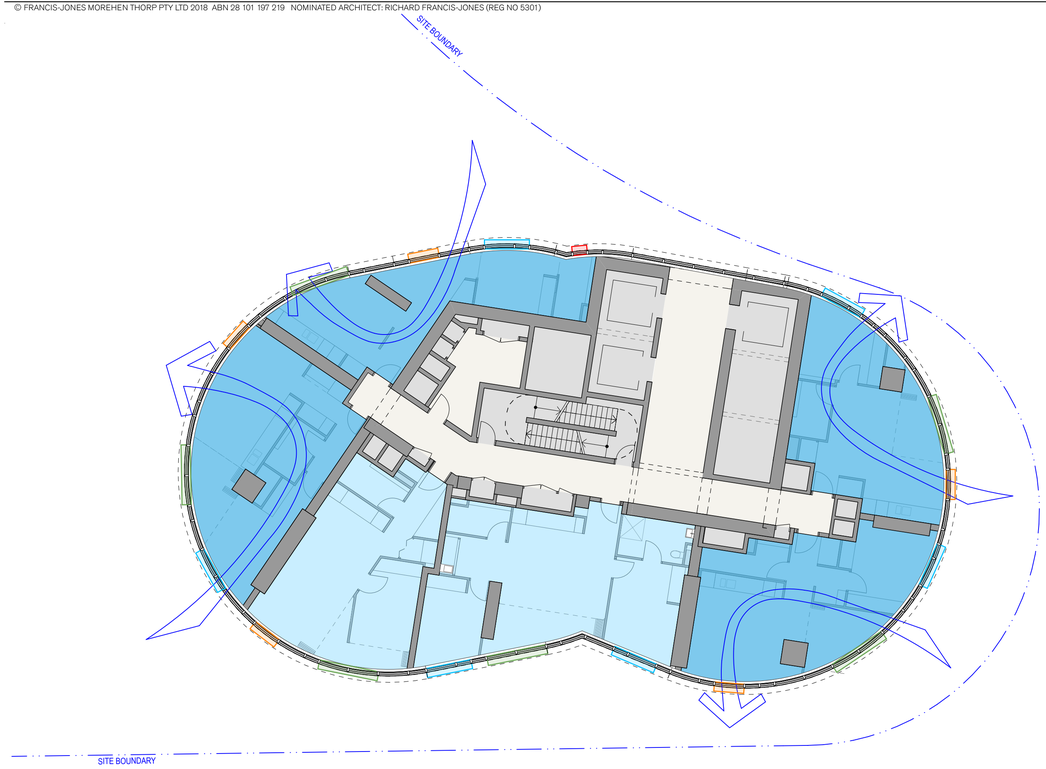
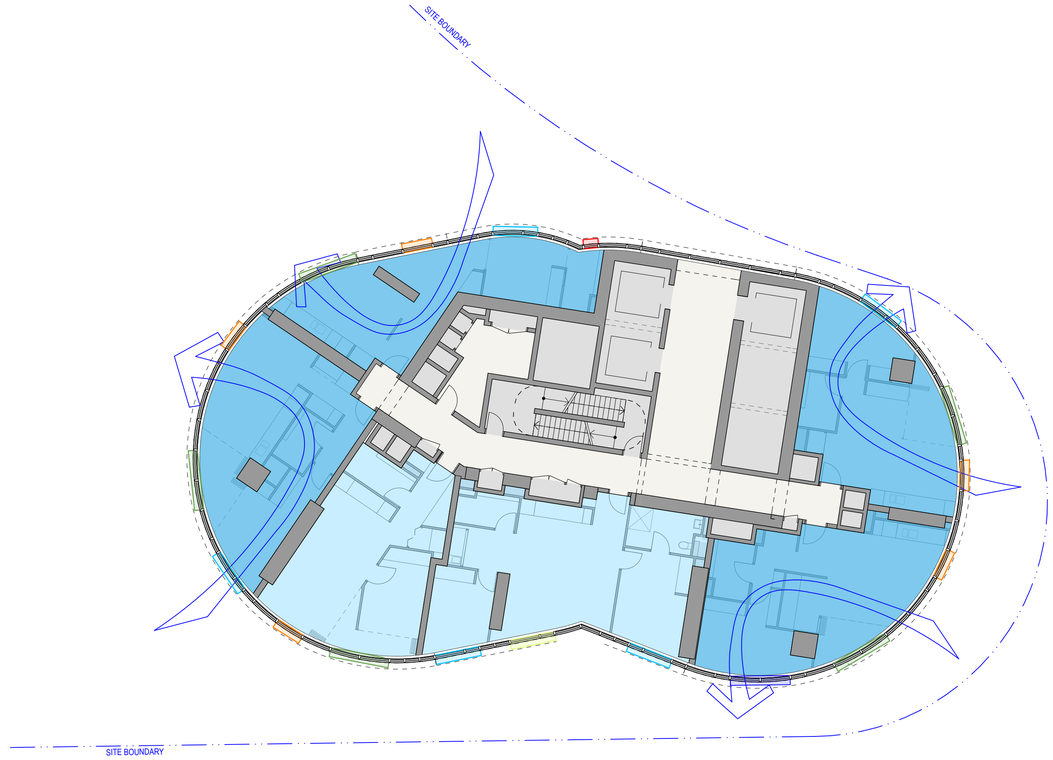


1 PLAN LEVEL 10 A3
1:150

GOOD VENTILATION - 100% (Above Level 09)



2 PLAN LEVEL 11 A4
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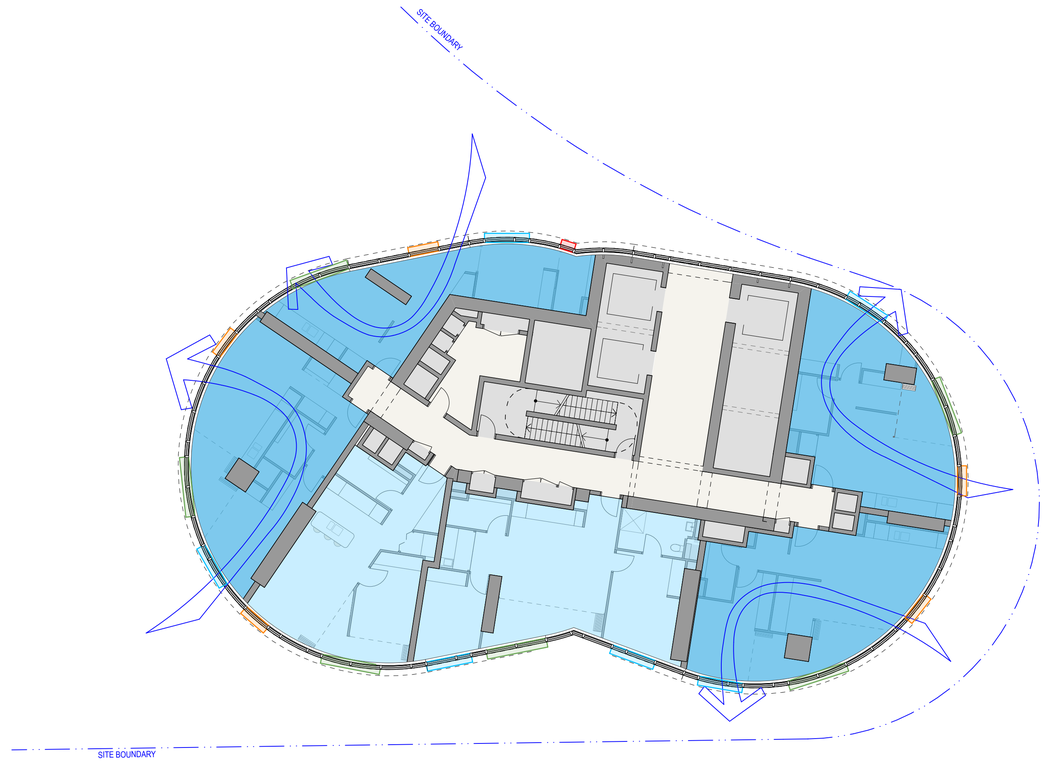
GOOD VENTILATION - 100% (Above Level 09)



3 PLAN LEVEL 12 A5
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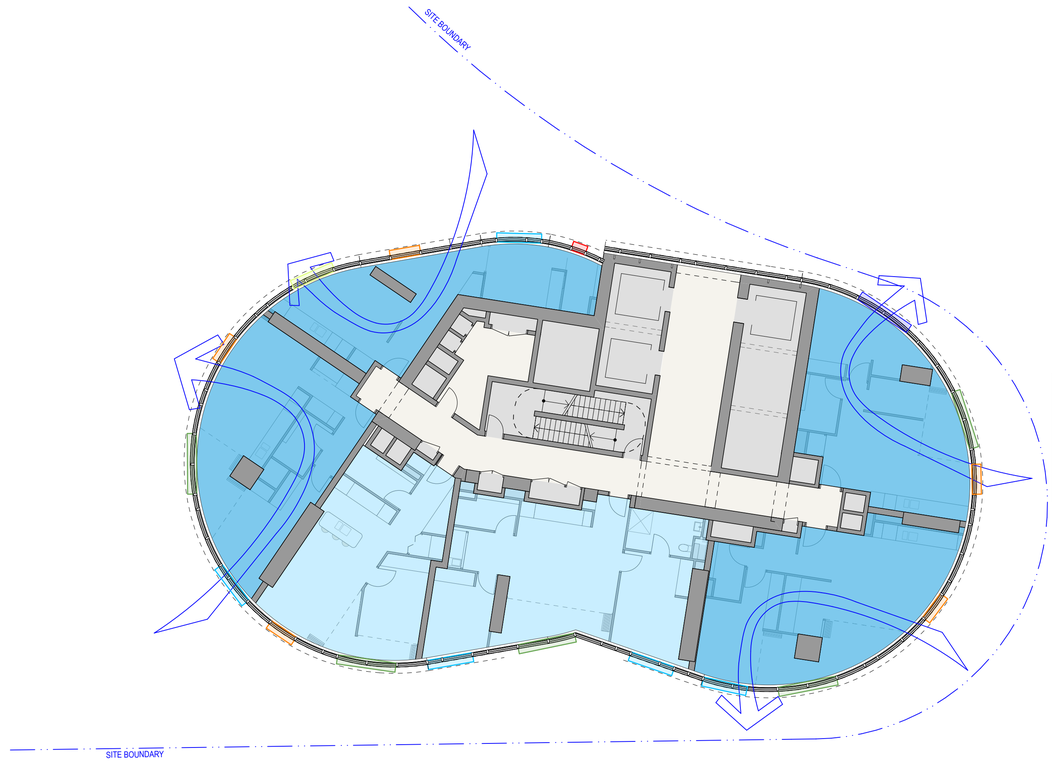
GOOD VENTILATION - 100% (Above Level 09)



4 PLAN LEVEL 14 A6
1:150

GOOD VENTILATION - 100% (Above Level 09)

GENERAL NOTES

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- ALL LEVELS RELATIVE TO 'AUSTRALIAN HEIGHT DATUM'
- DO NOT SCALE DRAWINGS. USE FIGURED DIMENSIONS ONLY

legend

Cross Ventilation

Good Ventilation

Assisted Cross Ventilation

Wintergarden Operable Facade

1.5 Modules - 1400x1000 + 700x1000mm

2 Modules - 1400x1000 + 1400x1000mm

Awning Windows

0.5 Modules - 700x400mm

1 Module - 1400x400mm

1.5 Modules - 1400x400 + 700x400mm

2 Modules - 1400x400 + 1400x400mm

8.0
Average star rating
NATIONWIDE HOUSE ENERGY RATING SCHEME
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Certificate Number: GAD1RM2336
Assessor Name: Nicholas Asha
Accreditation number: VICBDAV1/6/1712
Certificate date: 2 Aug 2018
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DA01	2/11/18	Response to Submissions	JRS	

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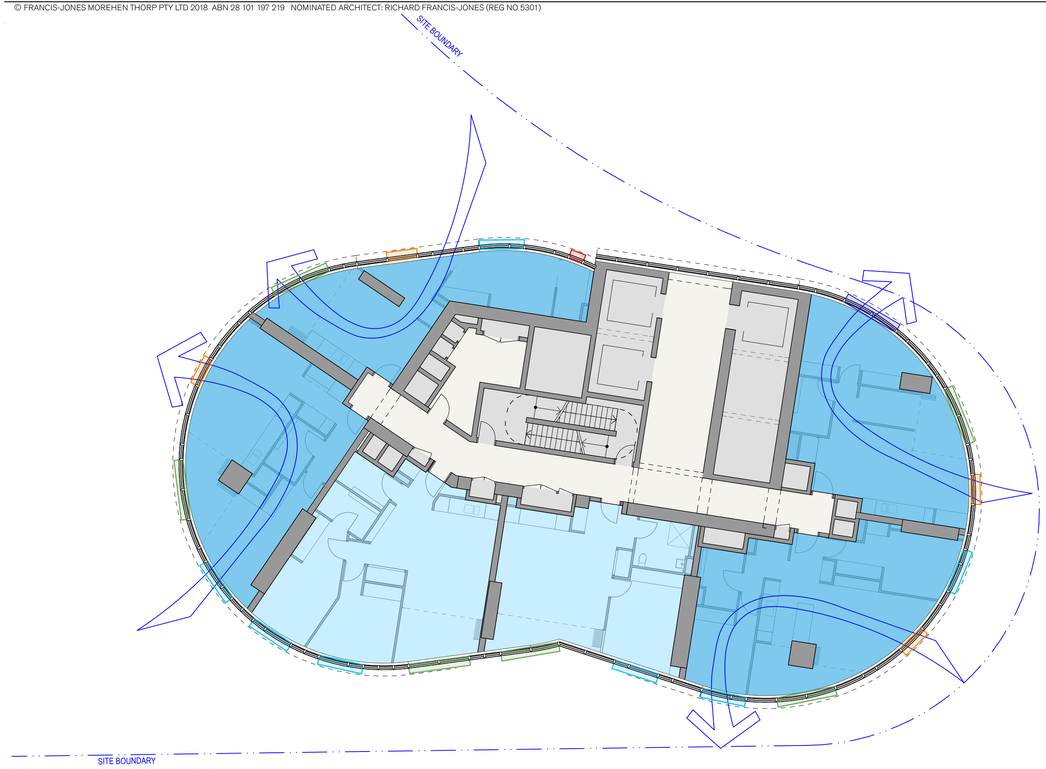
project
Modification 13
80 PYRMONT STREET
PYRMONT NSW 2009

title
Ventilation Diagrams
Ventilation Diagrams

scale	Not to Scale	first issued	2/11/18
project code		sheet no.	revision
SM13		AF8201	DA01

For Information



1 PLAN LEVEL 15 A7
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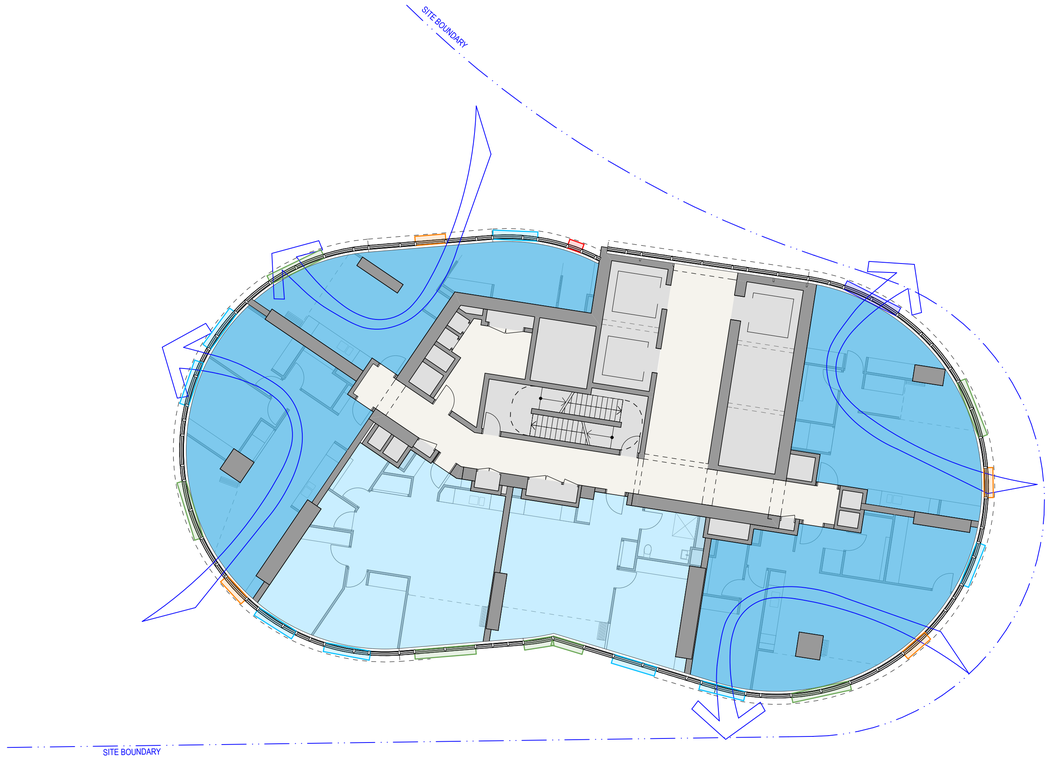
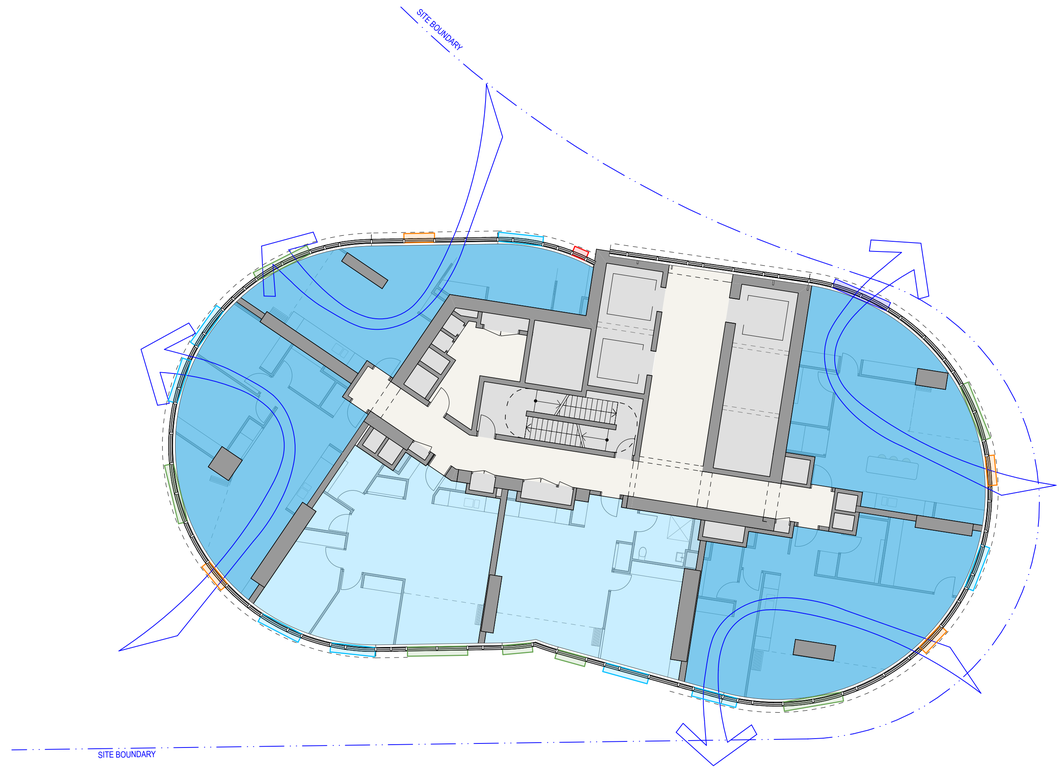
GOOD VENTILATION - 100% (Above Level 09)



