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14 August 2019

Azusa Sekkei Co Ltd
c/- dwp Australia
16 Telford Street
Newcastle NSW 2300

Re: J190015 - Nihon University: Response to Submission - Noise

Dear Katherine,

1 Introduction

EMM Consulting Pty Limited (EMM) was engaged by Azusa Sekkei on behalf of Nihon University Group to prepare a construction noise and vibration assessment (CNVA) to support a development application (DA) for the Newcastle Nihon University campus and associated 108 bed student accommodation at 9 Church Street, Newcastle NSW (the site). The site will be redeveloped into the proposed Nihon University Newcastle campus with an associated 108 bed student accommodation. The proposal will involve the adaptive reuse of the State listed heritage building known as the Courthouse. The proposed development will comprise the following elements:

- demolition of the Administration Building (east wing) and Supreme Court Building (west wing);
- change of use and minor internal alterations to the former Courthouse to a 'Community Building' to be utilised by both students and the general public for educational purposes;
- construction of two new 4-storey buildings consisting of a 108 bed 'Residential Building' (east wing) and 'Education Building' (west wing);
- service vehicle access from Church Street along an existing eastern boundary driveway;
- ground level car parking; and
- associated ground and rooftop landscaping.

EMM Consulting Pty Limited (EMM) prepared a construction noise and vibration assessment (CNVA) to support the development application (DA) SSD 9787 in this regard. The NSW Department of Planning & Environment (DPE) received a submission regarding the DA from the Newcastle City Council (NCC). NCC expressed concerns that the proposal did not address existing noise which may impact on the proposed development. This letter report has been prepared in response to NCC's request and should be read in conjunction with the CNVA previously prepared by EMM for the DA; *Noise and Vibration Assessment – Operational and Construction: Nihon University – Newcastle Campus* (herein referred to as "noise assessment") dated 1 May 2019.

2 Newcastle City Council Submission

The Newcastle City Council (NCC) submission regarding the noise impacts on the development is reproduced below.

4. Noise

The acoustic and vibration assessment has focused on potential noise impacts on surrounding receivers emitted during construction and from activities, vehicles and plant and equipment on site, but has not addressed noise from existing noise sources which may impact upon the proposed development. In this respect, it is noted the Grand Hotel is located opposite proposed student accommodation rooms. The acoustic assessment should address potential noise impacts on the proposal to confirm whether any acoustic attenuation is required to help ensure noise levels will meet appropriate guidelines such as: *Internal noise levels. AS/NZS 2107:2000 Acoustics – Recommended design sound levels and reverberation times for building interiors.*

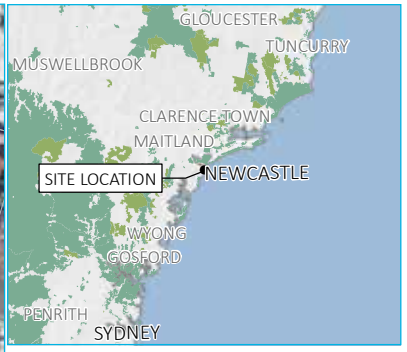
3 Existing ambient noise environment

Short-term operator attended noise monitoring was conducted to establish the existing ambient noise environment surrounding the proposed development site. The location of monitoring was selected to record background and ambient noise levels at locations representative of receptors potentially most affected by noise from the proposed development. The operator attended noise monitoring location (L1) can be seen in Figure 3.1. Noise levels measured at this location are also considered representative of those that would be experienced at the proposed façade of the Residential Building in terms of likely noise emissions from the nearby hotel.

A Brüel & Kjær 2250 Type 1 sound analyser (s/n 2759405) was used to conduct 15-minute attended measurements and record 1/3 octave frequency and statistical noise indices. The sound analyser was calibrated before and on completion of the survey using a Brüel & Kjær Type 4230 calibrator (s/n 1276091). Attended measurements were conducted in accordance with Australian Standard (AS) 1055-2018 *Description and Measurement of Environmental Noise,* Parts 1, 2 and 3. The instrumentation's calibration certificates are provided in Appendix C. Meteorological conditions throughout each survey period were generally calm and clear with no winds above 5 m/s at microphone height or rain events.

Where possible throughout each survey, the operator has quantified the contribution of each significant noise source. This was done by matching audible sounds with the response of the analyser (where applicable) and/or via post-analysis of data.

