

Mirvac Projects Pty Ltd

7 Railway St, Chatswood

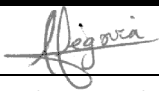
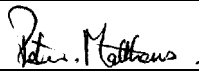
BASIX Assessment



Report No. 20C-10-0128-TRP-461887-3

23 Jul 2010

DOCUMENT CONTROL

7 Railway St, Chatswood		
BASIX Assessment		
REPORT NO: 20C-10-0128-TRP-461887-3	LIBRARY CODE:	
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REVISION HISTORY:		
Revision No.	Date Issued:	Reason/Comments:
0	09 Jul 10	Initial Issue
1	21 Jul 10	Final issue
2-3	23 Jul 2010	Update Energy Section
DISTRIBUTION:		
Copy No. <u>2</u>		Location
1		Project
2	Uncontrolled Copy	Client (PDF Format)
KEYWORDS: Mirvac Projects Pty Ltd, 7 Railway St, Chatswood , BASIX Assessment		

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EXECUTIVE SUMMARY

VIPAC Engineers & Scientists Ltd. has been commissioned by Mirvac Projects Pty Ltd to assess the interaction of the proposed 7 Railway St, Chatswood development with the local environment in terms of BASIX compliance.

The proposed development comprises of:

- 7 levels of basement car parking.
- 304 Apartments over 38 levels.
- 3 levels of commercial spaces.
- Retail spaces on Ground floor.

Dwellings within the development have been assessed in terms of their passive energy design using the Nationwide House Energy Rating scheme (NatHERS). They have also been assessed in terms of their ability to conserve water and also to minimise energy consumption via appliances and hot water etc. With the recommendations contained within this report we find that the proposed development is able to achieve a BASIX certificate.

While every endeavour has been made to provide a realistic energy rating for the proposed development, we note that the energy calculating process using computer program simulation is not 100% accurate.

The energy efficiency of any building is determined not only by the design but also by the energy consumption requirements and practices of the occupants. Actual energy consumption will not be known until a building is occupied and operational.

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1. INTRODUCTION

BASIX is a web-based planning tool designed to assess the potential performance of new homes against a range of sustainability issues including Landscape, Stormwater, Water, Thermal Comfort and Energy. BASIX aims to reduce the environmental impact of these features of new residential housing and therefore will produce homes that are more comfortable and cheaper to run than most existing homes.

BASIX focuses on reducing Water and Energy use. Landscape, Stormwater and Thermal Comfort indices are also included in the assessment as information relating to these attributes impacts on water consumption and greenhouse gas emissions. BASIX has set targets so that each new residential development will use less drinking-quality water and produce less greenhouse gas emissions than average NSW homes of the same type (20% for developments of 6 storeys or over).

BERS Pro is Australian designed 2nd Generation software used for assessing the thermal performance of residential units and houses. BERS Pro computer simulation of residential developments forms part of the Nationwide House Energy Rating Scheme, and is used to assess the potential of a residential development to have low energy requirements once operational.

2. WATER

The proposed 7 Railway St, Chatswood development has met the mandatory BASIX water target of 40%. For details of the requirements necessary to achieve this target, please refer to the BASIX Certificate Nos. 323344M_04, 323058M_04, 323089M_04 & 323130M_05.

Requirements:

- A total area of 1,000m² must be indigenous or low water use species.
- **50,000L rainwater tank** collecting from 100% of the total roof area. Water collected will be used for: apartments toilet flushing.
- **50,000L rainwater tank** collecting from 80% of the soft landscape area. Water collected will be used for: Landscape irrigation.
- Pool size: 60kL.
- Common area facilities must install: 3-star (Water Rating) showerheads, 3-star (Water Rating) toilets, 3-star (Water rating) taps.
- Apartments must install:
 - 3-star (Water Rating) showerheads, 3-star (Water Rating) toilets, 3-star (Water rating) taps for kitchen & bathrooms.
 - 4-star (Water rating) Clothes Washers.
 - 3-star (Water rating) Dishwashers.

3. THERMAL COMFORT

3.1 BERS PRO MODELLING ASSUMPTIONS

BERS Pro calculates the transient hourly heat gains and losses for each space inside a building taking into account the building's thermal storage, typical residential operational schedules and hourly weather data.

The 'base-case' modelled materials of construction for the development are described in Table 1. Building geometry and orientation were modelled according to supplied drawings.

Table 1: Construction Materials - BERS Pro Model

Element	Material	Detail
External walls	Concrete Block, lined	Insulation: See Table 2
		Medium colour: $0.7 < \text{absorptance} < 0.475$
Internal walls	Plasterboard	
Party walls	Cavity Panel wider than 70mm	
Windows	Single glazed, clear	Holland Blinds to all glazing except to bathrooms
	Aluminium frame	U-value 6.57 & SHGC 0.74
Roof	Concrete	Insulation: See Table 2
		Medium colour: $0.7 < \text{absorptance} < 0.475$
Ceilings	Plasterboard	Insulation: See Table 2
Floors	Concrete	Wet areas only: Tiles
		Elsewhere: Carpet

3.2 BERS PRO RESULTS (THERMAL COMFORT)

Energy summary reports for the modelled residential dwelling space are summarized in Table 2 below. The Additional Treatment listed in Table 2 below need to be implemented to the corresponding dwelling to achieve the heating and cooling loads required by BASIX.

Table 2: BERS Pro Energy Consumption Result

Unit No.	Repeated Units	Additional Treatments Required	Heating Load (MJ/m ² .yr)	Cooling Load (MJ/m ² .yr)	Maximum BASIX Heating Load (MJ/m ² .yr)	Maximum BASIX Cooling Load (MJ/m ² .yr)	Pass/Fail
501	601-1401	R1.5 External Wall Insulation	22.9	26.0	66.0	59.0	Pass
502	602-1402	R1.5 External Wall Insulation	12.2	25.2	66.0	59.0	Pass
503		R1.5 External Wall Insulation	19.7	29.5	66.0	59.0	Pass
603	703-1403	R1.5 External Wall Insulation	12.6	30.2	66.0	59.0	Pass
504	604-1404	R1.5 External Wall Insulation	14.3	27.6	66.0	59.0	Pass
505	605-1405	R1.5 External Wall Insulation	31.8	31.2	66.0	59.0	Pass
506		R1.5 External Wall Insulation	24.0	17.9	66.0	59.0	Pass
606	706-1406	R1.5 External Wall Insulation	28.3	15.3	66.0	59.0	Pass
607	707-1407	R1.5 External Wall Insulation	7.5	25.6	66.0	59.0	Pass
507	608-1408, 1506-2506	R1.5 External Wall Insulation	15.9	14.6	66.0	59.0	Pass
508	609-1409, 1507-2507	R1.5 External Wall Insulation	9.9	20.0	66.0	59.0	Pass
509	610-1410, 1508-2508	R1.5 External Wall Insulation	24.3	27.9	66.0	59.0	Pass
1501	1601-2501	R1.5 External Wall Insulation	27.6	26.2	66.0	59.0	Pass
1502	1602-4102	R1.5 External Wall Insulation	18.0	32.0	66.0	59.0	Pass
1503	1603-2403	R1.5 External Wall Insulation	19.4	34.1	66.0	59.0	Pass
1504	1604-2404	R1.5 External Wall Insulation	19.9	22.4	66.0	59.0	Pass
1505	1605-2505	R1.5 External Wall Insulation	7.2	13.6	66.0	59.0	Pass
2601	2701-4101	R1.5 External Wall Insulation	29.6	27.9	66.0	59.0	Pass

