



Our ref: PS106553-ESD SEARs requirements\_Rev001.docx

Your ref: ESD SEARs requirements

By email  
ghill@devkon.com.au

15 December 2017

Confidential

Geoffrey Hill  
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Geoff,

**ESD SEARs requirements**

WSP are engaged by Devkon to provide advice on ESD initiatives to meet regulatory requirements and benefit the environment for the proposed Dicker Data development, located at 138 – 158 Captain Cook Drive, Kurnell.

We append our Sustainability Statement for the purposes of addressing the relevant Secretary's Environmental Assessment Requirements (SEARs) for development application.

Should you have any questions, please contact me.

Yours sincerely

A handwritten signature in black ink, appearing to read 'S. Beard'.

Sophie Beard  
Sustainability Consultant

cc: WSP - Rob Beck  
Devkon - Geoffrey Hill  
Devkon - Daniel Jones

# DICKER DATA OFFICE & WAREHOUSE

## SUSTAINABILITY STATEMENT

15 DECEMBER, 2017

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# DICKER DATA OFFICE & WAREHOUSE

## SUSTAINABILITY STATEMENT



WSP

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REV	DATE	DETAILS
001	15/12/2017	For Issue

	NAME	DATE	SIGNATURE
Prepared by:	Sophie Beard	14/12/2017	
Reviewed by:	Katie Fallowfield	14/12/2017	
Approved by:	Katie Fallowfield	14/12/2017	

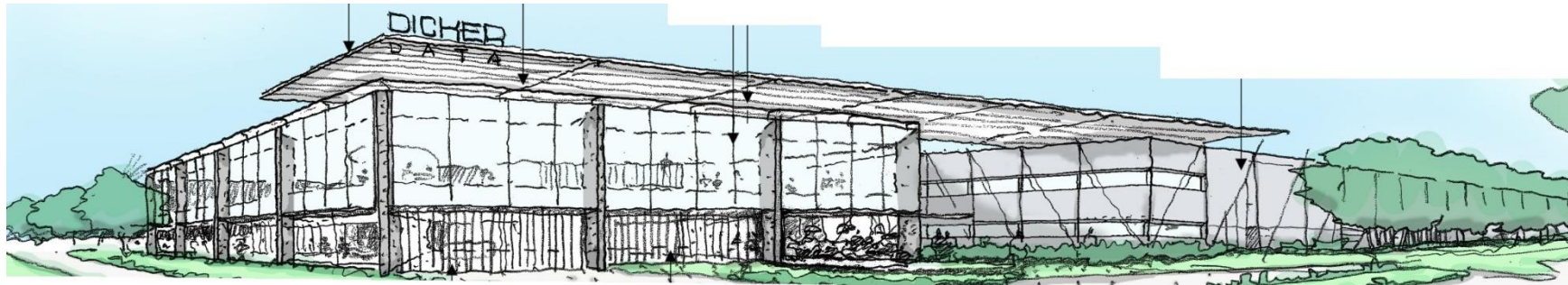
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# 1 INTRODUCTION

The purpose of this Sustainability Statement is to outline the Ecologically Sustainable Development (ESD) initiatives being considered for the proposed Dicker Data Warehouse and Office development in Kurnell, NSW. The completed building will consist of three levels of office space and approximately 38,500 m<sup>2</sup> of warehouse space. This report outlines design opportunities being explored to reduce the building's impact on the environment, through both greenhouse gas emissions reductions and potable water savings. Strategies to improve the health and wellbeing of the building occupants are also discussed.



## 2 ENERGY

---

### 2.1 SOLAR POWER

The viability of onsite energy generation using solar panels is being evaluated. If implemented, capacity and location will be explored during detailed design.

### 2.2 SOLAR HOT WATER

The viability of a solar hot water system is being evaluated. If implemented, capacity and location will be explored during detailed design.



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### 2.3 LED LIGHTING

LED lighting will be installed to provide an energy efficient lighting solution. This will be documented in detailed design.

---

### 2.4 LIGHTING CONTROL

A lighting control strategy consisting of daylight sensors, occupancy sensors, time switches or manual switches, as appropriate, will be employed in tandem with high efficiency LED lighting to further reduce lighting energy consumption.

---

### 2.5 INSULATION AND THERMAL MASS

Increased wall and ceiling insulation beyond code compliance is being investigated to reduce loads on the HVAC system in the office.

High thermal mass building materials are also being considered to improve thermal comfort in the warehouse.

---

### 2.6 GLAZING AND SHADING

Selection of higher performance glazing in the office than necessary to meet code requirements will be considered in detailed design development.

Fixed horizontal shading to the north, and vertical shading to the east and west has also been considered.

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### 2.7 REFLECTIVE FOIL

As a possible alternative to insulation, reflective foil in the warehouse roof to reduce the amount of radiant heat entering the building and improve thermal comfort will be considered during detailed design development.

## 3 WATER

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### 3.1 LANDSCAPING AND RAINWATER

Rainwater collection and storage is being investigated to be used for landscape irrigation and toilet flushing. If implemented, capacity and location will be explored during detailed design



### 3.2 EFFICIENT FIXTURES AND FITTINGS

Efficient water fixtures and fittings that achieve best practice WELS (Water Efficiency Labelling Scheme) ratings will be selected. This applies to taps, toilets, showers and urinals.

## 4 WELLNESS

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### 4.1 AIR

Clean air is critical to the health of a building's occupants and unless the indoor air quality is properly managed, the occupants may be susceptible to a range of negative health outcomes such as asthma, allergies and other respiratory illnesses. To promote good indoor air quality throughout the building, the following will be taken into consideration:

- Ventilation rates that exceed minimum code requirements
- CO<sub>2</sub> sensors for highly populated areas, and VOC sensors
- Selection of paints, adhesives, flooring and furniture products with low VOC emissions.
- Selection of joinery and furniture products with low formaldehyde emissions
- Improved air filtration to exceed minimum code compliance
- Moisture management to prevent bacteria and mould growth

### 4.2 NOURISHMENT

Nutrition plays a key role in maintaining and enhancing health and wellbeing. The following strategies to promote better eating habits and food culture will be considered in the operation of the café:

- Promote consumption of fruit and vegetables by making it easily accessible to occupants
- Limit availability of refined sugar and ensure foods, beverages, snacks and meals do not contain trans fat
- All foods sold or provided should have clearly labelled information regarding allergens and artificial ingredients
- Sanitary hand washing facilities should be provided to reduce pathogen transmission
- Cold storage spaces should be provided to minimise exposure to food-borne pathogens
- Detailed nutritional information including total calories, macronutrients and total sugar content should be provided on all foods and beverages sold or provided

### 4.3 NATURAL LIGHT

Improved access to natural light in the warehouse through the use of skylights will be considered during detailed design development.

### 4.4 FITNESS

Facilities to encourage fitness will be included in the design, such as a gym and changing facilities.

### 4.5 COMFORT

Selection of furniture will take into consideration desks, chairs and monitor arms that can be easily adjusted by staff to improve their comfort.

### 4.6 PLANTS

The inclusion of plants in the office interior design will be considered.

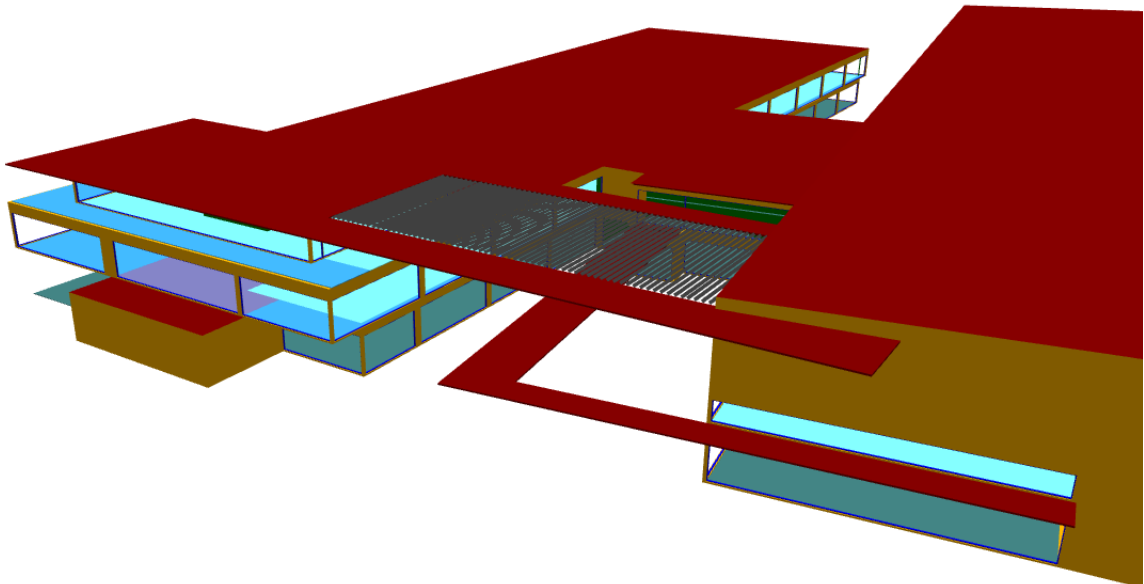


DICKER DATA

# SECTION J REPORT

## DICKER DATA PROPOSED OFFICE AND SERVICE AREA

FEBRUARY 2018



Question today  
*Imagine tomorrow*  
Create for the future


**Section J Report**  
**Dicker Data Proposed Office and Service Area**

**Dicker Data**

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REV	DATE	DETAILS
00	07/01/2018	Draft issue for comment
01	22/02/2018	Draft issue for comment

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Prepared by:	Bayley Larkin	22/02/2018	
Reviewed by:	Sophie Beard	22/02/2018	
Approved by:	Katie Fallowfield	22/02/2018	

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# 1 EXECUTIVE SUMMARY

WSP has been engaged by Dicker Data to carry out a Performance Solution assessment under Section J Energy Efficiency Verification Method JV3, National Construction Code (NCC) 2016 for the office and service area portion of the proposed Dicker Data warehouse and office development in Kurnell, NSW.

Verification Method JV3 requires a comparison between a Reference Building – constructed in accordance the deemed-to-satisfy (DTS) provisions detailed in the Parts of Section J – and the Proposed Building – constructed in accordance with the design intent.

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 1.1 and Figure 1.1 demonstrate the predicted annual energy consumption for the simulations performed.

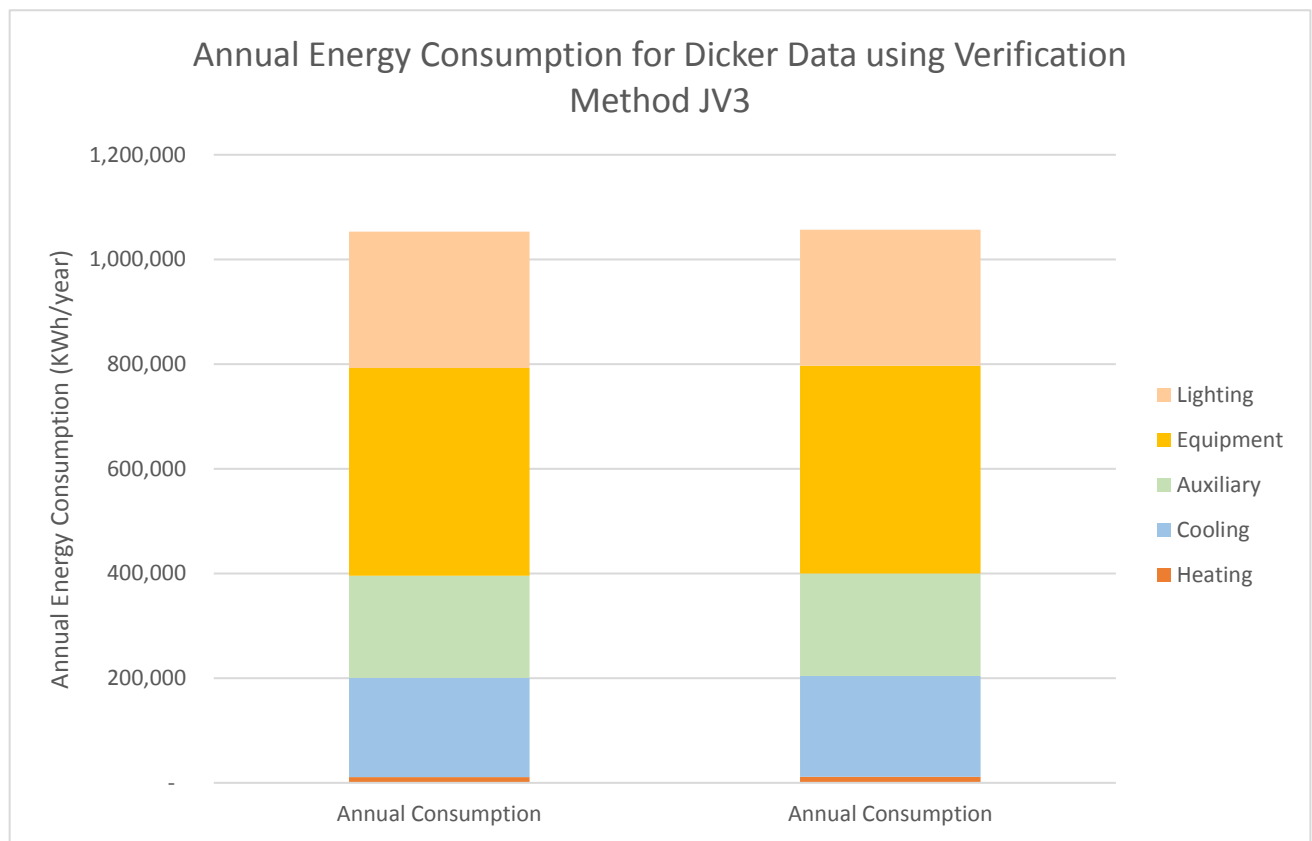
Based on the modelling performed, the proposed building envelope achieves an energy consumption which is within 0.38% of the energy consumption of the reference building. This is deemed compliant under the Section J Energy Efficiency Verification Method JV3, National Construction Code (NCC) 2016.

