WALL	🟪

PARKING CALCULATIONS

ELC:	15
STAFF:	51
STUDENT PARKING:	23
TOTAL:	89
SPARE:	6

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
GFA:	3716 m2	6782m2	9795 m2	
FSR:	0.093:1	0.17:1	0.24:1	
ELC ENROLMENT:	18	42	60	
SSP ENROLMENT:	10	10	30	
PRIMARY ENROLMENT:	290	440	505	
SECONDARY ENROLMENT:	0	160	385	
STAFF PERMANENT:	15	33	51	
STAFF CASUAL:	2	4	6	
KISS AND DROP PROVIDED :	17	17	30	
PARKING REQUIRED:	23	57	89	
PARKING PROVIDED:	24	86	95	

STAGE 3 GROUND FLOOR - POST CONSTRUCTION PLAN

DATE	REV	DESCRIPTION:
31/03/22	A	ISSUE FOR SSDA
19/03/24	B	AMENDED ISSUE FOR SSDA
24/06/24	C	AMENDED ISSUE FOR SSDA
26/02/25	D	AMENDED ISSUE FOR SSDA

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DRAWING TITLE
STAGE 3 GROUND FLOOR PLAN

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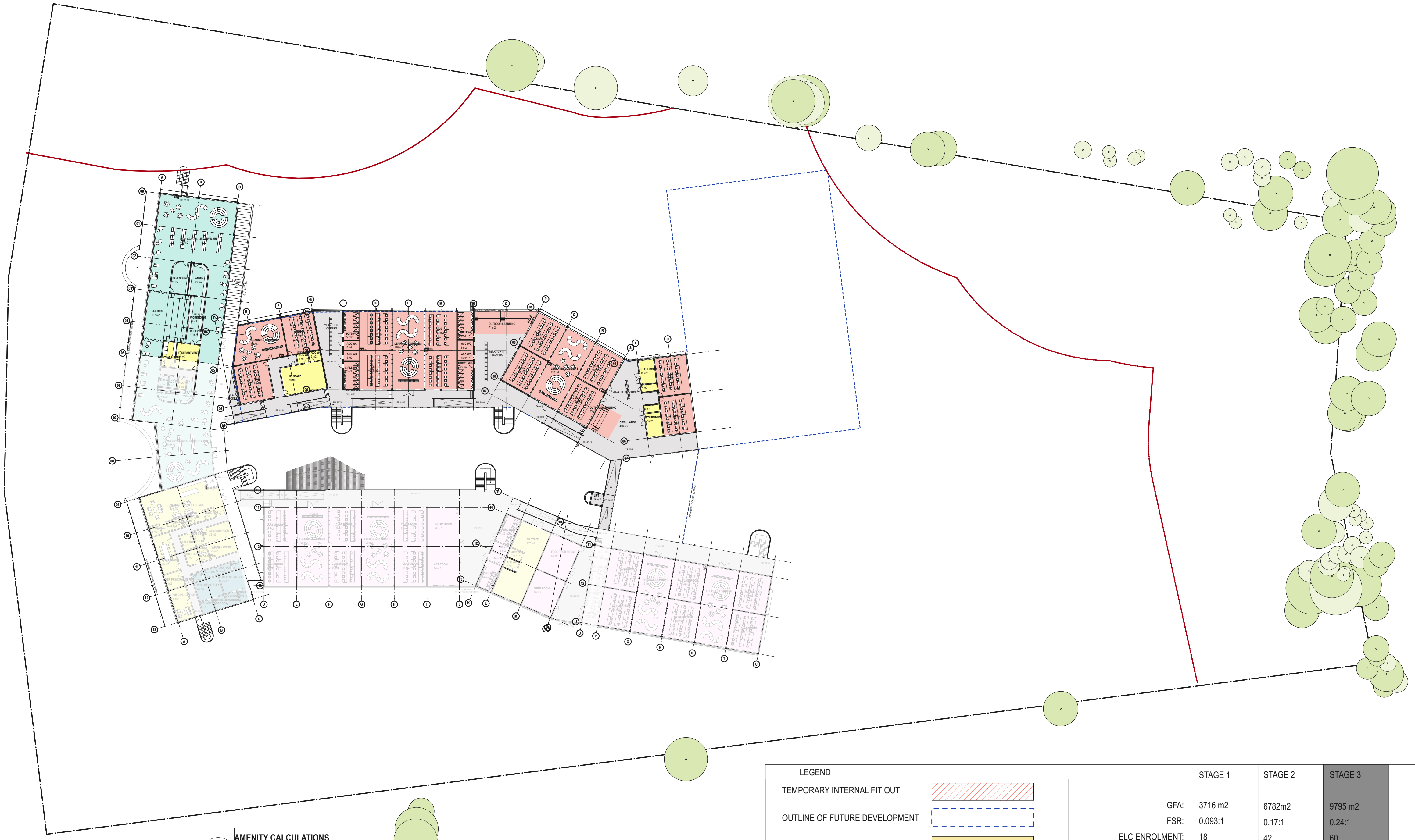
DATE 27.02.2025
PHASE AMENDED SSDA
DRAWING NO A 117
REV D

7280-1.2R Rev G Appendix C



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	S	WASHBASINS
ELC STUDENTS TOTAL	6	0	6
ELC STAFF TOTAL	2 (2)	0	2 (2)
STAFF TOTAL	16 (2) (12)	0	16 (12)
PS STUDENT BOY TOTAL	29 (4) (7)	12	41 (7)
PS STUDENT GIRL TOTAL	41 (4) (7)	0	41 (7)
HS STUDENT BOY TOTAL	29 (4) (7)	12	41 (7)
HS STUDENT GIRL TOTAL	41 (4) (4)	0	41 (7)

PARKING CALCULATIONS

ELC:	15
STAFF:	51
STUDENT PARKING:	23
TOTAL:	89
SPARE:	6

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
GFA:	3716 m2	6782m2	9795 m2
FSR:	0.093:1	0.17:1	0.24:1
ELC ENROLMENT:	18	42	60
SSP ENROLMENT:	10	10	30
PRIMARY ENROLMENT:	290	440	505
SECONDARY ENROLMENT:	0	160	385
STAFF PERMANENT:	15	33	51
STAFF CASUAL:	2	4	6
KISS AND DROP PROVIDED :	17	17	30
PARKING REQUIRED:	23	57	89
PARKING PROVIDED:	24	86	95

STAGE 3 FIRST FLOOR - POST CONSTRUCTION PLAN

DATE	REV	DESCRIPTION:
31/03/22	A	ISSUE FOR SSDA
19/03/24	B	AMENDED ISSUE FOR SSDA
24/06/24	C	AMENDED ISSUE FOR SSDA

NOTES:
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SCALE 1:500
2.5 0m 5 10 20