Unit No.	Repeated Units	Additional Treatments Required	Heating Load (MJ/m ² .yr)	Cooling Load (MJ/m ² .yr)	Maximum BASIX Heating Load (MJ/m ² .yr)	Maximum BASIX Cooling Load (MJ/m ² .yr)	Pass/Fail
2603	2703-4103	R1.5 External Wall Insulation	26.2	37.1	66.0	59.0	Pass
2604	2704-4104	R1.5 External Wall Insulation	23.1	22.7	66.0	59.0	Pass
2605	2705-4205	R1.5 External Wall Insulation	10.1	18.8	66.0	59.0	Pass
2606	2706-4206	R1.5 External Wall Insulation	14.1	36.0	66.0	59.0	Pass
2607	2707-4107	R1.5 External Wall Insulation	31.4	33.1	66.0	59.0	Pass
4201		R1.5 External Wall Insulation, R2.5 Ceiling Insulation	37.4	27.0	66.0	59.0	Pass
4202		R1.5 External Wall Insulation, R2.5 Ceiling Insulation	29.3	34.2	66.0	59.0	Pass
4203		R1.5 External Wall Insulation, R2.5 Ceiling Insulation	37.9	39.5	66.0	59.0	Pass
4204		R1.5 External Wall Insulation, R2.5 Ceiling Insulation	39.4	24.5	66.0	59.0	Pass
4207		R1.5 External Wall Insulation, R2.5 Ceiling Insulation	39.6	35.3	66.0	59.0	Pass

Table 3: Area Schedule

Unit No.	Repeated Units	Subfloor	Conditioned Area (m ²)	Unconditioned Area (m ²)	Wall Area (m ²)	Window Area (m ²)	Skylight (m ²)
501	601-1401	None	101.6	0.0	93.4	38.2	0.0
502	602-1402	None	59.9	0.0	92.0	15.8	0.0
503		None	86.3	0.0	126.6	25.4	0.0
603	703-1403	None	95.2	0.0	111.9	25.4	0.0
504	604-1404	None	61.4	0.0	77.8	18.9	0.0
505	605-1405	None	57.7	0.0	65.8	25.2	0.0
506		None	78.3	0.0	105.3	24.8	0.0
606	706-1406	None	54.2	0.0	82.3	19.5	0.0
607	707-1407	None	59.9	0.0	82.4	20.1	0.0
507	608-1408, 1506-2506	None	104.7	0.0	126.8	30.9	0.0
508	609-1409, 1507-2507	None	104.2	0.0	130.1	24.6	0.0
509	610-1410, 1508-2508	None	135.1	0.0	104.8	50.8	0.0
1501	1601-2501	None	130.0	0.0	85.6	56.5	0.0

Unit No.	Repeated Units	Subfloor	Conditioned Area (m ²)	Unconditioned Area (m ²)	Wall Area (m ²)	Window Area (m ²)	Skylight (m ²)
1502	1602-4102	None	64.2	0.0	79.3	21.6	0.0
1503	1603-2403	None	89.1	0.0	86.9	32.4	0.0
1504	1604-2404	None	96.1	0.0	111.8	28.8	0.0
1505	1605-2505	None	96.8	0.0	99.4	28.7	0.0
2601	2701-4101	None	133.9	0.0	89.5	60.4	0.0
2603	2703-4103	None	99.0	0.0	94.9	38.4	0.0
2604	2704-4104	None	96.6	0.0	123.1	25.8	0.0
2605	2705-4205	None	135.1	0.0	136.4	36.0	0.0
2606	2706-4206	None	145.6	0.0	123.0	49.8	0.0
2607	2707-4107	None	135.8	0.0	79.9	71.4	0.0
4201		None	93.9	0.0	93.9	55.9	0.0
4202		None	64.2	0.0	78.7	21.9	0.0
4203		None	99.0	0.0	94.4	38.7	0.0
4204		None	96.6	0.0	119.9	28.8	0.0
4207		None	135.0	0.0	79.0	71.4	0.0

4. ENERGY

The proposed 7 Railway St, Chatswood development has met the mandatory BASIX energy target of 20%. For details of the requirements necessary to achieve this target, please refer to the BASIX Certificate No. 323344M_04, 323058M_04, 323089M_04 & 323130M_05.

Below is the summary of the requirements:

- Hot Water System (HWS):
 - Centralised Solar (gas boosted) HWS with R1.0 (38mm) internal piping insulation and solar panel area of 75m² for apartments on levels 5-10.
 - Central Gas Boiler with R1.0 (38mm) internal piping insulation for levels apartments on levels 11-42.
- Central Cooling System: Water Sourced Packaged Units, with Cooling Tower and low COP (less than 3.5).
- Central Heating System: Water Sourced Packaged Units, with heated water using Gas Boiler and low COP (less than 3.5).
- Lifts: 6 lifts, all using gearless traction with VVVF motor.
- Pool heating is using Gas with timer controlled pump installed.
- Sauna is using Electric Resistance with manual on/timer off switch.
- Common Area Ventilations:
 - Indoor Pool & Gym: ventilation supply + exhaust with time clock/BMS.
 - Carpark: ventilation supply + exhaust with CO monitor + VSD fan.
 - Lift motor, switch, garbage and plant rooms: ventilation exhaust only.
 - Ground Floor Lobbies: Air-conditioning with time clock/BMS.

- Other Lobbies & Hallways: ventilation supply only with time clock/BMS.
- Common Area lightings:
 - Indoor Pool, Gym, Lift motor, switch, garbage and plant rooms: Compact fluorescent with manual on/off switch.
 - Car park: Fluorescent with zoned switching + motion sensors.
 - Lifts: Compact fluorescent.
 - Lobbies & Hallways: Compact fluorescent with time clock & motion sensors.
- Apartments Ventilation:
 - Kitchen Exhaust: individual fan, not ducted, with manual on/off switch.
 - Laundry & Bathroom Exhaust: motorised damper into central duct + VSD, with manual on/off switch.
- Heating & Cooling system to both living areas and bedrooms: Central Cooling + Heating, and must be Day/Night Zoned.
- At least 80% of light fittings in all apartments (including the main light fittings) in all bathrooms, laundries, hallways, bedrooms & at least 1 living area to use Fluorescent or LED lights with dedicated fittings¹.
- All apartments must install:
 - Gas cooktop and electric oven.
 - Well-ventilated fridge space.
 - 2-star (Energy Rating) Clothes Dryer.
 - 2.5-star (Energy Rating) Dishwasher.
 - Indoor² clothes drying line.

5. SUMMARY

The proposed development has been assessed in terms of its passive energy design (thermal comfort) using the Nationwide House Energy Rating scheme (NatHERS). The proposed development has also been assessed in terms of its ability to conserve water and also to minimise energy consumption via appliances and hot water etc. With the recommendations contained within this report we find that the proposed development is able to achieve a BASIX certificate. For further details, please refer to the BASIX Certificate Nos. 323344M_04, 323058M_04, 323089M_04 & 323130M_05 provided.

While every endeavour has been made to provide a realistic energy rating for the proposed development, we note that the energy calculating process using computer program simulation is not 100% accurate.

¹ Definition of a dedicated fittings is a light fitting that is only capable of accepting fluorescent or LED (Light Emitting Diode) lamps. It will not accept incandescent, halogen or any other non-fluorescent or non-LED lamps.

² Examples of indoor or sheltered clothes drying lines include a screened line on balconies and an extendable line over a bath.

The energy efficiency of any building is determined not only by the design but also by the energy consumption requirements and practices of the occupants. Actual energy consumption will not be known until a building is occupied and operational.

6. ARCHITECTURAL DRAWINGS

The environmental assessment carried out in this report was based on the following architectural drawings supplied by MIRVAC PROJECTS PTY LTD.