Table 1.1 Simulation Results

BUILDING	ANNUAL ENERGY CONSUMPTION (KWH/YEAR)					
	Heating	Cooling	Auxiliary	Equipment	Lighting	Total
Reference Building + Reference Services	11,009	189,535	195,339	397,076	259,983	1,052,941
Proposed Building + Reference Services	11,595	192,927	195,412	397,076	259,983	1,056,991



Figure 1.1 Simulation Results



## 2 INTRODUCTION

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### 2.1 PURPOSE OF REPORT

WSP has been engaged by Dicker Data to carry out a Section J assessment using Verification Method JV3 for the office and service area portion of the proposed Dicker Data warehouse and office development in Kurnell, NSW. 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 the Proposed Building.

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

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

---

### 2.2 PERFORMANCE REQUIREMENTS

#### **Volume One of the NCC Series 2016 Clause A0.7 Requirements**

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

- Section J Part J0 Energy Efficiency
- Section J Part J1 Building Fabric
- Section J Part J2 Glazing
- Section J Part J3 Building Sealing
- Section J Part J5 Air Conditioning and Ventilation System
- Section J Part J6 Artificial Lighting and Power

There are no performance requirements from other Sections or Parts of Volume One of the NCC Series 2016 that are relevant to any aspects of the Reference Building and the Proposed Building or that are affected by the application of the DTS provisions that are the subject of the Reference Building and the Proposed Building.

#### **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

# 3 METHODOLOGY

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## 3.1 ASSESSMENT METHOD AND BUILDING CLASSIFICATION

Clause A0.5 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 NCC; or such other Verification Methods as the appropriate authority accepts for determining compliance with the Performance Requirements
- Expert judgement
- Comparison with the Deemed-to-Satisfy provisions

The development seeks to demonstrate compliance with JP1 by using:

- 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 Method JV3; determining that the annual energy consumption of the Proposed Building is not more than the annual energy consumption of the Reference Building for the leisure centre.

In accordance with Part A3.2 of NCC Volume 1, the proposed building comprises spaces with the following classifications:

- Class 5 Office
- Class 7b Warehouse

The site is located within Climate Zone 5.

---

## 3.2 MODEL INFORMATION

### 3.2.1 SOFTWARE

The computer package used for the thermal simulation was Tas version 9.4.1 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*.

### 3.2.2 SOURCES OF INFORMATION

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

- Parts J1 – J3, Section J, Volume One of the NCC Series 2016
- Australian Building Codes Board (ABCB) glazing calculator 2014 (current version)

- Glazing candidates: certified products listed on the Window Energy Rating Scheme (WERS) website
- Architectural drawings: WMK Architecture preliminary DA architectural drawings issued 22/12/17 drawing sheets DA000 – DA600
- Modern Building Certifiers BCA Design Compliance Report – Revision 01, issued 02/11/17
- WSP DTS Prescriptive Solution Compliance Report – Revision 01, issued 22/12/17

### **3.2.3 EQUIPMENT LOADS**

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

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

### **3.2.4 MECHANICAL SERVICES**

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

- Specification JV Table 2b 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 J5.2, Table J5.2
- Minimum EER for heat pump, as per Table 2b in Specification J5.2e

### **3.2.5 OCCUPANCY LOADS**

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

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

### **3.2.6 LIGHTING LOADS**

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

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

## 4 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 4.1 lists the building fabric performance parameters used in the reference and the proposed building. See Appendix A for drawings showing where the total construction values need to be applied.

The BCA Section J1 Building Fabric and J2 Glazing assesses the building envelope only. Therefore, the following values are only applicable between typical conditioned spaces that adjoin an unconditioned space or the outside.

Table 4.1: Building Fabric Performance Parameters

BUILDING FABRIC ELEMENT	REFERENCE BUILDING	PROPOSED BUILDING
Slab on ground	None	Per the reference building
Suspended Floor	<p><b>R 1.0 m<sup>2</sup>.K/W</b> – to an enclosed non-conditioned spaces</p> <p><b>R 2.0 m<sup>2</sup>.K/W</b> – to the outside or enclosed space with more than 1.5 air changes per hour</p>	<p><b>R 0.5 m<sup>2</sup>.K/W</b> – to an enclosed non-conditioned spaces</p> <p><b>R 0.5 m<sup>2</sup>.K/W</b> – to the outside or enclosed space with more than 1.5 air changes per hour</p>
External walls	<b>R 2.8 m<sup>2</sup>.K/W</b>	Per the reference building
Envelope walls other than external walls	<p><b>R 1.0 m<sup>2</sup>.K/W</b> – the non-conditioned space has ventilation of not more than 1.5 air changes per hour of outside air per hour</p> <p><b>R 1.8 m<sup>2</sup>.K/W</b> – the non-conditioned space has ventilation of more than 1.5 air changes per hour of outside air during occupied hours</p>	Per the reference building
Roof	<b>R 3.2 m<sup>2</sup>.K/W</b> Downwards	<b>R 3.0 m<sup>2</sup>.K/W</b> Downwards
Sunshading Roof with Solar Blades	Blade angle set at 140° from horizontal and width 200mm as per Figure 2 below	Blade angle set at 140° from horizontal and width 200mm as per Figure 2 below

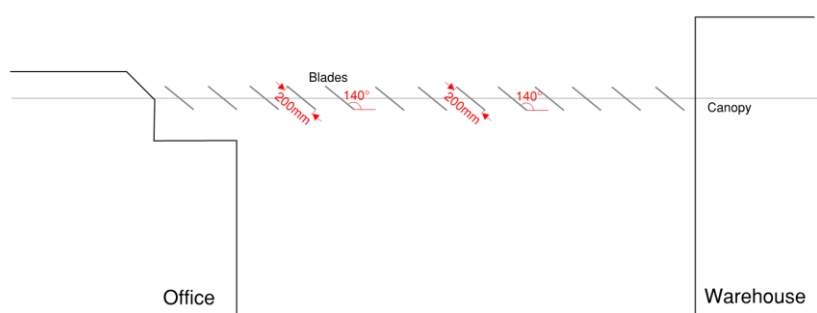


Figure 2: Indicative blade angle and width. Not to scale

# 5 BUILDING GLAZING PERFORMANCE PARAMETERS

The reference building glazing is developed in compliance with the National Construction Code Glazing Calculators (Volume One) using available glazing products. Refer to Appendix B for the completed Glazing Calculators and Table 5.1 which summarises the glazing parameters used for the proposed building in the JV3 analysis.

Table 5.1 Proposed Building Glazing Parameters

ORIENTATION	LEVEL	REFERENCE BUILDING (Whole of System Values)	PROPOSED BUILDING (Whole of System Values)
All	All	Per the glazing calculators in Appendix B Aluminum Frame	Viridian Comfort Plus Neutral DGU U-Value 2.9, SHGC 0.39 Aluminium Frame

## 6 RESULTS

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 6.1 and Figure 6.1 demonstrate the predicted annual energy consumption for the simulations performed.

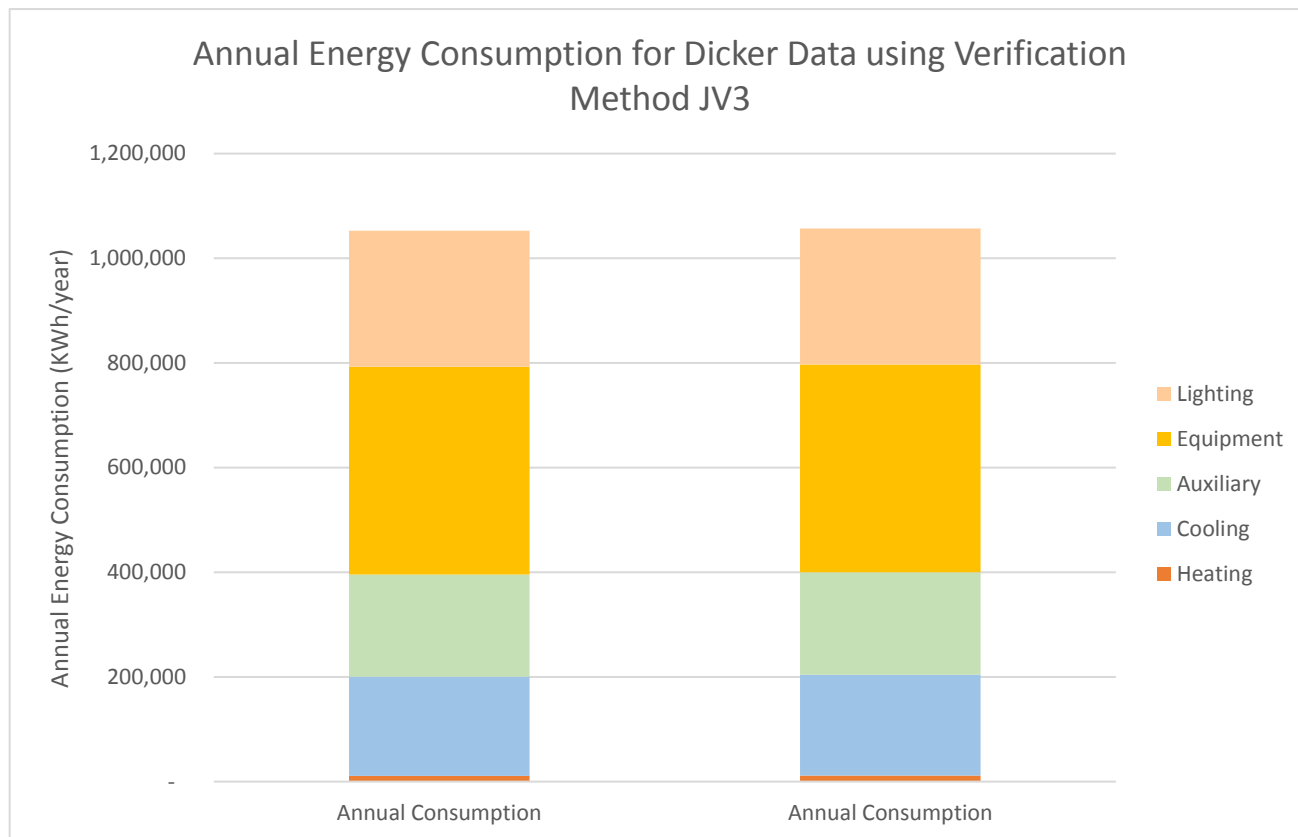
Based on the modelling performed, the proposed building envelope achieves an energy consumption which is within 0.38% of the energy consumption of the reference building. This is deemed compliant under the Section J Energy Efficiency Verification Method JV3, National Construction Code (NCC) 2016.

Table 6.1: Simulation Results

BUILDING	ANNUAL ENERGY CONSUMPTION (KWH/YEAR)					
	Heating	Cooling	Auxiliary	Equipment	Lighting	Total
Reference Building + Reference Services	11,009	189,535	195,339	397,076	259,983	1,052,941
Proposed Building + Reference Services	11,595	192,927	195,412	397,076	259,983	1,056,991



Figure 6.1: Simulation Results



# WALL, FLOOR AND ROOF INSULATION LOCATIONS

Architectural floor plan of the University of the Pacific (UoP) Energy Centre. The plan shows a large building complex with various rooms and outdoor areas. Key areas include:

- CAFE 300 m<sup>2</sup> RL 3.300
- OFFICE 1855 m<sup>2</sup> RL 3.300
- OFFICE STAGE 2 970 m<sup>2</sup>
- WAREHOUSE 23050 m<sup>2</sup> RL 3.300
- PROPOSED LIBRARY

Outdoor areas and features include:

- CAFE OUTDOOR AREA
- WATER FEATURE
- STAFF BIKE/PEDAL AREA

Legend:

- External Envelope Wall - total R value R2.8
- Internal Envelope Wall - total R value R1.8
- Roof/Exposed Ceiling - total R value R3.0
- Exposed Floor - total R-value R0.5

1 PROPOSED OFFICE PLAN - GROUND

LEGEND

- LEGEND
- |   |                       |   |                            |   |                                    |
|---|-----------------------|---|----------------------------|---|------------------------------------|
|  | PROPOSED WAREHOUSE    |  | PROPOSED WAREHOUSE STAGE 2 |  | PROPOSED CORE                      |
|  | PROPOSED OFFICE       |  | PROPOSED OFFICE STAGE 2    |  | PROPOSED WAREHOUSE WC              |
|  | PROPOSED CAFE         |  | PROPOSED LANDSCAPE         |  | PROPOSED GARAGE                    |
|  | PROPOSED SERVICE AREA |  | PROPOSED 301 AREA          |  | PROPOSED WC + END OF TRIP FACILITY |

PRELIMINARY



Name	Description	Date	Client	Project	Title	Drawing No.	Sheet
P2	Proposed C/A Conditions Final Draw Size 34.0	11.01.19 10.0.0	DICKER DATA PTY LTD	DICKER DATA 238-238 CAPTAIN COOK DRIVE, MURRELL NSW 2231	THE PROPOSED OFFICE PLAN - GROUND	DA104 Scale 1:200@A1	P2
						Drawing Size A1	
						Project No. 10202	Drawing Title PK
					Dimensioned Drawing to show construction and building. Construction to comply with provisions in relevant standards and specifications. All dimensions to be shown to the nearest millimetre unless otherwise stated.	Q&B Reference	