PROJECT :
MINARAH COLLEGE
N
PROJECT NO : #21019

ARCHITECT
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tonkin zulaikha greer ARCHITECTS

DRAWING TITLE
STAGE 3 FIRST FLOOR PLAN

SCALES
1:500

PHASE
AMENDED SSDA

DRAWING NO
A 118

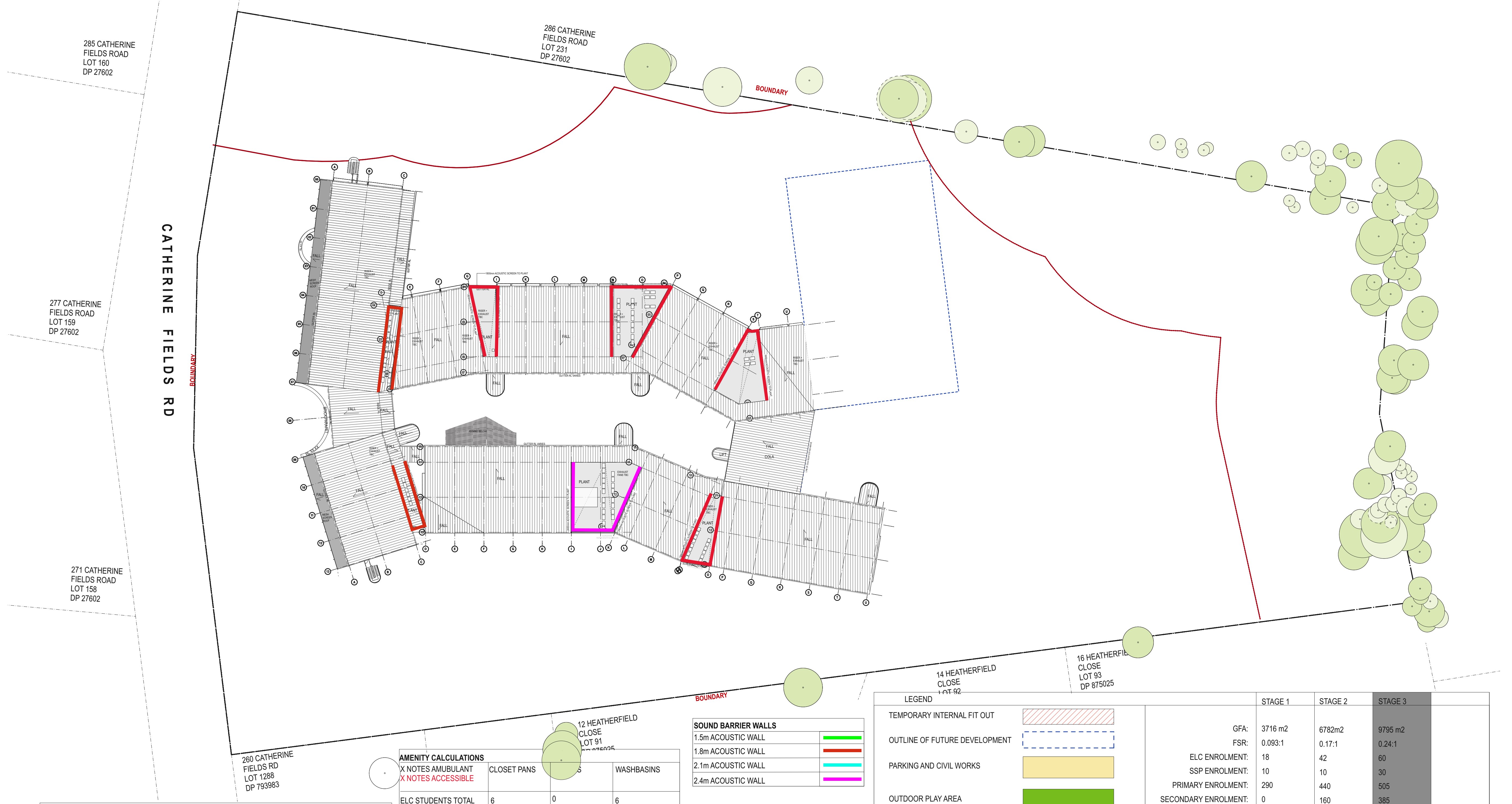
DRAWN BY
BS, RL, JD, WR

CHECKED
PT

DATE
27.02.2025

REV
C

7280-1.2R Rev G Appendix C


285 CATHERINE
FIELDS ROAD
LOT 160
DP 27602
286 CATHERINE
FIELDS ROAD
LOT 231
DP 27602
BOUNDARY
277 CATHERINE
FIELDS ROAD
LOT 159
DP 27602
CATHERINE FIELDS RD
BOUNDARY
271 CATHERINE
FIELDS ROAD
LOT 158
DP 27602
PLANT
FALL
COLA
LIFT
16 HEATHERFIELD
CLOSE
LOT 93
DP 875025
14 HEATHERFIELD
CLOSE
LOT 92
BOUNDARY
12 HEATHERFIELD
CLOSE
LOT 91
260 CATHERINE
FIELDS RD
LOT 1288
DP 793983

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	S	WASHBASINS
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PS STUDENT GIRL TOTAL	41 (4) (7)	0	41 (7)
HS STUDENT BOY TOTAL	29 (4) (7)	12	41 (7)
HS STUDENT GIRL TOTAL	41 (4) (4)	0	41 (7)

SOUND BARRIER WALLS

1.5m ACOUSTIC WALL	—
1.8m ACOUSTIC WALL	—
2.1m ACOUSTIC WALL	—
2.4m ACOUSTIC WALL	—

PARKING CALCULATIONS

ELC:	15
STAFF:	51
STUDENT PARKING:	23
TOTAL:	89
SPARE:	6

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
GFA:	3716 m2	6782m2	9795 m2
FSR:	0.093:1	0.17:1	0.24:1
ELC ENROLMENT:	18	42	60
SSP ENROLMENT:	10	10	30
PRIMARY ENROLMENT:	290	440	505
SECONDARY ENROLMENT:	0	160	385
STAFF PERMANENT:	15	33	51
STAFF CASUAL:	2	4	6
KISS AND DROP PROVIDED :	17	17	30
PARKING REQUIRED:	23	57	89
PARKING PROVIDED:	24	86	95

STAGE 3 ROOF - POST CONSTRUCTION PLAN

DATE	REV	DESCRIPTION:
20/03/25	A	ISSUE FOR SSDA

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2.5 0m 5 10 20

PROJECT :
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DRAWING TITLE
STAGE 3 ROOF PLAN