- PA1000[1] DRAWING REGISTER
- PA1001[1] LOCALITY & CONTEXT PLAN
- PA1002[1] SITE PLAN
- PA1003[1] SITE ANALYSIS PLAN
- PA1004[1] B6 & B7 FLOOR PLANS
- PA1005[1] B5 & B4 FLOOR PLANS
- PA1006[1] B3 & B2 FLOOR PLANS
- PA1007[1] B1 FLOOR PLANS
- PA1008[1] LEVEL 1 (GROUND) FLOOR PLAN
- PA1009[1] LEVELS 2-4 & 5 FLOOR PLANS
- PA1010[1] LEVELS 6-13 FLOOR PLANS
- PA1011[1] LEVELS 14- 25 FLOOR PLANS
- PA1012[1] LEVELS 26-39 & 41 FLOOR PLANS
- PA1013[1] LEVELS 40 & 42 FLOOR PLANS
- PA1014[1] LEVELS 43, 43 MEZZANINE & ROOF PLAN
- PA1015[1] NORTH ELEVATION
- PA1016[1] SOUTH ELEVATION
- PA1017[1] EAST ELEVATION
- PA1018[1] WEST ELEVATION
- PA1019[1] SECTION A-A
- PA1020[1] SECTION B-B

This Report Has Been Prepared for

MIRVAC PROJECTS PTY LTD

By

VIPAC ENGINEERS & SCIENTISTS Ltd



Certificate number: 323344M_04

This certificate confirms that the proposed development will meet the NSW government's requirements for sustainability, if it is built in accordance with the commitments set out below. Terms used in this certificate, or in the commitments, have the meaning given by the document entitled "BASIX Definitions" dated 29/06/2009 published by the Department of Planning. This document is available at www.basix.nsw.gov.au

Director-General

Date of issue: Friday, 23 July 2010



Planning

Project summary		
Project name	7 Railway Street, Chatswood (501-120_04	
Street address	7 Railway Street Chatswood 2067	
Local Government Area	Willoughby City Council	
Plan type and plan number	deposited 1058962	
Lot no.	6	
Section no.	-	
No. of unit buildings	1	
No. of units in unit buildings	76	
No. of attached dwelling houses	0	
No. of separate dwelling houses	0	
Project score		
Water	✓ 42	Target 40
Thermal Comfort	✓ Pass	Target Pass
Energy	✓ 20	Target 20

Certificate Prepared by (please complete before submitting to Council or PCA)	
Name / Company Name:	
ABN (if applicable):	

Description of project

Project address	
Project name	7 Railway Street, Chatswood (501-120_04
Street address	7 Railway Street Chatswood 2067
Local Government Area	Willoughby City Council
Plan type and plan number	deposited 1058962
Lot no.	6
Section no.	-
Project type	
No. of unit buildings	1
No. of units in unit buildings	76
No. of attached dwelling houses	0
No. of separate dwelling houses	0
Site details	
Site area (m²)	1228.25
Roof area (m²)	293.75
Non-residential floor area (m²)	952.5
Residential car spaces	89
Non-residential car spaces	9

Common area landscape	
Common area lawn (m²)	121.5
Common area garden (m²)	325
Area of indigenous or low water use species (m²)	250
Assessor details	
Assessor number	20241
Certificate number	24732027
Climate zone	56
Project score	
Water	✓ 42 Target 40
Thermal Comfort	✓ Pass Target Pass
Energy	✓ 20 Target 20

Description of project

The tables below describe the dwellings and common areas within the project

Unit building - 501-1207, 76 dwellings, 42 storeys above ground

Dwelling no.	No. of bedrooms	Conditioned floor area (m ²)	Unconditioned floor area (m ²)	Area of garden & lawn (m ²)	Indigenous species (min area m ²)
501	2	101.0	0.0	0	0
505	1	57.0	0.0	0	0
509	3	135.0	0.0	0	0
604	1	61.0	0.0	0	0
608	2	104.0	0.0	0	0
702	1	59.0	0.0	0	0
706	1	54.0	0.0	0	0
710	3	135.0	0.0	0	0
804	1	61.0	0.0	0	0
808	2	104.0	0.0	0	0
902	1	59.0	0.0	0	0
906	1	54.0	0.0	0	0
910	3	135.0	0.0	0	0
1004	1	61.0	0.0	0	0
1008	2	104.0	0.0	0	0
1102	1	59.0	0.0	0	0
1106	1	54.0	0.0	0	0
1110	3	135.0	0.0	0	0

Dwelling no.	No. of bedrooms	Conditioned floor area (m ²)	Unconditioned floor area (m ²)	Area of garden & lawn (m ²)	Indigenous species (min area m ²)
503	2	86.0	0.0	0	0
507	2	104.0	0.0	0	0
602	1	59.0	0.0	0	0
606	1	54.0	0.0	0	0
610	3	135.0	0.0	0	0
704	1	61.0	0.0	0	0
708	2	104.0	0.0	0	0
802	1	59.0	0.0	0	0
806	1	54.0	0.0	0	0
810	3	135.0	0.0	0	0
904	1	61.0	0.0	0	0
908	2	104.0	0.0	0	0
1002	1	59.0	0.0	0	0
1006	1	54.0	0.0	0	0
1010	3	135.0	0.0	0	0
1104	1	61.0	0.0	0	0
1108	2	104.0	0.0	0	0
1202	1	59.0	0.0	0	0

Dwelling no.	No. of bedrooms	Conditioned floor area (m ²)	Unconditioned floor area (m ²)	Area of garden & lawn (m ²)	Indigenous species (min area m ²)
504	1	61.0	0.0	0	0
508	2	104.0	0.0	0	0
603	2	95.0	0.0	0	0
607	1	59.0	0.0	0	0
701	2	101.0	0.0	0	0
705	1	57.0	0.0	0	0
709	2	104.0	0.0	0	0
803	2	95.0	0.0	0	0
807	1	59.0	0.0	0	0
901	2	101.0	0.0	0	0
905	1	57.0	0.0	0	0
909	2	104.0	0.0	0	0
1003	2	95.0	0.0	0	0
1007	1	59.0	0.0	0	0
1101	2	101.0	0.0	0	0
1105	1	57.0	0.0	0	0
1109	2	104.0	0.0	0	0
1203	2	95.0	0.0	0	0

Dwelling no.	1204	No. of bedrooms	1	Conditioned floor area (m ²)	61.0	Unconditioned floor area (m ²)	0.0	Area of garden & lawn (m ²)	0	Indigenous species (min area m ²)	0
Dwelling no.	1205	No. of bedrooms	1	Conditioned floor area (m ²)	57.0	Unconditioned floor area (m ²)	0.0	Area of garden & lawn (m ²)	0	Indigenous species (min area m ²)	0

Dwelling no.	1206	No. of bedrooms	1	Conditioned floor area (m ²)	54.0	Unconditioned floor area (m ²)	0.0	Area of garden & lawn (m ²)	0	Indigenous species (min area m ²)	0
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Dwelling no.	1207	No. of bedrooms	1	Conditioned floor area (m ²)	59.0	Unconditioned floor area (m ²)	0.0	Area of garden & lawn (m ²)	0	Indigenous species (min area m ²)	0
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Description of project

The tables below describe the dwellings and common areas within the project

Common areas of unit building - 501-1207

Common area	Floor area (m²)
Indoor pool &/or spa area (No. 1)	37
Lift car (No. 1)	-
Lift car (No. 4)	-
Lift motor room (No. 1)	14.25
Plant or service room (No. 1)	456.25
Hallway/lobby type (No. 1)	520

Common area	Floor area (m²)
Gym (No. 1)	8.25
Lift car (No. 2)	-
Lift car (No. 5)	-
Switch room (No. 1)	7.5
Ground floor lobby type (No. 1)	16

Common area	Floor area (m²)
Car park area (No. 1)	3665
Lift car (No. 3)	-
Lift car (No. 6)	-
Garbage room (No. 1)	35
Ground floor lobby type (No. 2)	30

Schedule of BASIX commitments

1. Commitments for unit building - 501-1207

(a) Dwellings

- (i) Water
 - (ii) Energy
 - (iii) Thermal Comfort
- (b) Common areas and central systems/facilities

(i) Water

(ii) Energy

2. Commitments for attached dwelling houses

3. Commitments for separate dwelling houses

4. Commitments for common areas and central systems/facilities for the development (non-building specific)

(i) Water

(ii) Energy

Schedule of BASIX commitments

The commitments set out below regulate how the proposed development is to be carried out. It is a condition of any development consent granted, or complying development certificate issued, for the proposed development, that BASIX commitments be complied with.