Table 3.1 presents the results of the attended noise measurements, description of the ambient noise environment and quantification of existing noise levels at nearby residences.



KEY

- Subject site
- Cadastral boundary
- Assessment location
- Noise monitoring location

Noise monitoring and assessment locations

Nihon University – Newcastle campus
Noise - Response to Submissions
Figure 3.1

Source: EMM (2019); DFSI (2017); GA (2011)

0 50 100 m

GDA 1994 MGA Zone 56

N

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Table 3.1 Attended noise monitoring summary

Location	Date	Start time	Period[1]	L_{Aeq}	L_{A90}	L_{Amax}	Comments
L1 Corner of Bolton & Church Streets	17/4/19	11:52	Day	58	49	80	Urban hum (nearby fans, pumps, etc.) and distant traffic noise consistent. Car passbys frequent. Bird noise, aircraft noise, pedestrian noise and wind in trees occasional.
	17/4/19	21:45	Evening	56	45	75	Urban hum (nearby fans, pumps, etc.) and insects consistent. Distant traffic, car passbys and nearby hotel noise frequent. Resident noise, pedestrian noise and dog barking occasional.
	17/4/19	22:15	Night	55	45	71	Urban hum (nearby fans, pumps, music, etc.) and insects consistent. Distant traffic and car passbys frequent. Pedestrian and hotel patron noise occasional.

Notes: 1. The daytime is 7 am to 6 pm; evening 6 pm to 10 pm; night-time 10 pm to 7 am. On Sundays and Public Holidays, the daytime is 8 am to 6 pm; evening 6 pm to 10 pm; night-time 10 pm to 8 am.

Results of operator-attended noise surveys indicate that road traffic and, to a lesser extent, existing commercial operations are the main contributors to ambient noise levels in the vicinity of the site.

4 AS/NZS 2107:2000

The Australian Standard AS/NZS 2107-2000: 'Acoustics – Recommended design sound levels and reverberation times for building interiors' recommends design criteria for conditions affecting the acoustic environment within occupied spaces.

Table 4.1 provides a summary of recommended internal noise levels for houses, apartments, and retail buildings near 'major roads' as per AS/NZS 2107-2000 (Table 1 p. 11).

Table 4.1 AS/NZS 2107:2000 recommended design sound levels

Type of occupancy/activity	Recommended sound design level, L_{Aeq} dB	
	Satisfactory	Maximum
Houses and apartments near major roads		
Living areas	35	45
Sleeping areas	30	40
Apartment common areas	45	55
Enclosed car parks	55	65
Shop buildings		
Department stores (main floor)	50	55
Department stores (upper floor)	45	50
Small retail stores (general)	45	50
Supermarkets	50	55
Specialty shops (where detailed discussion is necessary in transactions)	40	45

5 Noise modelling and assessment

5.1 Noise intrusion

The Roads and Maritime Services (RMS) 2001 document, *"Environmental Noise Management Manual"* provides typical noise reductions achieved by standard residential building constructions, which are presented in Table 5.1. These typical noise reductions are used with the measured ambient noise levels in Table 3.1 to estimate internal noise levels at 9 Church Street, for windows open and closed scenarios.

Table 5.1 Indicative building noise reduction

Building type	Windows	Internal noise reduction, dB
All	Open	10
Light frame	Single glazed (closed)	20
Masonry	Single glazed (closed)	25
	Double glazed (closed)	35

Source: RTA Environmental Noise Management Manual 200. (adapted from FHWA 1995).

The estimated internal noise levels for the development are summarised in Table 5.3. Noise reductions afforded by the masonry building type with single glazed windows in Table 5.1 have been adopted.

Table 5.2 Calculated internal noise levels

Location	Period	External $L_{Aeq,period}$, dB	Predicted internal $L_{Aeq,period}$, dB		Criteria $L_{Aeq,period}$, dB
			Windows open (-10 dB)	Windows closed (-25 dB)	
9 Church Street (most affected rooms)	Day	58	48	33	35 (living area)
	Night	55	45	30	30 (bedroom)

Notes: 1. Based on measured noise levels in Table 2.1.
2. Based on the AS/NZS 2107-2000 recommended noise criteria. It is of note that private rooms have been considered as living areas during the day and sleeping areas during the night.

The current architectural plans (Appendix A) show that the development will be standard masonry construction and 4mm glazing in a well-sealed frame.

