Section J (DTS)
Compliance Report
NCC 2019
02.09.2020

Heffron Centre

417-439 Bunnerong Road,
Maroubra

INTEGRAL GROUP

Randwick City Council
a sense of community

Document Control

Revision #	Date	Revision details	Author	Verifier
01	21.08.2020	FINAL	AC	DA
02	02.09.2020	Updated drawings	AC	DA

Melbourne Office
L4, 10 Yarra Street
South Yarra VIC 3141
Australia
Tel: +61 3 9249 0288
Fax: + 61 3 9249 0299
Email:
ulmelb@umowlai.com.au
Web: www.umowlai.com.au
ABN: 29 143 564 738

Sydney Office
L7, 657 Pacific Highway
St Leonards NSW 2065
Australia
Tel: +61 2 9431 9431
Fax: +61 2 9437 3120
Email: ulsyd@umowlai.com.au
Web: www.umowlai.com.au
ABN: 99 150 174 782

Brisbane Office
L7, 200 Creek Street
Brisbane QLD 4000
Australia
Tel: +61 7 3917 8888
Fax: +61 7 3917 8887
Email:
ulbris@umowlai.com.au
Web: www.umowlai.com.au
ABN: 91 142 668 773

Contents

1 Introduction

1.1 Scope of works

This report will provide an assessment of compliance with the parts J1 and J3 of NCC 2019, Section J Energy Efficiency requirements for the proposed Heffron Centre located at Maroubra, NSW.

Section J of the National Construction Code (NCC) Volume One sets regulations for energy efficiency with respect to the building's nature, design and activity in order to achieve the performance requirements described in JP1-Energy Use.

The BCA offers several compliance routes that differ in complexity and flexibility. These compliance routes are:

- Deemed-To-Satisfy (DTS) Compliance.
- JV1 – NABERS Energy Commitment Agreement
- JV2 - Greenstar
- JV3 – Verification using a reference building.

This report will provide an assessment of all Section J requirements against the **Deemed-to-Satisfy (DTS) provisions**.

For the purpose of Section J the term Envelope relates to the physical elements, known as building fabric, which separate conditioned spaces or habitable rooms from the exterior of the building. Appendix C indicates a markup of the thermal envelope for the different glazing locations for the project.

1.2 Applicable NCC Version

This report has been undertaken with reference to the National Construction Code 2019 Volume One.

Verification Method:	Deem-to-Satisfied (DTS)
Tool used for the analysis:	NCC2019 Façade Calculator

1.3 Building Classification & Climate Zone

Property title:	The Heffron Centre,
Address:	Bunnerong Road, Maroubra, NSW, 2035
Building Class and Use:	Class 5 Administrative, Class 9b Sports Venue
Version of code:	NCC 2019
NCC Climate Zone:	Climate Zone 5, Warm Temperate

1.4 Project Description

The Heffron Centre is a new indoor multi-purpose facility, gymnastics facility and Community and High-Performance Centre (CHPC) which forms a major part of the ongoing upgrade works in Heffron Park and enables the community to have access to high-quality sporting facilities into the future.

Table 1 provides a summary of the NCC building classes in the project that include new works

Table 1. *NCC classification & building areas*

Space Type(s)	*NCC Class*
Administrative Areas, study spaces, Sports Hall, Gym, Amenities, Gymnastics	Class 5 Class 9b

Appendix C: Building Envelope Mark Up contains marked-up plans of the thermal envelope showing windows and walls. For areas undergoing refurbishment, a clear identification of walls/windows is shown to indicate the elements that have been considered as part of the assessment.

1.5 Source of Documentation

This report was developed based on the design documentation provided by COOP Studio. Refer to Appendix A for a complete list of all referenced information in this report.

1.6 Limitations of this Report

Due care and skill have been exercised in the preparation of this report. The information contained in this document is intended as a guide to assist with the application of Parts J1 – J3 of Section J in NCC 2019. It should be read in conjunction with the NCC 2019 provisions and specific applications may vary during the design development of the project. All remaining components of Section J are to be addressed by the relevant Building Service Consultants.