1. Commitments for unit building - 501-1207

(a) Dwellings

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below.			
(b) The applicant must plant indigenous or low water use species of vegetation throughout the area of land specified for the dwelling in the "Indigenous species" column of the table below, as private landscaping for that dwelling. (This area of indigenous vegetation is to be contained within the "Area of garden and lawn" for the dwelling specified in the "Description of Project" table).	✓	✓	
(c) If a rating is specified in the table below for a fixture or appliance to be installed in the dwelling, the applicant must ensure that each such fixture and appliance meets the rating specified for it.		✓	✓
(d) The applicant must install an on demand hot water recirculation system which regulates all hot water use throughout the dwelling, where indicated for a dwelling in the "HW recirculation or diversion" column of the table below.		✓	✓
(e) The applicant must install: (aa) a hot water diversion system to all showers, kitchen sinks and all basins in the dwelling, where indicated for a dwelling in the "HW recirculation or diversion" column of the table below; and (bb) a separate diversion tank (or tanks) connected to the hot water diversion systems of at least 100 litres. The applicant must connect the hot water diversion tank to all toilets in the dwelling.		✓ ✓	✓ ✓
(e) The applicant must not install a private swimming pool or spa for the dwelling, with a volume exceeding that specified for it in the table below.	✓	✓	
(f) If specified in the table, that pool or spa (or both) must have a pool cover or shading (or both).		✓	
(g) The pool or spa must be located as specified in the table.	✓	✓	
(h) The applicant must install, for the dwelling, each alternative water supply system, with the specified size, listed for that dwelling in the table below. Each system must be configured to collect run-off from the areas specified (excluding any area which supplies any other alternative water supply system), and to divert overflow as specified. Each system must be connected as specified.	✓	✓	✓

Dwelling no.	Fixtures					Appliances		Individual pool					Individual spa		
	All shower-heads	All toilet flushing systems	All kitchen taps	All bathroom taps	HW recirculation or diversion	All clothes washers	All dish-washers	Volume (max volume)	Pool cover	Pool location	Pool shaded	Volume (max volume)	Spa cover	Spa shaded	
All dwellings	3 star (> 7.5 but <= 9 L/min)	3 star	3 star	3 star	no	4 star	3 star	-	-	-	-	-	-	-	

Alternative water source										Dwelling no.	All dwellings	None
Alternative water supply systems					Size	Configuration	Landscape connection	Toilet connection (s)	Laundry connection			
central water tank (no. 1)					See central systems	See central systems	no	yes	no	no	no	no
-					-	-	-	-	-	-	-	-

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below.			
(b) The applicant must install each hot water system specified for the dwelling in the table below, so that the dwelling's hot water is supplied by that system. If the table specifies a central hot water system for the dwelling, then the applicant must connect that central system to the dwelling, so that the dwelling's hot water is supplied by that central system.	✓	✓	✓
(c) The applicant must install, in each bathroom, kitchen and laundry of the dwelling, the ventilation system specified for that room in the table below. Each such ventilation system must have the operation control specified for it in the table.		✓	✓
(d) The applicant must install the cooling and heating system/s specified for the dwelling under the "Living areas" and "Bedroom areas" headings of the "Cooling" and "Heating" columns in the table below, in/for at least 1 living/bedroom area of the dwelling. If no cooling or heating system is specified in the table for "Living areas" or "Bedroom areas", then no systems may be installed in any such areas. If the term "zoned" is specified beside an air conditioning system, then the system must provide for day/night zoning between living areas and bedrooms.		✓	✓
(e) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Artificial lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that the "primary type of artificial lighting" for each such room in the dwelling is fluorescent lighting or light emitting diode (LED) lighting. If the term "dedicated" is specified for a particular room or area, then the light fittings in that room or area must only be capable of being used for fluorescent lighting or light emitting diode (LED) lighting.		✓	✓

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(f) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Natural lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that each such room or area is fitted with a window and/or skylight.	✓	✓	✓
(g) This commitment applies if the applicant installs a water heating system for the dwelling's pool or spa. The applicant must: (aa) install the system specified for the pool in the "Individual Pool" column of the table below (or alternatively must not install any system for the pool). If specified, the applicant must install a timer, to control the pool's pump; and (bb) install the system specified for the spa in the "Individual Spa" column of the table below (or alternatively must not install any system for the spa). If specified, the applicant must install a timer to control the spa's pump.		✓ ✓	
(h) The applicant must install in the dwelling: (aa) the kitchen cook-top and oven specified for that dwelling in the "Appliances & other efficiency measures" column of the table below; (bb) each appliance for which a rating is specified for that dwelling in the "Appliances & other efficiency measures" column of the table, and ensure that the appliance has that minimum rating; and (cc) any clothes drying line specified for the dwelling in the "Appliances & other efficiency measures" column of the table.		✓ ✓ ✓	✓
(i) If specified in the table, the applicant must carry out the development so that each refrigerator space in the dwelling is "well ventilated".		✓	

Hot water		Bathroom ventilation system		Kitchen ventilation system		Laundry ventilation system	
Dwelling no.	Hot water system	Each bathroom	Operation control	Each kitchen	Operation control	Each laundry	Operation control
1101, 1102, 1103, 1104, 1105, 1106, 1107, 1108, 1109, 1110, 1201, 1202, 1203, 1204, 1205, 1206, 1207	central hot water system 2	motorised damper into central duct + VSD	manual switch on/off	individual fan, not ducted	manual switch on/off	motorised damper into central duct + VSD	manual switch on/off

	Hot water	Bathroom ventilation system		Kitchen ventilation system		Laundry ventilation system	
Dwelling no.	Hot water system	Each bathroom	Operation control	Each kitchen	Operation control	Each laundry	Operation control
501, 502, 503, 504, 505, 506, 507, 508, 509, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 1001, 1002, 1003, 1004, 1005, 1006, 1007, 1008, 1009, 1010	central hot water system 1	motorised damper into central duct + VSD	manual switch on/off	individual fan, not ducted	manual switch on/off	motorised damper into central duct + VSD	manual switch on/off

	Cooling		Heating		Artificial lighting							Natural lighting	
Dwelling no.	living areas	bedroom areas	living areas	bedroom areas	No. of bedrooms &/or study	No. of living &/or dining rooms	Each kitchen	All bathrooms/toilets	Each laundry	All hallways	No. of bathrooms &/or toilets	Main kitchen	
509, 610, 710, 810, 910, 1010, 1110	central cooling system 1 (zoned)	central cooling system 1 (zoned)	central heating system 1 (zoned)	central heating system 1 (zoned)	3 (dedicated)	1 (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	0	yes	
501, 503, 506, 507, 508, 601, 603, 608, 609, 701, 703, 708, 709, 801, 803, 808, 809, 901, 903, 908, 909, 1001, 1003, 1008, 1009, 1101, 1103, 1108, 1109, 1201, 1203	central cooling system 1 (zoned)	central cooling system 1 (zoned)	central heating system 1 (zoned)	central heating system 1 (zoned)	2 (dedicated)	1 (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	0	yes	