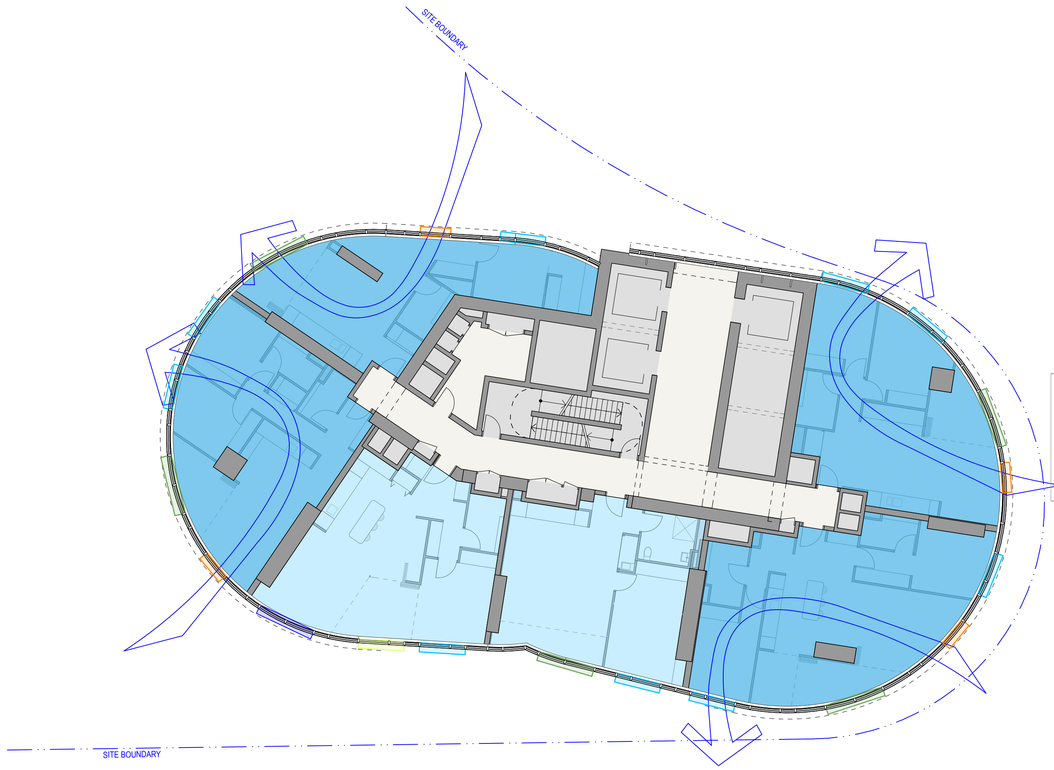
2 PLAN LEVEL 16 A8
1:150

GOOD VENTILATION - 100% (Above Level 09)



3 PLAN LEVEL 17 A9
1:150

GOOD VENTILATION - 100% (Above Level 09)



4 PLAN LEVEL 18 A10
1:150

GOOD VENTILATION - 100% (Above Level 09)

GENERAL NOTES

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legend

Cross Ventilation

Good Ventilation

Assisted Cross Ventilation

Wintergarden Operable Facade

1.5 Modules - 1400x1000 + 700x1000mm

2 Modules - 1400x1000 + 1400x1000mm

Awning Windows

0.5 Modules - 700x400mm

1 Module - 1400x400mm

1.5 Modules - 1400x400 + 700x400mm

2 Modules - 1400x400 + 1400x400mm

8.0 Average star rating
NATIONWIDE HOUSE ENERGY RATING SCHEME
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rev	date	name	by	chk
DA01	2/11/18	Response to Submissions	JRS	

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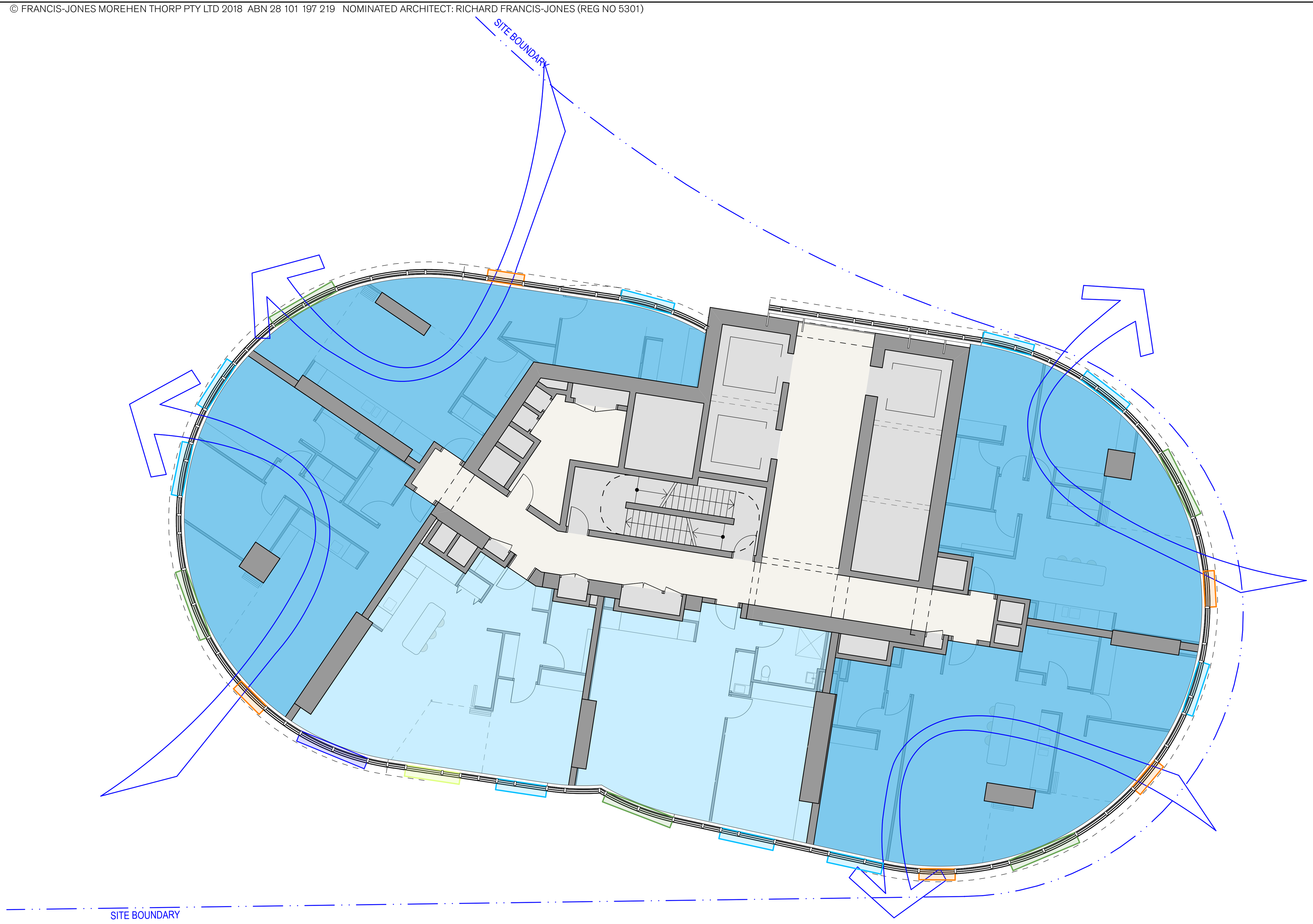
project
Modification 13
80 PYRMONT STREET
PYRMONT NSW 2009

title
Ventilation Diagrams
Ventilation Diagrams

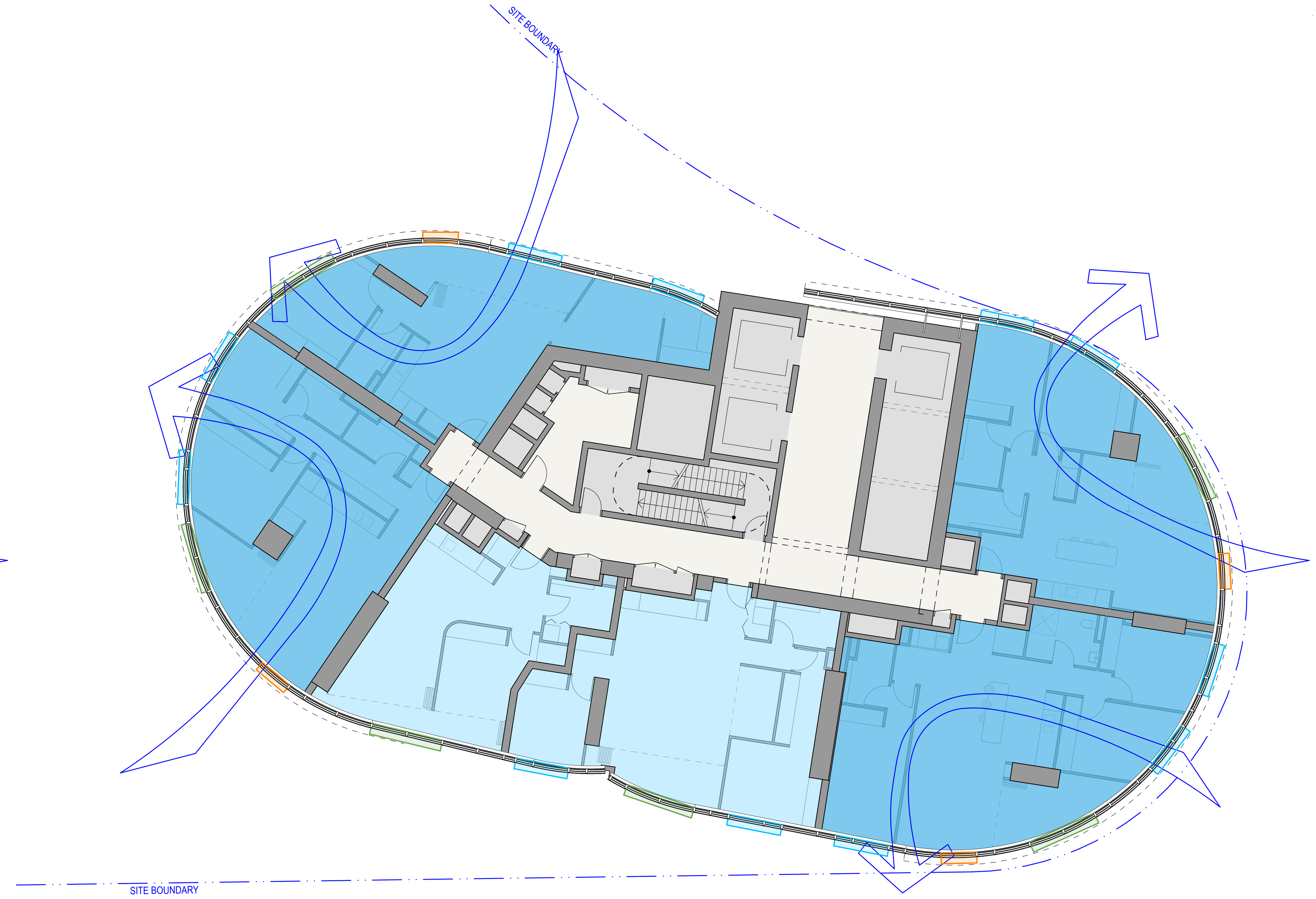
scale	Not to Scale	first issued	2/11/18
project code		sheet no.	revision
SM13		AF8202	DA01

For Information



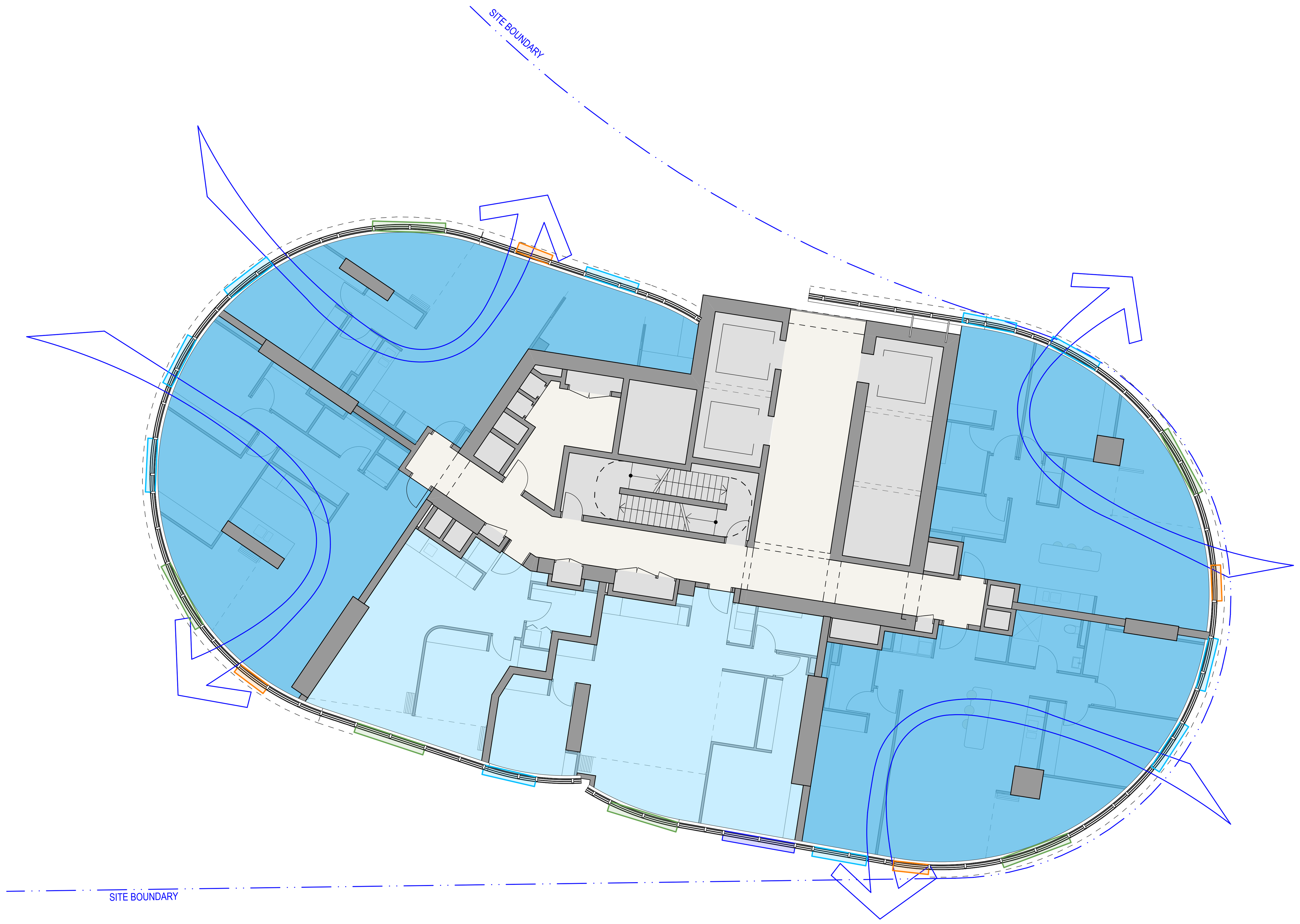
1 PLAN LEVEL 19 A11
1:150

GOOD VENTILATION - 100% (Above Level 09)



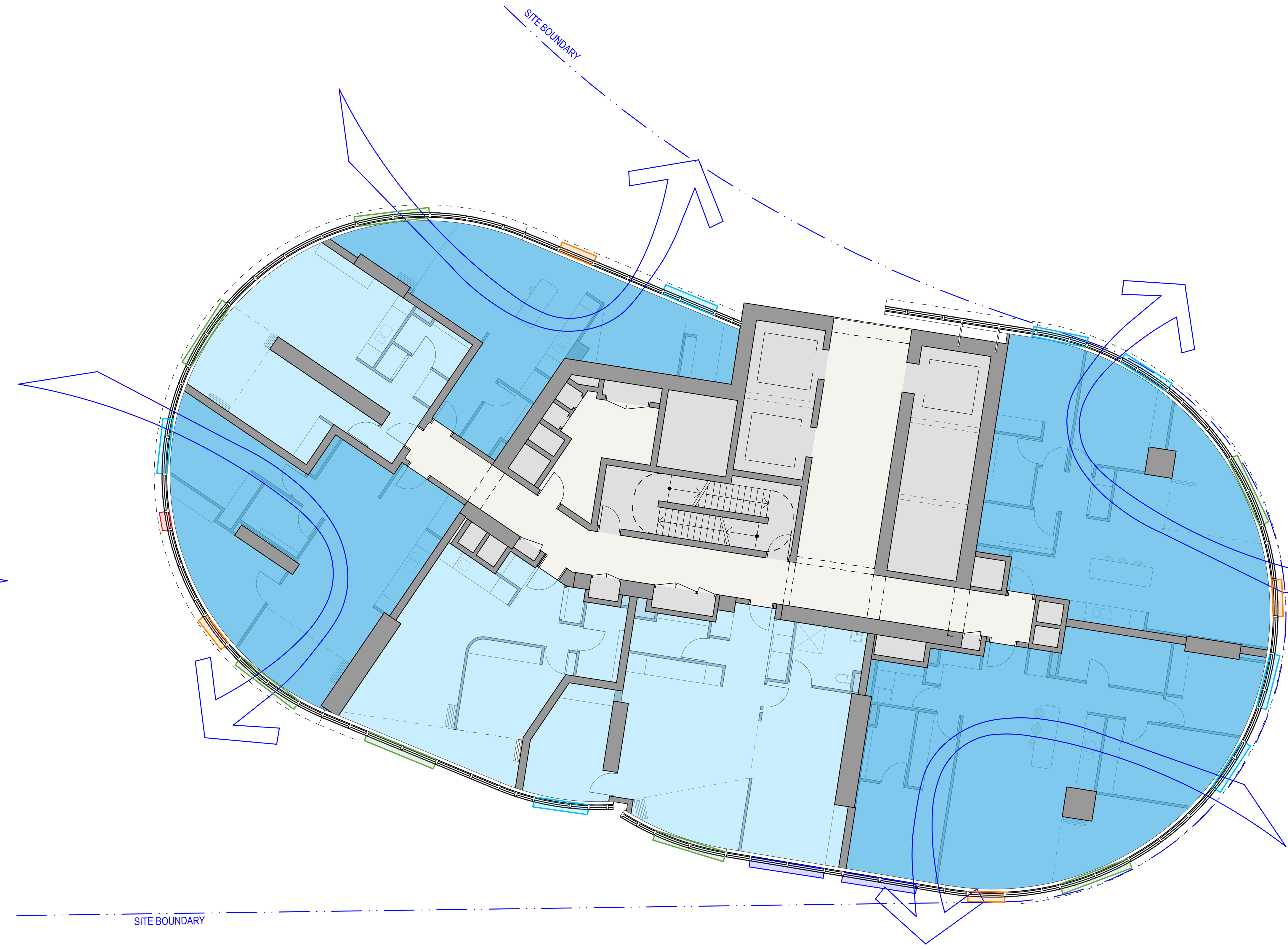
2 PLAN LEVEL 20 A12
1:150

GOOD VENTILATION - 100% (Above Level 09)



3 PLAN LEVEL 21 A13
1:150

GOOD VENTILATION - 100% (Above Level 09)



4 PLAN LEVEL 22 A14
1:150

GOOD VENTILATION - 100% (Above Level 09)