Predicted noise levels presented in Table 5.2 confirm that internal noise levels for all sleeping and habitable areas can be met with standard masonry building construction with windows closed (assuming standard 4 mm glazing in a well-sealed frame).

6 Conclusion

EMM has prepared a response to submissions received by the NSW Department of Planning & Environment (DPE) from Newcastle City Council (NCC) regarding Development Application SSD 9787.

AS/NZS 2107-2000 recommended noise criteria for residential spaces are expected to be achieved within all areas by adopting standard masonry construction, assuming standard 4 mm glazing in a well-sealed frame. A review of the current architectural plans shows that these provisions have been included in the construction of the development and therefore noise intrusion is not likely to impact the internal acoustic amenity of the development. It is of note that by adopting AS/NZS 2107-2000 recommended noise criteria for residential spaces, SEPP Infrastructure (2007) noise criteria will also be satisfied.

Yours sincerely

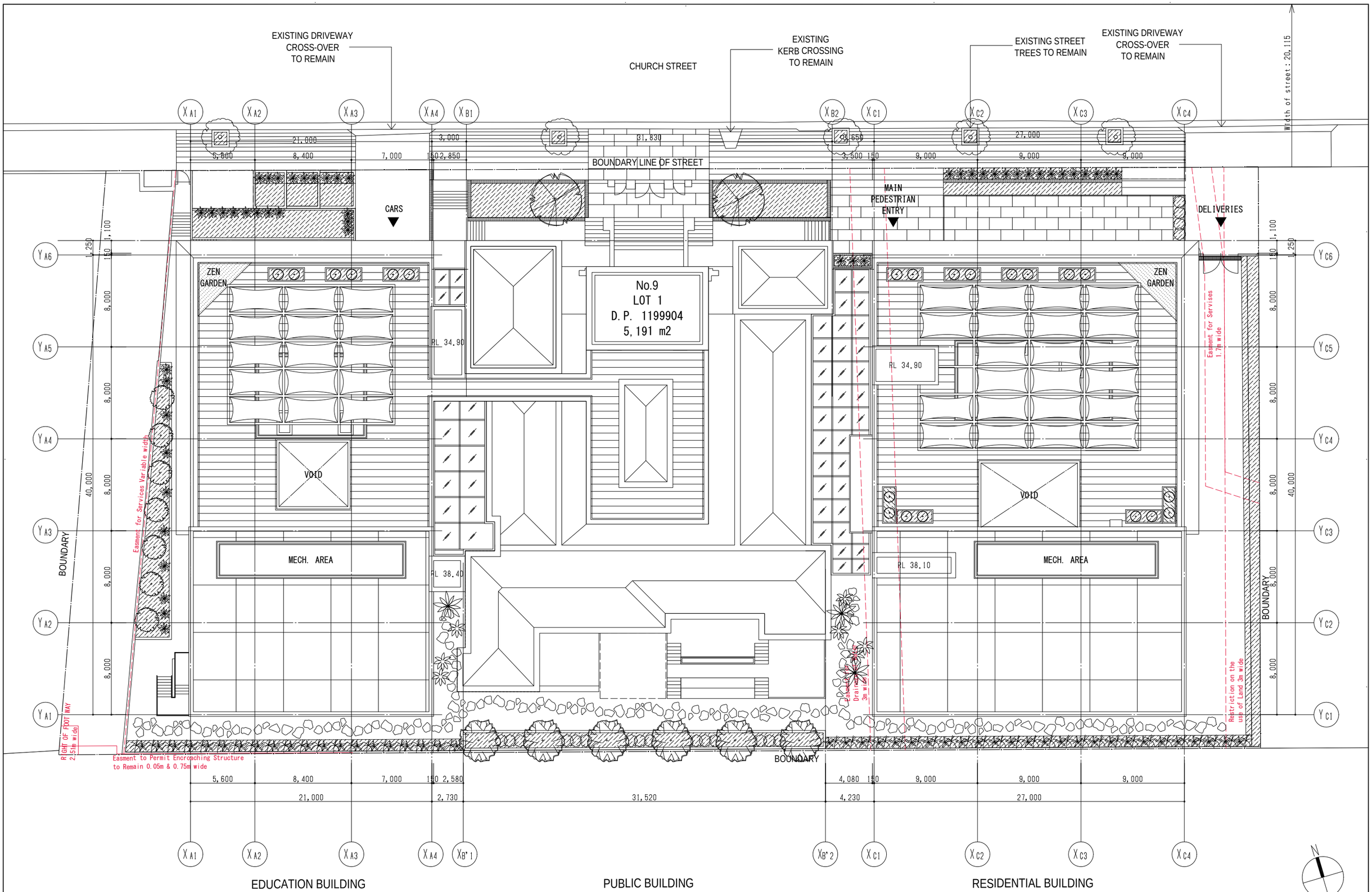
Lucas Adamson
Acoustic Consultant

ladamson@emmconsulting.com.au

Review: KT (16/7/2019)

Appendix A

Architectural plans



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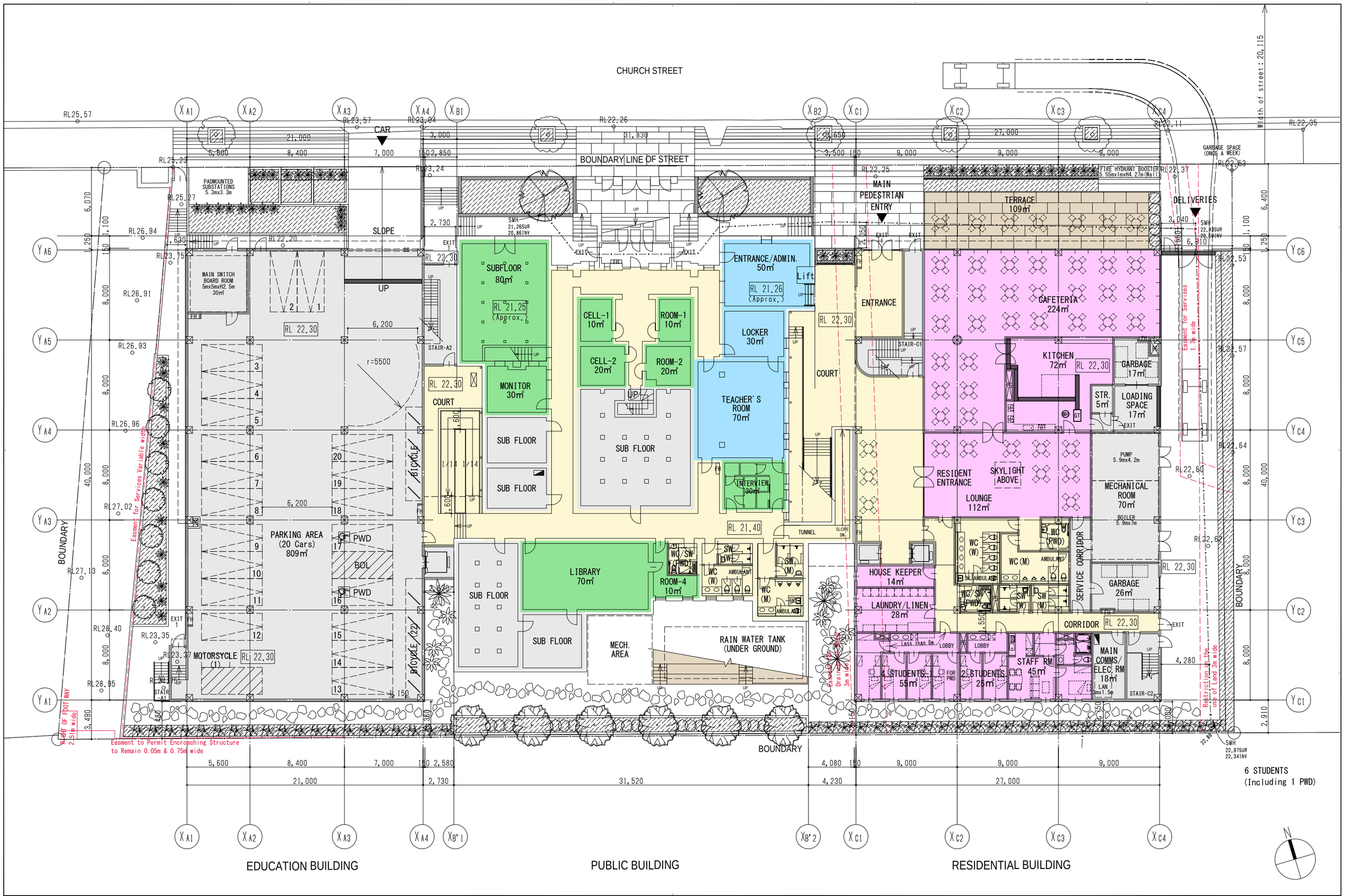
Planner								