	Cooling		Heating		Artificial lighting							Natural lighting	
Dwelling no.	living areas	bedroom areas	living areas	bedroom areas	No. of bedrooms &/or study	No. of living &/or dining rooms	Each kitchen	All bathrooms/toilets	Each laundry	All hallways	No. of bathrooms &/or toilets	Main kitchen	
502, 504, 505, 602, 604, 605, 606, 607, 702, 704, 705, 706, 707, 802, 804, 805, 806, 807, 902, 904, 905, 906, 907, 1002, 1004, 1005, 1006, 1007, 1102, 1104, 1105, 1106, 1107, 1202, 1204, 1205, 1206, 1207	central cooling system 1 (zoned)	central cooling system 1 (zoned)	central heating system 1 (zoned)	central heating system 1 (zoned)	1 (dedicated)	1 (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	0	yes	

Individual pool		Individual spa		Appliances & other efficiency measures								
Dwelling no.	Pool heating system	Timer	Spa heating system	Timer	Kitchen cooktop/oven	Refrigerator	Well ventilated fridge space	Dishwasher	Clothes washer	Clothes dryer	Indoor or sheltered clothes drying line	Private outdoor or unsheltered clothes drying line
All dwellings	-	-	-	-	gas cooktop & electric oven	-	yes	2.5 star	-	2 star	yes	no

(iii) Thermal Comfort	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must attach the certificate referred to under "Assessor details" on the front page of this BASIX certificate (the "Assessor Certificate") to the development application and construction certificate application for the proposed development (or, if the applicant is applying for a complying development certificate for the proposed development, to that application). The applicant must also attach the Assessor Certificate to the application for a final occupation certificate for the proposed development.			
(b) The Assessor Certificate must have been issued by an Accredited Assessor in accordance with the Thermal Comfort Protocol.			
(c) The details of the proposed development on the Assessor Certificate must be consistent with the details shown in this BASIX Certificate, including the details shown in the "Thermal Loads" table below.			
(d) The applicant must show on the plans accompanying the development application for the proposed development, all matters which the Thermal Comfort Protocol requires to be shown on those plans. Those plans must bear a stamp of endorsement from the Accredited Assessor, to certify that this is the case.			
(e) The applicant must show on the plans accompanying the application for a construction certificate (or complying development certificate, if applicable), all thermal performance specifications set out in the Assessor Certificate, and all aspects of the proposed development which were used to calculate those specifications.			
(f) The applicant must construct the development in accordance with all thermal performance specifications set out in the Assessor Certificate, and in accordance with those aspects of the development application or application for a complying development certificate which were used to calculate those specifications.		✓	✓
(g) Where there is an in-slab heating or cooling system, the applicant must: (aa) Install insulation with an R-value of not less than 1.0 around the vertical edges of the perimeter of the slab; or (bb) On a suspended floor, install insulation with an R-value of not less than 1.0 underneath the slab and around the vertical edges of the perimeter of the slab.	✓	✓	✓
(h) The applicant must construct the floors and walls of the development in accordance with the specifications listed in the table below.	✓	✓	✓

Thermal loads		
Dwelling no.	Area adjusted heating load (in mJ/m ² /yr)	Area adjusted cooling load (in mJ/m ² /yr)
503	19.7	29.5
506	24	17.9
507, 608, 708, 808, 908, 1008, 1108	15.9	14.6
508, 609, 709, 809, 909, 1009, 1109	9.9	20
509, 610, 710, 810, 910, 1010, 1110	24.3	27.9
603, 703, 803, 903, 1003, 1103, 1203	12.6	30.2
606, 706, 806, 906, 1006, 1106, 1206	28.3	15.3
607, 707, 807, 907, 1007, 1107, 1207	7.5	25.6
501, 601, 701, 801, 901, 1001, 1101, 1201	22.9	26
502, 602, 702, 802, 902, 1002, 1102, 1202	12.2	25
504, 604, 704, 804, 904, 1004, 1104, 1204	14.3	27.6
All other dwellings	31.8	31.2

(b) Common areas and central systems/facilities

(i) Water		Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a showerhead, toilet, tap or clothes washer into a common area, then that item must meet the specifications listed for it in the table.			✓	✓
(b) The applicant must install (or ensure that the development is serviced by) the alternative water supply system(s) specified in the "Central systems" column of the table below. In each case, the system must be sized, be configured, and be connected, as specified in the table.		✓	✓	✓
(c) A swimming pool or spa listed in the table must not have a volume (in kLs) greater than that specified for the pool or spa in the table.		✓	✓	
(d) A pool or spa listed in the table must have a cover or shading if specified for the pool or spa in the table.			✓	
(e) The applicant must install each fire sprinkler system listed in the table so that the system is configured as specified in the table.			✓	✓
(f) The applicant must ensure that the central cooling system for a cooling tower is configured as specified in the table.			✓	✓

Common area	Showerheads rating	Toilets rating	Taps rating	Clothes washers rating
All common areas	3 star (> 7.5 but ≤ 9 L/min)	3 star	3 star	no common laundry facility

Central systems	Size	Configuration	Connection (to allow for...)
Central water tank - rainwater or stormwater (No. 1)	12500	To collect run-off from at least: - 250 square metres of roof area of buildings in the development - 0 square metres of impervious area in the development - 0 square metres of garden/lawn area in the development - 0 square metres of planter box area in the development (excluding, in each case, any area which drains to, or supplies, any other alternative water supply system).	- irrigation of 0 square metres of common landscaped area on the site - car washing in 0 car washing bays on the site

Central systems	Size	Configuration	Connection (to allow for...)
Central water tank - rainwater or stormwater (No. 2)	12500	To collect run-off from at least: - 0 square metres of roof area of buildings in the development - 0 square metres of impervious area in the development - 357.2 square metres of garden/lawn area in the development - 0 square metres of planter box area in the development (excluding, in each case, any area which drains to, or supplies, any other alternative water supply system).	- irrigation of 446.5 square metres of common landscaped area on the site - car washing in 0 car washing bays on the site
Pool (No. 1)	Volume: 15 kLs	Location: Indoor pool &/or spa area (No. 1)	-
Fire sprinkler system (No. 1)	-	-	-

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a ventilation system to service a common area specified in the table below, then that ventilation system must be of the type specified for that common area, and must meet the efficiency measure specified.		✓	✓
(b) In carrying out the development, the applicant must install, as the "primary type of artificial lighting" for each common area specified in the table below, the lighting specified for that common area. This lighting must meet the efficiency measure specified. The applicant must also install a centralised lighting control system or Building Management System (BMS) for the common area, where specified.		✓	✓
(c) The applicant must install the systems and fixtures specified in the "Central energy systems" column of the table below. In each case, the system or fixture must be of the type, and meet the specifications, listed for it in the table.	✓	✓	✓

Common area ventilation system				Common area lighting	
Common area	Ventilation system type	Ventilation efficiency measure	Primary type of artificial lighting	Lighting efficiency measure	Lighting control system/BMS
Indoor pool &/or spa area (No. 1)	ventilation (supply + exhaust)	time clock or BMS controlled	compact fluorescent	manual on / manual off	No
Gym (No. 1)	ventilation (supply + exhaust)	time clock or BMS controlled	compact fluorescent	manual on / manual off	No
Car park area (No. 1)	ventilation (supply + exhaust)	carbon monoxide monitor + VSD fan	fluorescent	zoned switching with motion sensor	No
Lift car (No. 1)	-	-	compact fluorescent	none	No