GENERAL NOTES

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legend

Cross Ventilation
Good Ventilation
Assisted Cross Ventilation

Wintergarden Operable Facade

1.5 Modules - 1400x1000 + 700x1000mm
2 Modules - 1400x1000 + 1400x1000mm

Awning Windows

0.5 Modules - 700x400mm
1 Module - 1400x400mm
1.5 Modules - 1400x400 + 700x400mm
2 Modules - 1400x400 + 1400x400mm

8.0
Average star rating
NATIONWIDE HOUSE ENERGY RATING SCHEME
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Dwelling address: 20-80 Pyrmont St, Pyrmont NSW 2009

www.nathers.gov.au

https://www.fr5.com.au/QRCodeLanding?PublicId=GAD1RM2336&GrpCert=

rev	date	name	by	chk
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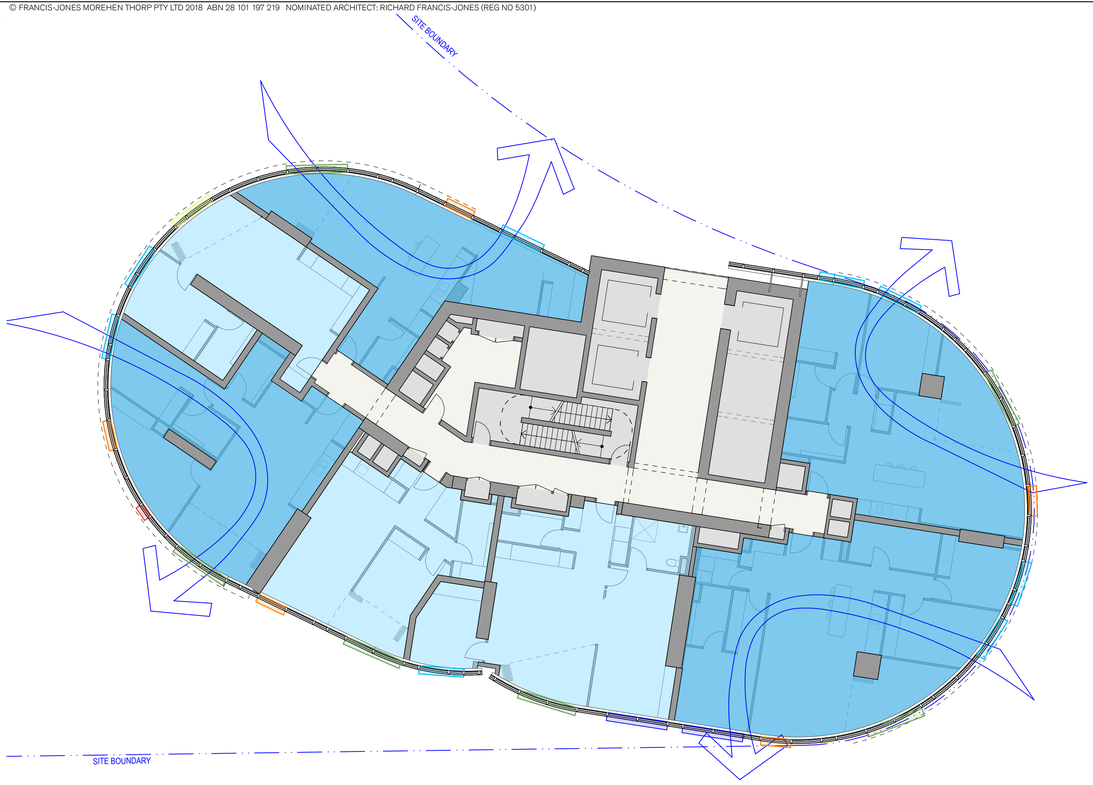
fjmt

project
Modification 13
80 PYRMONT STREET
PYRMONT NSW 2009

title
Ventilation Diagrams
Ventilation Diagrams

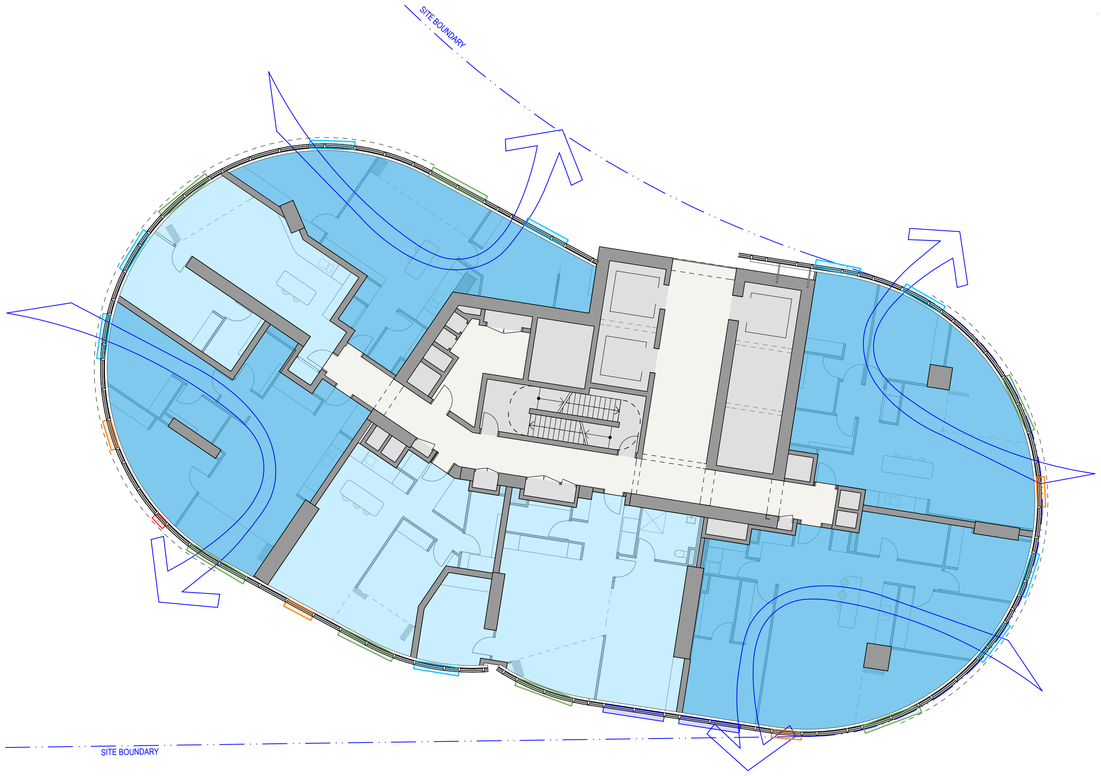
For Information

scale	Not to Scale	first issued	2/11/18
project code	sheet no.	revision	
SM13	**AF8203**	**DA01**	



1 PLAN LEVEL 23 A15
1:150

GOOD VENTILATION - 100% (Above Level 09)



2 PLAN LEVEL 24 A16
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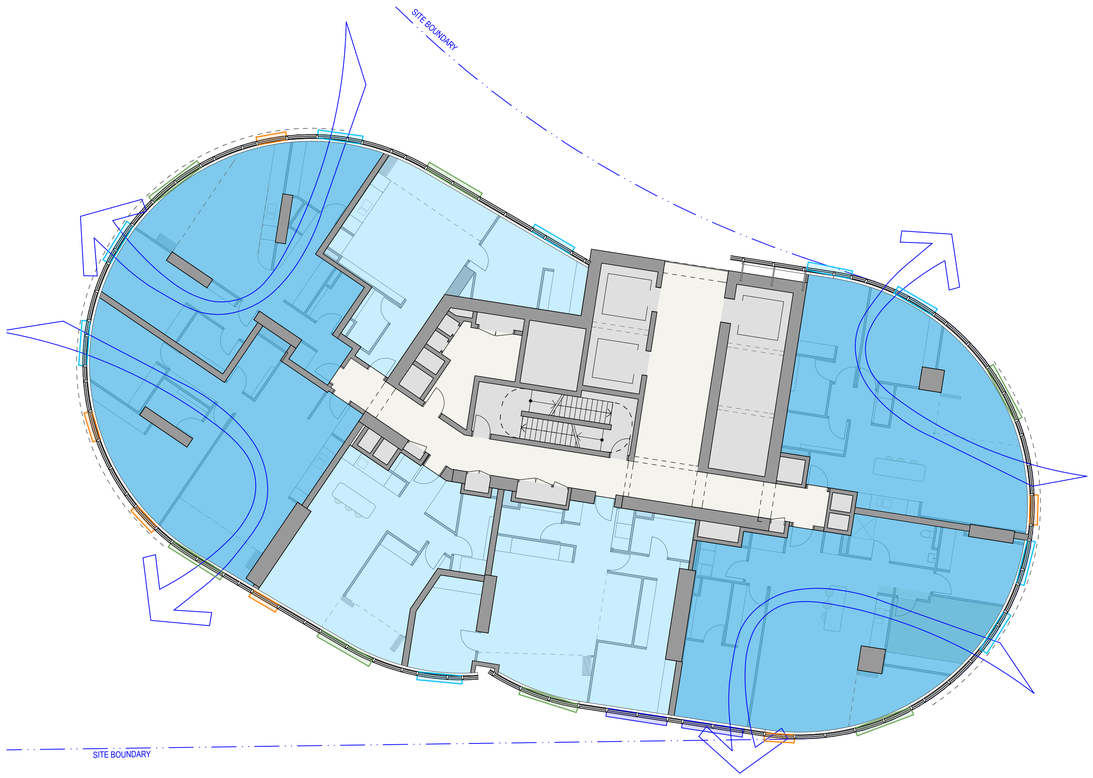
GOOD VENTILATION - 100% (Above Level 09)



3 PLAN LEVEL 25 A17
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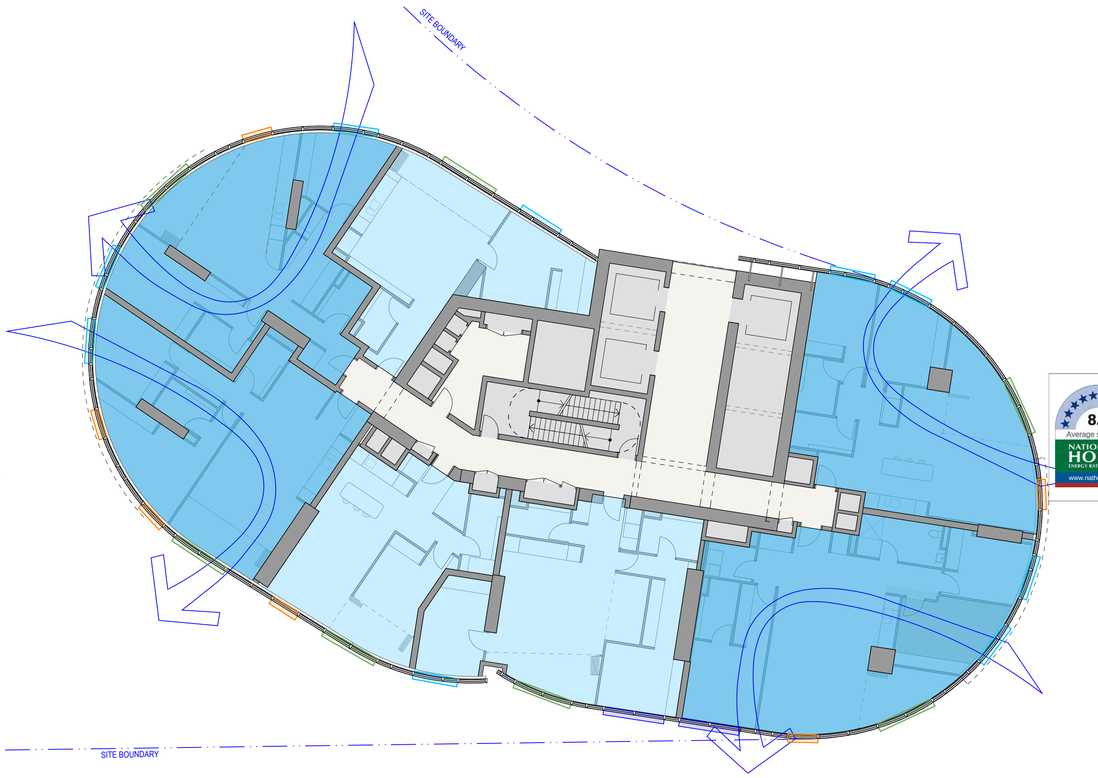
GOOD VENTILATION - 100% (Above Level 09)



4 PLAN LEVEL 26 A18
1:150

GOOD VENTILATION - 100% (Above Level 09)

GENERAL NOTES

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legend

Cross Ventilation

Good Ventilation

Assisted Cross Ventilation

Wintergarden Operable Facade

1.5 Modules - 1400x1000 + 700x1000mm

2 Modules - 1400x1000 + 1400x1000mm

Awning Windows

0.5 Modules - 700x400mm

1 Module - 1400x400mm

1.5 Modules - 1400x400 + 700x400mm

2 Modules - 1400x400 + 1400x400mm

8.0
Average star rating
NATIONWIDE HOUSE ENERGY RATING SCHEME
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DA01	2/11/18	Response to Submissions	JRS	

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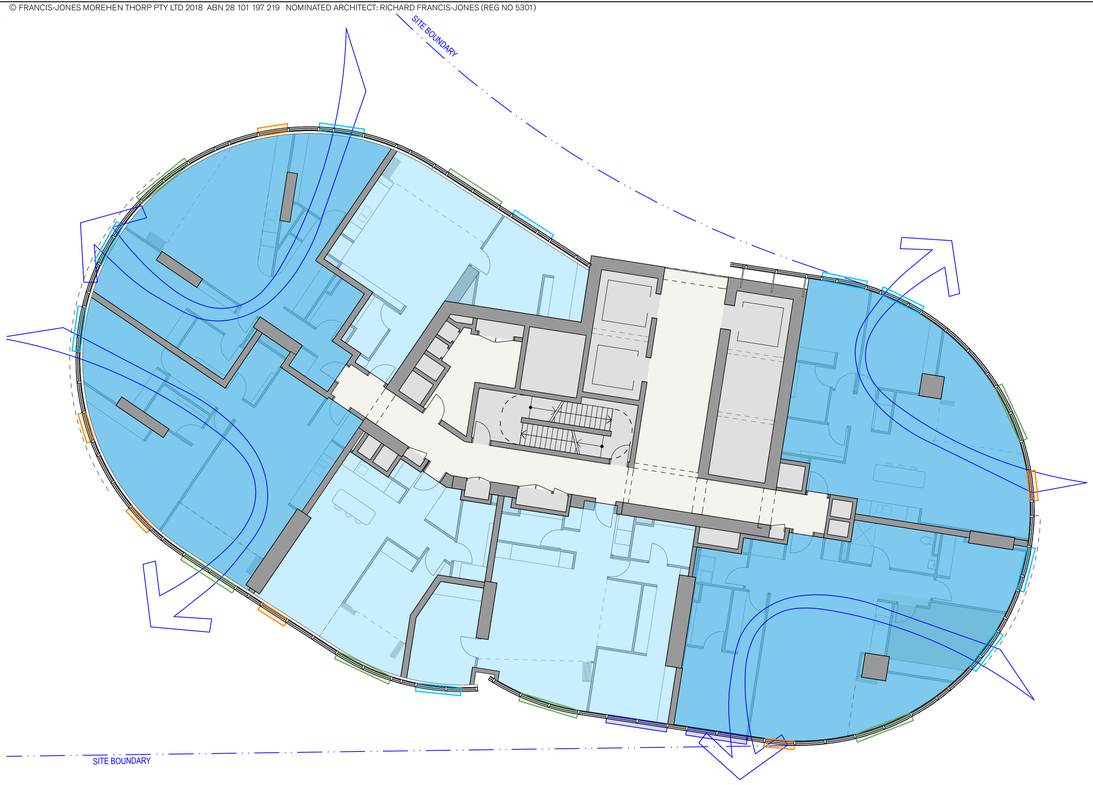
project
Modification 13
80 PYRMONT STREET
PYRMONT NSW 2009

title
Ventilation Diagrams
Ventilation Diagrams

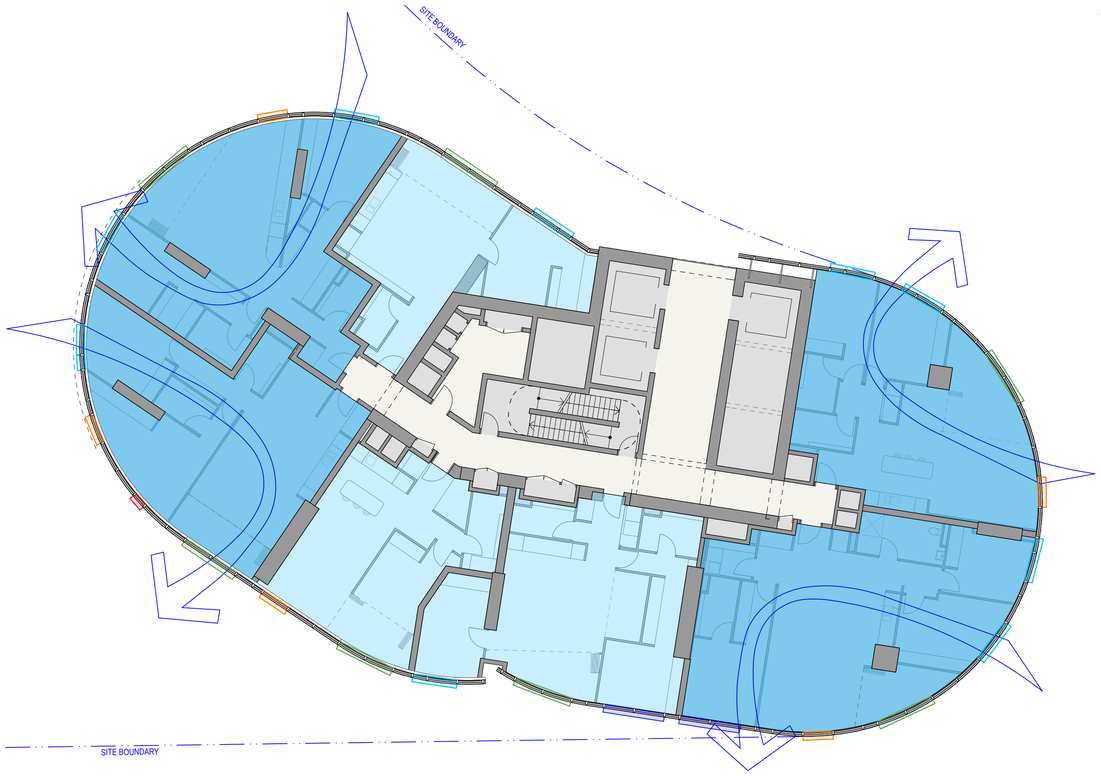
scale	Not to Scale	first issued	2/11/18
project code		sheet no.	revision
SM13		AF8204	DA01

For Information



1 PLAN LEVEL 27 A19
1:150

GOOD VENTILATION - 100% (Above Level 09)