Nihon University
Australia Newcastle Campus Project

Site Plan

Scale	Date	Drawing No.
1/A1:150 A3:300	2018 - 12 - 14	A — 107

No



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Planner

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Australia Newcastle Campus Project

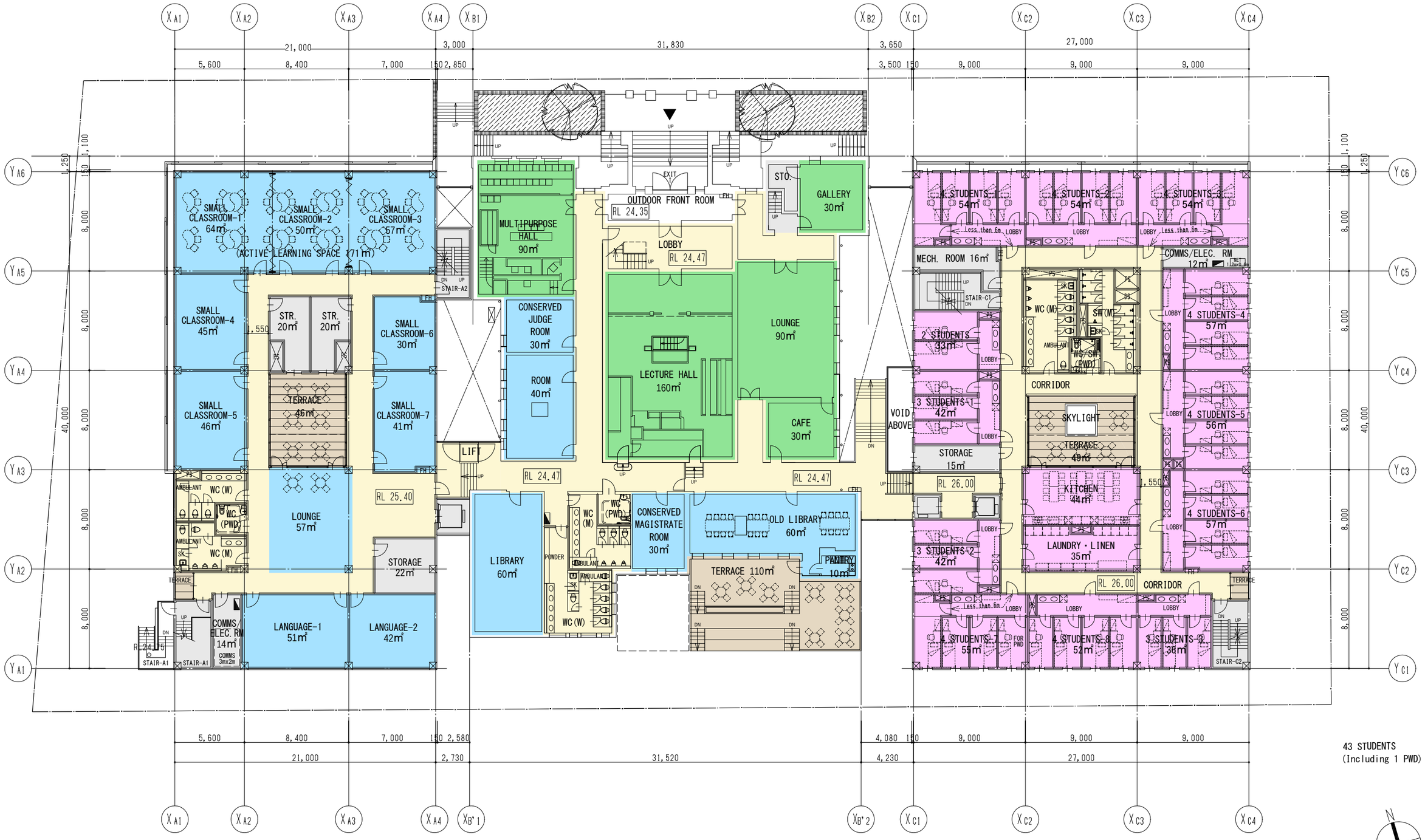
1st Floor Plan

Scale 1/A1:150 A3:300