Common area	Common area ventilation system		Common area lighting		
	Ventilation system type	Ventilation efficiency measure	Primary type of artificial lighting	Lighting efficiency measure	Lighting control system/BMS
Lift car (No. 2)	-	-	compact fluorescent	none	No
Lift car (No. 3)	-	-	compact fluorescent	none	No
Lift car (No. 4)	-	-	compact fluorescent	none	No
Lift car (No. 5)	-	-	compact fluorescent	none	No
Lift car (No. 6)	-	-	compact fluorescent	none	No
Lift motor room (No. 1)	ventilation exhaust only	none ie. continuous	compact fluorescent	manual on / manual off	No
Switch room (No. 1)	ventilation exhaust only	none ie. continuous	compact fluorescent	manual on / manual off	No
Garbage room (No. 1)	ventilation exhaust only	-	compact fluorescent	manual on / manual off	No
Plant or service room (No. 1)	ventilation exhaust only	none ie. continuous	compact fluorescent	manual on / manual off	No
Ground floor lobby type (No. 1)	air conditioning system	time clock or BMS controlled	compact fluorescent	time clock and motion sensors	No
Ground floor lobby type (No. 2)	air conditioning system	time clock or BMS controlled	compact fluorescent	time clock and motion sensors	No
Hallway/lobby type (No. 1)	ventilation supply only	time clock or BMS controlled	compact fluorescent	time clock and motion sensors	No

Central energy systems		Type	Specification
Central hot water system (No. 1)		solar - gas boosted	Solar collector area (minimum, in square metres): 75 Piping insulation (ringmain & supply risers): (b) Piping internal to building: R1.0 (~38 mm)
Central hot water system (No. 2)		gas-fired boiler	Piping insulation (ringmain & supply risers): (b) Piping internal to building: R1.0 (~38 mm)
Central cooling system (No. 1)		water source packaged units	Heat rejection method: cooling tower Unit efficiency (min): low - COP < 3.5
Central heating system (No. 1)		water source packaged units + heated water	Energy source: gas boiler Unit efficiency: low - COP < 3.5
Lift (No. 1)		gearless traction with V V V F motor	Number of levels (including basement): 12

Central energy systems		Type	Specification
Lift (No. 2)		gearless traction with V V V F motor	Number of levels (including basement): 12
Lift (No. 3)		gearless traction with V V V F motor	Number of levels (including basement): 12
Lift (No. 4)		gearless traction with V V V F motor	Number of levels (including basement): 12
Lift (No. 5)		gearless traction with V V V F motor	Number of levels (including basement): 3
Lift (No. 6)		gearless traction with V V V F motor	Number of levels (including basement): 3
Pool (No. 1)		Heating source: gas	Pump controlled by timer: yes
Sauna (No. 1)		Heating source: electric resistance	Efficiency measure: manual on / timer off

4. Commitments for common areas and central systems/facilities for the development (non-building specific)

(b) Common areas and central systems/facilities

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a showerhead, toilet, tap or clothes washer into a common area, then that item must meet the specifications listed for it in the table.		✓	✓
(b) The applicant must install (or ensure that the development is serviced by) the alternative water supply system(s) specified in the "Central systems" column of the table below. In each case, the system must be sized, be configured, and be connected, as specified in the table.	✓	✓	✓
(c) A swimming pool or spa listed in the table must not have a volume (in kLs) greater than that specified for the pool or spa in the table.	✓	✓	
(d) A pool or spa listed in the table must have a cover or shading if specified for the pool or spa in the table.		✓	
(e) The applicant must install each fire sprinkler system listed in the table so that the system is configured as specified in the table.		✓	✓
(f) The applicant must ensure that the central cooling system for a cooling tower is configured as specified in the table.		✓	✓

Common area	Showerheads rating	Toilets rating	Taps rating	Clothes washers rating
All common areas	3 star (> 7.5 but ≤ 9 L/min)	3 star	3 star	no common laundry facility

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a ventilation system to service a common area specified in the table below, then that ventilation system must be of the type specified for that common area, and must meet the efficiency measure specified.		✓	✓
(b) In carrying out the development, the applicant must install, as the "primary type of artificial lighting" for each common area specified in the table below, the lighting specified for that common area. This lighting must meet the efficiency measure specified. The applicant must also install a centralised lighting control system or Building Management System (BMS) for the common area, where specified.		✓	✓
(c) The applicant must install the systems and fixtures specified in the "Central energy systems" column of the table below. In each case, the system or fixture must be of the type, and meet the specifications, listed for it in the table.	✓	✓	✓

Notes

1. In these commitments, "applicant" means the person carrying out the development.
2. The applicant must identify each dwelling, building and common area listed in this certificate, on the plans accompanying any development application, and on the plans and specifications accompanying the application for a construction certificate / complying development certificate, for the proposed development, using the same identifying letter or reference as is given to that dwelling, building or common area in this certificate.
3. This note applies if the proposed development involves the erection of a building for both residential and non-residential purposes (or the change of use of a building for both residential and non-residential purposes). Commitments in this certificate which are specified to apply to a "common area" of a building or the development, apply only to that part of the building or development to be used for residential purposes.
4. If this certificate lists a central system as a commitment for a dwelling or building, and that system will also service any other dwelling or building within the development, then that system need only be installed once (even if it is separately listed as a commitment for that other dwelling or building).
5. If a star or other rating is specified in a commitment, this is a minimum rating.
6. All alternative water systems to be installed under these commitments (if any), must be installed in accordance with the requirements of all applicable regulatory authorities. NOTE: NSW Health does not recommend that stormwater, recycled water or private dam water be used to irrigate edible plants which are consumed raw, or that rainwater be used for human consumption in areas with potable water supply.

Legend

1. Commitments identified with a "✓" in the "Show on DA plans" column must be shown on the plans accompanying the development application for the proposed development (if a development application is to be lodged for the proposed development).
2. Commitments identified with a "✓" in the "Show on CC/CDC plans and specs" column must be shown in the plans and specifications accompanying the application for a construction certificate / complying development certificate for the proposed development.
3. Commitments identified with a "✓" in the "Certifier check" column must be certified by a certifying authority as having been fulfilled. (Note: a certifying authority must not issue an occupation certificate (either interim or final) for a building listed in this certificate, or for any part of such a building, unless it is satisfied that each of the commitments whose fulfilment it is required to monitor in relation to the building or part, has been fulfilled).

Certificate number: 323058M_04

This certificate confirms that the proposed development will meet the NSW government's requirements for sustainability, if it is built in accordance with the commitments set out below. Terms used in this certificate, or in the commitments, have the meaning given by the document entitled "BASIX Definitions" dated 29/06/2009 published by the Department of Planning. This document is available at www.basix.nsw.gov.au

Director-General

Date of issue: Friday, 23 July 2010



Planning

Project summary		
Project name	7 Railway Street, Chatswood (1208-21_04	
Street address	7 Railway Street Chatswood 2067	
Local Government Area	Willoughby City Council	
Plan type and plan number	deposited 1058962	
Lot no.	6	
Section no.	-	
No. of unit buildings	1	
No. of units in unit buildings	76	
No. of attached dwelling houses	0	
No. of separate dwelling houses	0	
Project score		
Water	✓ 41	Target 40
Thermal Comfort	✓ Pass	Target Pass
Energy	✓ 20	Target 20

Certificate Prepared by (please complete before submitting to Council or PCA)
Name / Company Name:
ABN (if applicable):

Description of project

Project address	
Project name	7 Railway Street, Chatswood (1208-21_04
Street address	7 Railway Street Chatswood 2067
Local Government Area	Willoughby City Council
Plan type and plan number	deposited 1058962
Lot no.	6
Section no.	-
Project type	
No. of unit buildings	1
No. of units in unit buildings	76
No. of attached dwelling houses	0
No. of separate dwelling houses	0
Site details	
Site area (m²)	1228.25
Roof area (m²)	293.75
Non-residential floor area (m²)	952.5
Residential car spaces	89
Non-residential car spaces	9