Figure A.2 Dicker Data Level One Markup

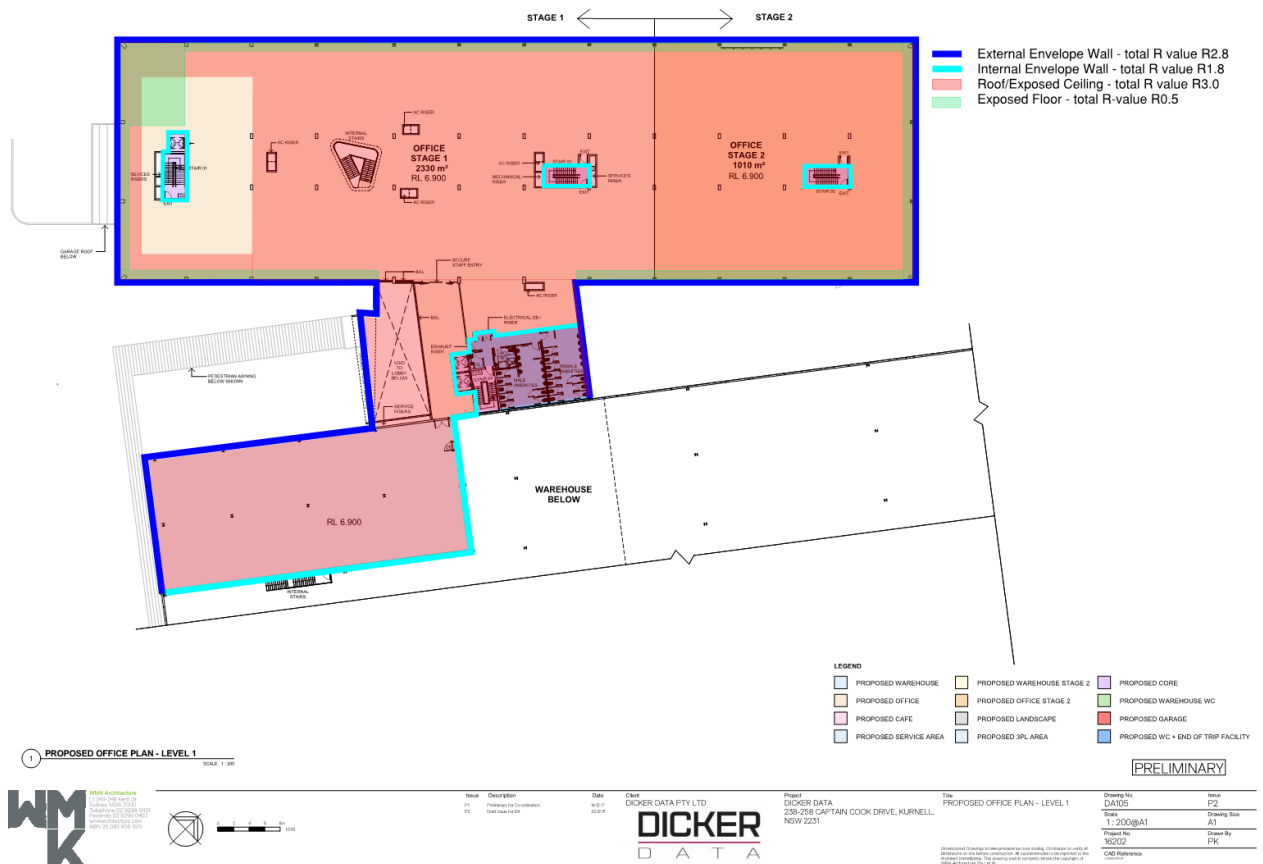
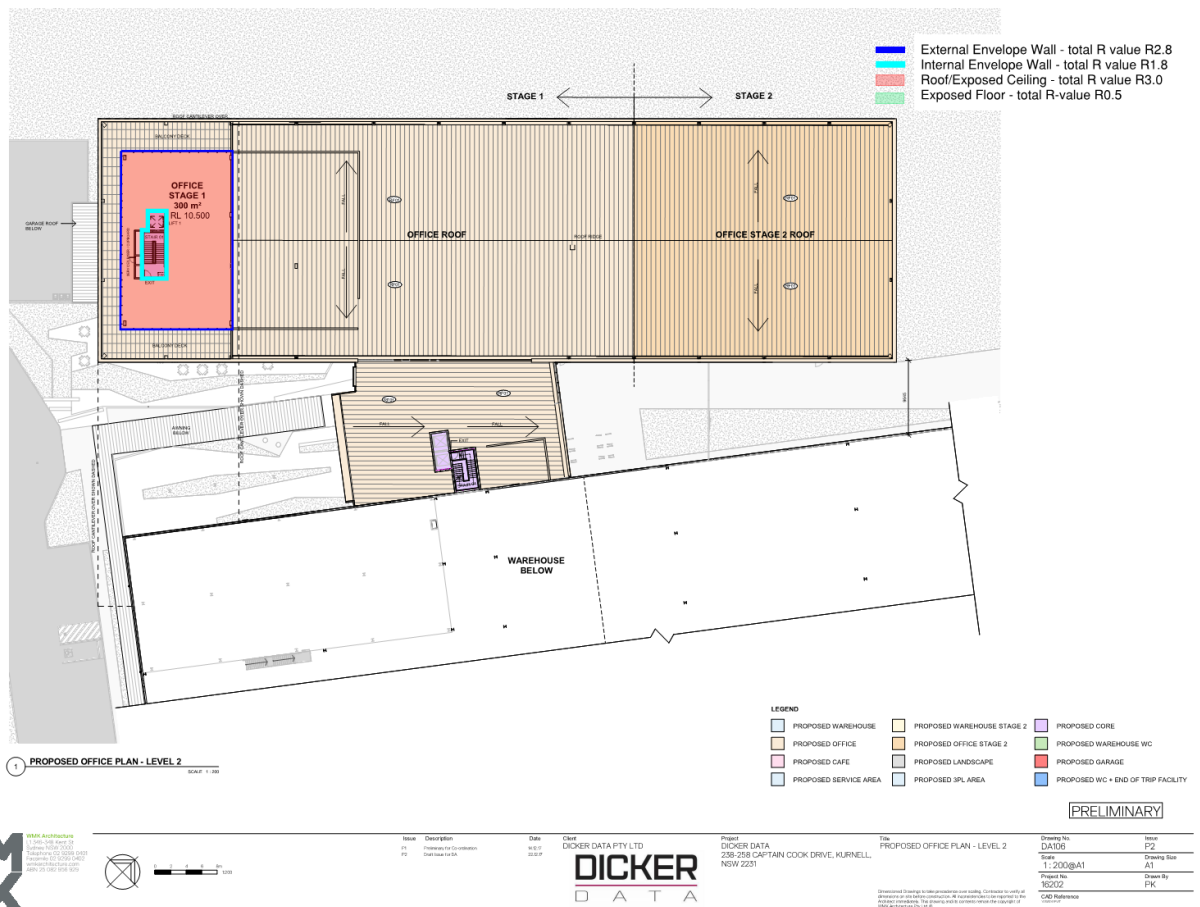


Figure A.3 Dicker Data Level Two Markup



# APPENDIX B

## COMPLIANT NCC GLAZING CALCULATORS AND MARKUPS

Figure B.1 Dicker Data Ground Floor Office Calculator Output

Report from PS106553.BAL.180130 CalculatorGlazingVolOne2014\_Ground\_office.xlsx

printed 1/02/2018

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

Building name/description

Dicker Data Office

Application

other

Climate zone

5

Storey  
Ground

Facade areas

N	NE	E	SE	S	SW	W	NW	Internal
	121m <sup>2</sup>		250m <sup>2</sup>		120m <sup>2</sup>		316m <sup>2</sup>	
Option A								
Option B								n/a

Glazing area (A) ..... 77.5m<sup>2</sup> ..... 184m<sup>2</sup> ..... 91.5m<sup>2</sup> ..... 240m<sup>2</sup>

Number of rows preferred in table below

33 (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	
	Description (optional)	Option A facades	Option B facades	Height (m)	Width (m)	Area (m <sup>2</sup> )	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S <sub>H</sub> )	Cooling (S <sub>C</sub> )	Area used (m <sup>2</sup> )	Element share of % of allowance used	
1	NE										ROW SKIPPED (OK if intentional)						
2		NE		2.70	9.50		3.8	0.22	0.800	3.400	0.24	0.70	1.00	0.97	25.65	33% of 100%	
3		NE		2.70	9.70		3.8	0.22	0.800	3.400	0.24	0.70	1.00	0.97	26.19	34% of 100%	
4		NE		2.70	9.50		3.8	0.22	0.800	3.400	0.24	0.70	1.00	0.97	25.65	33% of 100%	
5	SE										ROW SKIPPED (OK if intentional)						
6	Bifold doors	SE		2.70	5.30		2.8	0.30	0.800	3.400	0.24	0.70	0.99	0.97	14.31	8% of 100%	
7	Bifold doors	SE		2.70	8.00		2.8	0.30	0.800	3.400	0.24	0.70	0.99	0.97	21.60	12% of 100%	
8		SE		2.70	8.00		2.8	0.30	0.800	3.400	0.24	0.70	0.99	0.97	21.60	12% of 100%	
9		SE		2.70	7.40		2.8	0.30	0.800	3.400	0.24	0.70	0.99	0.97	19.98	11% of 100%	
10		SE		2.70	8.00		2.8	0.30	0.800	3.400	0.24	0.70	0.99	0.97	21.60	12% of 100%	
11		SE		2.70	8.00		2.8	0.30	0.800	3.400	0.24	0.70	0.99	0.97	21.60	12% of 100%	
12		SE		2.70	8.00		2.8	0.30	0.800	3.400	0.24	0.70	0.99	0.97	21.60	12% of 100%	
13		SE		2.70	8.00		2.8	0.30	0.800	3.400	0.24	0.70	0.99	0.97	21.60	12% of 100%	
14		SE		2.70	7.35		2.8	0.30	0.800	3.400	0.24	0.70	0.99	0.97	19.85	11% of 100%	
15	SW										ROW SKIPPED (OK if intentional)						
16	Bifold doors	SW		2.70	9.80		3.2	0.30	2.000	3.400	0.59	0.70	0.93	0.88	26.46	28% of 100%	
17	Bifold doors	SW		2.70	6.80		3.2	0.30	1.500	3.400	0.44	0.70	0.95	0.93	18.36	20% of 100%	
18		SW		2.70	3.70		3.2	0.30				0.00	1.00	1.00	9.99	11% of 100%	
19	Entry door	SW		2.70	3.80		3.2	0.30				0.00	1.00	1.00	10.26	12% of 100%	
20		SW		2.70	9.80		3.2	0.30				0.00	1.00	1.00	26.46	30% of 100%	
21	NW										ROW SKIPPED (OK if intentional)						

page 1 of 2



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 <sub>u</sub> )	Cooling (S <sub>c</sub> )	Area used (m²)	Element share of % of allowance used	
22		NW		2.70	7.30		3.0	0.21	0.800	3.400	0.24	0.70	0.99	0.97	19.71	8% of 97%	
23		NW		2.70	8.00		3.0	0.21	0.800	3.400	0.24	0.70	0.99	0.97	21.60	9% of 97%	
24		NW		2.70	8.00		3.0	0.21	0.800	3.400	0.24	0.70	0.99	0.97	21.60	9% of 97%	
25		NW		2.70	8.00		3.0	0.21	0.800	3.400	0.24	0.70	0.99	0.97	21.60	9% of 97%	
26		NW		2.70	8.00		3.0	0.21	0.800	3.400	0.24	0.70	0.99	0.97	21.60	9% of 97%	
27		NW		2.70	8.00		3.0	0.21	0.800	3.400	0.24	0.70	0.99	0.97	21.60	9% of 97%	
28		NW		2.70	8.00		3.0	0.21	0.800	3.400	0.24	0.70	0.99	0.97	21.60	9% of 97%	
29		NW		2.70	8.00		3.0	0.21	0.800	3.400	0.24	0.70	0.99	0.97	21.60	9% of 97%	
30		NW		2.70	9.60		3.0	0.21	0.800	3.400	0.24	0.70	0.99	0.97	25.92	11% of 97%	
31		NW		2.70	8.00		3.0	0.21	0.800	3.400	0.24	0.70	0.99	0.97	21.60	9% of 97%	
32	Bifold doors	NW		2.70	8.00		3.0	0.21	0.800	3.400	0.24	0.70	0.99	0.97	21.60	9% of 97%	

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Figure B.2 Dicker Data Level One Office Calculator

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

Building name/description

Dicker Data Office

Application

other

Climate zone

5

Storey

1

Facade areas

N	NE	E	SE	S	SW	W	NW	Internal
	121m²		276m²		167m²		348m²	n/a

Option A

Option B

Glazing area (A) ..... 79.9m² ..... 197m² ..... 80.5m² ..... 263m²

Number of rows preferred in table below

33 (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 <sub>u</sub> )	Cooling (S <sub>c</sub> )	Area used (m²)	Element share of % of allowance used	
1	NE															ROW SKIPPED (OK if intentional)	
2		NE		2.70	9.80		2.7	0.20				0.00	1.00	1.00	26.46	33% of 100%	
3		NE		2.70	9.80		2.7	0.20				0.00	1.00	1.00	26.46	33% of 100%	
4		NE		2.70	10.00		2.7	0.20				0.00	1.00	1.00	27.00	34% of 100%	
5	SE															ROW SKIPPED (OK if intentional)	
6		SE		2.70	8.10		3.6	0.19				0.00	1.00	1.00	21.87	11% of 100%	
7		SE		2.70	8.00		3.6	0.19				0.00	1.00	1.00	21.60	11% of 100%	
8		SE		2.70	8.00		3.6	0.19				0.00	1.00	1.00	21.60	11% of 100%	
9		SE		2.70	7.40		3.6	0.19				0.00	1.00	1.00	19.98	10% of 100%	
10		SE		2.70	1.50		3.6	0.19				0.00	1.00	1.00	4.05	2% of 100%	
11		SE		2.70	8.00		3.6	0.19				0.00	1.00	1.00	21.60	11% of 100%	
12		SE		2.70	8.00		3.6	0.19				0.00	1.00	1.00	21.60	11% of 100%	
13		SE		2.70	8.00		3.6	0.19				0.00	1.00	1.00	21.60	11% of 100%	
14		SE		2.70	8.00		3.6	0.19				0.00	1.00	1.00	21.60	11% of 100%	
15		SE		2.70	7.80		3.6	0.19				0.00	1.00	1.00	21.06	11% of 100%	
16	SW															ROW SKIPPED (OK if intentional)	
17		SW		2.70	10.00		4.8	0.48				0.00	1.00	1.00	27.00	34% of 100%	
18		SW		2.70	9.80		4.8	0.48				0.00	1.00	1.00	26.46	33% of 100%	
19		SW		2.70	10.00		4.8	0.48				0.00	1.00	1.00	27.00	34% of 100%	
20	NW															ROW SKIPPED (OK if intentional)	
21		NW		2.70	8.30		3.0	0.21				0.00	1.00	1.00	22.41	9% of 100%	

page 1 of 2

○

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
	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 <sub>h</sub> )	Cooling (S <sub>c</sub> )	Area used (m²)	Element share of % of allowance used
22		NW		2.70	8.00		3.0	0.21				0.00	1.00	1.00	21.60	8% of 100%
23		NW		2.70	8.00		3.0	0.21				0.00	1.00	1.00	21.60	8% of 100%
24		NW		2.70	9.60		3.0	0.21				0.00	1.00	1.00	25.92	10% of 100%
25		NW		2.70	8.00		3.0	0.21				0.00	1.00	1.00	21.60	8% of 100%
26		NW		2.70	8.00		3.0	0.21				0.00	1.00	1.00	21.60	8% of 100%
27		NW		2.70	8.00		3.0	0.21				0.00	1.00	1.00	21.60	8% of 100%
28		NW		2.70	8.00		3.0	0.21				0.00	1.00	1.00	21.60	8% of 100%
29		NW		2.70	8.00		3.0	0.21				0.00	1.00	1.00	21.60	8% of 100%
30		NW		2.70	8.00		3.0	0.21				0.00	1.00	1.00	21.60	8% of 100%
31		NW		2.70	8.00		3.0	0.21				0.00	1.00	1.00	21.60	8% of 100%
32		NW		2.70	7.40		3.0	0.21				0.00	1.00	1.00	19.98	8% of 100%
33																