SCALES
1:500

PHASE
AMENDED SSDA

DRAWING NO
A 119

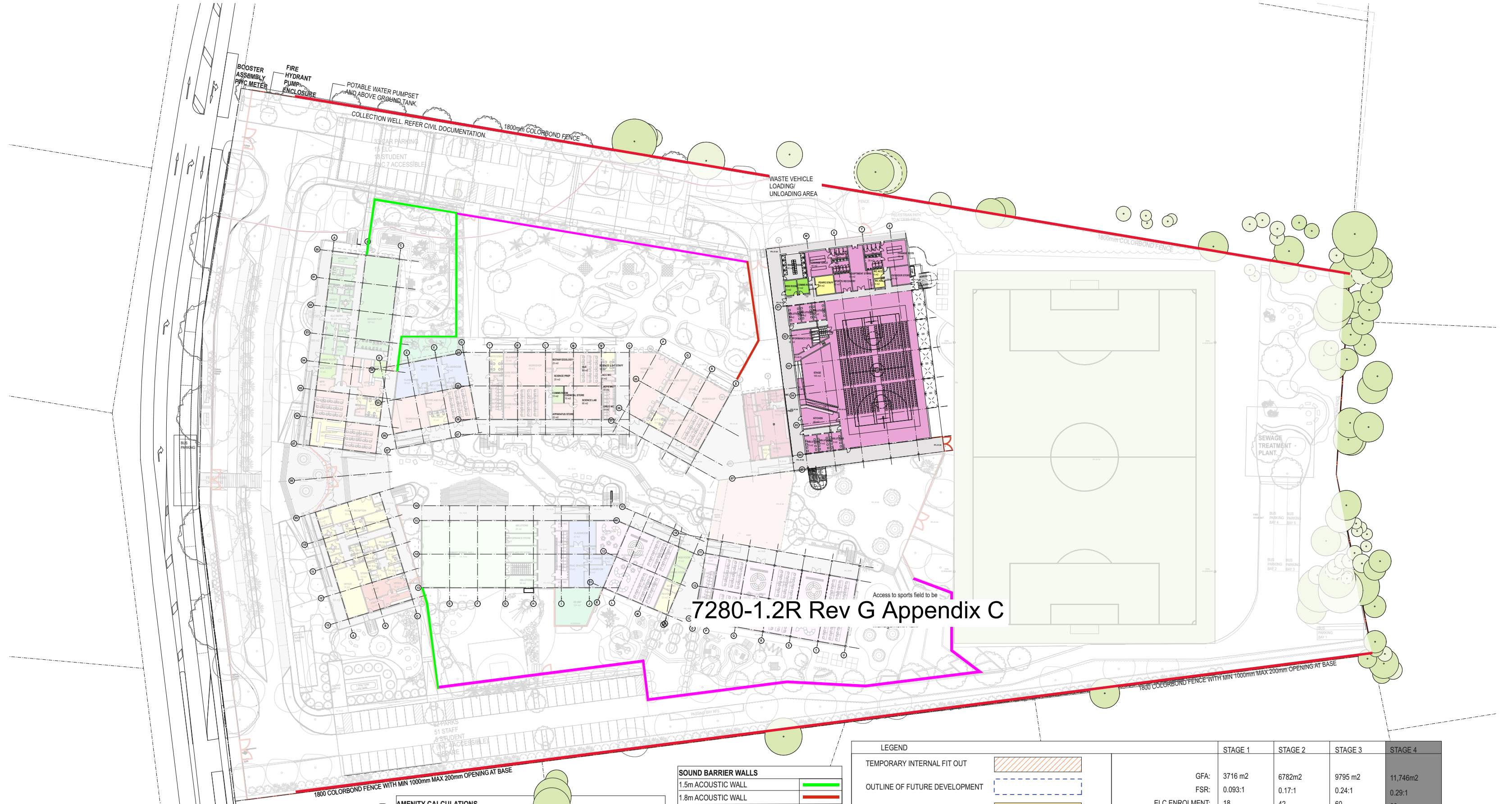
DRAWN BY
BS, RL, JD, WR

CHECKED
PT

DATE
27.02.2025

REV
C

7280-1.2R Rev G Appendix C


BOOSTER ASSEMBLY PWC METER
FIRE HYDRANT PUMP ENCLOSURE
POTABLE WATER PUMPSET AND ABOVE GROUND TANK.
COLLECTION WELL. REFER CIVIL DOCUMENTATION.
1800mm COLORBOND FENCE
33 CAR PARKING
15 ELC
18 STUDENT
(INC 7 ACCESSIBLE)
WASTE VEHICLE LOADING/ UNLOADING AREA
1800mm COLORBOND FENCE
SEWAGE TREATMENT PLANT.
BUS PARKING BAY 4
BUS PARKING BAY 5
BUS PARKING BAY 2
BUS PARKING BAY 3
BUS PARKING BAY 1
Access to sports field to be
62 PARKS
51 STAFF
5 STUDENT
(INC 4 ACCESSIBLE)
6 SPARE
1800 COLORBOND FENCE WITH MIN 1000mm MAX 200mm OPENING AT BASE
1800 COLORBOND FENCE WITH MIN 1000mm MAX 200mm OPENING AT BASE

SOUND BARRIER WALLS

1.5m ACOUSTIC WALL	🟩
1.8m ACOUSTIC WALL	🟥
2.1m ACOUSTIC WALL	🟦
2.4m ACOUSTIC WALL	🟪

AMENITY CALCULATIONS

X NOTES AMUBULANT X NOTES ACCESSIBLE	CLOSET PANS	S	WASHBASINS
ELC STUDENTS TOTAL	6	0	6
ELC STAFF TOTAL	2 (2)	0	2 (2)
STAFF TOTAL	16 (2) (12)	0	16 (12)
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PS STUDENT GIRL TOTAL	41 (4) (7)	0	41 (7)
HS STUDENT BOY TOTAL	32 (7) (7)	14	46 (7)
HS STUDENT GIRL TOTAL	46 (9) (7)	0	46 (7)

PARKING CALCULATIONS

ELC:	15
STAFF:	51
STUDENT PARKING:	23
TOTAL:	89
SPARE:	6

SCHOOL INDOOR ZONES LEGEND:

ELC	🟩	LIBRARY	🟩	OOSH	🟥
PRIMARY	🟪	PRIMARY HALL	🟩	SSP	🟦
HIGH	🟥	HIGH HALL	⬛	MULTIFUNCTIONAL	⬜
STAFF	🟨	WELLBEING	🟦	CANTEEN	🟥

LEGEND			STAGE 1	STAGE 2	STAGE 3	STAGE 4
TEMPORARY INTERNAL FIT OUT	▨	GFA:	3716 m2	6782m2	9795 m2	11,746m2
OUTLINE OF FUTURE DEVELOPMENT	⬚	FSR:	0.093:1	0.17:1	0.24:1	0.29:1
PARKING AND CIVIL WORKS	🟨	ELC ENROLMENT:	18	42	60	60
		SSP ENROLMENT:	10	10	30	30
OUTDOOR PLAY AREA TEMPORARY LANDSCAPING WORKS	🟩	PRIMARY ENROLMENT:	290	440	505	505
		SECONDARY ENROLMENT:	0	160	385	385
OUTDOOR PLAY AREA PERMANENT LANDSCAPING WORKS	🟩	STAFF PERMANENT:	15	33	51	51
		STAFF CASUAL:	2	4	6	6
PERMANENT FENCE	───	KISS AND DROP PROVIDED :	17	17	30	30
		PARKING REQUIRED:	23	57	89	89
TEMPORARY FENCE	─·─	PARKING PROVIDED:	24	86	95	95

STAGE 4 GROUND FLOOR - POST CONSTRUCTION PLAN

DATE	REV	DESCRIPTION:
31/03/22	A	ISSUE FOR SSDA
19/03/24	B	AMENDED ISSUE FOR SSDA
24/06/24	C	AMENDED ISSUE FOR SSDA
26/02/25	D	AMENDED ISSUE FOR SSDA

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SCALE 1:500
2.5 0m 5 10 20

PROJECT :
MINARAH COLLEGE
N
PROJECT NO : #21019

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tonkin zulaikha greer ARCHITECTS