2 PLAN LEVEL 28 A20
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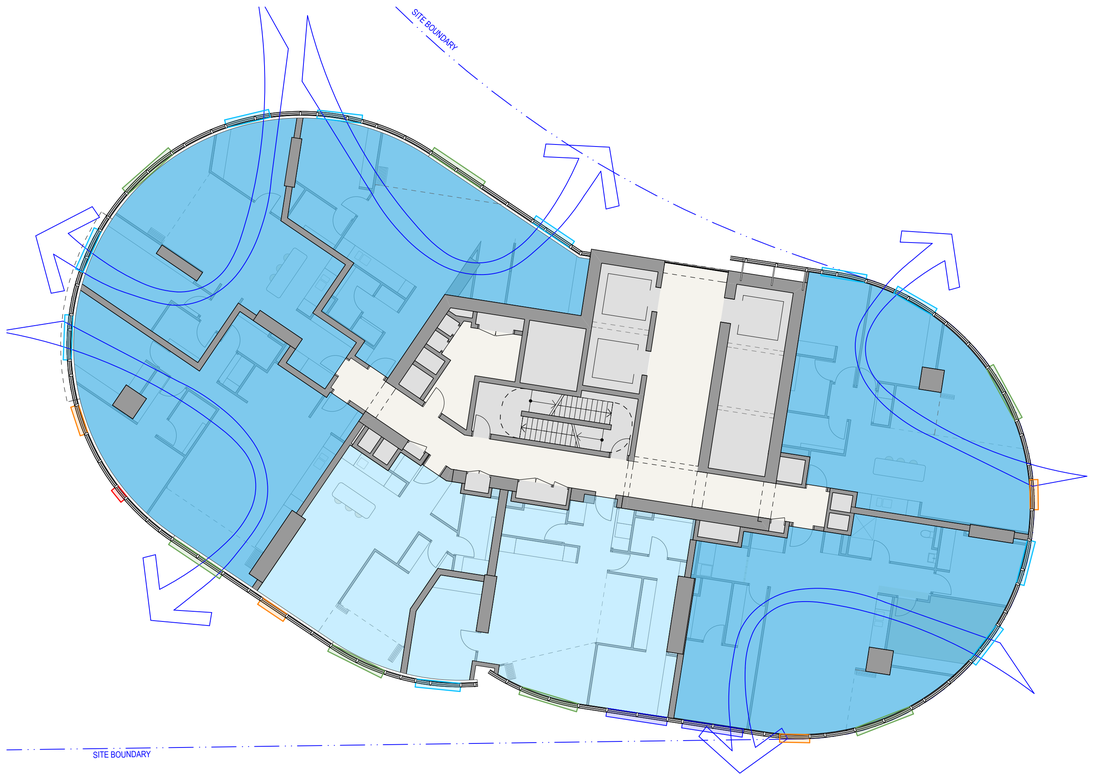
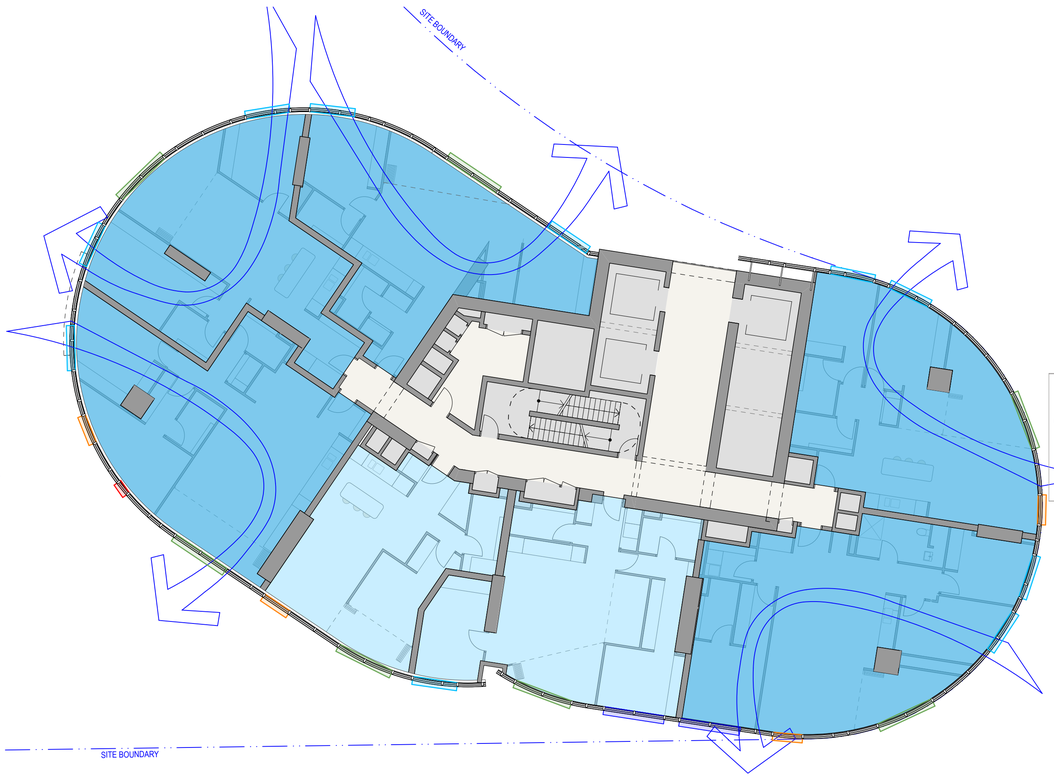
GOOD VENTILATION - 100% (Above Level 09)



3 PLAN LEVEL 29 A21
1:150

GOOD VENTILATION - 100% (Above Level 09)



4 PLAN LEVEL 30 - 38 A22
1:150

GOOD VENTILATION - 100% (Above Level 09)

GENERAL NOTES

- ALL DIMENSIONS AND EXISTING CONDITIONS SHALL BE CHECKED AND VERIFIED BY THE CONTRACTOR BEFORE PROCEEDING WITH THE WORK
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legend

Cross Ventilation

Good Ventilation

Assisted Cross Ventilation

Wintergarden Operable Facade

1.5 Modules - 1400x1000 + 700x1000mm

2 Modules - 1400x1000 + 1400x1000mm

Awning Windows

0.5 Modules - 700x400mm

1 Module - 1400x400mm

1.5 Modules - 1400x400 + 700x400mm

2 Modules - 1400x400 + 1400x400mm

8.0 Average star rating
NATIONWIDE HOUSE ENERGY RATING SCHEME
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DA01	2/11/18	Response to Submissions	JRS	

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project
Modification 13
80 PYRMONT STREET
PYRMONT NSW 2009

title
Ventilation Diagrams
Ventilation Diagrams

scale	Not to Scale	first issued	2/11/18
project code		sheet no.	revision
SM13		AF8205	DA01

For Information

0 0.2 0.5 1.0m

GENERAL NOTES

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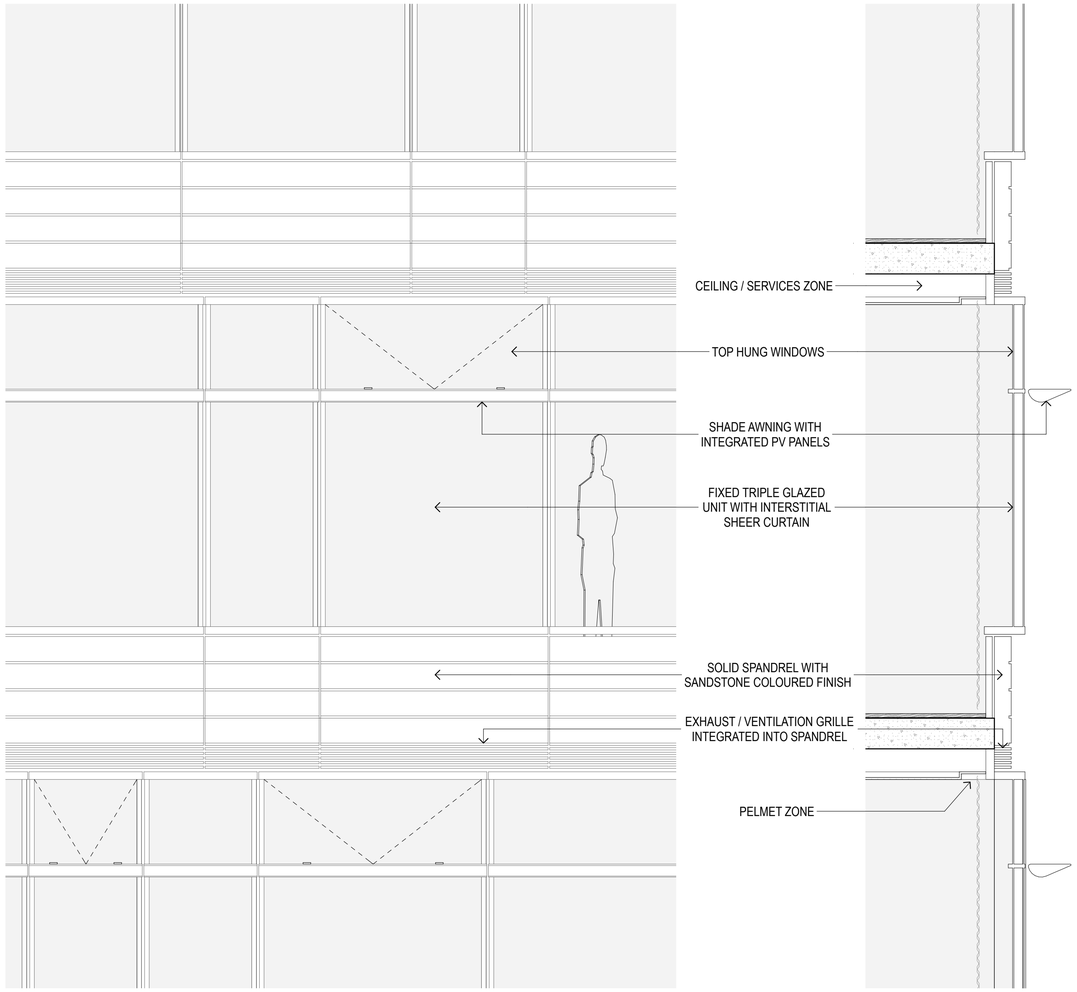
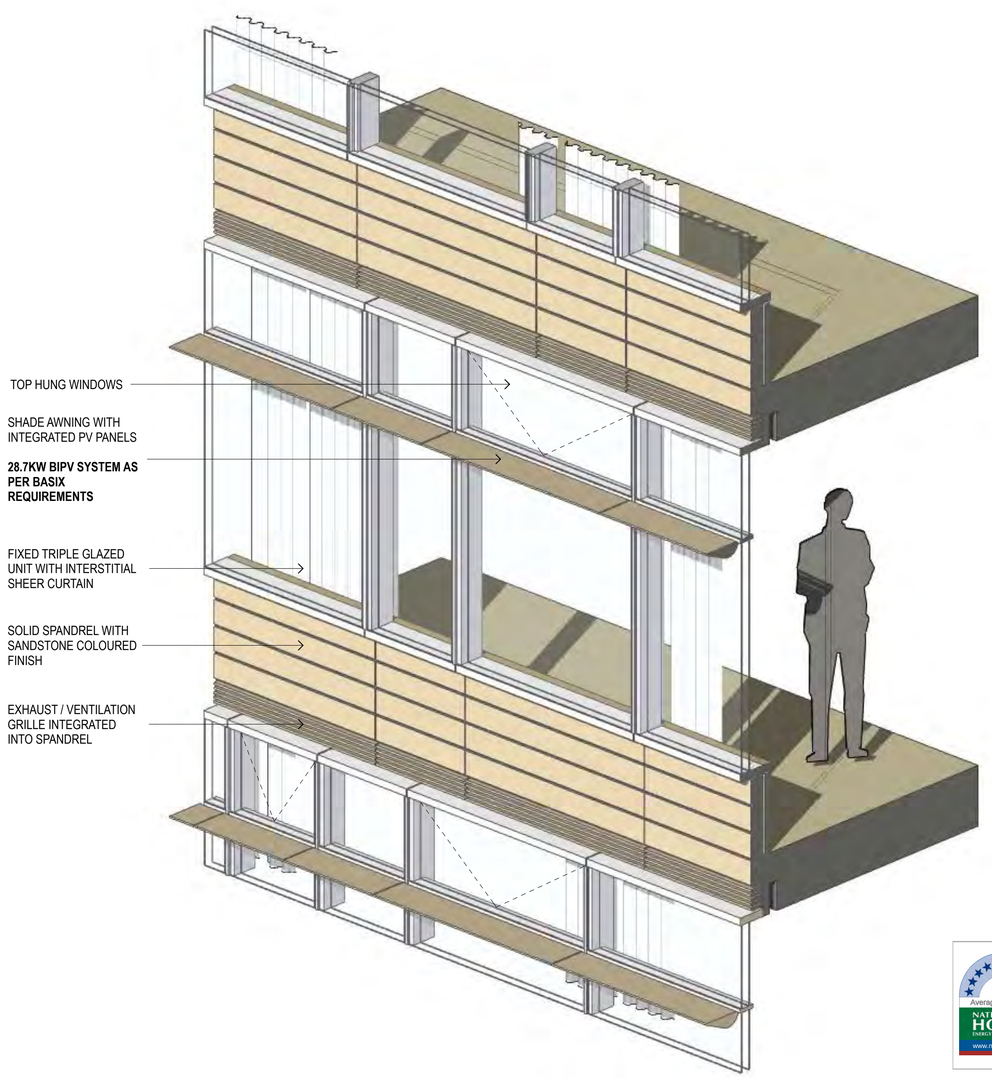
legend



1 ELEVATION Typical Elevation
1:20

2 SECTION Typical Section
1:20



3 3D VIEW Sectional Axonometric
1:20

8.0 Average star rating
NATIONWIDE HOUSE ENERGY RATING SCHEME
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DA01	2/11/18	Response to Submissions	JRS	

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project
Modification 13
80 PYRMONT STREET
PYRMONT NSW 2009

title
Facade Details
Typical Tower Facade Details

scale	1:20 @ A1	first issued	2/11/18
project code		sheet no.	revision
SM13		AF8300	DA01

0 0.2 0.5 1.0m

GENERAL NOTES

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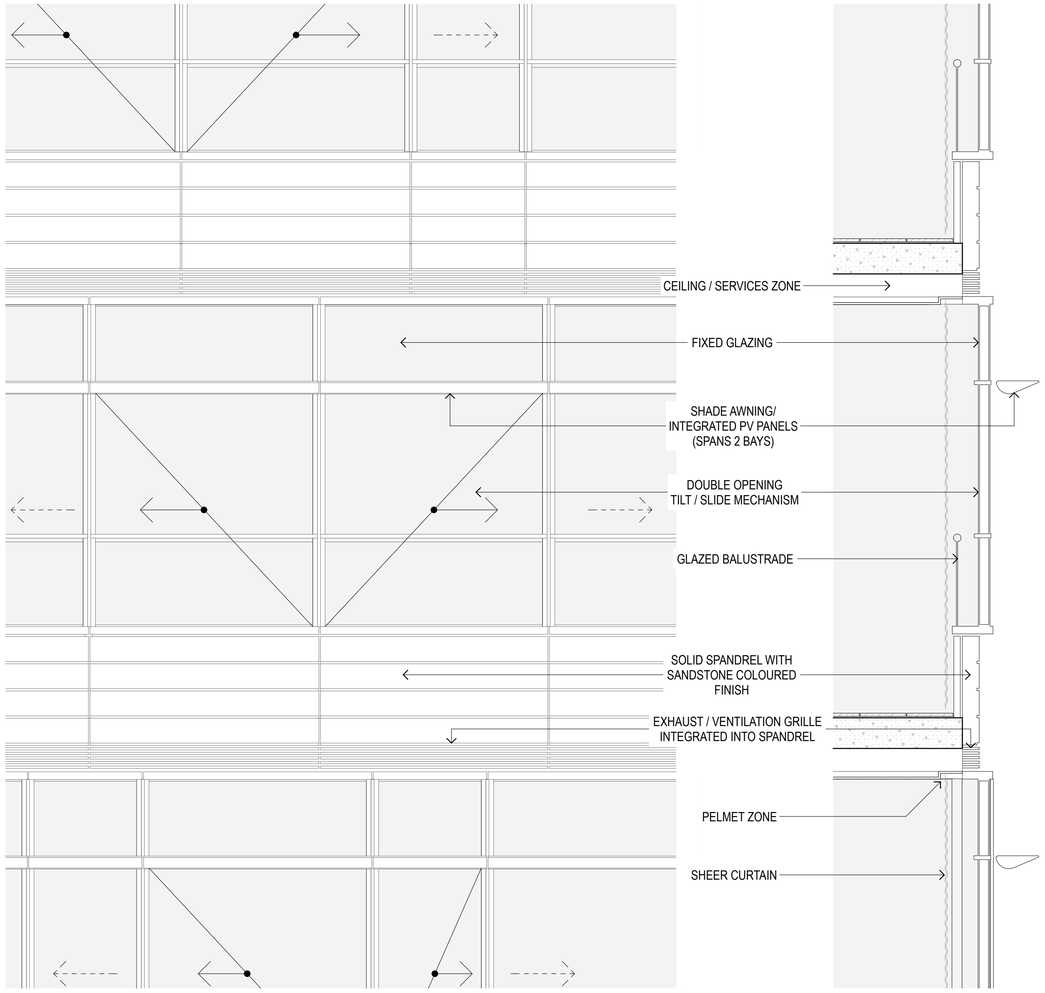
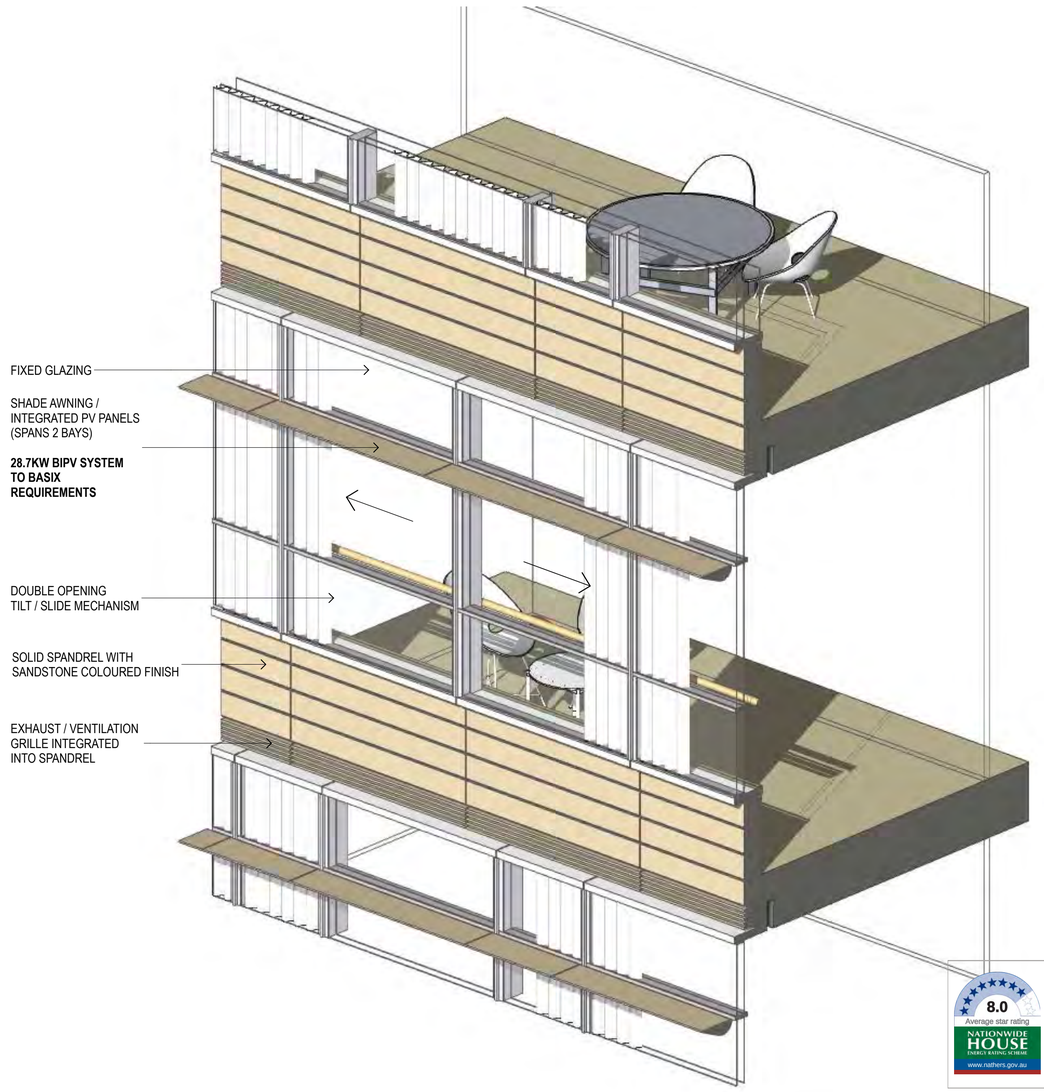
legend



1 ELEVATION Typical Elevation
1:20

2 SECTION Typical section
1:20



3 3D VIEW Sectional Axonometric
1:20

8.0 Average star rating
NATIONWIDE HOUSE ENERGY RATING SCHEME
www.nathers.gov.au

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DA01	2/11/18	Response to Submissions	JRS	

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project
Modification 13
80 PYRMONT STREET
PYRMONT NSW 2009

title
Facade Details
Typical Wintergarden Facade Details

scale	1:20 @ A1	first issued	2/11/18
project code		sheet no.	revision
SM13		AF8301	DA01