Common area landscape	
Common area lawn (m²)	121.5
Common area garden (m²)	325
Area of indigenous or low water use species (m²)	250
Assessor details	
Assessor number	20241
Certificate number	47266533
Climate zone	56
Project score	
Water	✓ 41 Target 40
Thermal Comfort	✓ Pass Target Pass
Energy	✓ 20 Target 20

Description of project

The tables below describe the dwellings and common areas within the project

Unit building - 1208-2105, 76 dwellings, 42 storeys above ground

Dwelling no.	No. of bedrooms	Conditioned floor area (m ²)	Unconditioned floor area (m ²)	Area of garden & lawn (m ²)	Indigenous species (min area m ²)	Dwelling no.	No. of bedrooms	Conditioned floor area (m ²)	Unconditioned floor area (m ²)	Area of garden & lawn (m ²)	Indigenous species (min area m ²)	Dwelling no.	No. of bedrooms	Conditioned floor area (m ²)	Unconditioned floor area (m ²)	Area of garden & lawn (m ²)	Indigenous species (min area m ²)	Dwelling no.	No. of bedrooms	Conditioned floor area (m ²)	Unconditioned floor area (m ²)	Area of garden & lawn (m ²)	Indigenous species (min area m ²)
1208	2	104.0	0.0	0	0	1209	2	104.0	0.0	0	0	1210	3	135.0	0.0	0	0	1301	2	101.0	0.0	0	0
1302	1	59.0	0.0	0	0	1303	2	95.0	0.0	0	0	1304	1	61.0	0.0	0	0	1305	1	57.0	0.0	0	0
1306	1	54.0	0.0	0	0	1307	1	59.0	0.0	0	0	1308	2	104.0	0.0	0	0	1309	2	104.0	0.0	0	0
1310	3	135.0	0.0	0	0	1401	2	101.0	0.0	0	0	1402	1	59.0	0.0	0	0	1403	2	95.0	0.0	0	0
1404	1	61.0	0.0	0	0	1405	1	57.0	0.0	0	0	1406	1	54.0	0.0	0	0	1407	1	59.0	0.0	0	0
1408	2	104.0	0.0	0	0	1409	2	104.0	0.0	0	0	1410	3	135.0	0.0	0	0	1501	3	130.0	0.0	0	0
1502	1	64.0	0.0	0	0	1503	2	89.0	0.0	0	0	1504	2	96.0	0.0	0	0	1505	2	96.0	0.0	0	0
1506	2	104.0	0.0	0	0	1507	2	104.0	0.0	0	0	1508	3	135.0	0.0	0	0	1601	3	130.0	0.0	0	0
1602	1	64.0	0.0	0	0	1603	2	89.0	0.0	0	0	1604	2	96.0	0.0	0	0	1605	2	96.0	0.0	0	0
1606	2	104.0	0.0	0	0	1607	2	104.0	0.0	0	0	1608	3	135.0	0.0	0	0	1701	3	130.0	0.0	0	0
1702	1	64.0	0.0	0	0	1703	2	89.0	0.0	0	0	1704	2	96.0	0.0	0	0	1705	2	96.0	0.0	0	0
1706	2	104.0	0.0	0	0	1707	2	104.0	0.0	0	0	1708	3	135.0	0.0	0	0	1801	3	130.0	0.0	0	0
1802	1	64.0	0.0	0	0	1803	2	89.0	0.0	0	0	1804	2	96.0	0.0	0	0	1805	2	96.0	0.0	0	0
1806	2	104.0	0.0	0	0	1807	2	104.0	0.0	0	0	1808	3	135.0	0.0	0	0	1901	3	130.0	0.0	0	0
1902	1	64.0	0.0	0	0	1903	2	89.0	0.0	0	0	1904	2	96.0	0.0	0	0	1905	2	96.0	0.0	0	0
1906	2	104.0	0.0	0	0	1907	2	104.0	0.0	0	0	1908	3	135.0	0.0	0	0	2001	3	130.0	0.0	0	0
2002	1	64.0	0.0	0	0	2003	2	89.0	0.0	0	0	2004	2	96.0	0.0	0	0	2005	2	96.0	0.0	0	0
2006	2	104.0	0.0	0	0	2007	2	104.0	0.0	0	0	2008	3	135.0	0.0	0	0	2101	3	130.0	0.0	0	0

Dwelling no.	2102	No. of bedrooms	1	64.0	0.0	0	0	0	Indigenous species (min area m ²)
		Conditioned floor area (m ²)							
		Unconditioned floor area (m ²)							
		Area of garden & lawn (m ²)							
		Indigenous species (min area m ²)							
Dwelling no.	2103	No. of bedrooms	2	89.0	0.0	0	0	0	Indigenous species (min area m ²)
		Conditioned floor area (m ²)							
		Unconditioned floor area (m ²)							
		Area of garden & lawn (m ²)							
		Indigenous species (min area m ²)							

Dwelling no.	2104	No. of bedrooms	2	96.0	0.0	0	0	0	Indigenous species (min area m ²)
		Conditioned floor area (m ²)							
		Unconditioned floor area (m ²)							
		Area of garden & lawn (m ²)							
		Indigenous species (min area m ²)							

Dwelling no.	2105	No. of bedrooms	2	96.0	0.0	0	0	0	Indigenous species (min area m ²)
		Conditioned floor area (m ²)							
		Unconditioned floor area (m ²)							
		Area of garden & lawn (m ²)							
		Indigenous species (min area m ²)							

Description of project

The tables below describe the dwellings and common areas within the project

Common areas of unit building - 1208-2105

Common area	Floor area (m²)
Indoor pool &/or spa area (No. 1)	37
Lift car (No. 1)	-
Lift car (No. 4)	-
Lift motor room (No. 1)	14.25
Plant or service room (No. 1)	456.25
Hallway/lobby type (No. 1)	520

Common area	Floor area (m²)
Gym (No. 1)	8.25
Lift car (No. 2)	-
Lift car (No. 5)	-
Switch room (No. 1)	7.5
Ground floor lobby type (No. 1)	16

Common area	Floor area (m²)
Car park area (No. 1)	3665
Lift car (No. 3)	-
Lift car (No. 6)	-
Garbage room (No. 1)	35
Ground floor lobby type (No. 2)	30

Schedule of BASIX commitments

1. Commitments for unit building - 1208-2105

(a) Dwellings

- (i) Water
 - (ii) Energy
 - (iii) Thermal Comfort
- (b) Common areas and central systems/facilities
- (i) Water
 - (ii) Energy

2. Commitments for attached dwelling houses

3. Commitments for separate dwelling houses

4. Commitments for common areas and central systems/facilities for the development (non-building specific)

- (i) Water
- (ii) Energy

Schedule of BASIX commitments

The commitments set out below regulate how the proposed development is to be carried out. It is a condition of any development consent granted, or complying development certificate issued, for the proposed development, that BASIX commitments be complied with.