DRAWING TITLE
STAGE 4 GROUND FLOOR PLAN

SCALES
1:500

PHASE
AMENDED SSDA

DRAWING NO
A 120

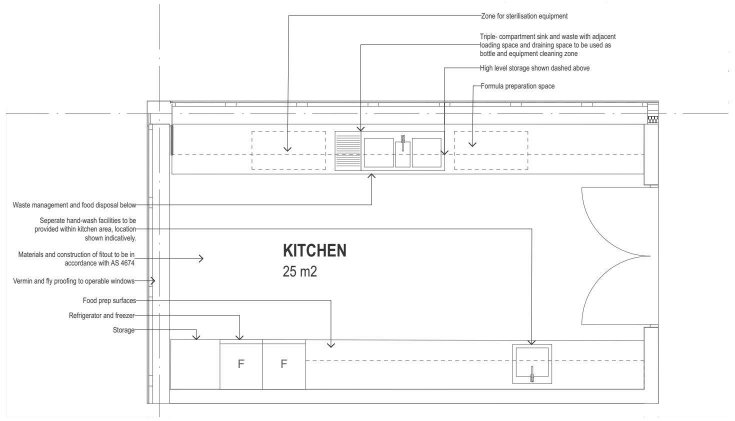
DRAWN BY
BS, RL, JD, WR

CHECKED
PT

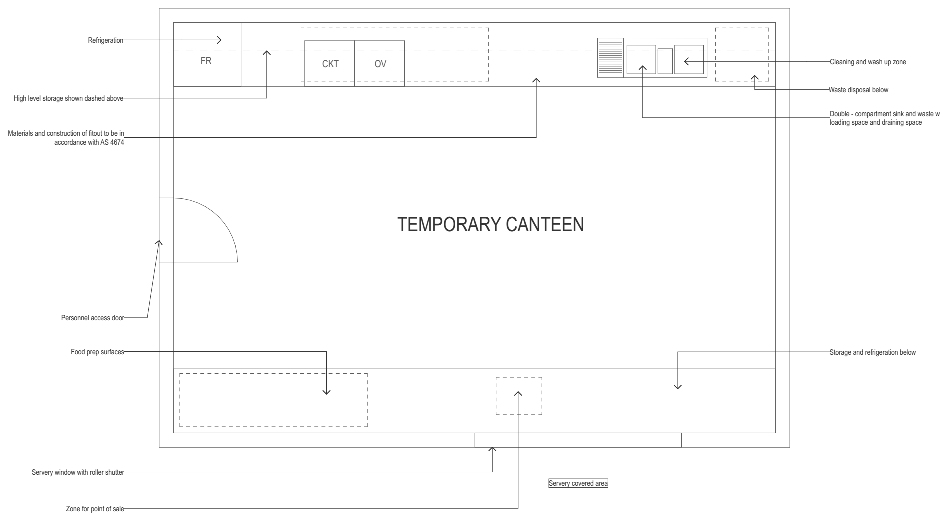
DATE
27.02.2025

REV
D

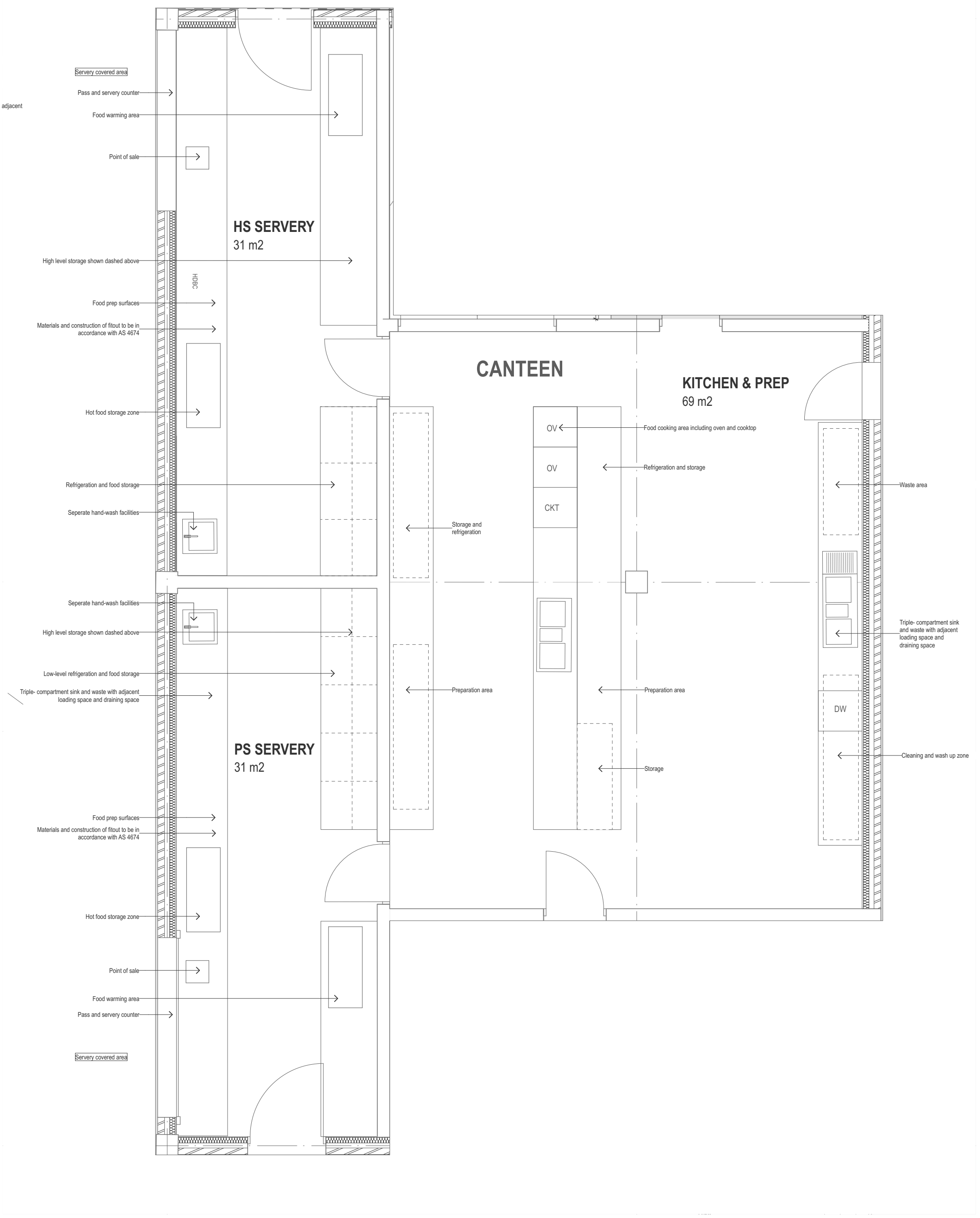
7280-1.2R Rev G Appendix C

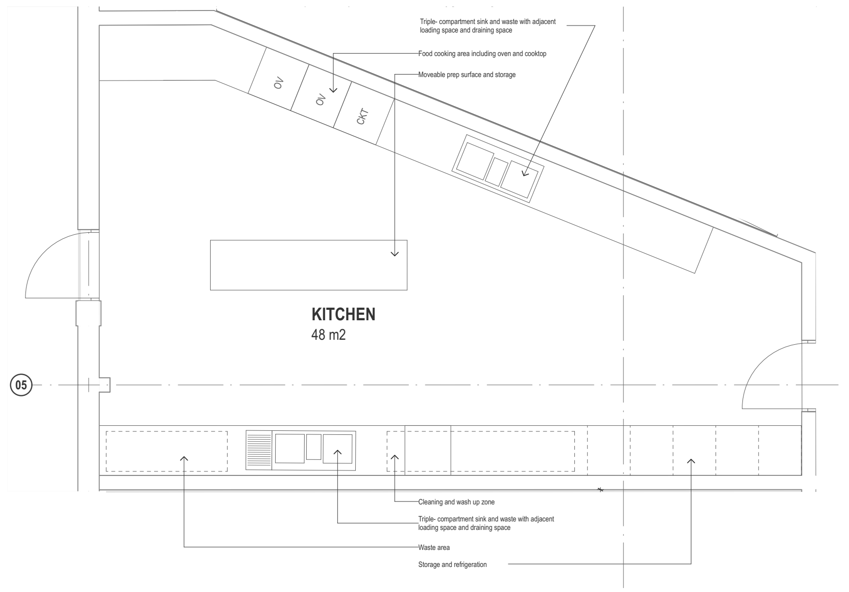

Zone for sterilisation equipment
Triple- compartment sink and waste with adjacent loading space and draining space to be used as bottle and equipment cleaning zone
High level storage shown dashed above
Formula preparation space
Waste management and food disposal below
Seperate hand-wash facilities to be provided within kitchen area, location shown indicatively.
Materials and construction of fitout to be in accordance with AS 4674
Vermin and fly proofing to operable windows
Food prep surfaces
Refrigerator and freezer
Storage
KITCHEN
25 m2
F
F

1 DETAIL PLAN - EARLY LEARNING KITCHEN
1:50

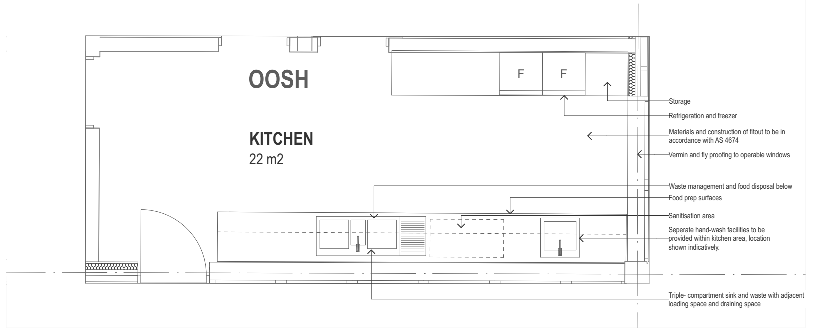

Refrigeration
FR
CKT
OV
High level storage shown dashed above
Materials and construction of fitout to be in accordance with AS 4674
Cleaning and wash up zone
Waste disposal below
Double - compartment sink and waste with adjacent loading space and draining space
TEMPORARY CANTEEN
Personnel access door
Food prep surfaces
Storage and refrigeration below
Servery window with roller shutter
Zone for point of sale
Servery covered area

5 DETAIL PLAN - TEMPORARY CANTEEN
1:50


Servery covered area
Pass and servery counter
Food warming area
Point of sale
HS SERVERY
31 m2
High level storage shown dashed above
HDBC
Food prep surfaces
Materials and construction of fitout to be in accordance with AS 4674
Hot food storage zone
Refrigeration and food storage
Seperate hand-wash facilities
CANTEEN
KITCHEN & PREP
69 m2
OV
OV
CKT
Food cooking area including oven and cooktop
Refrigeration and storage
Waste area
Storage and refrigeration
Seperate hand-wash facilities
High level storage shown dashed above
Low-level refrigeration and food storage
Triple- compartment sink and waste with adjacent loading space and draining space
Preparation area
Preparation area
Triple- compartment sink and waste with adjacent loading space and draining space
DW
PS SERVERY
31 m2
Storage
Cleaning and wash up zone
Food prep surfaces
Materials and construction of fitout to be in accordance with AS 4674
Hot food storage zone
Point of sale
Food warming area
Pass and servery counter
Servery covered area


Triple- compartment sink and waste with adjacent loading space and draining space
Food cooking area including oven and cooktop
Moveable prep surface and storage
OV
OV
CKT
KITCHEN
48 m2
05
Cleaning and wash up zone
Triple- compartment sink and waste with adjacent loading space and draining space
Waste area
Storage and refrigeration