It is the responsibility of each member of the design team to inform of any services, structural or architectural changes that may affect the performance of the thermal envelope of the proposed design. Umow Lai/Integral Group should be informed immediately of any deviation from the thermal performances contained herein, so that this report may be updated to accurately reflect these changes. Umow Lai cannot/Integral Group be held responsible for document validity claims made as a result of design changes undertaken without its knowledge

1.7 Disclaimer

The advice in this report does not relate to the NCC BCA regulation requirements pertaining to façade non-combustibility. Confirmation on any non-combustibility compliance requirements must be referred to the Building Surveyor for approval.

No responsibility or liability to any third party is accepted for any loss or damage arising out of the use of this report by any third party. Any third party wishing to act upon any material contained in this report should first contact Umow Lai/Integral Group for detailed advice which will consider that party's requirements.

2 Part J1 – Building Fabric

2.1 **J1.1** - Application of Part

The deemed to satisfy provisions of this part apply to all parts of the building fabric forming the Envelope of the building.

2.2 **J1.2** - Thermal Construction

In accordance with J1.2 (a) required insulation will comply with AS/NZS 4859.1 and be installed so that the insulation forms a continuous barrier with all parts of the building fabric and it overlaps adjoining insulation other than at supporting members such as studs, joists and the like where the insulation must be against the member. The insulation should not affect the safe or effective operation of a service or fitting.

J1.2 (b) states that any reflective insultation must be installed with the necessary airspace to achieve the required R-Value between a reflective side of the reflective insulation and a building lining or cladding. In this case, the insulation must be closely fitted against any penetration, door or window opening, and it should be adequately supported by framing members. Each adjoining sheet of roll membrane should be overlapped not less than 50 mm or taped together.

In accordance with J1.2(c), where required, bulk insulation should be installed so that it maintains its position and thickness, other than where it is compressed between cladding and supporting. In addition, in a ceiling, where there is no bulk insulation or reflective insulation in the wall beneath, the bulk insulation should overlap the wall by not less than 50 mm.

Roof, ceiling, wall and floor materials, and associated surfaces are deemed to have the thermal properties listed in Specification J1.2.

Important Note on thermal bridging J1.2(e): The required Total R-Value and Total System U-Value, must include allowance for thermal bridging and should be calculated in accordance to the relevant standard or method for each case:

- For a roof or floor; in accordance with AS/NZS 4859.2
- For wall-glazing construction determined in accordance with Specification J1.5a
- For soil or sub-floor spaces determined in accordance with Specification J1.6 or Section 3.5 of CIBSE Guide A

2.3 **J1.3** - Roof and Ceiling Construction

In this climate zone, compliance with J1.3(a) sets a minimum Total R-Value of R3.2 for a downward direction of heat flow. In addition, the solar absorptance (SA) of the roof upper surface must be not more than 0.45. **Table 2** provides a summary of these values.

Table 2. *Roof and ceiling requirements*

Building Component	***Total R-Value*** W/m²K *(Minimum)*	***Solar Absorptance*** *(Maximum)*	***Examples from Colorbond***
Roof & Ceiling	**≥R3.7**	**≤0.45**	• Classic Cream, Surfmist, Cosmic, Whitehaven: SA < 0.4

2.4 **J1.4** - Roof lights

Roof lights are required to have a total area of not more than 5% of the floor area of the room or space served. The glazing system of roof lights should have a maximum U-value of U3.9. The SHGC is dictated by the total area of the roof light and the shaft index as described in J1.4. The requirement for SHGC is case-specific. Therefore, any variation to the current design of the skylight or implementation of new roof lights will require a review of these provisions.

Table 3. *Roof lights requirements*

Building Component	***Area Skylight*** *(Maximum % of Total Area of the Floor space)*	***U-value*** W/m²K *(Maximum)**	***SHGC*** *(Maximum)**	***Notes***
Roof Lights	**5%**	**≤U.3.9**	**≤0.29-0.49**	* Performance values for the roof lights refer to Total System accounting the effects of any frame. * SHGC is dependent on the area of the skylight and the Shaft index, which will be calculated when the roof design is finalized.

2.5 **J1.5** - Walls and Glazing

The Total System U-Value of wall-glazing construction must not be greater than U.2.0. Solar admittance of externally facing wall-glazing construction must not be greater than 1.3 in all orientations for this climate zone and type of building.