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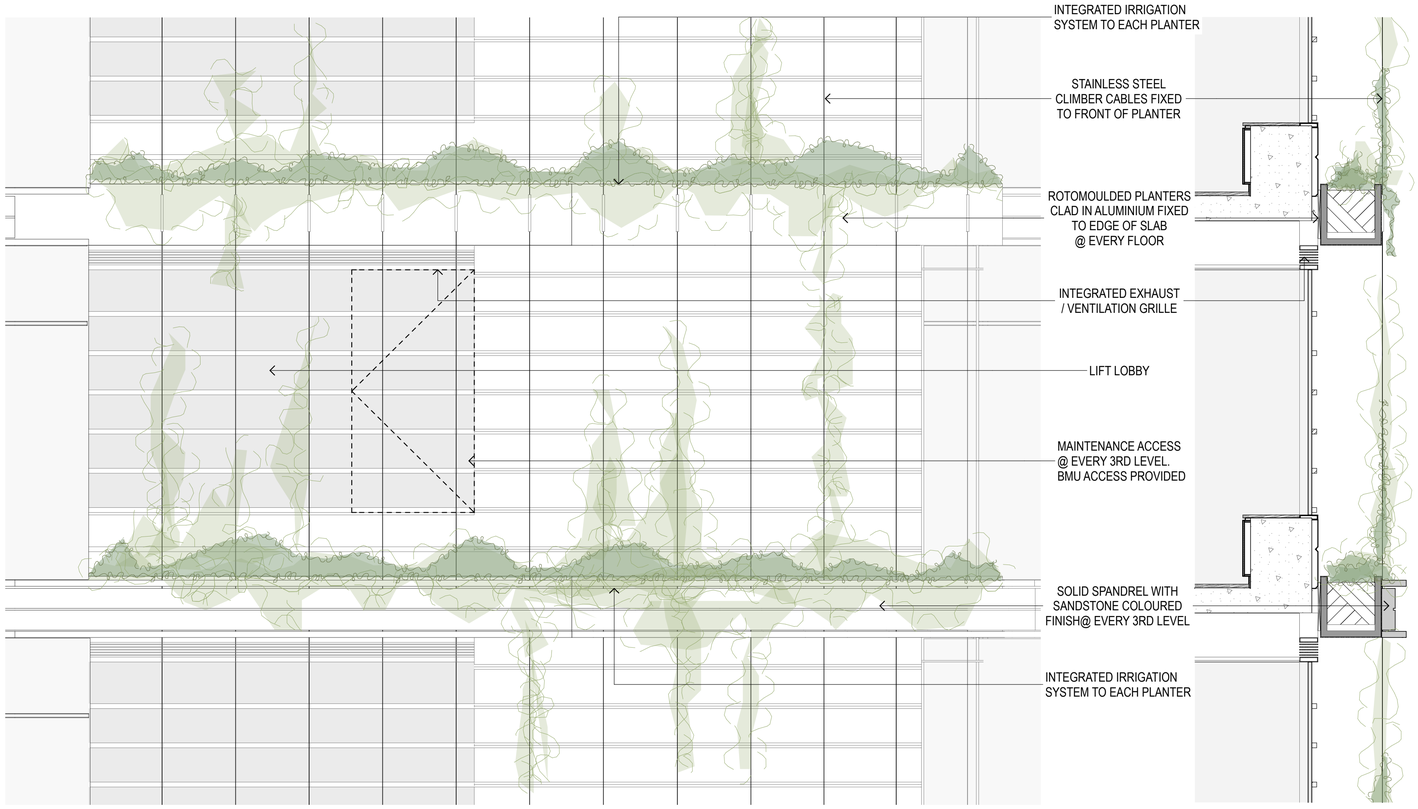
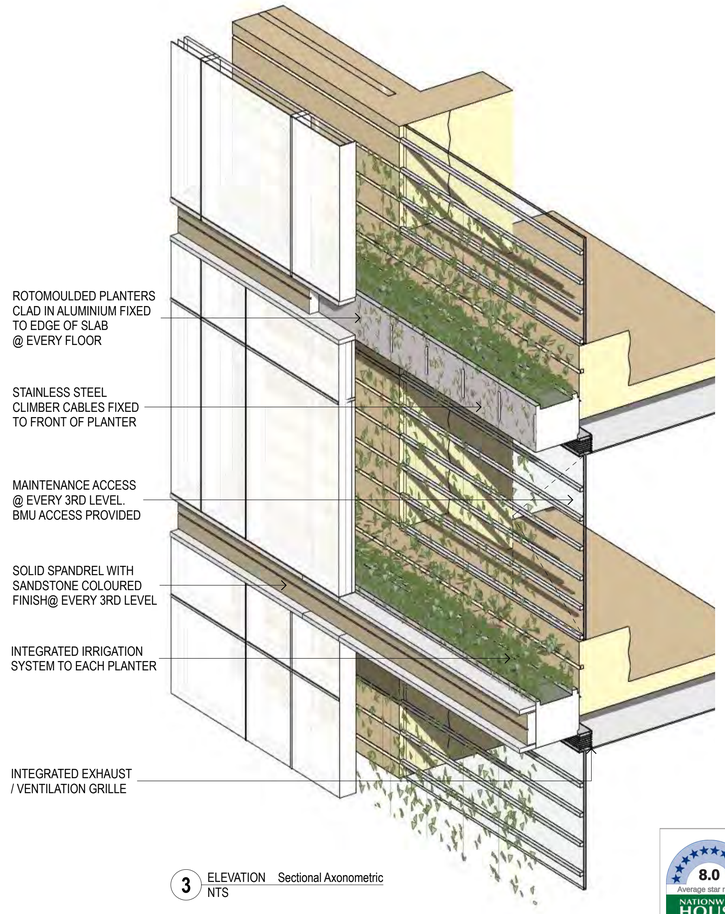
legend



1 ELEVATION Elevation
1:25

2 ELEVATION Section
1:25



3 ELEVATION Sectional Axonometric
NTS

8.0 Average star rating
NATIONWIDE HOUSE ENERGY RATING SCHEME
www.nathers.gov.au

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Assessor Name: Nicholas Asha
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DA01	2/11/18	Response to Submissions	JRS	

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sydney melbourne uk
Level 5, 70 King Street t +61 2 9251 7077 w fjmtstudio.com

project
Modification 13
80 PYRMONT STREET
PYRMONT NSW 2009

title
Facade Details
Western Seam Planter Details

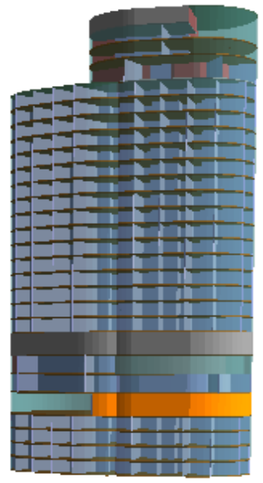
scale	1:25 @ A1	first issued	2/11/18
project code		sheet no.	revision
SM13		AF8302	DA01

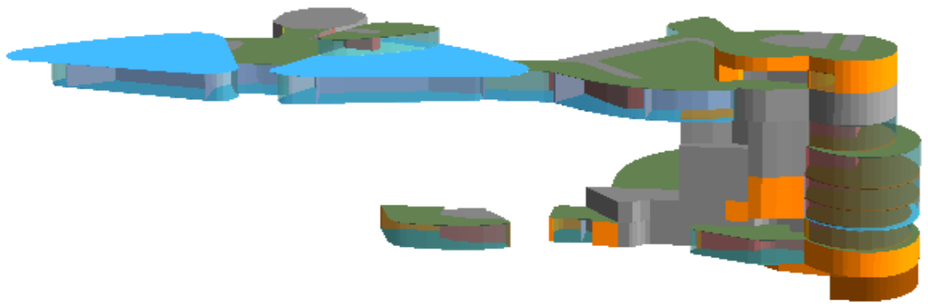
APPENDIX B NCC SECTION J REPORT

2305180U

THE STAR - MODIFICATION 13

JV3 ANALYSIS REPORT





JUNE 2017

THE STAR - MODIFICATION 13

Prepared for The Star Entertainment Group Limited

Project: 2305180U
Date: 09/06/2017

WSP Australia Pty Ltd
Level 27, 680 George St
Sydney NSW 2000
Australia

Phone: 02 9272 5100
www.wsp.com

QUALITY MANAGEMENT

ISSUE/REVISION	FOR ISSUE	FOR ISSUE	FOR ISSUE
Remarks	For Planning Approval	Updated For Planning Approval	Updated for planning approval
Date	28/02/2017	24/03/2017	09/06/2017
Prepared by	MJT	MJT	
Checked by	SNH	SNH	
Authorised by	TRP	TRP	NJA
Project number	2305180U	2305180U	
Report number	Rev00	Rev01	Rev02
File reference	2305180U.0.2/ESD	2305180U.0.2/ESD	

SIGNATURES

PREPARED BY

Martin Timperley
Sustainability Consultant

AUTHORISED BY

Sean Holmes,
Senior Sustainability Consultant

EXECUTIVE SUMMARY

WSP has been engaged by The Star Entertainment Group to undertake a BCA Section J assessment using Verification Method JV3 for the Modification 13 development of the existing Star site in Pyrmont Sydney, Australia. This assessment will relate to the hotel, restaurant, community center, club lounge, function and lobby spaces of the 61 storey tower and ribbon complex as outlined in red in Figure 1.

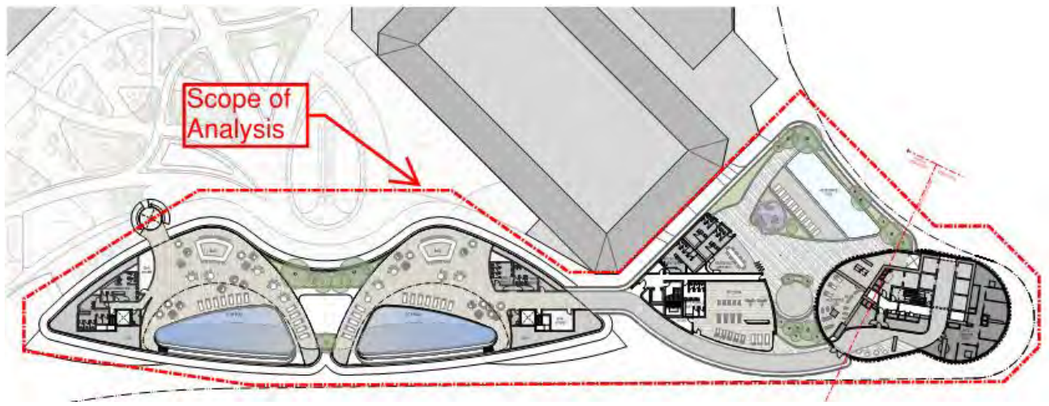


Figure 1: Scope of Section J assessment for the Star's Modification 13 development

Verification Method JV3 requires a comparison between a Reference Building — constructed in accordance to the Deemed-to-Satisfy (DTS) provisions detailed in Section J Energy Efficiency, Volume One of the National Construction Code (NCC) Series 2016—and a Proposed Building – representing the building envelope design of the proposed development.

The following simulations have been carried out:

- Reference Building + Reference Services—modelling of the building with the building envelope and services meeting the DTS provisions
- Proposed Building + Reference Services—modelling of the building with the building envelope meeting the design intent and the services meeting the DTS provisions

Table 1and Figure 2 demonstrate the predicted annual energy consumption for the simulations performed.

Building	Annual Energy Consumption (MWh/year)					
	Heating	Cooling	Fans & Pumps	Equipment	Lighting	Total
Reference Building + Reference Services	323	422	2,964	805	764	5,278
Proposed Building + Reference Services	282	453	2,862	805	764	5,165

Table 1: Simulation Results

Based on the modelling performed, the proposed building envelope is deemed to comply with the performance requirements for Section J provided that the building fabric in the body of this report and new glazing with the following thermal performance properties are implemented. For the purpose of this assessment glazing of the following performance has been used across the entire development.

Modification 13 Ribbon and Tower	SHGC (Centre of Pane)	U-Value (Centre of Pane)	VLT (Centre of Pane)
All Glazing Systems	0.32	1.62	0.64

Table 2: Compliant glazing thermal performance characteristics

It is not necessary to install the exact glazing product specified above but the U-value and the SHGC of the glazing must be less than or equal to the specified value.

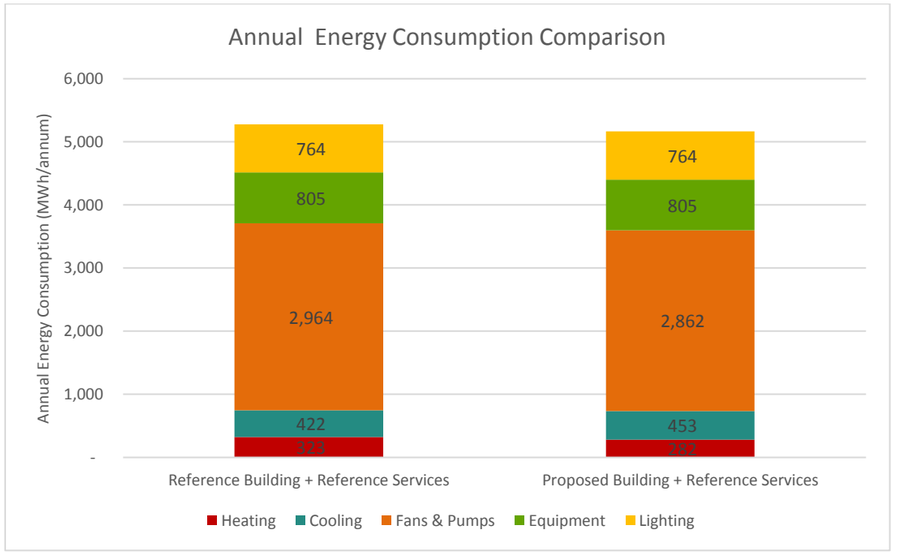


Figure 2: Simulation Results

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1 INTRODUCTION

PURPOSE OF REPORT

WSP | Parsons Brinckerhoff has been engaged by The Star Entertainment Group to undertake a Section J assessment using Verification Method JV3 for the Modification 13 development at The Star, Sydney, at 80 Pyrmont Road, Pyrmont NSW. This assessment relates to the hotel, restaurant, community center, club lounge, function and lobby spaces of the tower and ribbon development as outlined in red in Figure 1.

Verification Method JV3 requires a comparison between a Reference Building—constructed in accordance the Deemed-to-Satisfy (DTS) provisions detailed in Section J Energy Efficiency, Volume One of the National Construction Code (NCC) Series 2016—and a Proposed Building.

The following simulations have been carried out:

- Reference Building + Reference Services—energy modelling of the building with the building envelope and services meeting the DTS provisions
- Proposed Building + Reference Services—energy modelling of the building with the building envelope meeting the design intent and the services meeting the DTS provisions

This report presents the methodology used for the JV3 modelling and the results of the simulations undertaken.

EXPERT

Alan Davis has a Bachelor of Science in Mechanical Engineering and a Masters of Science in Sustainable Energy Engineering. He is an Associate Director of WSP | Parsons Brinckerhoff. Alan has eleven years of experience in energy modelling and building code compliance reporting. He is a Green Star and Infrastructure Sustainability Accredited Professional.

PERFORMANCE REQUIREMENTS

Volume One of the NCC Series 2016 Clause A0.10 Requirements

The relevant DTS Provisions considered in the Reference Building and the Proposed Building is as follows:

- Section J Part J1 Building Fabric
- Section J Part J2 Glazing

Volume One of the NCC Series 2016 JP1 Requirements

A building, including its services, must have, to the degree necessary, features that facilitate the efficient use of energy appropriate to:

- The function and use of the building and its services
- The internal environment
- The geographic location of the building
- The effects of nearby permanent features such as topography, structures and buildings
- Solar radiation being utilised for heating and controlled to minimise energy for cooling
- The sealing of the building envelope against air leakage
- The utilisation of air movement to assist heating and cooling
- The energy source of the services

2 METHODOLOGY

ASSESSMENT METHOD AND BUILDING CLASSIFICATION

Clause A0.9 of Volume One of the NCC Series 2016 stipulates that the following assessment methods, or any combination of them, can be used to determine that a building solution complies with the performance requirements:

- Evidence to support that the use of a material, form of construction or design meets a Performance Requirement or a Deemed-to-Satisfy provision as described in A2.2
- Verification Methods such as the Verification Methods in the BCA; or such other Verification Methods as the appropriate authority accepts for determining compliance with the Performance Requirements
- Comparison with the DTS provisions
- Expert judgement

The development seeks to demonstrate compliance with JP1 by using:

- **Verification Method JV3**; determining that the annual energy consumption of the Proposed Building is not more than the annual energy consumption of the Reference Building

Under Part A3.2 of Volume One of the NCC, the mixed use development includes a Class 3 residential building for the hotel portion of the tower, Class 6 retail areas for the bars, restaurants, club lounge and cafes and Class 9b assembly building for the community centre and function spaces.

The site is located within Climate Zone 5.

MODEL INFORMATION

SOFTWARE

The computer simulation package used for the thermal simulation was Tas version 9.4, by Environmental Design Solutions Limited. It is an EN ISO 13791 validated dynamic simulation modelling (DSM) software tool and is approved under the *ABCB Protocol for Building Energy Analysis Software*, *Version 2006.1*.

SOURCES OF INFORMATION

The following sources of information were used to generate the thermal model:

- Volume One of the NCC Series 2016;
- Post competition architectural model and drawings by Francis-Jones Morehen Thorp (FJMT).

EQUIPMENT LOADS

The simulations apply the following air conditioning parameters, per Volume One of the NCC Series 2016, including:

- Specification JV Table 2b and 2d for the appliances and equipment schedule;
- Specification JV Table 2h for equipment loads.

MECHANICAL SERVICES

The simulations apply the following air conditioning parameters, as per Volume One of the NCC Series 2016, including:

- Specification JV Table 2b and 2d for the air conditioning operational schedule;
- Clause JV3 (d), sub clause (i) (D) for the air conditioning temperature range;
- Maximum fan motor power, as per Specification J5.2a Table 3a.

OCCUPANCY LOADS

The simulations apply the following air conditioning parameters, as per Volume One of the NCC Series 2016, including:

- Specification JV Table 2b and 2d for the occupancy schedule;
- Specification JV, Table 2j, other applications (a) for sensible and latent occupancy heat gain;
- Table D1.13 for occupant density.

LIGHTING LOADS

The simulations apply the following air conditioning parameters, as per Volume One of the NCC Series 2016, including:

- Specification JV and Table 2b and 2d for artificial lighting schedule;
- Table J6.2a for maximum illumination power density.

3 BUILDING FABRIC PERFORMANCE PARAMETERS

This section summarises the building fabric as modelled for the JV3 analysis. It details changes to the building elements currently specified to achieve compliance.

Table 3 lists the building fabric performance parameters used in the reference and the proposed building. There is currently no proposed deviations from the “deemed to satisfy” building fabric provisions in the proposed model.

Table 3: Thermal envelope building fabric breakdown

Building Fabric Element	Reference Fabric Total R-value (m^2.K/W)	Proposed Fabric Total R-value (m^2.K/W)
Slab on ground	Nil	Nil
Enclosed floor/ceiling adjacent to a non-conditioned space mechanically ventilated by no more than 1.5 air changes per hour	1.25	1.25
Suspended floor	2.0	2.0
External wall	2.8	2.8
Enclosed envelope wall	1.8	1.8
Roof	3.2 Solar absorptance ≤ 0.4	3.2 Solar absorptance ≤ 0.4

4 BUILDING GLAZING PERFORMANCE PARAMETERS

The reference building glazing is developed in compliance with the National Construction Code Glazing Calculators (Volume One). Refer to Appendix 1 for the completed Glazing Calculators, Table 4 summarise the glazing parameters used for the JV3 analysis.