3 DETAIL PLAN - HALL KITCHEN
1:50


OOSH
F
F
KITCHEN
22 m2
Storage
Refrigeration and freezer
Materials and construction of fitout to be in accordance with AS 4674
Vermin and fly proofing to operable windows
Waste management and food disposal below
Food prep surfaces
Sanitisation area
Seperate hand-wash facilities to be provided within kitchen area, location shown indicatively.
Triple- compartment sink and waste with adjacent loading space and draining space

2 DETAIL PLAN - OOSH
1:50

4 DETAIL PLAN - HIGH SCHOOL CANTEEN
1:50

DATE	REV	DESCRIPTION:
26/02/25	A	AMENDED ISSUE FOR SSDA

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SCALE 1:50
0.5 0m 1 2 4

PROJECT :
MINARAH COLLEGE

PROJECT NO : #21019

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WEB www.tzg.com.au

DRAWING TITLE
DETAIL PLANS

DRAWN BY
BS, RL, JD, WR

CHECKED
PT

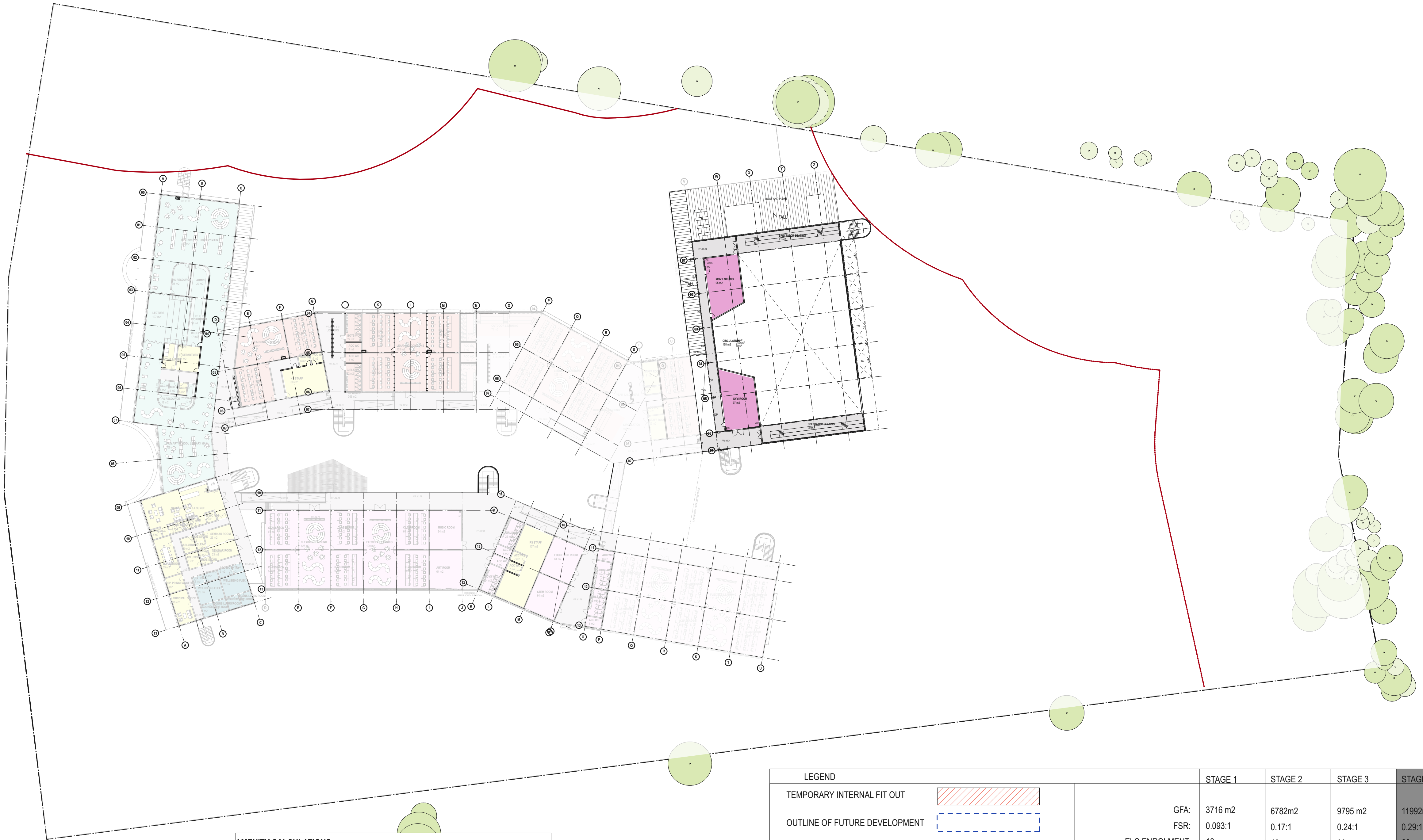
SCALES
1:50

DATE
27.02.2025

PHASE
SCHEMATIC DESIGN

DRAWING NO
A 121

REV
A



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	16 (2) (12)	0	16 (12)
PS STUDENT BOY TOTAL	29 (4) (7)	12	41 (7)
PS STUDENT GIRL TOTAL	41 (4) (7)	0	41 (7)
HS STUDENT BOY TOTAL	32 (7) (7)	14	46 (7)
HS STUDENT GIRL TOTAL	46 (9) (7)	0	46 (7)

SCHOOL INDOOR ZONES LEGEND:

ELC	🟩	LIBRARY	🟩	OOSH	🟥
PRIMARY	🟪	PRIMARY HALL	🟩	SSP	🟦
HIGH	🟥	HIGH HALL	⬛	MULTIFUNCTIONAL	⬜
STAFF	🟨	WELLBEING	🟦	CANTEEN	🟥

PARKING CALCULATIONS	
ELC:	15
STAFF:	51
STUDENT PARKING:	23
TOTAL:	89
SPARE:	6

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
GFA:	3716 m2	6782m2	9795 m2	11992m2
FSR:	0.093:1	0.17:1	0.24:1	0.29:1
ELC ENROLMENT:	18	42	60	60
SSP ENROLMENT:	10	10	30	30
PRIMARY ENROLMENT:	290	440	505	505
SECONDARY ENROLMENT:	0	160	385	385
STAFF PERMANENT:	15	33	51	51
STAFF CASUAL:	2	4	6	6
KISS AND DROP PROVIDED :	17	17	30	30
PARKING REQUIRED:	23	57	89	89
PARKING PROVIDED:	24	86	95	95