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if inputs are valid



Figure B.3 Dicker Data Level Two Office Calculator Output

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

Building name/description

Dicker Data Office

Application

other

Climate zone

5

Storey

2

Facade areas

Option A

Option B

Glazing area (A)

N	NE	E	SE	S	SW	W	NW	Internal
			38.3m²		62.1m²		38.3m²	
							n/a	
			38.3m²			62.1m²		

Number of rows preferred in table below

7 (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	
	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 <sub>h</sub> )	Cooling (S <sub>c</sub> )	Area used (m²)	Element share of % of allowance used	
1	SE										ROW SKIPPED (OK if intentional)						
2		SE		2.70	14.20		2.4	0.20	0.650	2.700	0.24	0.00	0.88	0.83	38.34	100% of 99%	
3	SW										ROW SKIPPED (OK if intentional)						
4		SW		2.70	23.00		3.0	0.25	3.600	2.700	1.33	0.00	0.51	0.43	62.10	100% of 97%	
5	NW										ROW SKIPPED (OK if intentional)						
6		NW		2.70	14.20		6.2	0.68	4.100	2.700	1.52	0.00	0.00	0.25	38.34	100% of 98%	
7																	

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if inputs are valid





Figure B.4 Dicker Data Ground Floor Service Calculator Output

Report from PS106553.BAL.180130 CalculatorGlazingVolOne2014\_Ground\_service.xlsx

printed 2/02/2018

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

Building name/description

Dicker Data Service Area

Application

other

Climate zone

5

Storey

Ground

Facade areas

	N	NE	E	SE	S	SW	W	NW	Internal
Option A						59.5m <sup>2</sup>		102m <sup>2</sup>	
Option B									n/a
Glazing area (A)	47.3m <sup>2</sup>					77.5m <sup>2</sup>			

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 <sub>a</sub> )	Cooling (S <sub>c</sub> )	Area used (m²)	Element share of % of allowance used
1	SW										ROW SKIPPED (OK if intentional)					
2		SW		2.70	8.75		3.6	0.36	2.100	2.700	0.78	0.00	0.67	0.58	23.63	50% of 99%
3		SW		2.70	8.75		3.6	0.36	2.100	2.700	0.78	0.00	0.67	0.58	23.63	50% of 99%
4											ROW SKIPPED (OK if intentional)					
5	NW	NW		2.70	9.50		3.8	0.21				0.00	1.00	1.00	25.65	33% of 97%
6		NW		2.70	9.50		3.8	0.21				0.00	1.00	1.00	25.65	33% of 97%
7		NW		2.70	8.60		3.8	0.21				0.00	1.00	1.00	23.22	30% of 97%
8		NW		2.70	1.10		3.8	0.21				0.00	1.00	1.00	2.97	4% of 97%

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if inputs are valid



Figure B.5 Dicker Data Level One Service Calculator Output

Report from PS106553.BAL.180130 CalculatorGlazingVolOne2014\_Level 1\_service.xlsx

printed 1/02/2018

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

Building name/description

Dicker Data Service

Application

other

Climate zone

5

Storey

1

Facade areas

	N	NE	E	SE	S	SW	W	NW	Internal
Option A						59.5m <sup>2</sup>		102m <sup>2</sup>	
Option B									n/a
Glazing area (A)	20.7m <sup>2</sup>					28.1m <sup>2</sup>			

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 <sub>a</sub> )	Cooling (S <sub>c</sub> )	Area used (m²)	Element share of % of allowance used
1	SW											ROW SKIPPED (OK if intentional)				
2		SW		1.30	5.40		6.5	0.70				0.00	1.00	1.00	7.02	34% of 100%
3		SW		1.30	5.10		6.5	0.70				0.00	1.00	1.00	6.63	32% of 100%
4		SW		1.30	5.40		6.5	0.70				0.00	1.00	1.00	7.02	34% of 100%
5												ROW SKIPPED (OK if intentional)				
6	NW	NW		1.30	5.30		5.0	0.55				0.00	1.00	1.00	6.89	25% of 100%
7		NW		1.30	5.30		5.0	0.55				0.00	1.00	1.00	6.89	25% of 100%
8		NW		1.30	5.30		5.0	0.55				0.00	1.00	1.00	6.89	25% of 100%
9		NW		1.30	5.70		5.0	0.55				0.00	1.00	1.00	7.41	26% of 100%
10																

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DICKER DATA

# **DICKER DATA PROPOSED OFFICE AND SERVICE AREA**

## **SECTION J PARTS J1 & J2 FABRIC PRESCRIPTIVE SOLUTION COMPLIANCE REPORT**

DECEMBER 2017



Question today  
*Imagine tomorrow*  
Create for the future




**Dicker Data Proposed Office and Service Area**  
**Section J Parts J1 & J2 Fabric**  
**Prescriptive Solution Compliance Report**

**Dicker Data**

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REV	DATE	DETAILS
00	5/12/17	Draft issue for comment

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Reviewed by:	Sophie Beard	5/12/217	
Approved by:	Sophie Beard	5/12/217	

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## LIST OF APPENDICES

Appendix A Wall, Floor and Roof Insulation Locations

Appendix B Compliant NCC Glazing Calculators and Markups

Appendix C Additional Ground Floor Shading Mark Up

# 1 INTRODUCTION

---

## 1.1 PURPOSE OF REPORT

This report is to provide a statement pertaining to the building envelope performance requirements necessary to meet Parts J1 Building Fabric and J2 Glazing, Section J Energy Efficiency, Volume One of the National Construction Code (NCC) Series 2016 based on the Deemed-to-Satisfy (DTS) provisions. This assessment under Section J applies to the Class 5 Office and Service Area of the building.

---

## 1.2 SOURCES OF INFORMATION

The following sources of information were used to undertake the Part J1 and Part J2 prescriptive solution assessment:

- Parts J1 – J3, Section J, Volume One of the NCC Series 2016
  - Australian Building Codes Board (ABCB) glazing calculator 2014 (current version)
  - Glazing candidates: certified products listed on the Window Energy Rating Scheme (WERS) website
  - Architectural drawings: WMK Architecture preliminary DA architectural drawings issued 20/10/17 drawing sheets DA500 – 602 and issued 23/11/17 drawing sheets DA103 – DA105
  - Modern Building Certifiers BCA Design Compliance Report – Revision 01, issued 02/11/17
  - Discussion between WSP and WMK on 29/11/17 regarding 800mm setback of Ground Floor Office façade to NE, NW and SE
- 

## 1.3 BUILDING CLASSIFICATION AND CLIMATE ZONE

In accordance with Part A3.2 of NCC Volume 1, the proposed building comprises spaces with the following classifications:

- Class 5 Office
- Class 7b Warehouse

The site is located within Climate Zone 5.

---

## 1.4 ASSESSMENT METHOD

The building envelope is defined by all building elements (building fabric and glazing) that separate conditioned spaces from external and non-conditioned spaces.

The compliance assessment method applied is outlined below:

- Assessment of Section J, Part J1 requires the proposed opaque fabric of the building envelope to comply with the Deemed-To-Satisfy (DTS) provisions of J1.1 to J1.6
- Assessment of Section J, Part J2 requires the proposed building envelope glazing to comply with the DTS provisions of J2.1 to J2.5. Glazing in each storey, including any mezzanine, is assessed separately for glazing in the

external fabric facing each orientation, and for glazing in the internal fabric.

A completed ABCB Volume 1 glazing calculator, displaying a ticked green outcomes box for each storey and mezzanine, demonstrates compliant thermal performance requirements for the glazing to satisfy the part J2 provisions. The compliant calculator indicates that no glazing element exceeds 100% of the air conditioning energy allowance for that element and orientation.

- Section J, Part J3 requires the appropriate sealing of relevant building elements to restrict air infiltration

## 2 PART J1 BUILDING FABRIC

Table 2.1 summarises the Part J1 DTS provisions for building fabric.

Insulation R-values are defined in units of  $\text{m}^2\text{K/W}$ . The R-values stated in Table 2.1 relate to the total system R-values across a built-up construction.

Marked up floor plans in Appendix A demonstrate the location of required fabric thermal performance for walls, floors and roof areas of the proposed development.

Table 2.1 Summary of Part J1 DTS provisions

Building Element	Minimum R-Value Requirements
External walls	<p>Total construction insulation rating must be <b>minimum R2.8</b> for all walls.</p> <p>This assessment assumes all walls have a surface density less than <math>220\text{kg/m}^2</math>.</p> <p><b>For walls that have a surface density &gt; <math>220\text{kg/m}^2</math></b>, the minimum total insulation requirement may be reduced as follows:</p> <p>R2.3 minimum</p> <p>R1.8 minimum for south oriented walls, or</p> <p>R1.8 minimum for walls shaded with a projection casting a shade angle between <math>30^\circ</math> and <math>60^\circ</math>, or</p> <p>R1.3 minimum for walls shaded with a projection casting a shade angle &gt; <math>60^\circ</math></p> <p><i>All wall constructions are assumed to have adequate lining/stud cavity depth to install the required thickness of insulation.</i></p>
Envelope walls other than external walls (e.g. between conditioned and non-conditioned internal spaces)	<p><b>Total construction insulation rating must be minimum:</b></p> <p><b>R1.0</b> for walls other than an external wall where ventilation rates on the unconditioned side are <math>\leq 1.5</math> air changes per hour (ach)</p> <p><b>R1.8</b> for all other cases</p>
Basement floor / slab on ground	<p><b>No minimum construction insulation requirement.</b></p> <p>Floor as constructed.</p>
Suspended floors over unconditioned enclosed space ventilated < 1.5 ach.	Total construction insulation rating must be <b>minimum R1.0</b>
Suspended floors over unenclosed space / overhanging external space.	Total construction insulation rating must be <b>minimum R2.0</b>
Roof, and ceilings with exposed terrace/balcony or the like above.	Total construction insulation rating must be <b>minimum R3.2</b>

### 3 PART J2 GLAZING

Table 3.1 summarises the Part J2 DTS provisions for glazing.

The glazing U-value and SHGC given in the table below are whole of window system values that account for both frame and glass effects.

Glazing orientation is assessed according to the 8 main ordinal compass direction sectors (N/NE/E/SE/S/SW/W/NW). Applicable glazing orientations are indicated on markups accompanying the completed glazing calculators in Appendix B. Shading to Ground Floor NE, NW and SE façade not shown on the architectural drawings are based on discussions between WSP and WMK on 29/11/17. See Appendix C for extent of this additional shading.

Table 3.1 Summary of Part J2 glazing thermal performance requirements

Location / Orientation	U-value	SHGC	Representative WERS Certified glazing system candidates		
			System	U-value	SHGC
Proposed Office					
NE Ground Floor glazing	3.6	0.17	Abbey Aluminium  Commercial Framing Series 424 Centreglazed - Double Glazed: 10.38mm Viridian Laminate Grey + 8mm Air + 6mm Clear	3.6	0.17
SE Ground Floor glazing	2.5	0.28	GLASSPLACE  Capral 425 Narrowline (Commercial Size) - Double Glazed: 6mm Eclipse Advantage Grey + 12mm Argon + 6mm Energy Advantage	2.5	0.28
SW Ground Floor Glazing	2.5	0.37	GLASSPLACE  Capral 425 Narrowline (Commercial Size) - Double Glazed: 6.38mm Comfort Plus Neutral + 12mm Argon + 6mm Energy Advantage	2.5	0.37
NW Ground Floor Glazing	4.2	0.22	AJ Aluminium Pty Ltd   Eco-Wall 225 Commercial Framing - Double Glazed: 6.38mm Grey Laminate + 12mm Argon + 10.38mm Clear Laminate	4.2	0.22
NE First Floor glazing	3.4	0.14	Altralite Windows & Doors  Capral 100mm 419 Flushline - Double Glazed: 6.76mm Vanceva PureWhite + 10mm Argon + 6.76mm Saflex Arctic Snow	3.4	0.14
SE First Floor glazing	2.5	0.23	Abbey Aluminium  Commercial Framing Series 626 (150mm) Frontglazed - Double Glazed: 6mm Grey + 12mm Argon + 6mm TLE62 on Clear	2.5	0.23
SW First Floor Glazing	2.5	0.55	Batemans Bay Windows  ESS Fixed Window External 52 - Commercial Size - Double Glazed - With TPS Spacer: 5mm EnergyTech+ 10mm Argon + 5mm Clear	2.5	0.55
NW First Floor Glazing	4.1	0.19	AJ Aluminium Pty Ltd  Eco-Wall 225 Commercial Framing - Double Glazed: 6mm TS21 on Green + 12mm Air + 6mm Clear	4.1	0.19

Location / Orientation	U-value	SHGC	Representative WERS Certified glazing system candidates		
			System	U-value	SHGC
SE Second Floor glazing	3.0	0.55	Sapa Singapore Holding Pte Ltd  SAPA Elegance 52ST Curtain Wall – Double Glazed: 6mm Clear + 12mm Air + 6mm SuperGreen	3.0	0.55
SW Second Floor Glazing	2.9	0.53	Darley Aluminium  Commercial Frame 150mm Front - Double Glazed: 6.38mm ComfortPlus Neutral + 12mm Argon + 6mm ET	2.9	0.53
NW Second Floor Glazing	6.4	0.59	Aluminium & Glass Construction  850-500 Series Fixed Window Wall - Single Glazed: 10.76mm Double Green Laminate (0.76mm interlayer)	6.4	0.59
<b>Proposed Service Area</b>					
NW Ground Floor Glazing	6.4	0.78	AJ Aluminium Pty Ltd  Hunter EVO 150mm Shopfront - Single Glazed: 4mm Clear	6.4	0.78
SW Ground Floor Glazing	6.4	0.78	AJ Aluminium Pty Ltd  Hunter EVO 150mm Shopfront - Single Glazed: 4mm Clear	6.4	0.78
NW Second Floor Glazing	6.4	0.78	AJ Aluminium Pty Ltd  Hunter EVO 150mm Shopfront - Single Glazed: 4mm Clear	6.4	0.78
SW Second Floor Glazing	6.4	0.78	AJ Aluminium Pty Ltd  Hunter EVO 150mm Shopfront - Single Glazed: 4mm Clear	6.4	0.78
<p>Note: The compliant example glazing product is presented for information only. This demonstrates that the glazing performance requirements detailed are achievable with commercial glazing products. It is the responsibility of the architect or contractor to select glazing products which meet the stated U-value and Solar Heat Gain Coefficient (SHGC) performance requirements.</p> <p>Other combination of U-value and SHGC may be compliant and can be verified using the NCC glazing calculator.</p>					



## 4 ADDITIONAL PART J1 AND J2 COMMENTS

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### 4.1 GENERAL REQUIREMENTS

Insulation is to comply with AS/NZS 4856.9 and be installed so it abuts or overlaps adjoining insulation other than at supporting members such as studs, noggins, joists, furring channels and the like where insulation must be against the member.