Table 4: Building glazing parameters

Level	Orientation	Glass Only (centre of pane)		Reference Building Benchmark Product	Proposed Building Thermal Performance Specification
		U-Value (W/m²K)	SHGC		
B2 – Lift Lobby	NE	5.9	0.85	Viridian Vfloat Clear 3mm Aluminium Frame	China southern 6SJ68S-1 on Clear +12A + 6C, 100mm U-Value: 1.6 W/m²K SHGC: 0.32 Aluminium Frame
B2 – Core Retail Area	NE	3.8	0.45	Viridian Evantage Bronze 6mm Aluminium Frame	
	E	1.9	0.3	Viridian Enviroshield Perfomance ITO SuperGreen 4 8.76mm+ Air 12mm + Clear 6mm Aluminium Frame	
	SE	1.87	0.46	Viridian Vfloat Green N 6mm+ Air 12mm + Clear 6mm Aluminium Frame	
B2 - Hotel Entry	SW	1.9	0.7	Viridian Vfloat Clear 3mm + 12mm Argon + 4mm Clear Aluminium Frame	
	S	1.9	0.3	Viridian Enviroshield Perfomance ITO SuperGreen 4 8.76mm+ Air 12mm + Clear 6mm Aluminium Frame	
	SE	1.9	0.7	Viridian Vfloat Clear 3mm + 12mm Argon + 4mm Clear, Aluminium Frame	
	E	3.8	0.63	Viridian Evantage Clear 6mm Aluminium Frame	
	NE	3.8	0.45	Viridian Evantage Bronze 6mm Aluminium Frame	
G - Resi Lobby	S	5.9	0.85	Viridian Vfloat Clear 3mm Aluminium Frame	China southern 6SJ68S-1 on Clear +12A + 6C, 100mm U-Value: 1.6 W/m²K SHGC: 0.32 Aluminium Frame
	W	1.7	0.21	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + Clear 6mm Aluminium Frame	
	NW	1.7	0.21	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + Clear 6mm Aluminium Frame	
	N	1.7	0.21	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + Clear 6mm Aluminium Frame	
	NE	1.9	0.3	Viridian Enviroshield Perfomance ITO SuperGreen 4 8.76mm+ Air 12mm + Clear 6mm Aluminium Frame	

	E	2.3	0.18	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + 6mm Grey Aluminium Frame	
	SE	1.87	0.46	Viridian Vfloat Green N 6mm+ Air 12mm + Clear 6mm Aluminium Frame	
Lvl01 - Community Centre	SW	1.9	0.3	Viridian Enviroshield Perfomance ITO SuperGreen 4 8.76mm+ Air 12mm + Clear 6mm Aluminium Frame	China southern 6SJ68S-1 on Clear +12A + 6C, 100mm U-Value: 1.6 W/m^{2}K SHGC: 0.32 Aluminium Frame
	W	2.3	0.18	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + 6mm Grey Aluminium Frame	
	NW	2.3	0.18	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + 6mm Grey Aluminium Frame	
	N	2.3	0.18	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + 6mm Grey Aluminium Frame	
	NE	0.9	0.15	SHGC: 0.13 U-Value: 1.2 W/m².K Aluminium frame Benchmark product: Pilkington Suncool 30/17 OW, Annealed, 6 mm + 16mm Air + Optifloat Clear, Annealed, 4 mm + 16mm Air + Eclipse Advantage Grey, Annealed, 6mm	
	E	2.3	0.18	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + 6mm Grey Aluminium Frame	
	SE	5.9	0.85	Viridian Vfloat Clear 3mm Aluminium Frame	
Lvl02 - Community Centre	SW	1.9	0.3	Viridian Enviroshield Perfomance ITO SuperGreen 4 8.76mm+ Air 12mm + Clear 6mm Aluminium Frame	China southern 6SJ68S-1 on Clear +12A + 6C, 100mm U-Value: 1.6 W/m^{2}K SHGC: 0.32 Aluminium Frame
	W	2.3	0.18	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + 6mm Grey Aluminium Frame	
	NW	2.3	0.18	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + 6mm Grey Aluminium Frame	
	N	2.3	0.18	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + 6mm Grey Aluminium Frame	
	NE	0.9	0.15	SHGC: 0.13 U-Value: 1.2 W/m².K Aluminium frame Benchmark product: Pilkington Suncool 30/17 OW, Annealed, 6 mm + 16mm Air + Optifloat Clear, Annealed, 4 mm + 16mm Air + Eclipse Advantage Grey, Annealed, 6mm	
	E	2.3	0.18	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + 6mm Grey Aluminium Frame	
	SE	5.9	0.85	Viridian Vfloat Clear 3mm Aluminium Frame	

Lvl03 - Community Centre	SW	1.9	0.3	Viridian Enviroshield Perfomance ITO SuperGreen 4 8.76mm+ Air 12mm + Clear 6mm Aluminium Frame	China southern 6SJ68S-1 on Clear +12A + 6C, 100mm U-Value: 1.6 W/m²K SHGC: 0.32 Aluminium Frame
	W	0.9	0.15	SHGC: 0.13 U-Value: 1.2 W/m².K Aluminium frame Benchmark product: Pilkington Suncool 30/17 OW, Annealed, 6 mm + 16mm Air + Optifloat Clear, Annealed, 4 mm + 16mm Air + Eclipse Advantage Grey, Annealed, 6mm	
	NW	0.9	0.15	SHGC: 0.13 U-Value: 1.2 W/m².K Aluminium frame Benchmark product: Pilkington Suncool 30/17 OW, Annealed, 6 mm + 16mm Air + Optifloat Clear, Annealed, 4 mm + 16mm Air + Eclipse Advantage Grey, Annealed, 6mm	
	N	0.9	0.15	SHGC: 0.13 U-Value: 1.2 W/m².K Aluminium frame Benchmark product: Pilkington Suncool 30/17 OW, Annealed, 6 mm + 16mm Air + Optifloat Clear, Annealed, 4 mm + 16mm Air + Eclipse Advantage Grey, Annealed, 6mm	
	NE	0.7	0.13	SHGC: 0.13 U-Value: 1.2 W/m².K Aluminium frame Benchmark product: Pilkington Suncool 30/17 OW, Annealed, 6 mm + 16mm Argon + OptiWhite 8mm, Annealed, 4 mm + 16mm Argon + Eclipse Advantage Bronze, Annealed, 6mm	
	E	0.9	0.15	SHGC: 0.13 U-Value: 1.2 W/m².K Aluminium frame Benchmark product: Pilkington Suncool 30/17 OW, Annealed, 6 mm + 16mm Air + Optifloat Clear, Annealed, 4 mm + 16mm Air + Eclipse Advantage Grey, Annealed, 6mm	
	SE	5.9	0.85	Viridian Vfloat Clear 3mm Aluminium Frame	
Lvl05 - Community Centre	W	1.7	0.17	SHGC: 0.17 U-Value: 2.2 W/m².K Aluminium frame Benchmark product: Pilkington Reflite Bronze, Annealed, 6mm + 8mm Air + Optilam OW Double White, Laminated, 8.8mm + 9mm Air + Eclipse Advantage Grey, Annealed, 6mm	China southern 6SJ68S-1 on Clear +12A + 6C, 100mm U-Value: 1.6 W/m²K SHGC: 0.32 Aluminium Frame
	NW	2.3	0.18	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + 6mm Grey Aluminium Frame	

	N	2.3	0.18	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + 6mm Grey Aluminium Frame	
	NE	0.9	0.15	SHGC: 0.13 U-Value: 1.2 W/m².K Aluminium frame Benchmark product: Pilkington Suncool 30/17 OW, Annealed, 6 mm + 16mm Air + Optifloat Clear, Annealed, 4 mm + 16mm Air + Eclipse Advantage Grey, Annealed, 6mm	
	E	2.3	0.18	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + 6mm Grey Aluminium Frame	
Lvl07 - Ribbon	SW	1.7	0.21	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + Clear 6mm Aluminium Frame	China southern 6SJ68S-1 on Clear +12A + 6C, 100mm U-Value: 1.6 W/m²K SHGC: 0.32 Aluminium Frame
	W	1.7	0.21	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + Clear 6mm Aluminium Frame	
	NW	2.3	0.18	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + 6mm Grey Aluminium Frame	
	N	1.7	0.21	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + Clear 6mm Aluminium Frame	
	NE	1.7	0.21	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + Clear 6mm Aluminium Frame	
	E	1.9	0.3	Viridian Enviroshield Perfomance ITO SuperGreen 4 8.76mm+ Air 12mm + Clear 6mm Aluminium Frame	
	SE	1.7	0.17	SHGC: 0.17 U-Value: 2.2 W/m².K Aluminium frame Benchmark product: Pilkington Reflite Bronze, Annealed, 6mm + 8mm Air + Optilam OW Double White, Laminated, 8.8mm + 9mm Air + Eclipse Advantage Grey, Annealed, 6mm	
	S	1.9	0.3	Viridian Enviroshield Perfomance ITO SuperGreen 4 8.76mm+ Air 12mm + Clear 6mm Aluminium Frame	
Lvl09 - Resi Gym	W	1.7	0.21	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + Clear 6mm Aluminium Frame	China southern 6SJ68S-1 on Clear +12A + 6C, 100mm U-Value: 1.6 W/m²K SHGC: 0.32 Aluminium Frame
	SW	1.7	0.21	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + Clear 6mm Aluminium Frame	
	S	1.7	0.21	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + Clear 6mm Aluminium Frame	
	SE	3.8	0.45	Viridian Evantage Bronze 6mm Aluminium Frame	

Lvl09 - Resi Gym	W	1.7	0.21	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + Clear 6mm Aluminium Frame	China southern 6SJ68S-1 on Clear +12A + 6C, 100mm U-Value: 1.6 W/m^{2}K SHGC: 0.32 Aluminium Frame
	NW	1.7	0.21	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + Clear 6mm Aluminium Frame	
	N	1.7	0.21	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + Clear 6mm Aluminium Frame	
	NE	1.7	0.21	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + Clear 6mm Aluminium Frame	
	E	1.7	0.21	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + Clear 6mm Aluminium Frame	
	S	1.87	0.46	Viridian Vfloat Green N 6mm+ Air 12mm + Clear 6mm Aluminium Frame	
	SW	1.9	0.3	Viridian Enviroshield Perfomance ITO SuperGreen 4 8.76mm+ Air 12mm + Clear 6mm Aluminium Frame	
Lvl10 - Resi Gym	W	1.7	0.21	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + Clear 6mm Aluminium Frame	China southern 6SJ68S-1 on Clear +12A + 6C, 100mm U-Value: 1.6 W/m^{2}K SHGC: 0.32 Aluminium Frame
	SW	1.7	0.21	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + Clear 6mm Aluminium Frame	
	S	1.7	0.21	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + Clear 6mm Aluminium Frame	
	SE	3.8	0.45	Viridian Evantage Bronze 6mm Aluminium Frame	
Lvl39 - Hotel BOH	SW	1.7	0.21	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + Clear 6mm Aluminium Frame	China southern 6SJ68S-1 on Clear +12A + 6C, 100mm U-Value: 1.6 W/m^{2}K SHGC: 0.32 Aluminium Frame
	W	1.7	0.17	SHGC: 0.17 U-Value: 2.2 W/m².K Aluminium frame Benchmark product: Pilkington Reflite Bronze, Annealed, 6mm + 8mm Air + Optilam OW Double White, Laminated, 8.8mm + 9mm Air + Eclipse Advantage Grey, Annealed, 6mm	
	E	2.3	0.18	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + 6mm Grey Aluminium Frame	
	SE	2.3	0.18	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + 6mm Grey Aluminium Frame	
	S	1.9	0.3	Viridian Enviroshield Perfomance ITO SuperGreen 4 8.76mm+ Air 12mm + Clear 6mm Aluminium Frame	
Lvl40 - Sky Lobby	SW	1.7	0.21	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + Clear 6mm Aluminium Frame	China southern 6SJ68S-1 on Clear +12A + 6C, 100mm U-Value: 1.6 W/m^{2}K SHGC: 0.32

	W	1.7	0.17	SHGC: 0.17 U-Value: 2.2 W/m².K Aluminium frame Benchmark product: Pilkington Reflite Bronze, Annealed, 6mm + 8mm Air + Optilam OW Double White, Laminated, 8.8mm + 9mm Air + Eclipse Advantage Grey, Annealed, 6mm	Aluminium Frame
	NW	2.3	0.18	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + 6mm Grey Aluminium Frame	
	N	2.3	0.18	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + 6mm Grey Aluminium Frame	
	NE	0.9	0.15	SHGC: 0.13 U-Value: 1.2 W/m².K Aluminium frame Benchmark product: Suncool 30/17 OW, Annealed, 6 mm + 16mm Air + Optifloat Clear, Annealed, 4 mm + 16mm Air + Eclipse Advantage Grey, Annealed, 6mm	
	E	2.3	0.18	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + 6mm Grey Aluminium Frame	
	SE	2.3	0.18	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + 6mm Grey Aluminium Frame	
	S	1.9	0.3	Viridian Enviroshield Perfomance ITO SuperGreen 4 8.76mm+ Air 12mm + Clear 6mm Aluminium Frame	
Lvl41 - Sky Lobby Mezz	SW	1.7	0.21	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + Clear 6mm Aluminium Frame	China southern 6SJ68S-1 on Clear +12A + 6C, 100mm U-Value: 1.6 W/m²K SHGC: 0.32 Aluminium Frame
	W	1.7	0.17	SHGC: 0.17 U-Value: 2.2 W/m².K Aluminium frame Benchmark product: Pilkington Reflite Bronze, Annealed, 6mm + 8mm Air + Optilam OW Double White, Laminated, 8.8mm + 9mm Air + Eclipse Advantage Grey, Annealed, 6mm	
	NE	0.9	0.15	SHGC: 0.13 U-Value: 1.2 W/m².K Aluminium frame Benchmark product: Pilkington Suncool 30/17 OW, Annealed, 6 mm + 16mm Air + Optifloat Clear, Annealed, 4 mm + 16mm Air + Eclipse Advantage Grey, Annealed, 6mm	
	E	2.3	0.18	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + 6mm Grey Aluminium Frame	
	SE	2.3	0.18	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + 6mm Grey Aluminium Frame	

	S	1.9	0.3	Viridian Enviroshield Perfomance ITO SuperGreen 4 8.76mm+ Air 12mm + Clear 6mm Aluminium Frame	
Lvl58 - Typical Hotel Plan	SW	1.7	0.21	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + Clear 6mm Aluminium Frame	China southern 6SJ68S-1 on Clear +12A + 6C, 100mm U-Value: 1.6 W/m²K SHGC: 0.32 Aluminium Frame
	W	1.7	0.17	SHGC: 0.17 U-Value: 2.2 W/m².K Aluminium frame Benchmark product: Pilkington Reflite Bronze, Annealed, 6mm + 8mm Air + Optilam OW Double White, Laminated, 8.8mm + 9mm Air + Eclipse Advantage Grey, Annealed, 6mm	
	NE	0.9	0.15	SHGC: 0.13 U-Value: 1.2 W/m².K Aluminium frame Benchmark product: Pilkington Suncool 30/17 OW, Annealed, 6 mm + 16mm Air + Optifloat Clear, Annealed, 4 mm + 16mm Air + Eclipse Advantage Grey, Annealed, 6mm	
	E	2.3	0.18	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + 6mm Grey Aluminium Frame	
	SE	2.3	0.18	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + 6mm Grey Aluminium Frame	
	N	2.3	0.18	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + 6mm Grey Aluminium Frame	
	NW	2.3	0.18	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + 6mm Grey Aluminium Frame	
	S	1.9	0.3	Viridian Enviroshield Perfomance ITO SuperGreen 4 8.76mm+ Air 12mm + Clear 6mm Aluminium Frame	
Lvl60 - Sky Villa	SW	1.9	0.3	Viridian Enviroshield Perfomance ITO SuperGreen 4 8.76mm+ Air 12mm + Clear 6mm Aluminium Frame	China southern 6SJ68S-1 on Clear +12A + 6C, 100mm U-Value: 1.6 W/m²K SHGC: 0.32 Aluminium Frame
	W	1.7	0.17	SHGC: 0.17 U-Value: 2.2 W/m².K Aluminium frame Benchmark product: Pilkington Reflite Bronze, Annealed, 6mm + 8mm Air + Optilam OW Double White, Laminated, 8.8mm + 9mm Air + Eclipse Advantage Grey, Annealed, 6mm	
	NE	0.7	0.13	SHGC: 0.13 U-Value: 1.2 W/m².K Aluminium frame Benchmark product: Pilkington Suncool 30/17 OW, Annealed, 6 mm + 16mm Argon + OptiWhite 8mm, Annealed, 4 mm + 16mm Argon + Eclipse Advantage Bronze, Annealed, 6mm	

	E	0.9	0.15	SHGC: 0.13 U-Value: 1.2 W/m².K Aluminium frame Benchmark product: Pilkington Suncool 30/17 OW, Annealed, 6 mm + 16mm Air + Optifloat Clear, Annealed, 4 mm + 16mm Air + Eclipse Advantage Grey, Annealed, 6mm	
	SE	1.7	0.17	SHGC: 0.17 U-Value: 2.2 W/m².K Aluminium frame Benchmark product: Pilkington Reflite Bronze, Annealed, 6mm + 8mm Air + Optilam OW Double White, Laminated, 8.8mm + 9mm Air + Eclipse Advantage Grey, Annealed, 6mm	
	N	2.3	0.18	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + 6mm Grey Aluminium Frame	
	NW	2.3	0.18	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + 6mm Grey Aluminium Frame	
Lvl61 - Sky Villa	S	1.9	0.3	Viridian Enviroshield Perfomance ITO SuperGreen 4 8.76mm+ Air 12mm + Clear 6mm Aluminium Frame	China southern 6SJ68S-1 on Clear +12A + 6C, 100mm U-Value: 1.6 W/m²K SHGC: 0.32 Aluminium Frame
	W	1.7	0.17	SHGC: 0.17 U-Value: 2.2 W/m².K Aluminium frame Benchmark product: Pilkington Reflite Bronze, Annealed, 6mm + 8mm Air + Optilam OW Double White, Laminated, 8.8mm + 9mm Air + Eclipse Advantage Grey, Annealed, 6mm	
	NE	0.9	0.15	SHGC: 0.13 U-Value: 1.2 W/m².K Aluminium frame Benchmark product: Pilkington Suncool 30/17 OW, Annealed, 6 mm + 16mm Air + Optifloat Clear, Annealed, 4 mm + 16mm Air + Eclipse Advantage Grey, Annealed, 6mm	
	E	2.3	0.18	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + 6mm Grey Aluminium Frame	
	SE	2.3	0.18	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + 6mm Grey Aluminium Frame	
	N	2.3	0.18	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + 6mm Grey Aluminium Frame	
	NW	2.3	0.18	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + 6mm Grey Aluminium Frame	
Lvl59 - Club Lounge	SW	1.7	0.21	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + Clear 6mm Aluminium Frame	China southern 6SJ68S-1 on Clear +12A + 6C, 100mm U-Value: 1.6 W/m²K SHGC: 0.32

	W	1.7	0.17	SHGC: 0.17 U-Value: 2.2 W/m².K Aluminium frame Benchmark product: Pilkington Reflite Bronze, Annealed, 6mm + 8mm Air + Optilam OW Double White, Laminated, 8.8mm + 9mm Air + Eclipse Advantage Grey, Annealed, 6mm	Aluminium Frame
	NE	0.7	0.13	SHGC: 0.13 U-Value: 1.2 W/m².K Aluminium frame Benchmark product: Pilkington Suncool 30/17 OW, Annealed, 6 mm + 16mm Argon + OptiWhite 8mm, Annealed, 4 mm + 16mm Argon + Eclipse Advantage Bronze, Annealed, 6mm	
	E	1.7	0.17	SHGC: 0.17 U-Value: 2.2 W/m².K Aluminium frame Benchmark product: Pilkington Reflite Bronze, Annealed, 6mm + 8mm Air + Optilam OW Double White, Laminated, 8.8mm + 9mm Air + Eclipse Advantage Grey, Annealed, 6mm	
	SE	2.3	0.18	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + 6mm Grey Aluminium Frame	
	N	2.3	0.18	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + 6mm Grey Aluminium Frame	
	NW	2.3	0.18	Viridian Enviroshield Perfomance ITO SuperBlue 40 12.76mm + air 12mm + 6mm Grey Aluminium Frame	
	S	1.9	0.3	Viridian Enviroshield Perfomance ITO SuperGreen 4 8.76mm+ Air 12mm + Clear 6mm Aluminium Frame	

5 RESULTS

The following simulations have been carried out:

- Reference Building + Reference Services—energy modelling of the building with the building envelope and services meeting the DTS provisions.
- Proposed Building + Reference Services—energy modelling of the building with the building envelope meeting the design intent and the services meeting the DTS provisions.