Wall components must achieve a minimum Total R-value according to the percentage of wall to façade area, as indicated below. Table 4 provides a summary of the requirements for wall-glazing construction.

Table 4. *Wall-Glazing construction requirements*

Building Component	***Total U-Value*** W/m²K *(Maximum)*	***Solar Admittance*** *(Maximum) for all orientations*	***Wall U-Value*** W/m²K *(Minimum)*
Wall-glazing construction	**≤U2.0**	**≤1.3**	**≥U1.0** (wall area < 80%)
			≥U1.4 (wall area > 80%)

Compliance with Section J1.5 is achieved via assessing the extent of wall and glazing constructions for each façade orientation against the 2019 NCC glazing calculator. Performance values for glass based on real references from the Window Energy Rating Scheme (WERS) have been input into the calculator to provide example systems that are compliant with the DTS provisions for each case. Summary reports from the official calculator are provided in Appendix C: Building Envelope Mark Up.

All horizontal shading was incorporated within the glazing calculations and 'device' has been allocated where it has been determined that at least 80% of summer sun is restricted to a glazed element.

Table 5 outline DTS allowances for wall and glazing performance values for the current design as per the NCC2019 calculator (Method 2). The table also shows the example glazing systems based on real products, which were used to demonstrate compliance on the calculator. All values are required to be total system values to achieve compliance.

Table 6 denotes the minimum R-value in order to achieve compliance. However, we would note that this is the minimum to achieve code compliance and buildings with aspirations should always look to surpass this; early work around the wall systems confirm that the minimum R-value in Table 5 should be easily surpassed.

(N: North, E: East, S: South and W: West)
(R-v: R-value, U-v: U-Value, SHGC: Solar heat gain coefficient, VLT: Visible light transmission)

Table 5. *Allowances for Glazing performance values (THSPS)*

Orientation	*Wall (min)*	*Example Compliant Glazing System*			
	R-v	*Type*	*U-v*	*SHGC*	*VLT*
N	1.64	Double Low-E glazing in aluminium frame	4.2	0.34	0.50
E	1.64	Double Low-E glazing in aluminium frame	4.2	0.40	0.50
S	1.64	Double glazing in aluminium frame	4.2	0.60	0.65
W	1.64	Double Low-E glazing in aluminium frame	4.2	0.40	0.50

Table 6. *Allowance for Wall R-value for all New walls in the project (includes effects thermal bridging)*

Building	*Orientation*	*Minimum Wall Allowances*	
		U-v	*R-v*
ALL	ALL	0.60	1.64

Although the current values provided match performance values available in the WERS data base, these values should be indicative only since variation often exists between different manufacturers. As such, it is critical that these values are confirmed with the glazing supplier to ensure compliant values can be achieved.

2.6 **J1.6** – Floors

The minimum total R-value for a Floor in Climate Zone 5, for downwards heat flow, without an in-slab heating or cooling system, is R2.0. This should be calculated in accordance within CIBSE Guide A Section 3.5. This calculation takes in the variance in heat transfer at the perimeter of the slab in comparison to the middle. As such, there is no insulation required for the floor slab.

3 PART J3 – BUILDING SEALING

3.1 **J3.1** – Application of Part

The deemed to satisfy provisions of this part apply to all parts of the Envelope of the building.

3.2 **J3.2** – Chimneys and Flues

There are no solid fuel burning appliances within the building therefore this section does not apply.

3.3 **J3.3** – Roof lights

A roof light is required to be sealed, or capable of being sealed, must be constructed with—

(i) an imperforate ceiling diffuser or the like installed at the ceiling or internal lining level; or

(ii) a weatherproof seal; or

(iii) a shutter system readily operated either manually, mechanically or electronically by the occupant.

3.4 **J3.4** –Windows and Doors

A seal to restrict air infiltration is to be fitted to each edge of all doors and openable windows, comprising of a foam or rubber compressible strip, fibrous seal or equivalent.

The bottom edge of all external swing doors will be fitted with a draft protection device.

Windows that comply with AS 2047 (Windows in buildings – selection and installation) are exempt as the standard contains acceptable provisions for sealing.

Entrance doors to a building, if leading to a conditioned space, as identified in Figure 1, must have an airlock, self-closing door, or equivalent.