STAGE 4 FIRST FLOOR - POST CONSTRUCTION PLAN

DATE	REV	DESCRIPTION:
31/03/22	A	ISSUE FOR SSDA
19/03/24	B	AMENDED ISSUE FOR SSDA
24/06/24	C	AMENDED ISSUE FOR SSDA

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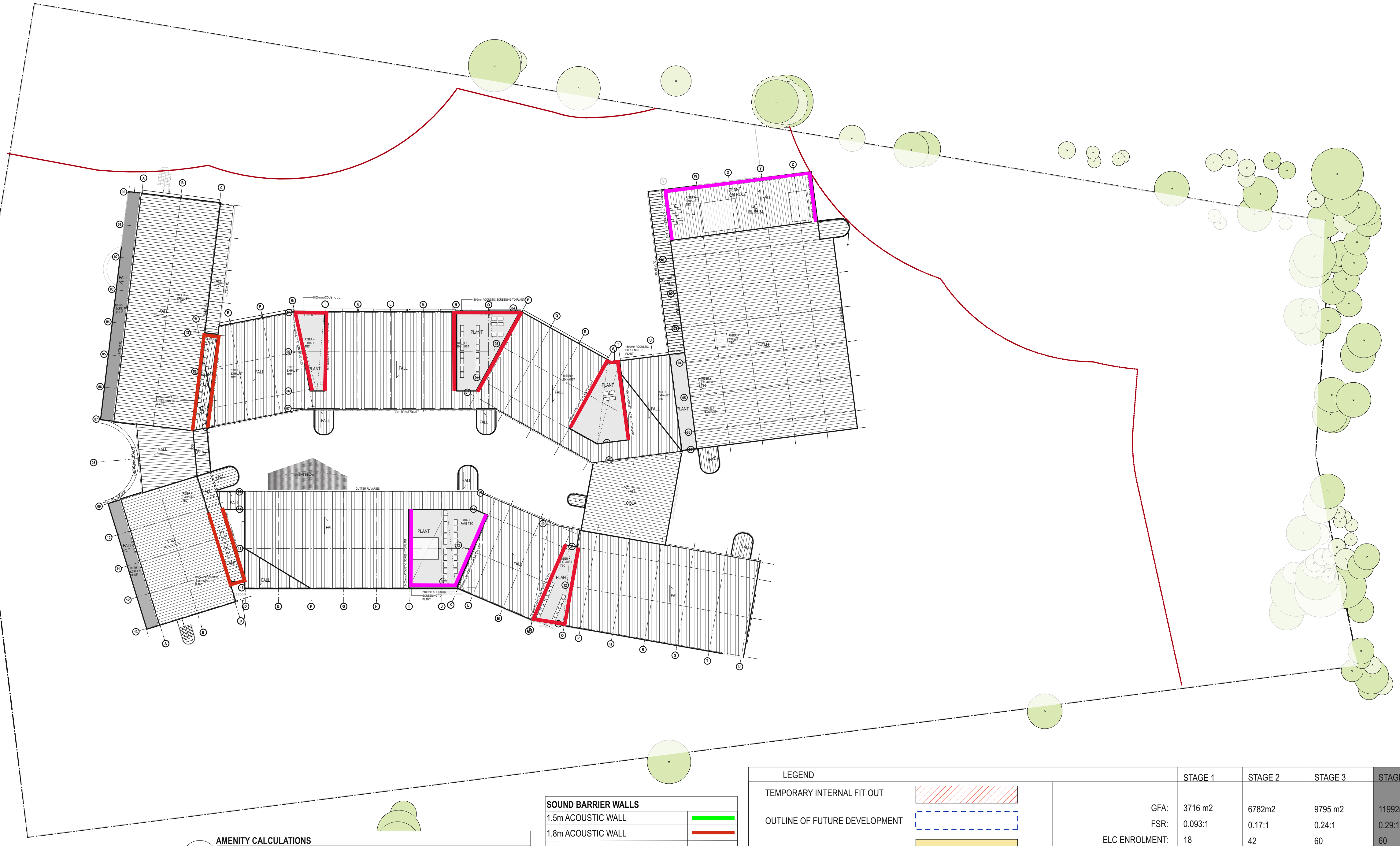
DRAWING TITLE
STAGE 4 FIRST FLOOR PLAN

DRAWN BY BS, RL, JD, WR
CHECKED PT
SCALES 1:500
DATE 27.02.2025
PHASE AMENDED SSDA
DRAWING NO A 121
REV C

7280-1.2R Rev G Appendix C



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
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HS STUDENT BOY TOTAL	32 (7) (7)	14	46 (7)
HS STUDENT GIRL TOTAL	46 (9) (7)	0	46 (7)

SOUND BARRIER WALLS

1.5m ACOUSTIC WALL	🟩
1.8m ACOUSTIC WALL	🟥
2.1m ACOUSTIC WALL	🟦
2.4m ACOUSTIC WALL	🟪

PARKING CALCULATIONS

ELC:	15
STAFF:	51
STUDENT PARKING:	23
TOTAL:	89
SPARE:	6

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
GFA:	3716 m2	6782m2	9795 m2	11992m2
FSR:	0.093:1	0.17:1	0.24:1	0.29:1
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SSP ENROLMENT:	10	10	30	30
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STAFF PERMANENT:	15	33	51	51
STAFF CASUAL:	2	4	6	6
KISS AND DROP PROVIDED :	17	17	30	30
PARKING REQUIRED:	23	57	89	89
PARKING PROVIDED:	24	86	95	95

STAGE 4 ROOF - POST CONSTRUCTION PLAN

DATE	REV	DESCRIPTION:
20/03/25	A	ISSUE FOR SSDA

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DRAWING TITLE
STAGE 4 ROOF PLAN

SCALES
1:500

PHASE
AMENDED SSDA

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DAY DESIGN PTY LTD
CONSULTING ACOUSTICAL ENGINEERS

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Curriculum Vitae

Adam Shearer

Adams Shearer is a Senior Acoustical Consultant at Day Design Pty Ltd. Adam has valuable knowledge and experience in the assessment of earthmoving machinery noise, environmental noise, architectural/building acoustics, mechanical services noise and transportation noise control.

Adam manages a wide variety of projects including the acoustical design of schools, child care centres, places of public worship, pubs and clubs, residential, commercial and industrial developments and mechanical services systems. He is competent in the measurement and assessment of noise, and in the design of noise control for such projects, which often require his reports to be submitted to regulatory authorities for approval. Adam also provides advice and evidence as an expert witness for matters listed in the NSW Land and Environment Court.

Adam regularly operates acoustical instrumentation including noise and vibration meters and analyses the data during the course of his work.