Table 5 and Figure 3 present the predicted annual energy consumption for the simulations performed.

Based on the modelling performed, the proposed building envelope is deemed to comply with the performance requirements of the 2016 Building Code of Australia.

Building	Annual Energy Consumption (MWh/year)					
	Heating	Cooling	Fans & Pumps	Equipment	Lighting	Total
Reference Building + Reference Services	323	422	2,964	805	764	5,278
Proposed Building + Reference Services	282	453	2,862	805	764	5,165

Table 5: Simulation Results

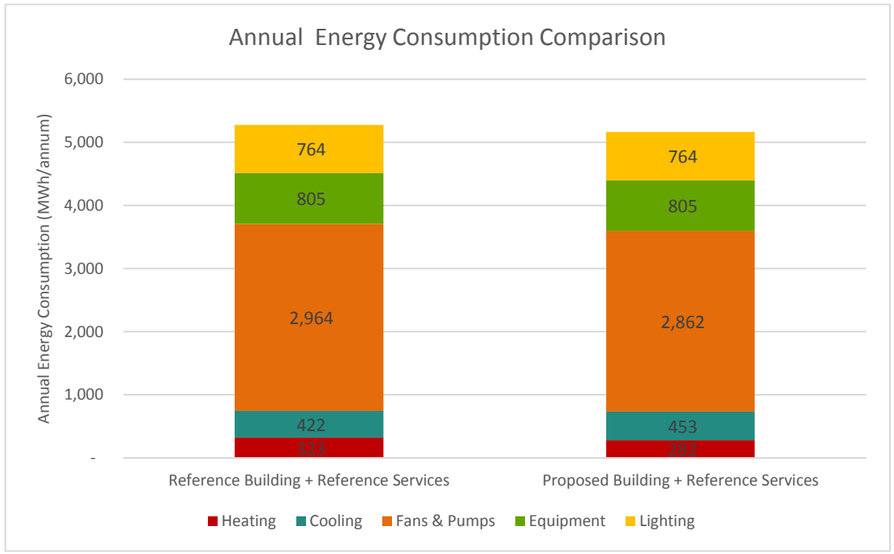

Figure 3: Simulation Results

Appendix 1

GLAZING CALCULATOR

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

HELP

Building name/description: **The Star - North Tower - Hotel Entry**

Application: **shop display**

Climate zone: **5**

Storey: **Basement 2**

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A		195m²	36.3m²	36m²					
Option B									
Glazing area (A)		*162m²*	*30.9m²*	*30.7m²*					

Number of rows preferred in table below: **8** *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS								SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance			P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)		P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	Retail1_NE	NE		9.65	5.85		4.4	0.43		4.450	4.850	0.92	-4.80	0.22	0.37	56.45	22% of 99%
2												ROW SKIPPED (OK if intentional)					
3	Retail2_NE	NE		4.85	21.76		4.4	0.43		2.110	4.850	0.44	0.00	0.80	0.66	######	78% of 99%
4												ROW SKIPPED (OK if intentional)					
5	Retail2_E	E		4.85	6.37		2.9	0.25					0.00	1.00	1.00	30.89	100% of 95%
6												ROW SKIPPED (OK if intentional)					
7	Retail2_SE	SE		4.85	6.32		3.0	0.43					0.00	1.00	1.00	30.65	100% of 98%
8																	

IMPORTANT NOTICE AND DISCLAIMER IN RESPECT OF THE GLAZING CALCULATOR

if inputs are valid

The Glazing Calculator has been developed by the ABCB to assist in developing a better understanding of glazing energy efficiency parameters.
While the ABCB believes that the Glazing Calculator, if used correctly, will produce accurate results, it is provided "as is" and without any representation or warranty of any kind, including that it is fit for any purpose or of merchantable quality, or functions as intended or at all.
Your use of the Glazing Calculator is entirely at your own risk and the ABCB accepts no liability of any kind.

Figure 4: NCC Glazing Calculator - The Star North Tower – Retail Glazing

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

HELP

Building name/description: **The Star - North Tower - Hotel Entry**

Application: **other**

Climate zone: **5**

Storey: **Basement 2**

Facade areas

	N	NE	E	SE	S	SW	W	NW	Internal
Option A		65.1m²	149m²	10.4m²	6.67m²	10.4m²			
Option B									
Glazing area (A)		*55.3m²*	*82.4m²*	*8.82m²*	*5.67m²*	*8.82m²*			

Number of rows preferred in table below: **12** *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS								SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device	Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	Hotel_SW	SW		4.85		8.82	2.7	0.65	device		2.00	0.00	0.39	0.34	8.82	100% of 86%
2											ROW SKIPPED (OK if intentional)					
3	Hotel_S	S		4.85		5.67	2.9	0.25	device		2.00	0.00	0.64	0.54	5.67	100% of 89%
4											ROW SKIPPED (OK if intentional)					
5	Hotel_SE	SE		4.85		8.82	2.7	0.65	device		2.00	0.00	0.39	0.32	8.82	100% of 91%
6											ROW SKIPPED (OK if intentional)					
7	Hotel_E	E		4.85		64.92	4.4	0.53	7.660	4.850	1.58	0.00	0.02	0.30	64.92	56% of 93%
8	Hotel_E	E		4.85		17.44	4.4	0.53				0.00	1.00	1.00	17.44	44% of 93%
9											ROW SKIPPED (OK if intentional)					
10	Hotel_NE	NE		4.85		48.21	4.4	0.43	0.680	0.450	1.51	-4.40	0.00	0.24	48.21	58% of 87%
11	Hotel_NE	NE		4.85		7.12	4.4	0.43				0.00	1.00	1.00	7.12	42% of 87%
12																

IMPORTANT NOTICE AND DISCLAIMER IN RESPECT OF THE GLAZING CALCULATOR

The Glazing Calculator has been developed by the ABCB to assist in developing a better understanding of glazing energy efficiency parameters. While the ABCB believes that the Glazing Calculator, if used correctly, will produce accurate results, it is provided "as is" and without any representation or warranty of any kind, including that it is fit for any purpose or of merchantable quality, or functions as intended or at all. Your use of the Glazing Calculator is entirely at your own risk and the ABCB accepts no liability of any kind.

if inputs are valid

Figure 5: NCC Glazing Calculator - The Star North Tower – Hotel Lobby Glazing

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

HELP

Building name/description: **The Star - North Tower - Hotel**

Application: **other**

Climate zone: **5**

Storey: **Basement 2**

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A		81.9m²							
Option B									

Glazing area (A) *25.1m²*

Number of rows preferred in table below: **5** *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS										SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance			P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)		P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	Ribbon_NE	NE		9.65	2.60		6.2	0.79		7.110	4.850	1.47	-4.80	0.00	0.25	25.09	100% of 43%
2																	
3																	
4																	
5																	

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if inputs are valid

Figure 6: NCC Glazing Calculator - The Star North Tower – Ribbon Lobby Glazing

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

HELP

Building name/description: The Star - North Tower - Resi

Application: other

Climate zone: 5

Storey: Ground

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A	28.7m²	29.1m²	31m²	39m²	73.1m²		112m²	47.8m²	
Option B									n/a
Glazing area (A)	*23.6m²*	*23.9m²*	*25.3m²*	*23.3m²*	*22.4m²*	.....	*83.6m²*	*37.4m²*	

Number of rows preferred in table below: 26 *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS										SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance			P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)		P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	Apartment Lobby_S	S		3.95	2.54		6.2	0.79					0.00	1.00	1.00	10.03	45% of 68%
2												ROW SKIPPED (OK if intentional)					
3	Apartment Lobby_W	W		3.95	8.76		2.8	0.20					0.00	1.00	1.00	34.60	42% of 95%
4												ROW SKIPPED (OK if intentional)					
5	Apartment Loby_NW	NW		3.95	0.52		2.8	0.20		0.750	3.950	0.19	0.00	0.95	0.85	2.05	5% of 93%
6												ROW SKIPPED (OK if intentional)					
7	Apartment Lobby_N	N		3.95	0.75		2.8	0.20		device		2.00	0.00	0.00	0.19	2.96	
8												ROW SKIPPED (OK if intentional)					
9	Resi1_W	W		3.95	4.95		2.8	0.20		2.350	4.550	0.52	0.60	0.95	0.91	19.55	22% of 95%
10												ROW SKIPPED (OK if intentional)					
11	Resi1_NW	NW		3.95	5.32		2.8	0.20		1.840	4.550	0.40	0.60	0.99	0.93	21.01	55% of 93%
12												ROW SKIPPED (OK if intentional)					
13	Resi1_N	N		3.95	5.23		2.8	0.20		1.840	4.550	0.40	0.60	0.99	0.90	20.66	100% of 80%
14												ROW SKIPPED (OK if intentional)					
15	Resi1_NE	NE		3.95	6.06		2.9	0.25		4.840	4.550	1.06	0.60	0.87	0.65	23.94	100% of 97%
16												ROW SKIPPED (OK if intentional)					
17	Resi1_E	E		3.95	6.40		2.8	0.18		0.720	4.550	0.16	0.60	0.99	0.98	25.28	100% of 95%
18												ROW SKIPPED (OK if intentional)					
19	Resi1_S	S		3.95	3.14		6.2	0.79					0.00	1.00	1.00	12.40	55% of 68%
20												ROW SKIPPED (OK if intentional)					
21	Resi2_SE	SE		3.95	5.90		2.9	0.43					0.00	1.00	1.00	23.31	100% of 100%
22												ROW SKIPPED (OK if intentional)					
##	Resi2_W	W		3.95	7.46		2.8	0.20					0.00	1.00	1.00	29.47	36% of 95%
24												ROW SKIPPED (OK if intentional)					
##	Resi2_NW	NW		3.95	3.62		2.8	0.20					0.00	1.00	1.00	14.30	41% of 93%
26																	

IMPORTANT NOTICE AND DISCLAIMER IN RESPECT OF THE GLAZING CALCULATOR

if inputs are valid

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Figure 7: NCC Glazing Calculator - The Star North Tower – Residential Lobby Glazing

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

HELP

Building name/description: The Star - North Tower - Resi

Application: other

Climate zone: 5

Storey: Level 01

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A	39.1m²	39.1m²	42m²	19.9m²		20.1m²	33.6m²	39.6m²	
Option B									
Glazing area (A)	*31.7m²*	*31.4m²*	*34.1m²*	*2.63m²*	.....	*16.3m²*	*27.2m²*	*32.1m²*	

Number of rows preferred in table below: 14 *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS								SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device	Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_w)	Cooling (S_c)	Area used (m²)	Element share of % of allowance used
1	Resi_SW	SW		3.65	4.46		2.9	0.25				0.00	1.00	1.00	16.28	100% of 97%
2											ROW SKIPPED (OK if intentional)					
3	Resi_W	W		3.65	7.46		2.8	0.18				0.00	1.00	1.00	27.23	100% of 97%
4											ROW SKIPPED (OK if intentional)					
5	Resi_NW	NW		3.65	8.80		2.8	0.18				0.00	1.00	1.00	32.12	100% of 91%
6											ROW SKIPPED (OK if intentional)					
7	Resi_N	N		3.65	8.69		2.8	0.18				0.00	1.00	1.00	31.72	100% of 91%
8											ROW SKIPPED (OK if intentional)					
9	Resi_NE	NE		3.65	8.60		1.4	0.15				0.00	1.00	1.00	31.39	100% of 95%
10											ROW SKIPPED (OK if intentional)					
11	Resi_E	E		3.65	9.33		2.8	0.18				0.00	1.00	1.00	34.05	100% of 96%
12											ROW SKIPPED (OK if intentional)					
13	Resi_SE	SE		3.65	0.72		6.2	0.79				0.00	1.00	1.00	2.63	100% of 44%

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if inputs are valid

Figure 8: NCC Glazing Calculator - The Star North Tower – Level 1 Glazing

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

HELP

Building name/description: The Star - North Tower - Resi

Application: other

Climate zone: 5

Storey: Level 02

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A	43.5m²	44.5m²	46.7m²	22.2m²		24.4m²	37.3m²	44m²	
Option B									
Glazing area (A)	*36.1m²*	*35.7m²*	*38.7m²*	*2.99m²*	.....	*18.5m²*	*31m²*	*36.5m²*	

Number of rows preferred in table below: 14 *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS								SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device	Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	Resi_SW	SW		4.15	4.46		2.9	0.25				0.00	1.00	1.00	18.51	100% of 91%
2											ROW SKIPPED (OK if intentional)					
3	Resi_W	W		4.15	7.46		2.8	0.18				0.00	1.00	1.00	30.96	100% of 100%
4											ROW SKIPPED (OK if intentional)					
5	Resi_NW	NW		4.15	8.80		2.8	0.18				0.00	1.00	1.00	36.52	100% of 93%
6											ROW SKIPPED (OK if intentional)					
7	Resi_N	N		4.15	8.69		2.8	0.18				0.00	1.00	1.00	36.06	100% of 93%
8											ROW SKIPPED (OK if intentional)					
9	Resi_NE	NE		4.15	8.60		1.4	0.15				0.00	1.00	1.00	35.69	100% of 94%
10											ROW SKIPPED (OK if intentional)					
11	Resi_E	E		4.15	9.33		2.8	0.18				0.00	1.00	1.00	38.72	100% of 98%
12											ROW SKIPPED (OK if intentional)					
13	Resi_SE	SE		4.15	0.72		6.2	0.79				0.00	1.00	1.00	2.99	100% of 45%
14																

IMPORTANT NOTICE AND DISCLAIMER IN RESPECT OF THE GLAZING CALCULATOR

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if inputs are valid

Figure 9: NCC Glazing Calculator - The Star North Tower – Level 2 Glazing

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

HELP

Building name/description: The Star - North Tower - Resi

Application: other

Climate zone: 5

Storey: Level 03

Facade areas

	N	NE	E	SE	S	SW	W	NW	Internal
Option A	60.8m²	60.8m²	65.3m²	31m²		35.2m²	52.2m²	61.6m²	
Option B									
Glazing area (A)	*53.4m²*	*53.4m²*	*57.4m²*	*4.43m²*	.....	*27.4m²*	*45.9m²*	*54.1m²*	

Number of rows preferred in table below: 14 *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS								SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device	Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_w)	Cooling (S_c)	Area used (m²)	Element share of % of allowance used
1	Resi_SW	SW		6.15	4.46		2.9	0.25				0.00	1.00	1.00	27.43	100% of 93%
2											ROW SKIPPED (OK if intentional)					
3	Resi_W	W		6.15	7.46		1.4	0.15				0.00	1.00	1.00	45.88	100% of 79%
4											ROW SKIPPED (OK if intentional)					
5	Resi_NW	NW		6.15	8.80		1.4	0.15				0.00	1.00	1.00	54.12	100% of 87%
6											ROW SKIPPED (OK if intentional)					
7	Resi_N	N		6.15	8.69		1.4	0.15				0.00	1.00	1.00	53.44	100% of 92%
8											ROW SKIPPED (OK if intentional)					
9	Resi_NE	NE		6.15	8.68		1.2	0.13				0.00	1.00	1.00	53.38	100% of 90%
10											ROW SKIPPED (OK if intentional)					
11	Resi_E	E		6.15	9.33		1.4	0.15				0.00	1.00	1.00	57.38	100% of 86%
12											ROW SKIPPED (OK if intentional)					
13	Resi_SE	SE		6.15	0.72		6.2	0.79				0.00	1.00	1.00	4.43	100% of 48%
14																

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if inputs are valid

Figure 10: NCC Glazing Calculator - The Star North Tower – Level 3 Glazing

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

HELP

Building name/description: **The Star - North Tower - Resi**

Application: **other**

Climate zone: **5**

Storey: **Level 05**

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A	50m²	45.8m²	34.3m²				25.9m²	39.8m²	
Option B									
Glazing area (A)	*42.6m²*	*38.9m²*	*29.1m²*				*22.1m²*	*33.9m²*	

Number of rows preferred in table below: **10** *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS										SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance			P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)		P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	Resi_W	W		4.85	4.55		2.2	0.17					0.00	1.00	1.00	22.07	100% of 92%
2												ROW SKIPPED (OK if intentional)					
3	Resi_NW	NW		4.85	6.99		2.8	0.18					0.00	1.00	1.00	33.90	100% of 95%
4												ROW SKIPPED (OK if intentional)					
5	Resi_N	N		4.85	8.78		2.8	0.18					0.00	1.00	1.00	42.58	100% of 96%
6												ROW SKIPPED (OK if intentional)					
7	Resi_NE	NE		4.85	8.03		1.4	0.15					0.00	1.00	1.00	38.95	100% of 100%
8												ROW SKIPPED (OK if intentional)					
9	Resi_E	E		4.85	6.01		2.8	0.18					0.00	1.00	1.00	29.15	100% of 100%
10																	

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if inputs are valid

Figure 11: NCC Glazing Calculator - The Star North Tower – Level 5 Glazing

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

HELP

Building name/description: The Star - North Tower - Ribbon/Function & Business Centre

Application: other

Climate zone: 5

Storey: Level 07

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A	114m²	684m²	532m²	129m²	164m²	552m²	365m²	168m²	
Option B									n/a
Glazing area (A)	*107m²*	*580m²*	*479m²*	*121m²*	*154m²*	*510m²*	*342m²*	*152m²*	