3.5 **J3.5** – Exhaust Fans

Exhaust fans must be fitted with a sealing device such as a self-closing damper or equivalent when serving a conditioned space, as identified in Figure 1, or a habitable room.

3.6 **J3.6** – Construction of ceilings, walls and floors

The building fabric is to be adequately sealed using caulking, skirting and cornices, and internal lining systems and are to be close fitting at ceiling, wall and floor junctions, to minimise air leakage.

3.7 **J3.7** – Evaporative Coolers

There are no evaporative coolers within the buildings therefore this section does not apply.

4 **Appendix A:** Source of Documentation

Architectural Drawings

DA101	COVER SHEET	D	31.08.20
DA111	EXISTING & DEMOLITION - SITE PLAN	D	31.08.20
DA112	SITE PLAN	D	31.08.20
DA201	GENERAL ARRANGEMENT PLAN - GROUND FLOOR	D	31.08.20
DA202	GENERAL ARRANGEMENT PLAN - LEVEL 01	D	31.08.20
DA203	GENERAL ARRANGEMENT PLAN - ROOF	D	31.08.20
DA401	BUILDING ELEVATIONS - NORTH & SOUTH	D	31.08.20
DA402	BUILDING ELEVATIONS - EAST & WEST	D	31.08.20
DA501	BUILDING SECTIONS - A & B	D	31.08.20
DA502	BUILDING SECTIONS - C & D	D	31.08.20
DA901	BUILDING SIGNAGE	D	31.08.20
DA951	SHADOW ANALYSIS	D	31.08.20
DA961	AREA ANALYSIS	D	31.08.20
DA971	PHOTOMONTAGES	D	31.08.20
DA972	PHOTOMONTAGES	D	31.08.20
DA973	PHOTOMONTAGES	D	31.08.20

5 **Appendix B:** NCC 2019 Façade Calculator

Façade

Report

Calculator

Project Summary

Date
21/08/2020

Name
Andy Cook

Company
Integral Group

Position
Senior Sustainability Consultant

Building Name / Address
Heffron Centre
Randwick

Building State

NSW

Climate Zone
Climate Zone 5 - Warm temperate

Building Classification
Class 9b - sports venues or the like

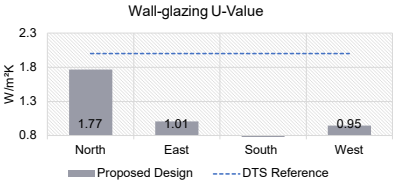
Storeys Above Ground
2

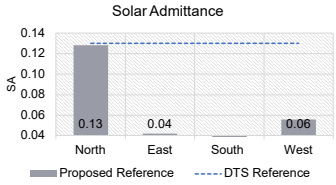
The summary below provides an overview of where compliance has been achieved for Specification J1.5a - Calculation of U-Value and solar admittance - Method 1 (Single Aspect) and Method 2 (Multiple Apects).

Compliant Solution =
Non-Compliant Solution =

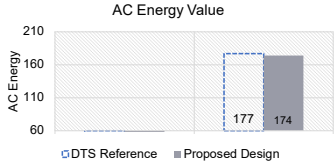
	Method 1				Method 2
	North	East	South	West	All
Wall-glazing U-Value (W/m².K)	1.77	1.01	0.44	0.95	0.96
Solar Admittance	0.13	0.04	0.00	0.06	
AC Energy Value					174

Method 1





Method 2



Project Details

	North	East	South	West
Glazing Area (m²)	225	250.8	7.2	159
Glazing to Façade Ratio	0.376884422	0.165348101	0.006721434	0.147769517
Glazing References	Low SHGC Glazing +	Clear Glazing + Clear Glazing 2 + Clear Glazing 3 +	Clear Glazing 4 +	Clear Glazing + Clear Glazing 2 +
Glazing System Types	Fixed +	Fixed +	Fixed +	Fixed +
Glass Types	Double Glazed Unit - double low-E coating +	Double Glazed Unit - no low-E coating +	Double Glazed Unit - no low-E coating +	Double Glazed Unit - no low-E coating +
Frame Types	Steel +	Steel +	Steel +	Steel +
Methodology	WERS (Default module size)			
Average Glazing U-Value (W/m².K)	4.00	4.00	4.00	4.00
Average Glazing SHGC	0.34	0.40	0.60	0.40
Shading Systems	Horizontal Device	Horizontal Device	Horizontal Device	Horizontal Device
Wall Area (m²)	372	1266	1064	917
Wall Types	Wall +	Wall +	Wall +	Wall +
Methodology	NCC Specification J1.5b			
Wall Construction	PB+INS2+BRK +	PB+INS2+BRK +	PB+INS2+BRK +	PB+INS2+BRK +
Wall Thickness	230 +	230 +	230 +	230 +
Average Wall R-value (m²K/W)	2.40	2.40	2.40	2.40
Solar Absorptance	0.7	0.7	0.7	0.7