All insulation must form a continuous barrier with ceilings, walls, bulkheads, floors or the like that inherently contribute to the thermal barrier.

---

### 4.2 BULK INSULATION

Bulk insulation should be installed so that it maintains its position and thickness other than where it is compressed between cladding and supporting members, water pipes, electrical cabling or the like.

---

### 4.3 STRINGENCY OF DTS GLAZING ASSESSMENT

The methodology applied by the DTS glazing calculations has resulted in very stringent thermal performance requirements for the glazing.

The parameters listed in Part J2 Glazing above are the least stringent that could be selected for each glazing segment and type that was identified off the plans and elevations in their present state of design development.

Glazing is assessed on the assumption that the area bounded by glazing is conditioned, regardless of its likely use in practice, and therefore must be able to achieve the required energy efficiency for heating and cooling due to the building envelope performance.

The DTS calculations also treat glazing on each of the eight cardinal orientations in isolation from the other orientations. The calculations consider the amount of glazing area compared to the amount of total wall area on that orientation, which can result in excessively stringent requirements on small segments of 'wall' that are near to 100% glazed.

An alternative compliance solution can be pursued, to identify a more consistent set of glazing parameters across the elevations.

A Performance Solution following the JV3 methodology will apply computational thermal simulation to holistically compare the proposed design against an 'ideal' reference building that would meet all the DTS requirements. The proposed design is deemed compliant where its calculated annual energy consumption is no greater than that for the reference. This approach more realistically reflects the influence of shading, façade articulations and site context on the whole building and avoids the limitations of discrete assessment of each orientation in isolation.

## 5 PART J3 BUILDING SEALING

Table 5.1 summarises the building sealing performance requirements that must be addressed to demonstrate compliance with the Part J3 Building Sealing DTS provisions.

Table 5.1 Building sealing performance requirements to demonstrate compliance

Part	Comments
J3.1	Part J3 is applicable to this development.
J3.2 Chimneys and Flues	Not Applicable – There are no chimneys or flues identified within the building envelope.
J3.3 Roof lights	<p>The following is to be addressed in the Architectural specification:</p> <p>(a) A roof light must be sealed, or capable of being sealed, when serving—</p> <ul style="list-style-type: none"> <li>(i) a conditioned space; or</li> <li>(ii) a habitable room in climate zones 4, 5, 6, 7 or 8.</li> </ul> <p>(b) A roof light required by (a) to be sealed, or capable of being sealed, must be constructed with—</p> <ul style="list-style-type: none"> <li>(i) an imperforate ceiling diffuser or the like installed at the ceiling or internal lining level; or</li> <li>(ii) a weatherproof seal; or</li> <li>(iii) a shutter system readily operated either manually, mechanically or electronically by the occupant.</li> </ul>
J3.4 Windows and doors	<p>The following is to be addressed in the Architectural specification:</p> <p>A seal to restrict air infiltration must be fitted to each edge of a door, openable window or the like forming part of the envelope of a conditioned space or the external fabric of a habitable room or public area.</p> <p>For a seal required on the bottom edge of an external swing door, a draft protection device must be installed</p> <p>The other edges of an external door may be a foam or rubber compression strip, fibrous seal or the like.</p> <p><i>This requirement is met by windows complying with AS 2047.</i></p> <p>Each entrance to the building, if leading to a conditioned space must have an airlock, self-closing door, revolving door or the like.</p>
J3.5 Exhaust fans	To be addressed in Mechanical specification.
J3.6 Construction of roofs, walls and floors	To be addressed in the Architectural specification.
J3.7 Evaporative coolers	Not Applicable – There are no evaporative coolers identified within the building envelope.

## 6 CONCLUSIONS

Based on the analysis performed and subject to the incorporation of the recommendations made in this report:

- The building fabric meets the performance requirements for Section J Part J1 of Volume One of the NCC 2016
- The glazing meets the performance requirements for Section J Part J2 of Volume One of the NCC 2016

This assessment includes shading to Ground Floor NE, NW and SE façade not shown on the architectural drawings and based on discussions between WSP and WMK on 29/11/17. See Appendix C for extent of this additional shading.

# APPENDIX A

## WALL, FLOOR AND ROOF INSULATION LOCATIONS

Figure A.1 Ground Level Building Fabric Markup

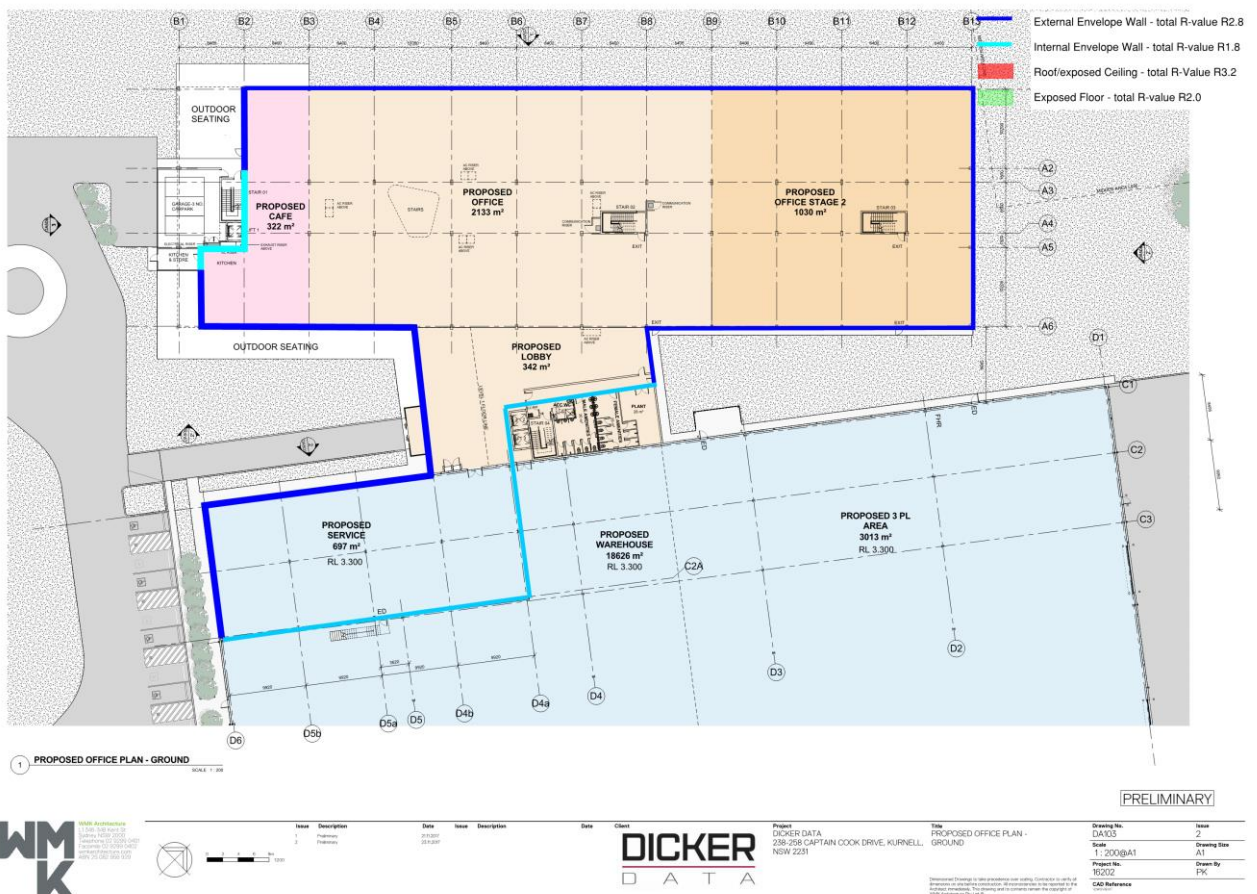


Figure A.2 Level 1 Building Fabric Markup

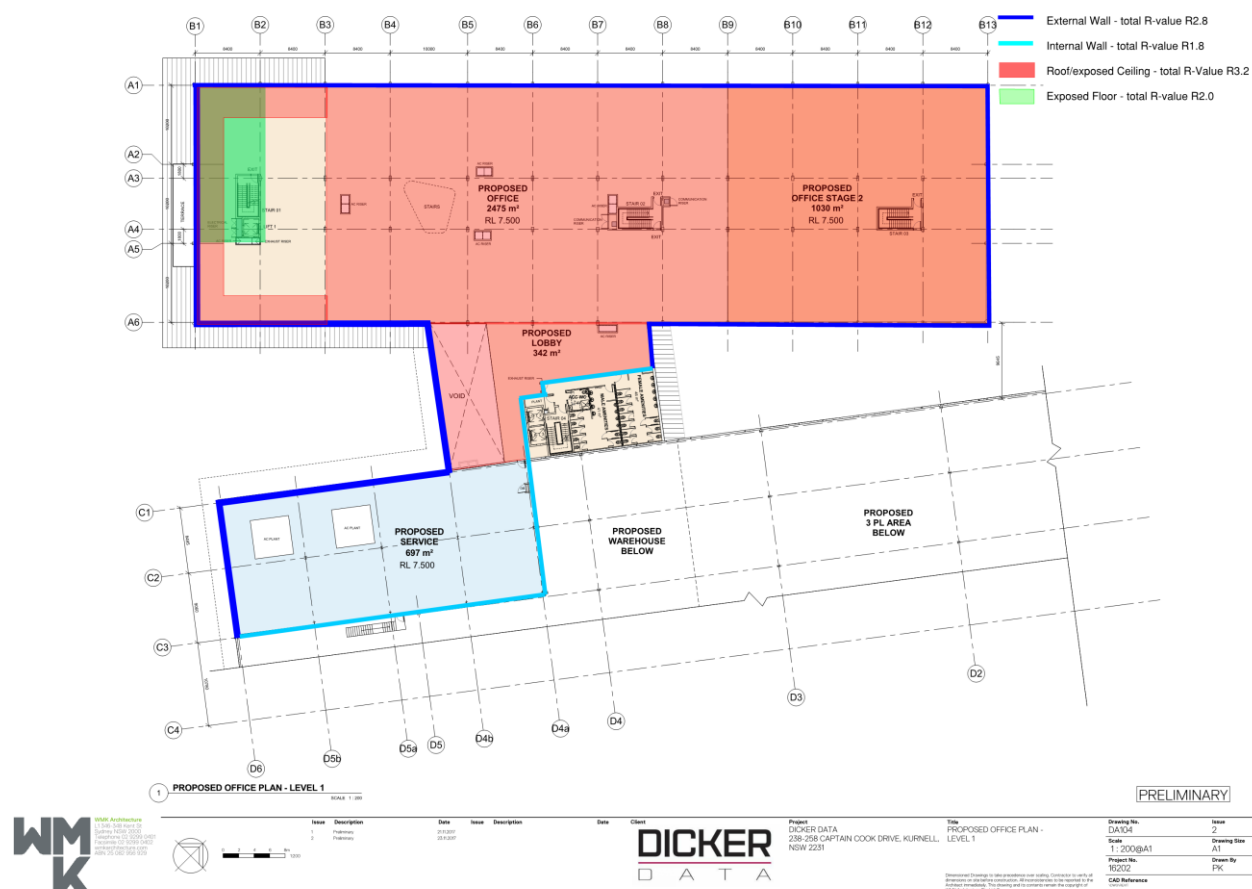
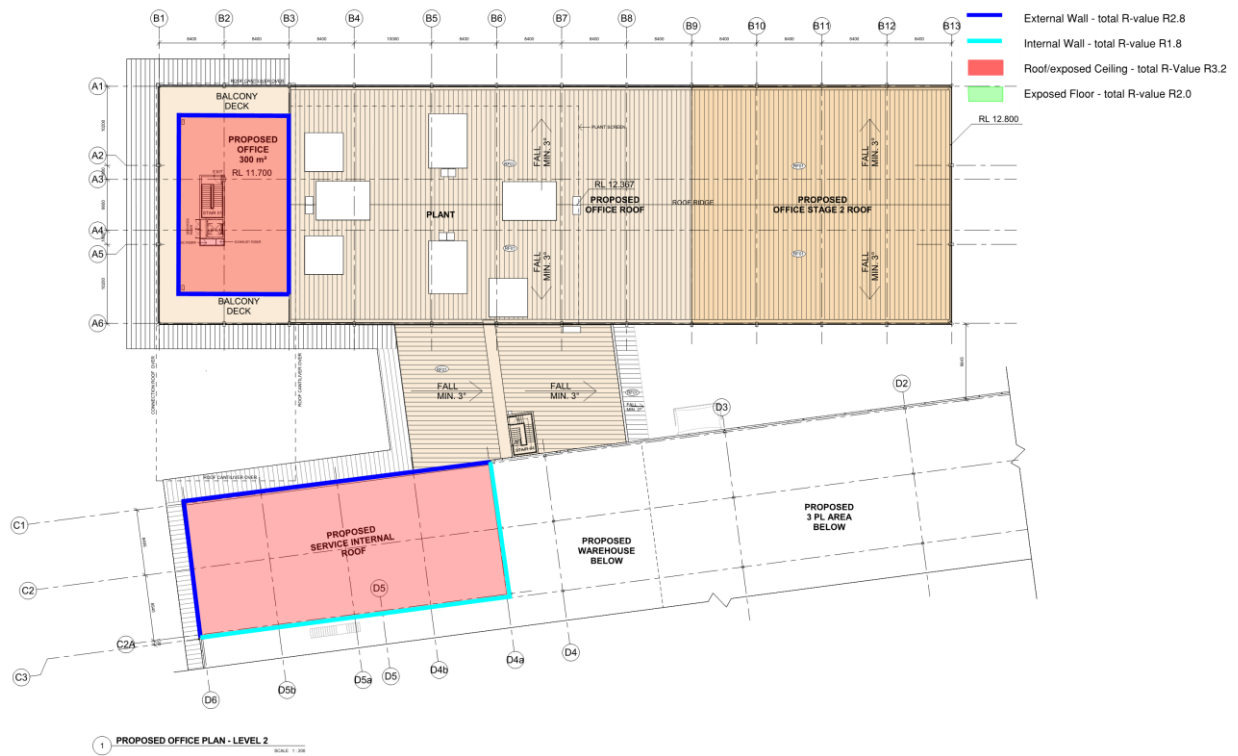