Date 2018 · 12 · 14

Drawing No. A — 108

No



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Planner

Nihon University
Australia Newcastle Campus Project

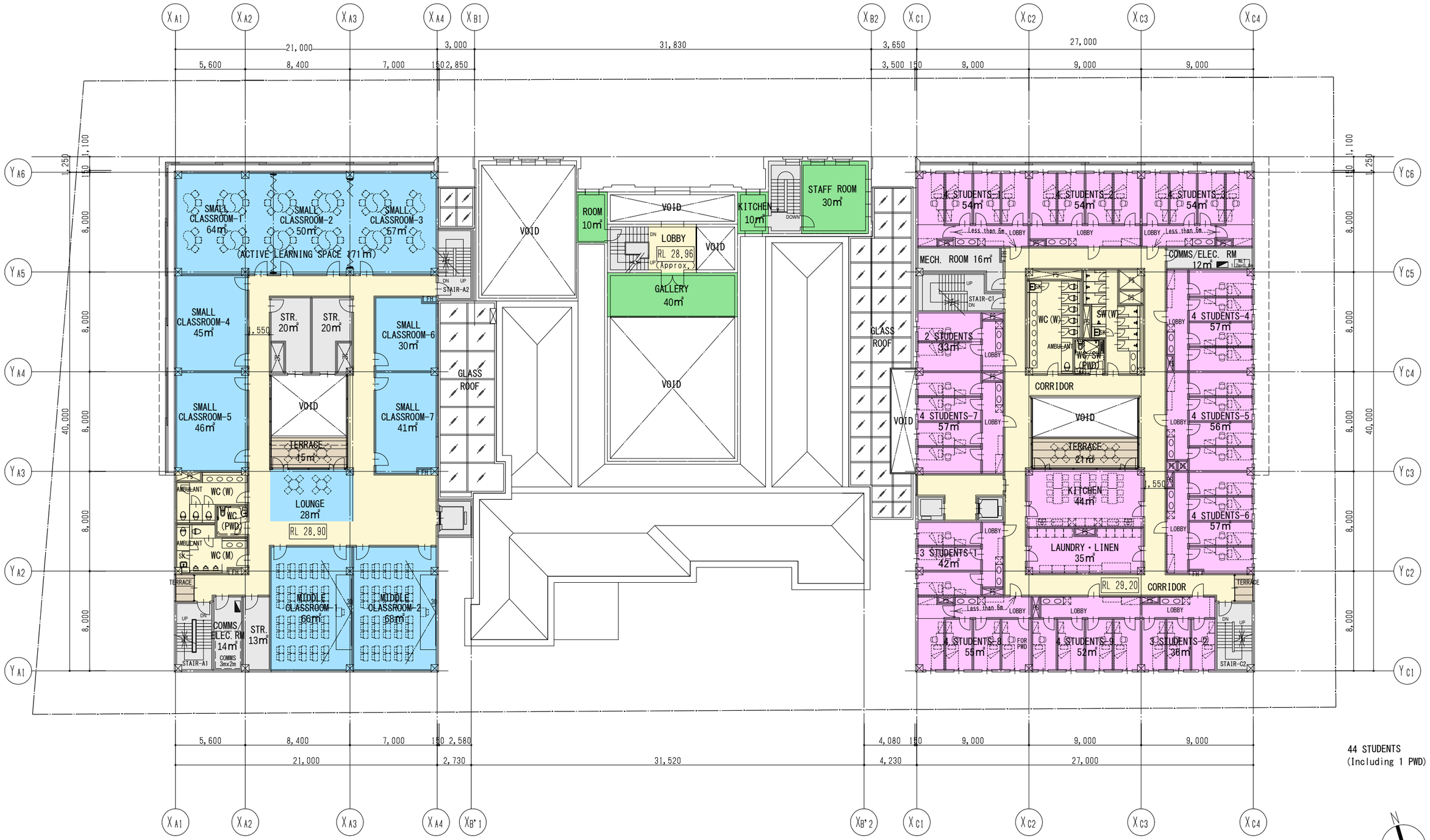
2nd Floor Plan

Scale 1/A1:150 A3:300

Date 2018・12・14

Drawing No. A — 109

No



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Australia Newcastle Campus Project