Number of rows preferred in table below: 46 *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS									SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	Kitchen/BOH_SW	SW		6.75	2.47		2.8	0.20				0.00	1.00	1.00	16.67	4% of 93%
2											ROW SKIPPED (OK if intentional)					
3	Kitchen/BOH_W	W		6.75	20.71		2.8	0.20				0.00	1.00	1.00	######	51% of 98%
4											ROW SKIPPED (OK if intentional)					
5	Kitchen/BOH_NW	NW		6.75	19.57		2.8	0.18				0.00	1.00	1.00	######	92% of 96%
6											ROW SKIPPED (OK if intentional)					
7	Kitchen/BOH_N	N		6.75	2.59		2.8	0.20				0.00	1.00	1.00	17.48	20% of 97%
8											ROW SKIPPED (OK if intentional)					
9	Kitchen/BOH_S	S		6.75	16.46		2.9	0.25				0.00	1.00	1.00	######	73% of 100%
10											ROW SKIPPED (OK if intentional)					
11	Kitchen/BOH_E	E		6.75	3.23		2.9	0.25				0.00	1.00	1.00	21.80	7% of 99%
12											ROW SKIPPED (OK if intentional)					
13	Kitchen/BOH_SE	SE		6.75	2.99		2.2	0.17				0.00	1.00	1.00	20.18	18% of 86%
14											ROW SKIPPED (OK if intentional)					
15	Pre Function_NE	NE		6.75	33.90		2.8	0.20				0.00	1.00	1.00	######	60% of 84%
16	Pre Function_NE	NE		6.75	12.13		2.8	0.20	6.200	6.750	0.92	0.00	0.21	0.37	81.88	7% of 84%
17	Restaurant_NE	NE		6.75	37.83		2.8	0.20	4.360	6.750	0.65	0.00	0.59	0.51	######	31% of 84%
18	Bar_NE	NE		6.75	2.04		2.8	0.20	3.340	6.750	0.49	0.00	0.74	0.61	13.77	2% of 84%
19											ROW SKIPPED (OK if intentional)					
20	Restaurant_SE	SE		6.75	2.72		2.2	0.17	3.070	6.750	0.45	0.00	0.76	0.69	18.36	14% of 86%
21	Bar_SE	SE		6.75	2.07		2.2	0.17	9.780	6.750	1.45	0.00	0.47	0.38	13.97	9% of 86%
22	Bar/Restaurant_SE	SE		6.75	10.08		2.2	0.17				0.00	1.00	1.00	68.04	59% of 86%
23											ROW SKIPPED (OK if intentional)					
24	Restaurant_S	S		6.75	3.61		2.9	0.25	3.070	6.750	0.45	0.00	0.85	0.79	24.37	16% of 100%
25	Bar_S	S		6.75	2.76		2.9	0.25	5.750	6.750	0.85	0.00	0.76	0.67	18.63	12% of 100%
26											ROW SKIPPED (OK if intentional)					
27	Pre Function_E	E		6.75	24.28		2.9	0.25				0.00	1.00	1.00	######	51% of 99%
28	Restaurant_E	E		6.75	2.72		2.9	0.25	device		2.00	0.00	0.00	0.25	18.36	2% of 99%
29	Bar_E	E		6.75	40.68		2.9	0.25	6.230	6.750	0.92	0.00	0.30	0.45	######	40% of 99%
30											ROW SKIPPED (OK if intentional)					
31	Bar_SW	SW		6.75	31.51		2.8	0.20	4.740	6.750	0.70	0.00	0.70	0.60	######	39% of 93%
32	Bar/Restaurant_SW	SW		6.75	25.11		2.8	0.20				0.00	1.00	1.00	######	36% of 93%
33	Restaurant_SW	SW		6.75	2.04		2.8	0.20	3.540	6.750	0.52	0.00	0.77	0.68	13.77	3% of 93%
34											ROW SKIPPED (OK if intentional)					
35	Pre Function_N	N		6.75	0.51		2.8	0.20	6.200	6.750	0.92	0.00	0.12	0.31	3.44	1% of 97%
36	Bar_N	N		6.75	2.72		2.8	0.20	device		2.00	0.00	0.00	0.19	18.36	
37	Bar/Restaurant_N	N		6.75	10.08		2.8	0.20				0.00	1.00	1.00	68.04	79% of 97%
38											ROW SKIPPED (OK if intentional)					
39	Bar_NW	NW		6.75	2.92		2.8	0.18	3.070	6.750	0.45	0.00	0.81	0.63	19.71	8% of 96%
40											ROW SKIPPED (OK if intentional)					
41	Bar_W	W		6.75	2.72		2.8	0.20	3.220	6.750	0.48	0.00	0.75	0.67	18.36	5% of 98%
42	Restaurant_W	W		6.75	27.24		2.8	0.20	4.540	6.750	0.67	0.00	0.60	0.57	######	44% of 98%
43											ROW SKIPPED (OK if intentional)					
44	Prefunction/Restaurant_	SW		6.75	8.91		2.8	0.20	3.900	6.750	0.58	0.00	0.75	0.65	60.14	11% of 93%
45	Prefunction/Restaurant_	SW		6.75	5.50		2.8	0.20				0.00	1.00	1.00	37.13	8% of 93%

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if inputs are valid

Figure 12: NCC Glazing Calculator - The Star North Tower – Level 7 Ribbon Glazing

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

HELP

Building name/description: The Star – North Tower –Hotel Gym/Hotel Spa

Application: other

Climate zone: 5

Storey: Level 09

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A	47m²	106m²	47m²		69m²	34m²	67m²	37m²	
Option B									n/a
Glazing area (Ai)	*40m²*	*90m²*	*40m²*	.....	*58m²*	*29m²*	*57m²*	*31m²*	

Number of rows preferred in table below: 28 *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS									SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	Hotel Gym_W	W		3.85		38.86	2.8	0.20	0.820	####	0.21	0.00	0.91	0.86	38.86	67% of 99%
2											ROW SKIPPED (OK if intentional)					
3	Hotel Gym_NW	NW		3.85		4.70	2.8	0.20	1.480	####	0.38	0.00	0.86	0.68	4.70	11% of 92%
4											ROW SKIPPED (OK if intentional)					
5	Hotel Gym_N	N		3.85		11.01	2.8	0.20	1.480	####	0.38	0.00	0.87	0.63	11.01	18% of 85%
6											ROW SKIPPED (OK if intentional)					
7	Hotel Gym_NE	NE		3.85		70.19	2.8	0.20	1.480	####	0.38	0.00	0.84	0.69	70.19	71% of 91%
8											ROW SKIPPED (OK if intentional)					
9	Hotel Gym_E	E		3.85		12.44	2.8	0.20	device		###	0.00	0.00	0.25	12.44	13% of 81%
10											ROW SKIPPED (OK if intentional)					
11	Hotel Gym_S	S		3.85		42.38	2.9	0.43	2.270	####	0.59	0.00	0.81	0.74	42.38	71% of 85%
12											ROW SKIPPED (OK if intentional)					
13	Hotel Gym_SW	SW		3.85		18.19	2.9	0.25	2.270	####	0.59	0.00	0.74	0.65	18.19	59% of 91%
14											ROW SKIPPED (OK if intentional)					
15	Hotel Spa_W	W		3.85		18.19	2.8	0.20	0.400	####	0.10	0.00	0.96	0.93	18.19	33% of 99%
16											ROW SKIPPED (OK if intentional)					
17	Hotel Spa_NW	NW		3.85		26.66	2.8	0.20	0.400	####	0.10	0.00	0.97	0.92	26.66	89% of 92%
18											ROW SKIPPED (OK if intentional)					
19	Hotel Spa_N	N		3.85		29.17	2.8	0.20	0.400	####	0.10	0.00	0.98	0.90	29.17	82% of 85%
20											ROW SKIPPED (OK if intentional)					
21	Hotel Spa_NE	NE		3.85		20.28	2.8	0.20	0.400	####	0.10	0.00	0.97	0.92	20.28	29% of 91%
22											ROW SKIPPED (OK if intentional)					
23	Hotel Spa_E	E		3.85		27.15	2.8	0.20	0.400	####	0.10	0.00	0.96	0.93	27.15	87% of 81%
24											ROW SKIPPED (OK if intentional)					
25	Hotel Spa_SW	SW		3.85		10.63	2.9	0.25				0.00	1.00	1.00	10.63	41% of 91%
26											ROW SKIPPED (OK if intentional)					
27	Hotel Spa_S	S		3.85		16.66	2.9	0.43				0.00	1.00	1.00	16.66	29% of 85%
28																

IMPORTANT NOTICE AND DISCLAIMER IN RESPECT OF THE GLAZING CALCULATOR

if inputs are valid

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Figure 13: NCC Glazing Calculator - The Star North Tower – Level 9 Glazing – Hotel Gym/Spa

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

HELP

Building name/description: **The Star - North Tower - Resi/Gym**

Application: **other**

Climate zone: **5**

Storey: **Level 09**

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A				27.8m²	26.7m²	53.5m²	11.9m²		
Option B									n/a
Glazing area (A)				*14.9m²*	*25.1m²*	*50.3m²*	*10.7m²*		

Number of rows preferred in table below: **8** *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS								SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	Resi Gym_W	W		3.85	2.79		2.8	0.20	0.300	0.700	0.43	-3.15	0.78	0.70	10.74	100% of 89%
2											ROW SKIPPED (OK if intentional)					
3	Resi Gym_SW	SW		3.85	13.06		2.8	0.20	0.300	0.700	0.43	-3.15	0.82	0.73	50.28	100% of 91%
4											ROW SKIPPED (OK if intentional)					
5	Resi Gym_S	S		3.85	6.52		2.8	0.20	0.300	0.700	0.43	-3.15	0.86	0.80	25.10	100% of 97%
6											ROW SKIPPED (OK if intentional)					
7	Resi Gym_SE	SE		3.85	3.86		4.4	0.43	0.300	0.700	0.43	-3.15	0.77	0.70	14.86	100% of 96%
8																

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if inputs are valid

Figure 14: NCC Glazing Calculator - The Star North Tower – Level 9 Glazing – Resi Gym/Spa

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

HELP

Building name/description: **The Star - North Tower - Resi/Gym**

Application: **other**

Climate zone: **5**

Storey: **Level 10**

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A				21.4m²	20.5m²	41.1m²	8.95m²		
Option B									
Glazing area (A)				*11.2m²*	*18.9m²*	*37.9m²*	*8.24m²*		

Number of rows preferred in table below: **8** *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS								SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	Resi Gym_W	W		2.90	2.84		2.8	0.20	0.300	0.700	0.43	-2.20	0.78	0.70	8.24	100% of 91%
2											ROW SKIPPED (OK if intentional)					
3	Resi Gym_SW	SW		2.90	13.06		2.8	0.20	0.300	0.700	0.43	-2.20	0.82	0.73	37.87	100% of 90%
4											ROW SKIPPED (OK if intentional)					
5	Resi Gym_S	S		2.90	6.52		2.8	0.20	0.300	0.700	0.43	-2.20	0.86	0.80	18.91	100% of 96%
6											ROW SKIPPED (OK if intentional)					
7	Resi Gym_SE	SE		2.90	3.86		4.4	0.43	0.300	0.700	0.43	-2.20	0.77	0.70	11.19	100% of 94%
8																

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if inputs are valid

Figure 15: NCC Glazing Calculator - The Star North Tower – Level 10 Glazing

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

HELP

Building name/description: **The Star - North Tower - Hotel BOH**

Application: **other**

Climate zone: **5**

Storey: **Level 39**

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A			35.8m²	42.3m²	45m²	41.4m²	77.1m²		
Option B									n/a
Glazing area (A)			*30.4m²*	*36m²*	*38.3m²*	*35.2m²*	*65.5m²*		

Number of rows preferred in table below: **10** *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS								SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device		Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	Hotel BOH_SW	SW		4.45		35.21	2.8	0.20				0.00	1.00	1.00	35.21	100% of 93%
2											ROW SKIPPED (OK if intentional)					
3	Hotel BOH_W	W		4.45		65.52	2.2	0.17				0.00	1.00	1.00	65.52	100% of 92%
4											ROW SKIPPED (OK if intentional)					
5	Hotel BOH_E	E		4.45		30.44	2.8	0.18				0.00	1.00	1.00	30.44	100% of 100%
6											ROW SKIPPED (OK if intentional)					
7	Hotel BOH_SE	SE		4.45		35.99	2.8	0.18				0.00	1.00	1.00	35.99	100% of 98%
8											ROW SKIPPED (OK if intentional)					
9	Hotel BOH_S	S		4.45		38.27	2.9	0.25				0.00	1.00	1.00	38.27	100% of 92%
10																

IMPORTANT NOTICE AND DISCLAIMER IN RESPECT OF THE GLAZING CALCULATOR

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if inputs are valid

Figure 16: NCC Glazing Calculator - The Star North Tower – Level 39 Glazing

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

HELP

Building name/description: The Star - North Tower - Sky Lobby(Hotel)

Application: other

Climate zone: 5

Storey: Level 40

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A	68m²	87.3m²	179m²	38.7m²	23.1m²	10.1m²	151m²	74.8m²	
Option B									
Glazing area (A)	57.8m²	74.2m²	152m²	32.9m²	19.7m²	8.6m²	128m²	63.6m²	

Number of rows preferred in table below: 25 *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS								SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance			P&H or device		Shading	Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)		P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	Office/Servery_SW	SW		3.65		8.60	2.8	0.20					0.00	1.00	1.00	8.60	100% of 93%
2												ROW SKIPPED (OK if intentional)					
3												ROW SKIPPED (OK if intentional)					
4	Office/Servery/Lounge_	W		3.65		58.72	2.2	0.17					0.00	1.00	1.00	58.72	46% of 92%
5	Office/Lounge_W	W		7.75		69.77	2.2	0.17					0.00	1.00	1.00	69.77	54% of 92%
6												ROW SKIPPED (OK if intentional)					
7	Lounge_NW	NW		7.75		63.58	2.8	0.18					0.00	1.00	1.00	63.58	100% of 95%
8												ROW SKIPPED (OK if intentional)					
9	Lounge_N	N		7.75		57.80	2.8	0.18					0.00	1.00	1.00	57.80	100% of 96%
10												ROW SKIPPED (OK if intentional)					
11	Lounge_NE	NE		3.65		10.64	1.4	0.15					0.00	1.00	1.00	10.64	14% of 100%
12	Lounge_NE	NE		7.75		63.58	1.4	0.15					0.00	1.00	1.00	63.58	86% of 100%
13												ROW SKIPPED (OK if intentional)					
14	Lounge/Bar_E	E		3.65		58.79	2.8	0.18					0.00	1.00	1.00	58.79	39% of 100%
15	Lounge/Bar_E	E		7.75		93.43	2.8	0.18					0.00	1.00	1.00	93.43	61% of 100%
16												ROW SKIPPED (OK if intentional)					
17	Bar_SE	SE		3.65		32.91	2.8	0.18					0.00	1.00	1.00	32.91	100% of 98%
18												ROW SKIPPED (OK if intentional)					
19	Bar_S	S		3.65		19.65	2.9	0.25					0.00	1.00	1.00	19.65	100% of 92%
20																	
21																	
22																	
23																	
24																	
25																	

IMPORTANT NOTICE AND DISCLAIMER IN RESPECT OF THE GLAZING CALCULATOR

if inputs are valid

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Figure 17: NCC Glazing Calculator - The Star North Tower – Level 40 Glazing

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

HELP

Building name/description: The Star - North Tower - Sky Lobby-Mezz (Hotel)

Application: other

Climate zone: 6

Storey: Level 41

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A		11.9m²	72.6m²	32.3m²	7.4m²	75.2m²	78.6m²		
Option B									
Glazing area (A)		*10.1m²*	*61.7m²*	*27.4m²*	*6.29m²*	*64m²*	*66.8m²*		

Number of rows preferred in table below: 15 *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS								SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device	Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_H)	Cooling (S_C)	Area used (m²)	Element share of % of allowance used
1	Office/Servery_SW	SW		3.65		63.95	1.0	0.10				0.00	1.00	1.00	63.95	100% of 78%
2											ROW SKIPPED (OK if intentional)					
3											ROW SKIPPED (OK if intentional)					
4	Office/Servery/Lounge_V	W		3.65		66.81	1.3	0.10				0.00	1.00	1.00	66.81	100% of 93%
5											ROW SKIPPED (OK if intentional)					
6	Lounge_NE	NE		3.65		10.10	5.0	0.10				0.00	1.00	1.00	10.10	100% of 58%
7											ROW SKIPPED (OK if intentional)					
8											ROW SKIPPED (OK if intentional)					
9	Lounge/Bar_E	E		3.65		61.71	1.7	0.10				0.00	1.00	1.00	61.71	100% of 96%
10											ROW SKIPPED (OK if intentional)					
11											ROW SKIPPED (OK if intentional)					
12	Bar_SE	SE		3.65		27.44	1.0	0.10				0.00	1.00	1.00	27.44	100% of 80%
13											ROW SKIPPED (OK if intentional)					
14	Bar_S	S		3.65		6.29	1.7	0.70				0.00	1.00	1.00	6.29	
15																

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if inputs are valid

Figure 18: NCC Glazing Calculator - The Star North Tower – Level 41 Glazing

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

HELP

Building name/description: The Star - North Tower - Typical Hotel Plan

Application: other

Climate zone: 5

Storey: Level 58

Facade areas

	N	NE	E	SE	S	SW	W	NW	internal
Option A	22.9m²	24.8m²	101m²	8.26m²	26.8m²	10.6m²	58m²	13.6m²	
Option B									
Glazing area (A)	*19.4m²*	*21.1m²*	*86.1m²*	*7.02m²*	*22.8m²*	*9.03m²*	*49.3m²*	*11.6m²*	

Number of rows preferred in table below: 16 *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS								SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device	Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_w)	Cooling (S_c)	Area used (m²)	Element share of % of allowance used
1	Typical_SW	SW		2.95		9.03	2.8	0.20				0.00	1.00	1.00	9.03	100% of 93%
2											ROW SKIPPED (OK if intentional)					
3	Typical_W	W		2.95		49.29	2.2	0.17				0.00	1.00	1.00	49.29	100% of 92%
4											ROW SKIPPED (OK if intentional)					
5	Typical_NE	NE		2.95		21.05	1.4	0.15				0.00	1.00	1.00	21.05	100% of 100%
6											ROW SKIPPED (OK if intentional)					
7	Typical_E	E		2.95		86.14	2.8	0.18				0.00	1.00	1.00	86.14	100% of 100%
8											ROW SKIPPED (OK if intentional)					
9	Typical_SE	SE		2.95		7.02	2.8	0.18				0.00	1.00	1.00	7.02	100% of 98%
10											ROW SKIPPED (OK if intentional)					
11	Typical_N	N		2.95		19.45	2.8	0.18				0.00	1.00	1.00	19.45	100% of 96%
12											ROW SKIPPED (OK if intentional)					
13	Typical_NW	NW		2.95		11.56	2.8	0.18				0.00	1.00	1.00	11.56	100% of 95%
14											ROW SKIPPED (OK if intentional)					
15	Typical_S	S		2.95		22.79	2.9	0.25				0.00	1.00	1.00	22.79	100% of 92%
16																

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if inputs are valid

Figure 19: NCC Glazing Calculator - The Star North Tower – Level 58 Glazing – Representative Hotel Floor

NCC VOLUME ONE GLAZING CALCULATOR (first issued with NCC 2014)

HELP

Building name/description: The Star - North Tower - Club Lounge

Application: other

Climate zone: 5

Storey: Level 59

Facade areas

	N	NE	E	SE	S	SW	W	NW	Internal
Option A	47.1m²	41.3m²	83.7m²	42.2m²	21.3m²	8.16m²	33.4m²	41.8m²	
Option B									
Glazing area (A)	*40.8m²*	*35.7m²*	*72.3m²*	*36.5m²*	*18.4m²*	*7.06m²*	*28.8m²*	*36.1m²*	

Number of rows preferred in table below: 16 *(as currently displayed)*

GLAZING ELEMENTS, ORIENTATION SECTOR, SIZE and PERFORMANCE CHARACTERISTICS								SHADING		CALCULATED OUTCOMES OK (if inputs are valid)					
Glazing element		Facing sector		Size			Performance		P&H or device	Shading		Multipliers		Size	Outcomes
ID	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m²)	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S_w)	Cooling (S_c)	Area used (m²)	Element share of % of allowance used
1	Library_SW	SW		4.15	1.70		2.8	0.20				0.00	1.00	1.00	7.06	100% of 94%
2											ROW SKIPPED (OK if intentional)					
3	Library_W	W		4.15	6.95		2.2	0.17				0.00	1.00	1.00	28.84	100% of 94%
4											ROW SKIPPED (OK if intentional)					
5	Bar_NE	NE		4.15	8.61		1.2	0.13				0.00	1.00	1.00	35.73	100% of 88%
6											ROW SKIPPED (OK if intentional)					
7	Dining_E	E		4.15	17.43		2.2	0.17				0.00	1.00	1.00	72.33	100% of 96%
8											ROW SKIPPED (OK if intentional)					
9	Dining_SE	SE		4.15	8.80		2.8	0.18				0.00	1.00	1.00	36.52	100% of 100%
10											ROW SKIPPED (OK if intentional)					
11	Bar_N	N		4.15	9.82		2.8	0.18				0.00	1.00	1.00	40.75	100% of 97%
12											ROW SKIPPED (OK if intentional)					
13	Library/Bar_NW	NW		4.15	8.71		2.8	0.18				0.00	1.00	1.00	36.15	100% of 97%
14											ROW SKIPPED (OK if intentional)					
15	Dining_S	S		4.15	4.44		2.9	0.25				0.00	1.00	1.00	18.43	100% of 93%
16																

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if inputs are valid

Figure 20: NCC Glazing Calculator - The Star North Tower – Level 59 Glazing