Figure A.3 Level 2 Building Fabric Markup



WMK Architecture  
11 Stirling Avenue  
Kurnell NSW 2231  
Phone: 02 9339 0077  
Fax: 02 9339 0078  
www.wmk.com.au



Issue	Description	Date	Issue	Description	Date
1	Proposed	23/12/17			
2	Proposed	23/12/17			

Issue	Description	Date
1	Proposed	23/12/17
2	Proposed	23/12/17

Issue	Description	Date
1	Proposed	23/12/17
2	Proposed	23/12/17

Issue	Description	Date
1	Proposed	23/12/17
2	Proposed	23/12/17

Issue	Description	Date
1	Proposed	23/12/17
2	Proposed	23/12/17

Issue	Description	Date
1	Proposed	23/12/17
2	Proposed	23/12/17

Issue	Description	Date
1	Proposed	23/12/17
2	Proposed	23/12/17

Issue	Description	Date
1	Proposed	23/12/17
2	Proposed	23/12/17

Issue	Description	Date
1	Proposed	23/12/17
2	Proposed	23/12/17

Issue	Description	Date
1	Proposed	23/12/17
2	Proposed	23/12/17

Issue	Description	Date
1	Proposed	23/12/17
2	Proposed	23/12/17

Issue	Description	Date
1	Proposed	23/12/17
2	Proposed	23/12/17

Issue	Description	Date
1	Proposed	23/12/17
2	Proposed	23/12/17

Issue	Description	Date
1	Proposed	23/12/17
2	Proposed	23/12/17

Issue	Description	Date
1	Proposed	23/12/17
2	Proposed	23/12/17

PRELIMINARY

**DICKER**  
DATA

Project:  
DICKER DATA  
238-258 CAPTAIN COOK DRIVE, KURNELL,  
NSW 2231

Site:  
PROPOSED OFFICE PLAN -  
LEVEL 2

Drawing No:  
DAS05

Scale:  
1:200 @ A1

Project No:  
R2002

Drawn By:  
PK

Issue:  
2

Drawing Size:  
A1

Issue:  
2

Issue:  
2

# APPENDIX B

## COMPLIANT NCC GLAZING CALCULATORS AND MARKUPS

Figure B.1 Ground Level Office Glazing Calculator output

Report from PS106553.BAL.171122 CalculatorGlazingVolOne2014\_Ground\_office.xlsx

printed 5/12/2017

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

Building name/description

Dicker Data Office

Application

other

Climate zone

5

Storey

Ground

Facade areas

	N	NE	E	SE	S	SW	W	NW	Internal
Option A		129m²		291m²		127m²		395m²	
Option B									n/a
Glazing area (A)	124m²	258m²	120m²	381m²					

Number of rows preferred in table below

37 (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 <sub>H</sub> )	Cooling (S <sub>C</sub> )	Area used (m²)	Element share of % of allowance used
1	NE										ROW SKIPPED (OK if intentional)					
2		NE		4.20	9.85		3.6	0.17	0.800	4.200	0.19	0.00	0.95	0.86	41.37	33% of 97%
3		NE		4.20	9.85		3.6	0.17	0.800	4.200	0.19	0.00	0.95	0.86	41.37	33% of 97%
4		NE		4.20	9.85		3.6	0.17	0.800	4.200	0.19	0.00	0.95	0.86	41.37	33% of 97%
5	SE										ROW SKIPPED (OK if intentional)					
6		SE		0.50	8.10		2.5	0.28				0.00	1.00	1.00	4.05	2% of 99%
7		SE		3.50	8.10		2.5	0.28	3.000	3.500	0.86	0.00	0.60	0.51	28.35	9% of 99%
8		SE		3.50	8.10		2.5	0.28	3.000	3.500	0.86	0.00	0.60	0.51	28.35	9% of 99%
9		SE		0.50	8.10		2.5	0.28				0.00	1.00	1.00	4.05	2% of 99%
10		SE		0.50	8.10		2.5	0.28				0.00	1.00	1.00	4.05	2% of 99%
11		SE		4.20	4.60		2.5	0.28	0.800	4.200	0.19	0.00	0.90	0.87	19.32	8% of 99%
12		SE		4.20	8.10		2.5	0.28	0.800	4.200	0.19	0.00	0.90	0.87	34.02	14% of 99%
13		SE		4.20	8.10		2.5	0.28	0.800	4.200	0.19	0.00	0.90	0.87	34.02	14% of 99%
14		SE		4.20	8.10		2.5	0.28	0.800	4.200	0.19	0.00	0.90	0.87	34.02	14% of 99%
15		SE		4.20	8.10		2.5	0.28	0.800	4.200	0.19	0.00	0.90	0.87	34.02	14% of 99%
16		SE		4.20	8.10		2.5	0.28	0.800	4.200	0.19	0.00	0.90	0.87	34.02	14% of 99%
17	SW										ROW SKIPPED (OK if intentional)					
18		SW		3.50	10.00		2.5	0.37	12.700	3.500	3.63	0.00	0.39	0.34	35.00	24% of 99%
19		SW		3.50	6.90		2.5	0.37	7.000	3.500	2.00	0.00	0.39	0.34	24.15	16% of 99%
20		SW		0.50	10.00		2.5	0.37				0.00	1.00	1.00	5.00	5% of 99%
21		SW		0.50	10.00		2.5	0.37				0.00	1.00	1.00	5.00	5% of 99%

page 1 of 2

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 <sub>H</sub> )	Cooling (S <sub>C</sub> )	Area used (m²)	Element share of % of allowance used		
22		SW		0.50	10.00		2.5	0.37				0.00	1.00	1.00	5.00	5% of 99%		
23		SW		4.20	10.90		2.5	0.37				0.00	1.00	1.00	45.78	45% of 99%		
24	NW										ROW SKIPPED (OK if intentional)							
25		NW		4.20	8.10		4.2	0.22	3.300	4.200	0.79	0.00	0.49	0.43	34.02	4% of 97%		
26		NW		4.20	8.10		4.2	0.22	0.800	4.200	0.19	0.00	0.95	0.85	34.02	9% of 97%		
27		NW		4.20	8.10		4.2	0.22	0.800	4.200	0.19	0.00	0.95	0.85	34.02	9% of 97%		
28		NW		4.20	8.10		4.2	0.22	0.800	4.200	0.19	0.00	0.95	0.85	34.02	9% of 97%		
29		NW		4.20	8.10		4.2	0.22	0.800	4.200	0.19	0.00	0.95	0.85	34.02	9% of 97%		
30		NW		4.20	8.10		4.2	0.22	0.800	4.200	0.19	0.00	0.95	0.85	34.02	9% of 97%		
31		NW		4.20	8.10		4.2	0.22	0.800	4.200	0.19	0.00	0.95	0.85	34.02	9% of 97%		
32		NW		4.20	8.10		4.2	0.22	0.800	4.200	0.19	0.00	0.95	0.85	34.02	9% of 97%		
33		NW		4.20	9.60		4.2	0.22	0.800	4.200	0.19	0.00	0.95	0.85	40.32	11% of 97%		
34		NW		4.20	8.10		4.2	0.22	0.800	4.200	0.19	0.00	0.95	0.85	34.02	9% of 97%		
35		NW		4.20	8.10		4.2	0.22	0.800	4.200	0.19	0.00	0.95	0.85	34.02	9% of 97%		
36																		
37																		

**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



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Figure B.2 Level 1 Office Glazing Calculator output

Report from PS106553.BAL.171122 CalculatorGlazingVolOne2014\_Level 1\_office.xlsx

printed 5/12/2017

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

Building name/description

Dicker Data Office

Application

other

Climate zone

5

Storey

1

Facade areas

N	NE	E	SE	S	SW	W	NW	Internal
	128m <sup>2</sup>		341m <sup>2</sup>		179m <sup>2</sup>		429m <sup>2</sup>	n/a
Option A								
Option B								
Glazing area (A)	124m <sup>2</sup>	299m <sup>2</sup>	170m <sup>2</sup>	415m <sup>2</sup>				

Number of rows preferred in table below

33 (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 <sub>h</sub> )	Cooling (S <sub>c</sub> )	Area used (m²)	Element share of % of allowance used
1	NE										ROW SKIPPED (OK if intentional)					
2		NE		4.20	9.85		3.4	0.14					1.00	1.00	41.37	33% of 95%
3		NE		4.20	9.85		3.4	0.14				0.00	1.00	1.00	41.37	33% of 95%
4		NE		4.20	9.85		3.4	0.14				0.00	1.00	1.00	41.37	33% of 95%
5	SE										ROW SKIPPED (OK if intentional)					
6		SE		4.20	8.10		2.5	0.23	3.100	4.200	0.74	0.00	0.64	0.55	34.02	10% of 95%
7		SE		4.20	8.10		2.5	0.23	3.100	4.200	0.74	0.00	0.64	0.55	34.02	10% of 95%
8		SE		4.20	8.10		2.5	0.23	3.100	4.200	0.74	0.00	0.64	0.55	34.02	10% of 95%
9		SE		4.20	6.50		2.5	0.23				0.00	1.00	1.00	27.30	10% of 95%
10		SE		4.20	8.10		2.5	0.23				0.00	1.00	1.00	34.02	12% of 95%
11		SE		4.20	8.10		2.5	0.23				0.00	1.00	1.00	34.02	12% of 95%
12		SE		4.20	8.10		2.5	0.23				0.00	1.00	1.00	34.02	12% of 95%
13		SE		4.20	8.10		2.5	0.23				0.00	1.00	1.00	34.02	12% of 95%
14		SE		4.20	8.10		2.5	0.23				0.00	1.00	1.00	34.02	12% of 95%
15	SW										ROW SKIPPED (OK if intentional)					
16		SW		4.20	10.00		2.5	0.55	4.000	4.200	0.95	0.00	0.61	0.52	42.00	23% of 99%
17		SW		4.20	10.00		2.5	0.55	4.000	4.200	0.95	0.00	0.61	0.52	42.00	23% of 99%
18		SW		4.20	10.00		2.5	0.55	4.000	4.200	0.95	0.00	0.61	0.52	42.00	23% of 99%
19		SW		4.00	10.90		2.5	0.55	2.640	4.200	0.63	0.20	0.84	0.76	43.60	30% of 99%
20	NW										ROW SKIPPED (OK if intentional)					
21		NW		4.20	8.10		4.1	0.19	3.350	4.200	0.80	0.00	0.47	0.42	34.02	3% of 96%

page 1 of 2

Report from PS106553.BAL.171122 CalculatorGlazingVolOne2014\_Level 1\_office.xlsx

printed 5/12/2017

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 (m <sup>2</sup> )	Total System U-Value (AFRC)	Total System SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (S <sub>h</sub> )	Cooling (S <sub>c</sub> )	Area used (m <sup>2</sup> )	Element share of % of allowance used
22		NW		4.20	8.10		4.1	0.19	3.350	4.200	0.80	0.00	0.47	0.42	34.02	3% of 96%
23		NW		4.20	8.10		4.1	0.19				0.00	1.00	1.00	34.02	9% of 96%
24		NW		4.20	8.10		4.1	0.19				0.00	1.00	1.00	34.02	9% of 96%
25		NW		4.20	8.10		4.1	0.19				0.00	1.00	1.00	34.02	9% of 96%
26		NW		4.20	8.10		4.1	0.19				0.00	1.00	1.00	34.02	9% of 96%
27		NW		4.20	8.10		4.1	0.19				0.00	1.00	1.00	34.02	9% of 96%
28		NW		4.20	8.10		4.1	0.19				0.00	1.00	1.00	34.02	9% of 96%
29		NW		4.20	9.60		4.1	0.19				0.00	1.00	1.00	40.32	11% of 96%
30		NW		4.20	8.10		4.1	0.19				0.00	1.00	1.00	34.02	9% of 96%
31		NW		4.20	8.10		4.1	0.19				0.00	1.00	1.00	34.02	9% of 96%
32		NW		4.20	8.10		4.1	0.19				0.00	1.00	1.00	34.02	9% of 96%
33																

### IMPORTANT NOTICE AND DISCLAIMER IN RESPECT OF THE GLAZING CALCULATOR

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if inputs are valid



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Figure B.3 Level 2 Office Glazing Calculator output

Report from PS106553.BAL.171122 CalculatorGlazingVolOne2014\_Level 2\_office.xlsx

printed 5/12/2017

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

Building name/description

Dicker Data Office

Application

other

Climate zone

5

Storey

2

Facade areas

N	NE	E	SE	S	SW	W	NW	Internal
			53.2m <sup>2</sup>		91.6m <sup>2</sup>		53.2m <sup>2</sup>	
								n/a

Option A

Option B

Glazing area (A) ..... 47.9m<sup>2</sup> ..... 82.8m<sup>2</sup> ..... 47.9m<sup>2</sup>