3rd Floor Plan

Scale 1/ A1:1/50 A3:1/100

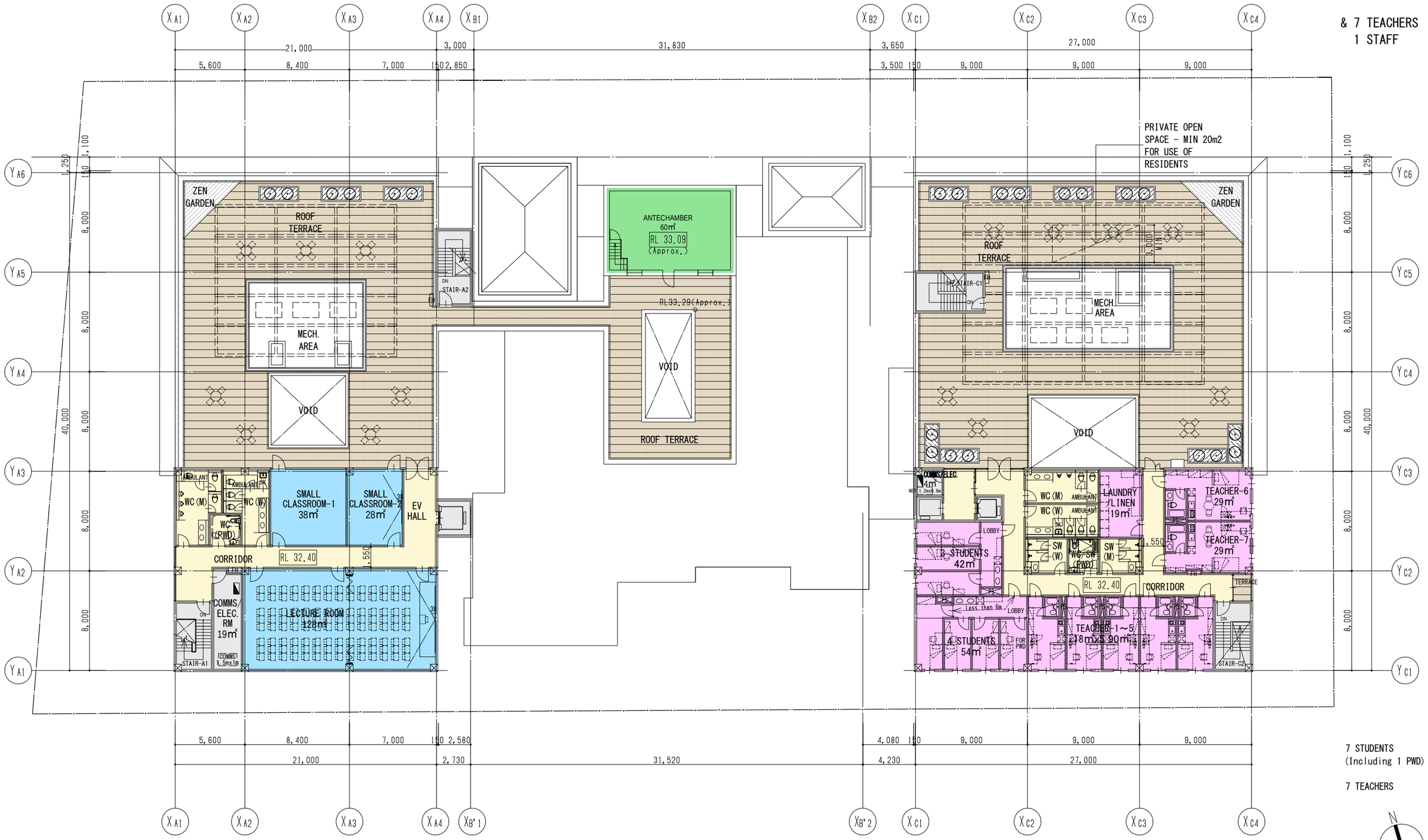
Date 2018・12・14

Drawing No. A — 110

No

1F	6 STUDENTS
2F	43 STUDENTS
3F	44 STUDENTS
4F	7 STUDENTS
TOTAL	100 STUDENTS

& 7 TEACHERS
1 STAFF



7 STUDENTS
(Including 1 PWD)

7 TEACHERS

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Planner

Nihon University