6 **Appendix C:** Building Envelope Mark Up

Further coordination needed in detailed design to determine the fabric performance of the climate chamber's envelope.

Further coordination needed in detailed design to determine the fabric performance of the aquatic centre's envelope.

More economical to insulated these external walls, as opposed to all the internal walls between the loading dock etc and the surrounding conditioned areas.

More economic option to insulated these external walls, as opposed to all the internal walls between the switch room etc and the surrounding conditioned areas.

CLIMATE 41.3 m²
GYM 567.2 m²
EXT. ST 20.7 m²
GYM ST 17.7 m²
HYDRATION
HOT DESKS
CHPC ADMINISTRATION 151.3 m²
ADMIN 7.6 m²
ADMIN 14.0 m²
PRINT 5.5 m²
HYDRATION 9.1 m²
GPS
ICE
STORE
MEET 8.0 m²
COVERED OUTDOOR AREA
PLAYER LOUNGE 89.7 m²
ST 7.2 m²
LECTURE 85.8 m²
MEET 8.6 m²
CLASSROOM (SOUTH CARES) 97.2 m²
ADMIN 14.2 m²
FOYER 161.8 m²
CIRC. 294.9 m²
MALE CHANGE 164.4 m²
STRAP 26.0 m²
RECOVERY 35.2 m²
PHYSIO 84.8 m²
ADMIN 14.0 m²
CHPC ADMINISTRATION 47.1 m²
WELL. B 11.9 m²
DOC 14.2 m²
COMMS 14.6 m²
STORE 51.3 m²
MULTI-PURPOSE CHANGE 81.1 m²
ACC. WC 9.1 m²
ST 3.3 m²
CAFE KITCHEN 68.2 m²
CAFE SEATING 221.6 m²
R. / SERV / POS 25.1 m²
STEAM 8.7 m²
SAUNA 8.8 m²
A/L 15.2 m²
AQUATICS 150.3 m²
POOL PLANT / PUMP 95.0 m²
CORP. STORE 15.5 m²
MERCH. STORE 17.2 m²
MERCHANDISE 82.5 m²
SOUTH'S CAFE 44.0 m²
PROPERTY 39.9 m²
LOADING 60.0 m²
BIN STORE 31.7 m²
CAFE SEATING 31.8 m²
FEMALE CHANGE 114.2 m²
LAUNDRY 12.5 m²
BIKE ST 12.4 m²
ROLLER DOOR ENTRY
14 SECURE BIKE SPACES.
8 VISITOR BIKE SPACES.
ENTRY AIRLOCK
PUBLIC 13.8 m²
PUBLIC 19.6 m²
ACC. 6.2 m²
CHANGE 1 29.2 m²
CHANGE 2 26.0 m²
CHANGE 3 26.2 m²
CHANGE 4 30.5 m²
A/L 2.5 m²
ACC. CH 6.5 m²
A/L 4.0 m²
A/L 2.3 m²
CIRC. 91.2 m²
RECEPTION 15.1 m²
ADMIN 5.8 m²
GYMNASTICS ADMIN 17.8 m²
ADMIN 5.8 m²
GYMNASTIC CHANGE 01 39.9 m²
VIEW 49.0 m²
GYMNASTIC CHANGE 02 52.0 m²
MAIN SWITCH 23.9 m²
INDOOR COURTS 1899.4 m²
GYMNASTICS 1021.0 m²
STORE 65.0 m²
STORE 31.3 m²
VIEWING MOUND
INCLINE TRACK
RL 22.150
RL 21.975
RL 21.950
117116
132474
67915
49655
1 DA501
2 DA501
1 DA502
2 DA502

Notes

Verify all dimensions and levels on site and report any discrepancies to Co-op for direction prior to the commencement of work. Drawings are to be read in conjunction with all other contract documents.