Number of rows preferred in table below

7 (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 <sub>H</sub> )	Cooling (S <sub>C</sub> )	Area used (m²)	Element share of % of allowance used
1	SE										ROW SKIPPED (OK if intentional)					
2		SE		3.60	13.30		3.0	0.55	33.000	3.600	9.17	0.00	0.39	0.32	47.88	100% of 100%
3	SW										ROW SKIPPED (OK if intentional)					
4		SW		3.60	23.00		2.9	0.53	3.600	3.600	1.00	0.00	0.60	0.50	82.80	100% of 98%
5	NW										ROW SKIPPED (OK if intentional)					
6		NW		3.60	13.30		6.4	0.59	3.800	3.600	1.06	0.00	0.11	0.33	47.88	100% of 100%
7																

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Figure B.4 Ground Level Service Glazing Calculator output

Report from PS106553.BAL.171122 CalculatorGlazingVolOne2014\_Ground\_service.xlsx

printed 5/12/2017

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

Building name/description  
**Dicker Data Service Area**

Application: **other** Climate zone: **5**

Storey: **Ground**

Facade areas

	N	NE	E	SE	S	SW	W	NW	Internal
Option A						73.9m²		126m²	
Option B									n/a

Glazing area (A) ..... 16m² ..... 28.2m²

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 <sub>H</sub> )	Cooling (S <sub>C</sub> )	Area used (m²)	Element share of % of allowance used	
1	SW										ROW SKIPPED (OK if intentional)						
2		SW		1.00	8.00		6.4	0.78	2.000	2.100	0.95	1.10	0.86	0.77	8.00	50% of 55%	
3		SW		1.00	8.00		6.4	0.78	2.000	2.100	0.95	1.10	0.86	0.77	8.00	50% of 55%	
4											ROW SKIPPED (OK if intentional)						
5	NW	NW		1.00	9.40		6.4	0.78	2.000	2.100	0.95	1.10	0.91	0.68	9.40	33% of 73%	
6		NW		1.00	9.40		6.4	0.78	2.000	2.100	0.95	1.10	0.91	0.68	9.40	33% of 73%	
7		NW		1.00	9.40		6.4	0.78	2.000	2.100	0.95	1.10	0.91	0.68	9.40	33% of 73%	
8																	

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Figure B.5 Level 1 Service Glazing Calculator output

Report from PS106553.BAL.171122 CalculatorGlazingVolOne2014\_Level 1\_service.xlsx

printed 5/12/2017

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

Building name/description

Dicker Data Service

Application

other

Climate zone

5

Storey

1

Facade areas

N	NE	E	SE	S	SW	W	NW	Internal
					73.9m <sup>2</sup>		126m <sup>2</sup>	
								n/a

Option A

Option B

Glazing area (A)

16m<sup>2</sup>

28.2m<sup>2</sup>

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 <sub>H</sub> )	Cooling (S <sub>C</sub> )	Area used (m²)	Element share of % of allowance used
1	SW										ROW SKIPPED (OK if intentional)					
2		SW		1.00	8.00		6.4	0.78	2.000	1.000	2.00	0.00	0.39	0.34	8.00	50% of 46%
3		SW		1.00	8.00		6.4	0.78	2.000	1.000	2.00	0.00	0.39	0.34	8.00	50% of 46%
4											ROW SKIPPED (OK if intentional)					
5	NW	NW		1.00	9.40		6.4	0.78	3.000	1.000	3.00	0.00	0.00	0.21	9.40	33% of 21%
6		NW		1.00	9.40		6.4	0.78	3.000	1.000	3.00	0.00	0.00	0.21	9.40	33% of 21%
7		NW		1.00	9.40		6.4	0.78	3.000	1.000	3.00	0.00	0.00	0.21	9.40	33% of 21%
8																

### IMPORTANT NOTICE AND DISCLAIMER IN RESPECT OF THE GLAZING CALCULATOR

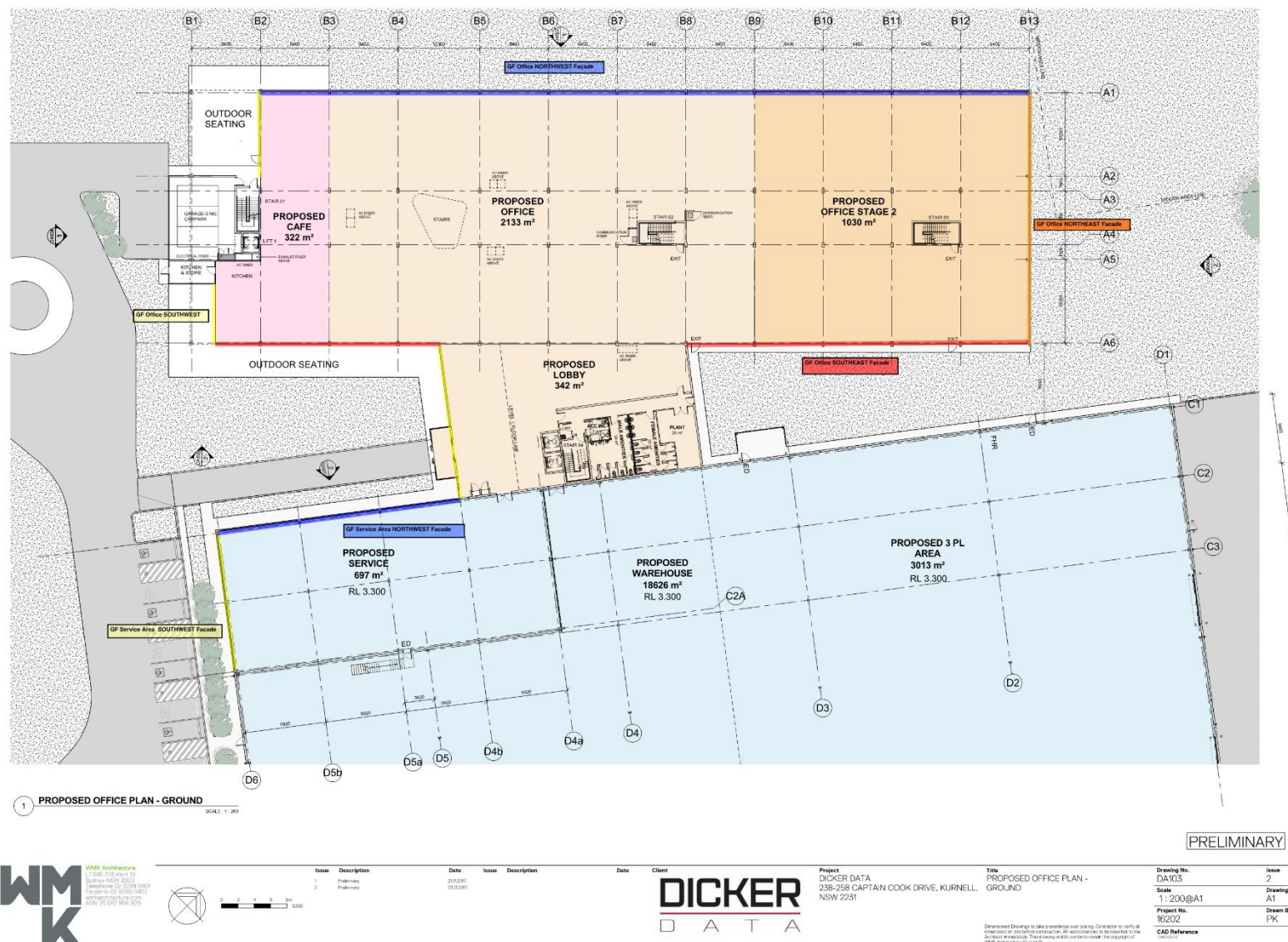
The Glazing Calculator has been developed by the ABCB to assist in developing a better understanding of glazing energy efficiency parameters. While the ABCB believes that the Glazing Calculator, if used correctly, will produce accurate results, it is provided "as is" and without any representation or 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.

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### Ground Floor markup showing orientation and façade calculations



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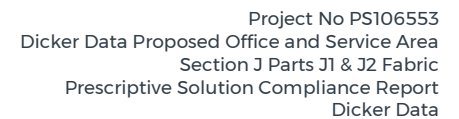
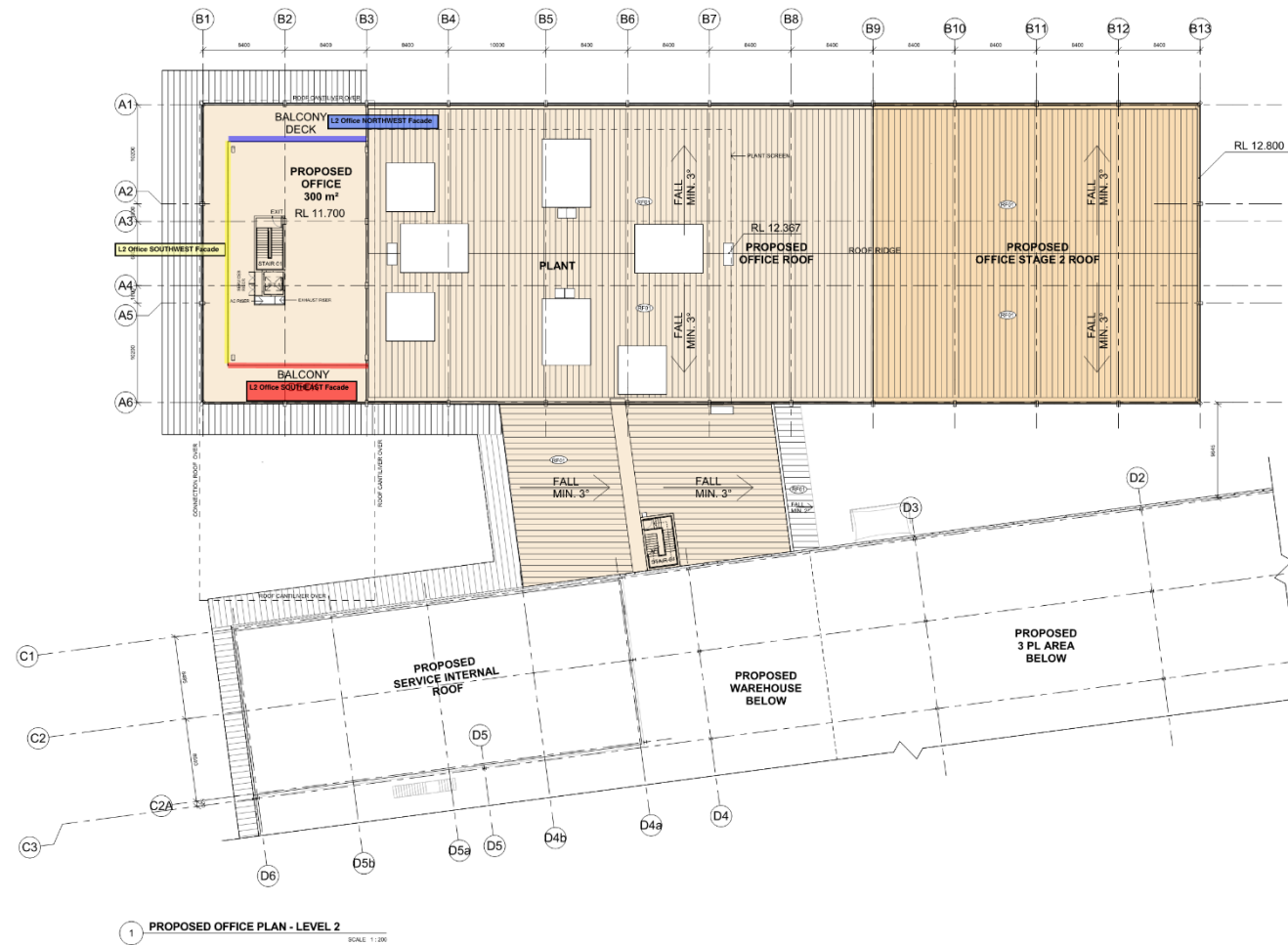




Figure B.8 Level 2 markup showing orientation and façade calculations



PRELIMINARY

**WMK** WMK Architecture  
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	Issue	Description	Date	Issue	Description	Date	Client	Project	Title	<table><tr><td>Drawing No.</td><td>Issue</td></tr><tr><td>DA105</td><td>2</td></tr><tr><td>Scale</td><td>Drawing Size</td></tr><tr><td>1:200@A1</td><td>A1</td></tr><tr><td>Project No.</td><td>Drawn By</td></tr><tr><td>16202</td><td>PK</td></tr></table>	Drawing No.	Issue	DA105	2	Scale	Drawing Size	1:200@A1	A1	Project No.	Drawn By	16202	PK
	Drawing No.	Issue																				
	DA105	2																				
Scale	Drawing Size																					
1:200@A1	A1																					
Project No.	Drawn By																					
16202	PK																					
1	Preliminary	21/9/2017						DICKER DATA	238-258 CAPTAIN COOK DRIVE, KURNELL, NSW 2231	PROPOSED OFFICE PLAN - LEVEL 2												
2	Preliminary	28/9/2017																				

Figure B.9 North, South and West Elevation Office markup showing glazing height and location