Australia Newcastle Campus Project

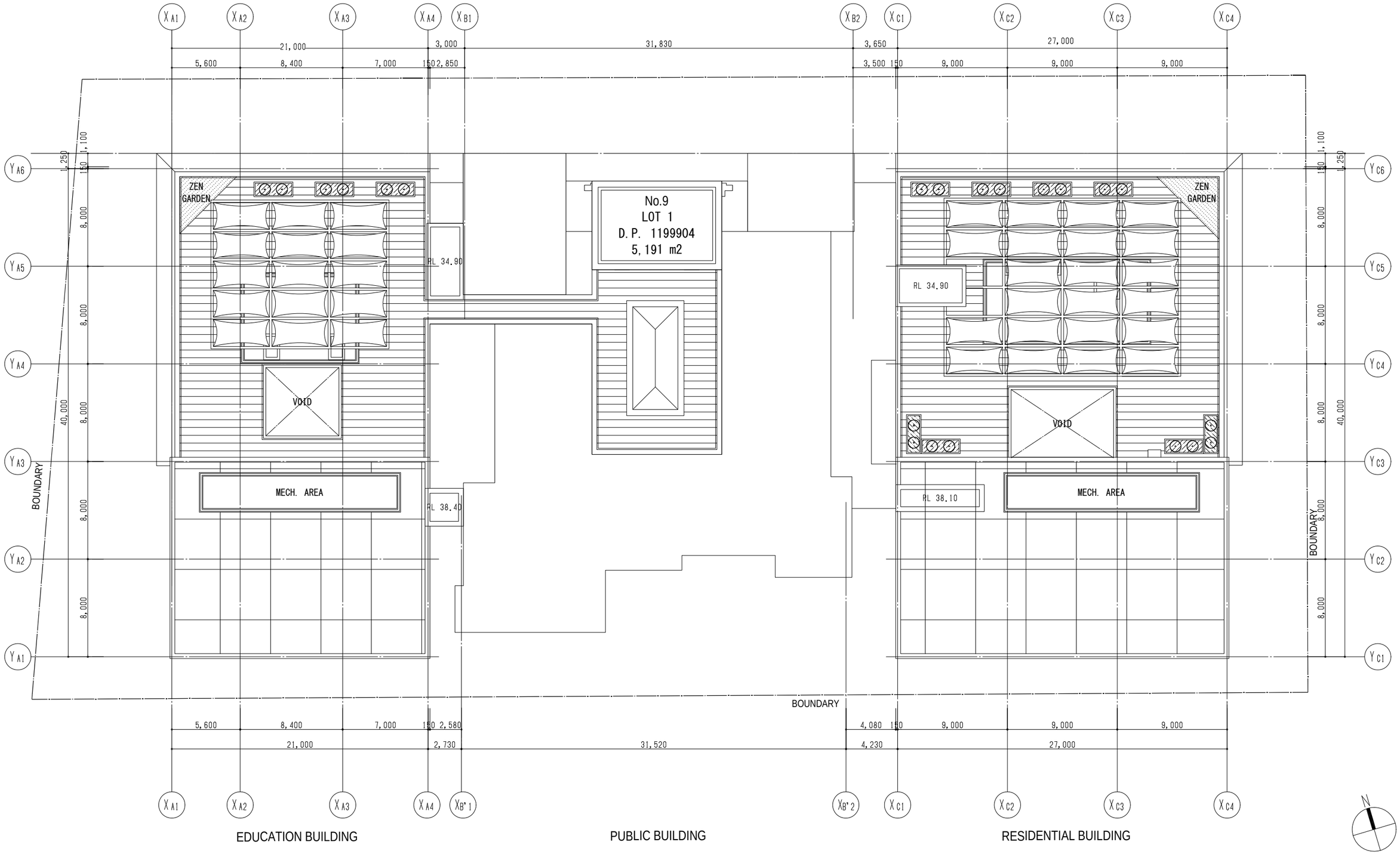
4th Floor Plan

Scale 1/ A1:1/50 A3:1/100

Date 2016 - 12 - 14

Drawing No. A — 111

No



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Nihon University
Australia Newcastle Campus Project

Roof Floor Plan

Scale 1/A1:150 A3:300

Date 2018 - 12 - 14

Drawing No. A — 112

No