Use figured dimensions only. Do not scale from drawings. Co-op cannot guarantee the accuracy of content and format for copies of drawings issued electronically. The completion of the Issue Details Checked and Authorised section below is confirmation of the status of the drawing. The drawing shall not be used for construction unless endorsed 'For Construction' and authorised for issue.

Registered Business Name ABN 93 167 783 600

LEGEND

- COMMUNITY & HIGH PERFORMANCE CENTRE
- INDOOR COURTS
- GYMNASTICS
- SERVICES
- SCOPE OF WORKS BOUNDARY
- SHOWCASE FIELD BOUNDARY - NOT PART PART OF APPROVAL

- Wall Insulation R-value 2.4 m2.K/W
- Glazing U-value 4.2 W/m2.K SHGC 0.34
- Glazing U-value 4.2 W/m2.K SHGC 0.4
- Glazing U-value 4.2 W/m2.K SHGC 0.6
- High Performance Areas - performance values > Section J, to be confirmed during detailed design

SECTION J MARK UP
02/09/20
AC
V.2

REV	DESCRIPTION	DATE	APP
D	ISSUED FOR DA	31.08.20	SD
C	FOR PCG REVIEW	27.08.20	SD
B	DRAFT DA - inclusive of DEP comments	24.08.20	SD
A	DRAFT DA	10.08.20	SD

CLIENT

CO-OP

CO-OP STUDIO
Level 7, 176 Wellington Parade, East Melbourne, 3002
Office: +61 452 281 614
admin@co-opstudio.com.au