Qualifications:	Bachelor of Creative Technology (Audio), JMC Academy; Masters of Design Science (Audio & Acoustics), University of Sydney (2009)
Membership:	Member – Australian Acoustical Society
Professional Experience:	***August 2017 - Present*** **Senior Acoustical Consultant** Day Design Pty Ltd ***December 2013 – August 2017*** **Acoustical Consultant** Day Design Pty Ltd

A short overview of the nature of **Mr Shearer's professional experience** is provided below:

Schools and Child Care Centres:	Schools located at East Leppington, Catherine Fields, Sydney CBD, Harrington Park, Armidale, Balmain, Lake Munmorah, Wahroonga, Ultimo, Castle Hill, Wentworthville, Drummoyne, Canada Bay, Point Claire, Dee Why, Woolwich, Tamworth and Merrylands. Child Care Centres located at Normanhurst, Olympic Park, Wahroonga, Eden, Kogarah, Lindfield, Glendenning, Killara, Middleton Grange, Schofields, Hornsby, Brighton Le Sands, Fairfield, St Leonards, Granville, Mudgee, Willoughby, Gymea, Bexley, Chatswood and Peakhurst.
Hotels/Clubs	Tapavino Restaurant Sydney, Cabra-vale Diggers, Harbord Diggers, St George Hotel, Toukley RSL, Willoughby Hotel, Doonside Hotel, Red Lantern Hotel Eastwood, Tathra Hotel, Woy Woy Bowling Club, Magpies Waitara, Gladesville RSL, Campsie RSL, Club Five Dock and Canterbury Hurlstone Park RSL.
Churches and Places of Worship:	Islamic Prayer Hall at Greenacre, Marsden Park Anglican Church, Eastwood Anglican Church, The Salvation Army at Rouse Hill, Saints in Sydney at Kellyville, St Aidan's Anglican Church at Hurstville Grove, Vine Church at Surry Hills and St Andrews Cathedral in Sydney CBD.
Environmental Noise	Malabar Waste Water Treatment Plant, Kurrajong Zone Substation, Munmorah Substation, Huntingwood Zone Substation, Mount Tomah Communications Facility, Shine Australia The Biggest Loser, Rossi Water Pumping Station, the Smeaton Grange Substation and resource recovery facilities in Kings Park, Somersby and Belmore. Animal facilities located at Kenthurst, North Richmond, Collaroy, Richmond Race Club, Colo Heights, Londonderry, Zetland and Fiddletown.
Mechanical:	New Acland Coal Mine – assessment of earthmoving machinery sound power levels. Residential and commercial mechanical services at Rose Bay, Potts Point, Canada Bay, Willoughby, Bellevue Hill, Bronte, Glebe, Singleton, Chatswood, Surry Hills, Ultimo, Convent Hills and Ryde.
Aircraft Noise:	Assessment of aircraft noise intrusion from Bankstown, Richmond and Sydney Airports. Design and compliance for residential developments in Botany, Mascot, Richmond, Windsor, Annandale, Revesby and Arncliffe.

Traffic Noise:	Design and compliance for residential and commercial developments at Lucas Gardens SSP, Iluka Residential Aged Care Facility, Kiah Residential Development, Fairlight, Pyrmont, West Wollongong, Eastern Creek, Schofields and Box Hill.
Train Noise	Design and compliance for residential and commercial developments at Kiama, Gosford, Revesby, Granville, Belmore, Haywards Bay, Miranda and Thirlmere.
Hearing Loss Assessments:	B&M Quality Meats at Umina, Wyong Rugby League Club at Kanwal, Belmont Golf Club at Marks Point, Hengl Transport at Beresfield, Hancock Sheetmetal at Lambton, Australian Timber Shutters at Berkeley Vale, Punchbowl Bus Co at Riverwood, MET Grono Transport at Ballina, Volvo Group Australia at Beresfield, Flamesafe Fire Protection at Rydalmere, Hunter Valley Buses at Hunter Valley and Integrated Steel Mill Services at Newcastle.
Occupational Noise	ARV Laundry at Glendenning, RBM Plastic Extrusions at Silverwater, TX Australia Pty Ltd at Artarmon, Sydney Water WWTP at Malabar.
Legal Assignments	ArtMade Architectural Pty Ltd v Willoughby City Council, Child Care Centre. Seventh Street Ventures Pty Ltd v Willoughby City Council, Child Care Centre. Omid Mohebati-Arani v Ku-ring-gai Council, Child Care Centre. Antoniou v Bayside Council, Child Care Centre. Northern Beaches Council v Peam, Animal Boarding Facility. Madss Properties No 2 Pty Ltd ATF Newtown Property Trust v Blacktown City Council, Boarding House Development. Ron Griffani & ORS v Ballina Shire Council & ORS (on behalf of the Second Respondent), Holiday Accommodation Development. Hezlett Group Pty Ltd v Cumberland City Council, Shop Top Housing Development. Hunter's Hill Council v Raland Construction Pty Ltd, Child Care Centre. Kerolos Zaki v Ku-ring-gai Council, Child Care Centre. BL2093 Pty Ltd v Northern Beaches Council, Co-Living Development. George Antoniou v Northern Beaches Council, Child Care Centre.

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PROPOSED SCHEDULE OF REGULAR EVENTS/MEETINGS

EVENT/MEETING PURPOSE	TIME	FREQUENCY	LOCATION	EST. No.
Presentations & Workshops	9.00 am – 3.00 pm	8 times per year	Library	30-50
Literature workshops	4.30 pm – 7.00 pm	3-4 times per year	Library	20-30
After School Creative Arts Programs	3.30 pm – 4.30 pm	3 days per week x 4 Terms	Art rooms	15-20
Parent Information Night	7.00 pm – 9.30 pm	1 time per year for primary and senior school	All School Facilities	180-200
U3A workshops	7.00 pm – 9.30 pm	2 days per week x 4 Terms	Library and IT classrooms	10-15
Martial Arts classes	3:30 pm – 6.30 pm	2 days per week x 4 Terms	Primary Hall and Theatre and drama classrooms	10-15
Netball training	3:30 pm – 5.30 pm	2 days per week x 4 Terms	Outside sports courts and Main Hall	10-15
Basketball Coaching	3:30 pm – 6.30 pm	2 days per week x 4 Terms	Outside sports courts and Main Hall	10-15
Community Language classes	4.30 pm – 7.00 pm 9.00 am- 12.00 pm	1 days per week x 4 Terms and on Saturdays	Classroom	10-15
After school sports program	3:30 pm – 4:30 pm	2-3 days per week x 4 terms	Sports field	10-15

GLOSSARY OF ACOUSTICAL TERMS

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.

GLOSSARY OF ACOUSTICAL TERMS

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).

GLOSSARY OF ACOUSTICAL TERMS

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.