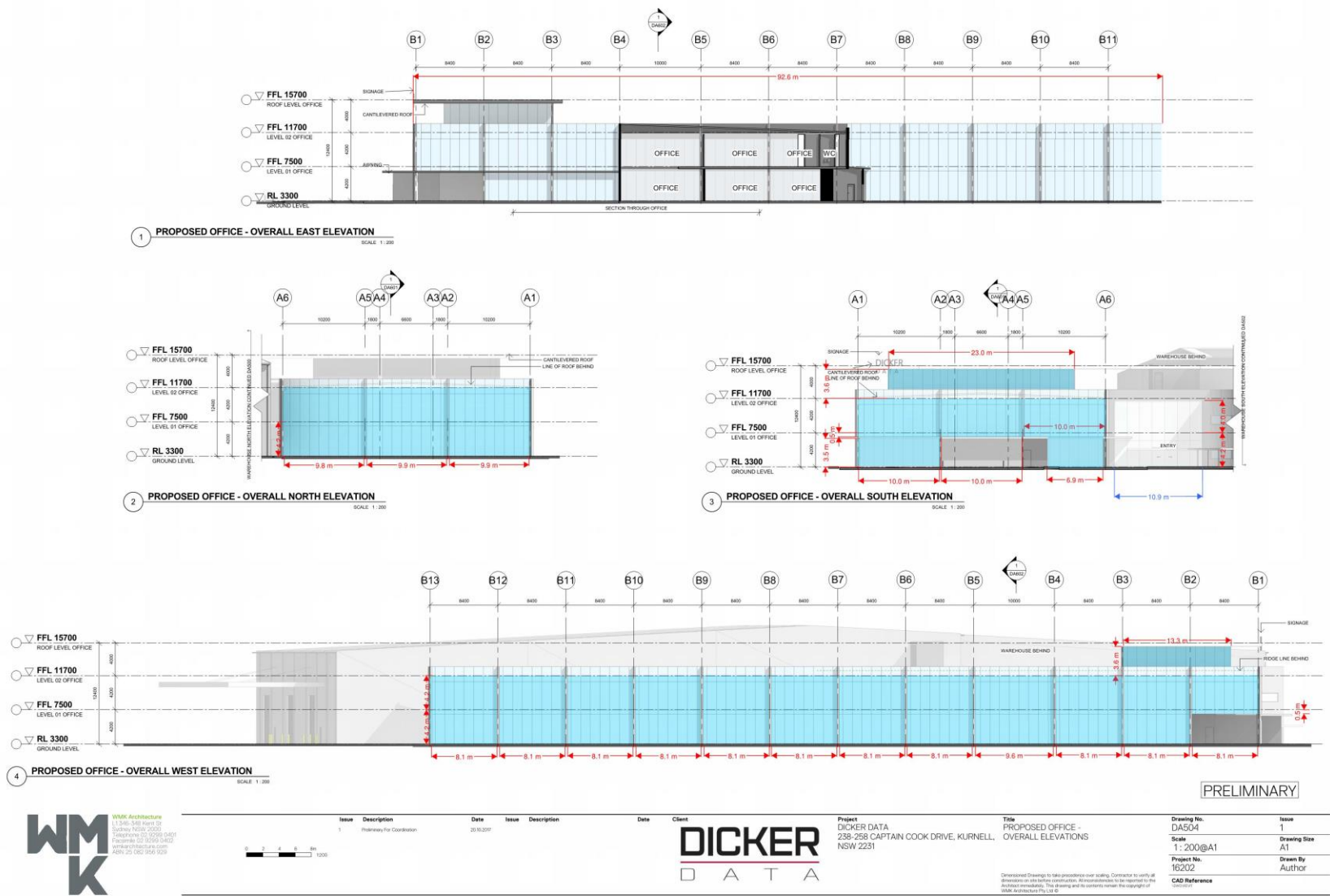




Figure B.10 East Office Elevation markup showing glazing height and location

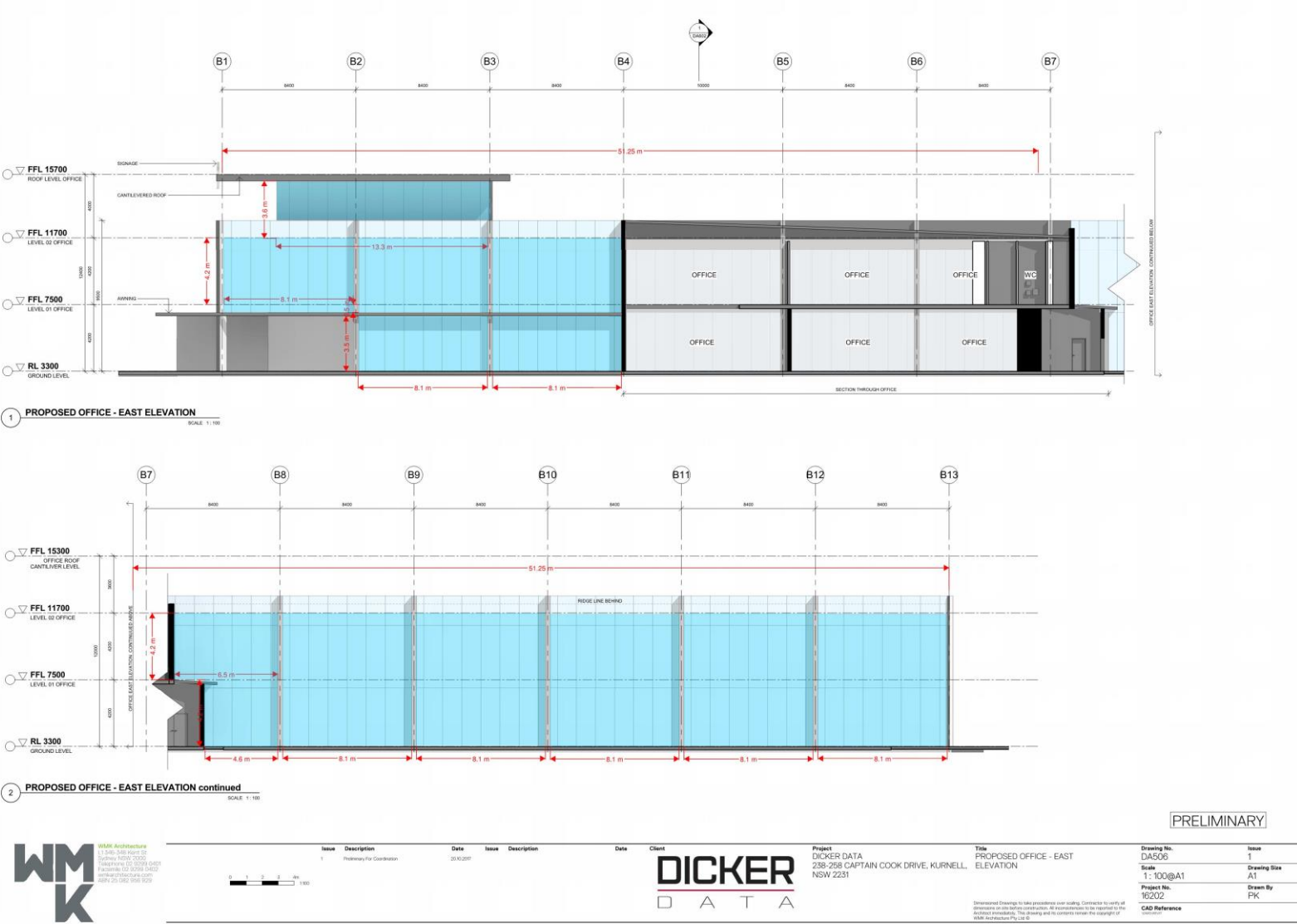


Figure B.11 South Service Elevation markup showing glazing height and location

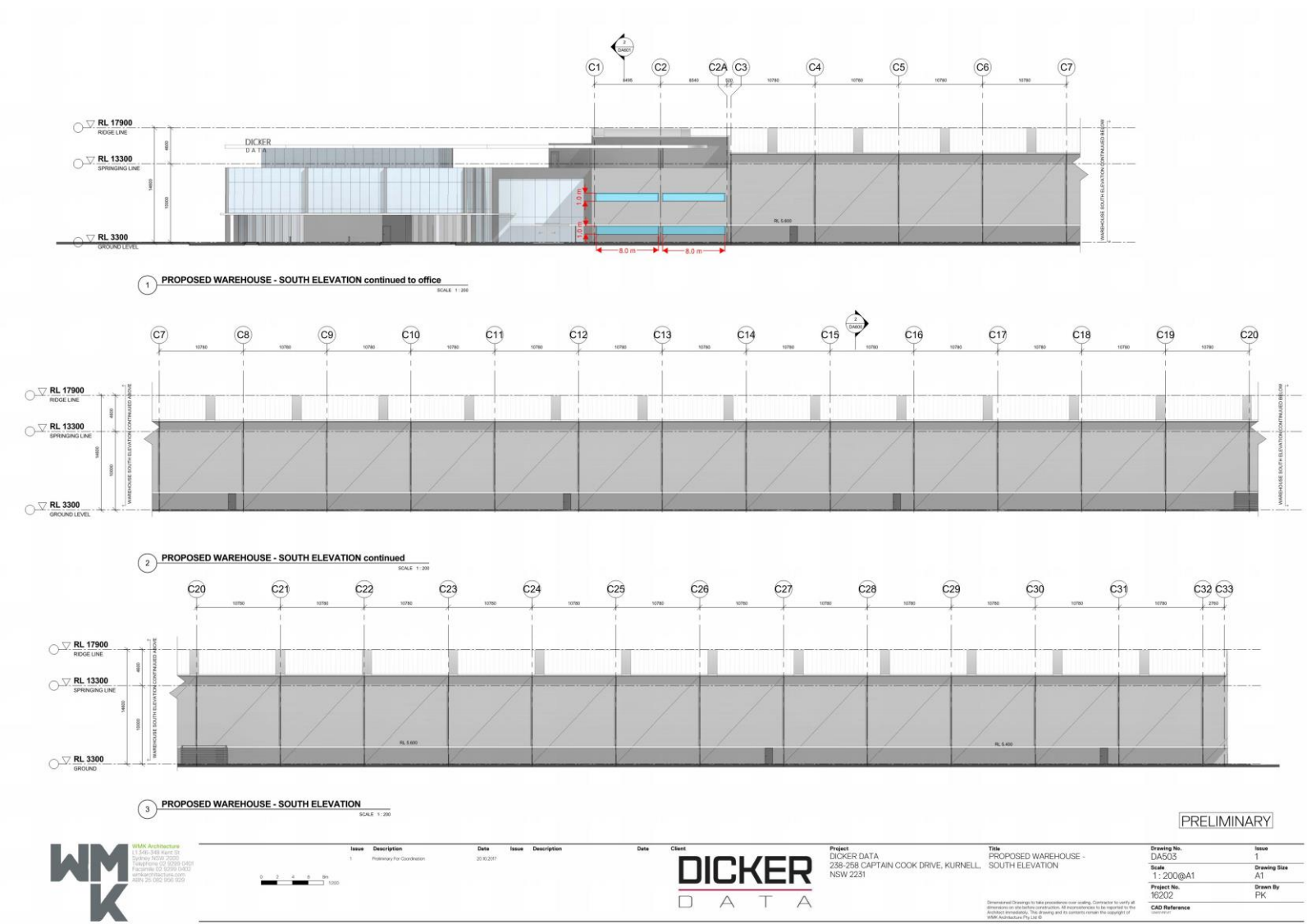
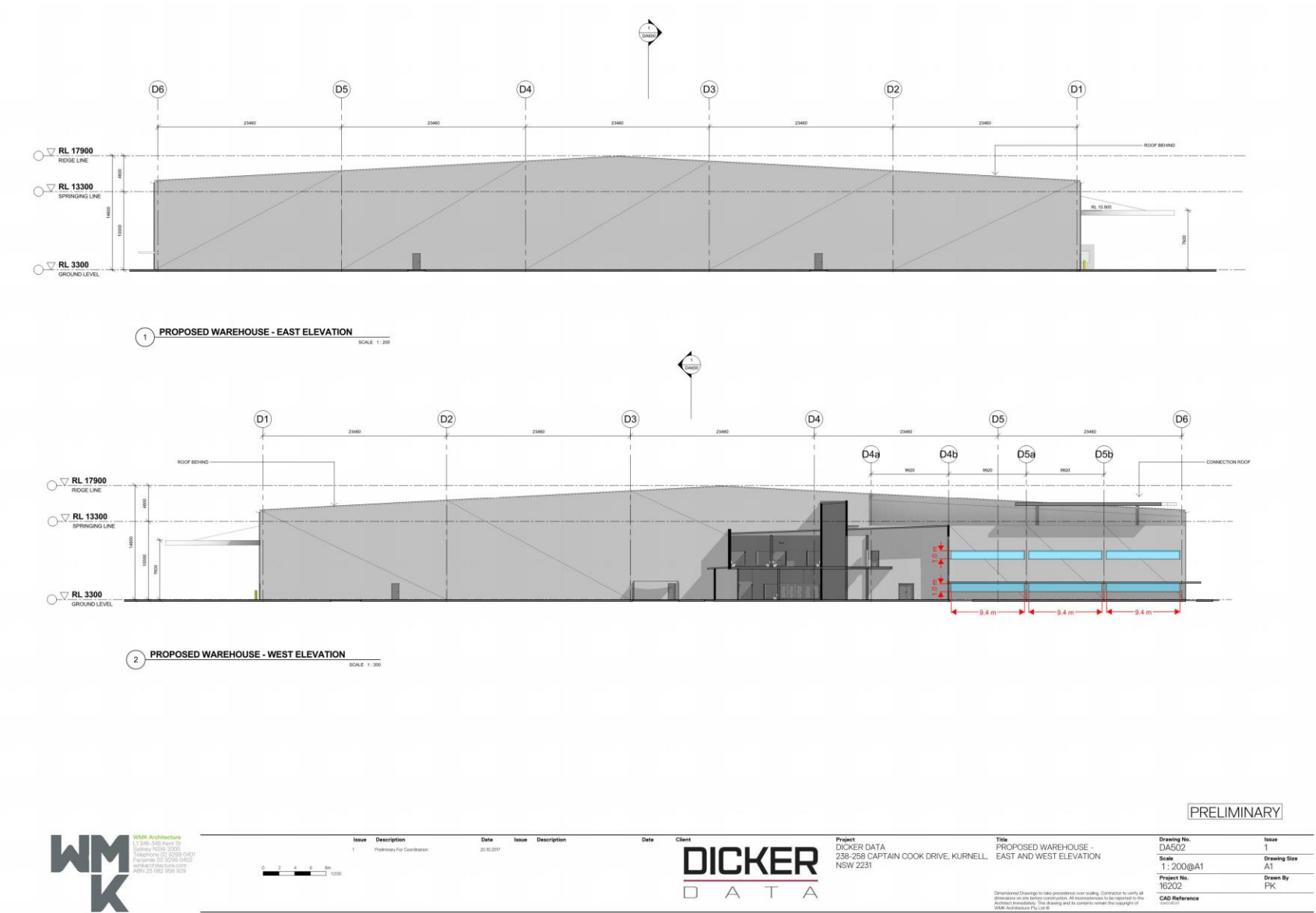


Figure B.12 West Service Elevation markup showing glazing height and location



# APPENDIX C

## ADDITIONAL GROUND FLOOR SHADING MARK UP