PROJECT

HEFFRON CENTRE

PROJECT NUMBER

100234

DRAWING

GENERAL ARRANGEMENT PLAN - GROUND FLOOR

SCALE As indicated @ A1

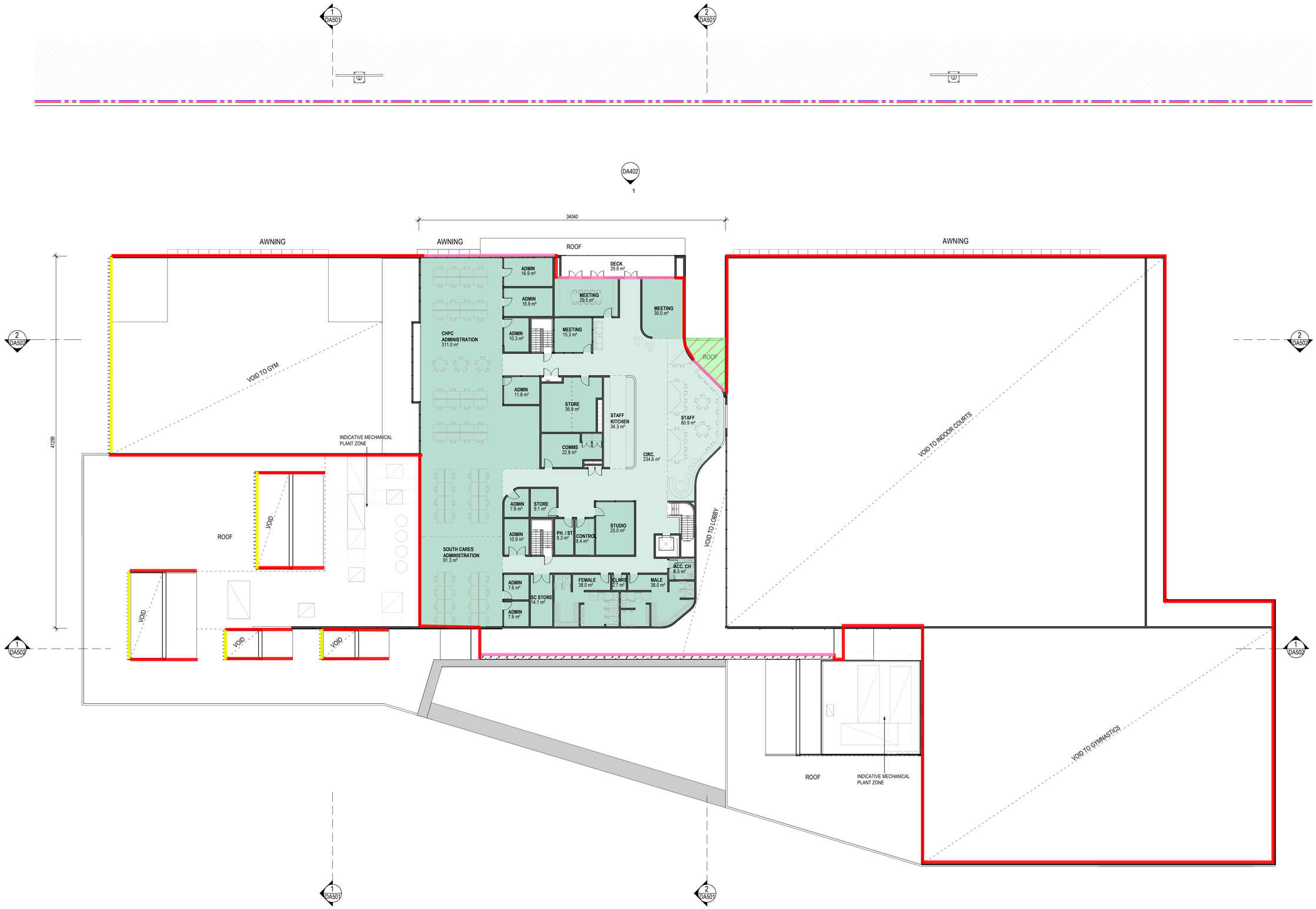
FOR APPROVAL
NOT TO BE USED DURING CONSTRUCTION

DRAWING NO. DA201D

REVISION

DATE PRINTED 2/09/2020 9:16:22 PM

FILE NAME BIM 360://Heffron Centre/100234_Heffron Centre_CENTRAL_R19-360.rvt



Notes

Verify all dimensions and levels on site and report any discrepancies to Co-op for direction prior to the commencement of work. Drawings are to be read in conjunction with all other contract documents.

Use figured dimensions only. Do not scale from drawings. Co-op cannot guarantee the accuracy of content and format for copies of drawings issued electronically. The completion of the Issue Details Checked and Authorised section below is confirmation of the status of the drawing. The drawing shall not be used for construction unless endorsed 'For Construction' and authorised for issue.

Registered Business Name ABN 93 167 783 600

LEGEND

- COMMUNITY & HIGH PERFORMANCE CENTRE
- INDOOR COURTS
- GYMNASTICS
- SERVICES

- SCOPE OF WORKS BOUNDARY
- SHOWCASE FIELD BOUNDARY - NOT PART PART OF APPROVAL

- Wall Insulation R-value 2.4 m2.K/W
- Glazing U-value 4.2 W/m2.K SHGC 0.34
- Glazing U-value 4.2 W/m2.K SHGC 0.4
- Glazing U-value 4.2 W/m2.K SHGC 0.6
- High Performance Areas - performance values > Section J, to be confirmed during detailed design

SECTION J MARK UP
02/09/20
AC
V.2

REV	DESCRIPTION	DATE	APP
D	ISSUED FOR DA	31.08.20	SD
C	FOR PCG REVIEW	27.08.20	SD
B	DRAFT DA - inclusive of DEP comments	24.08.20	SD
A	DRAFT DA	10.08.20	SD

CLIENT

CO-OP STUDIO
Level 7, 176 Wellington Parade, East Melbourne, 3002
Office: +61 452 281 614
admin@co-opstudio.com.au

PROJECT

HEFFRON CENTRE

PROJECT NUMBER

100234

DRAWING

GENERAL ARRANGEMENT PLAN - LEVEL 01

SCALE As indicated @ A1

FOR APPROVAL
NOT TO BE USED DURING CONSTRUCTION

DRAWING NO. DA202D

REVISION

DATE PRINTED 2/09/2020 9:16:49 PM

FILE NAME BIM 360://Heffron Centre/100234_Heffron Centre_CENTRAL_R19-360.rvt