1. Commitments for unit building - 1208-2105

(a) Dwellings

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below.			
(b) The applicant must plant indigenous or low water use species of vegetation throughout the area of land specified for the dwelling in the "Indigenous species" column of the table below, as private landscaping for that dwelling. (This area of indigenous vegetation is to be contained within the "Area of garden and lawn" for the dwelling specified in the "Description of Project" table).	✓	✓	
(c) If a rating is specified in the table below for a fixture or appliance to be installed in the dwelling, the applicant must ensure that each such fixture and appliance meets the rating specified for it.		✓	✓
(d) The applicant must install an on demand hot water recirculation system which regulates all hot water use throughout the dwelling, where indicated for a dwelling in the "HW recirculation or diversion" column of the table below.		✓	✓
(e) The applicant must install:			
(aa) a hot water diversion system to all showers, kitchen sinks and all basins in the dwelling, where indicated for a dwelling in the "HW recirculation or diversion" column of the table below; and		✓	✓
(bb) a separate diversion tank (or tanks) connected to the hot water diversion systems of at least 100 litres. The applicant must connect the hot water diversion tank to all toilets in the dwelling.		✓	✓
(e) The applicant must not install a private swimming pool or spa for the dwelling, with a volume exceeding that specified for it in the table below.	✓	✓	
(f) If specified in the table, that pool or spa (or both) must have a pool cover or shading (or both).		✓	
(g) The pool or spa must be located as specified in the table.	✓	✓	
(h) The applicant must install, for the dwelling, each alternative water supply system, with the specified size, listed for that dwelling in the table below. Each system must be configured to collect run-off from the areas specified (excluding any area which supplies any other alternative water supply system), and to divert overflow as specified. Each system must be connected as specified.	✓	✓	✓

Dwelling no.	Fixtures					Appliances		Individual pool					Individual spa		
	All shower-heads	All toilet flushing systems	All kitchen taps	All bathroom taps	HW recirculation or diversion	All clothes washers	All dish-washers	Volume (max volume)	Pool cover	Pool location	Pool shaded	Volume (max volume)	Spa cover	Spa shaded	
All dwellings	3 star (> 7.5 but <= 9 L/min)	3 star	3 star	3 star	no	4 star	3 star	-	-	-	-	-	-	-	

Alternative water source												
Dwelling no.	Alternative water supply systems	Size	Configuration	Landscape connection	Toilet connection (s)	Laundry connection	Pool top-up	Spa top-up				
All dwellings	central water tank (no. 1)	See central systems	See central systems	no	yes	no	no	no				
None	-	-	-	-	-	-	-	-				

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below.			
(b) The applicant must install each hot water system specified for the dwelling in the table below, so that the dwelling's hot water is supplied by that system. If the table specifies a central hot water system for the dwelling, then the applicant must connect that central system to the dwelling, so that the dwelling's hot water is supplied by that central system.	✓	✓	✓
(c) The applicant must install, in each bathroom, kitchen and laundry of the dwelling, the ventilation system specified for that room in the table below. Each such ventilation system must have the operation control specified for it in the table.		✓	✓
(d) The applicant must install the cooling and heating system/s specified for the dwelling under the "Living areas" and "Bedroom areas" headings of the "Cooling" and "Heating" columns in the table below, in/for at least 1 living/bedroom area of the dwelling. If no cooling or heating system is specified in the table for "Living areas" or "Bedroom areas", then no systems may be installed in any such areas. If the term "zoned" is specified beside an air conditioning system, then the system must provide for day/night zoning between living areas and bedrooms.		✓	✓
(e) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Artificial lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that the "primary type of artificial lighting" for each such room in the dwelling is fluorescent lighting or light emitting diode (LED) lighting. If the term "dedicated" is specified for a particular room or area, then the light fittings in that room or area must only be capable of being used for fluorescent lighting or light emitting diode (LED) lighting.		✓	✓

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(f) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Natural lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that each such room or area is fitted with a window and/or skylight.	✓	✓	✓
(g) This commitment applies if the applicant installs a water heating system for the dwelling's pool or spa. The applicant must: (aa) install the system specified for the pool in the "Individual Pool" column of the table below (or alternatively must not install any system for the pool). If specified, the applicant must install a timer, to control the pool's pump; and (bb) install the system specified for the spa in the "Individual Spa" column of the table below (or alternatively must not install any system for the spa). If specified, the applicant must install a timer to control the spa's pump.		✓ ✓	
(h) The applicant must install in the dwelling: (aa) the kitchen cook-top and oven specified for that dwelling in the "Appliances & other efficiency measures" column of the table below; (bb) each appliance for which a rating is specified for that dwelling in the "Appliances & other efficiency measures" column of the table, and ensure that the appliance has that minimum rating; and (cc) any clothes drying line specified for the dwelling in the "Appliances & other efficiency measures" column of the table.		✓ ✓ ✓	✓
(i) If specified in the table, the applicant must carry out the development so that each refrigerator space in the dwelling is "well ventilated".		✓	

Dwelling no.	Hot water		Bathroom ventilation system		Kitchen ventilation system		Laundry ventilation system	
	Hot water system		Each bathroom	Operation control	Each kitchen	Operation control	Each laundry	Operation control
All dwellings	central hot water system 1		motorised damper into central duct + VSD	manual switch on/off	individual fan, not ducted	manual switch on/off	motorised damper into central duct + VSD	manual switch on/off

Cooling		Heating		Artificial lighting							Natural lighting	
Dwelling no.	living areas	bedroom areas	living areas	bedroom areas	No. of bedrooms &/or study	No. of living &/or dining rooms	Each kitchen	All bathrooms/ toilets	Each laundry	All hallways	No. of bathrooms &/or toilets	Main kitchen
1210, 1310, 1410, 1501, 1508, 1601, 1608, 1701, 1708, 1801, 1808, 1901, 1908, 2001, 2008, 2101	central cooling system 1 (zoned)	central cooling system 1 (zoned)	central heating system 1 (zoned)	central heating system 1 (zoned)	3 (dedicated)	1 (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	0	yes
1302, 1304, 1305, 1306, 1307, 1402, 1404, 1405, 1406, 1407, 1502, 1602, 1702, 1802, 1902, 2002, 2102	central cooling system 1 (zoned)	central cooling system 1 (zoned)	central heating system 1 (zoned)	central heating system 1 (zoned)	1 (dedicated)	1 (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	0	yes

Dwelling no.	Cooling		Heating		Artificial Lighting						Natural lighting	
	living areas	bedroom areas	living areas	bedroom areas	No. of bedrooms &/or study	No. of living &/or dining rooms	Each kitchen	All bathrooms/toilets	Each laundry	All hallways	No. of bathrooms &/or toilets	Main kitchen
1208, 1209, 1301, 1303, 1308, 1309, 1401, 1403, 1408, 1409, 1503, 1504, 1505, 1506, 1507, 1603, 1604, 1605, 1606, 1607, 1703, 1704, 1705, 1706, 1707, 1803, 1804, 1805, 1806, 1807, 1903, 1904, 1905, 1906, 1907, 2003, 2004, 2005, 2006,	central cooling system 1 (zoned)	central cooling system 1 (zoned)	central heating system 1 (zoned)	central heating system 1 (zoned)	2 (dedicated)	1 (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	0	yes

	Cooling		Heating		Artificial lighting							Natural lighting	
	living areas	bedroom areas	living areas	bedroom areas	No. of bedrooms &/or study	No. of living &/or dining rooms	Each kitchen	All bathrooms/ toilets	Each laundry	All hallways	No. of bathrooms &/or toilets	Main kitchen	
Dwelling no.													
2007, 2103, 2104, 2105													

Individual pool		Individual spa		Appliances & other efficiency measures								
Dwelling no.	Pool heating system	Timer	Spa heating system	Timer	Kitchen cooktop/oven	Refrigerator	Well ventilated fridge space	Dishwasher	Clothes washer	Clothes dryer	Indoor or sheltered clothes drying line	Private outdoor or unsheltered clothes drying line
All dwellings	-	-	-	-	gas cooktop & electric oven	-	yes	2.5 star	-	2 star	yes	no

(iii) Thermal Comfort	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must attach the certificate referred to under "Assessor details" on the front page of this BASIX certificate (the "Assessor Certificate") to the development application and construction certificate application for the proposed development (or, if the applicant is applying for a complying development certificate for the proposed development, to that application). The applicant must also attach the Assessor Certificate to the application for a final occupation certificate for the proposed development.			
(b) The Assessor Certificate must have been issued by an Accredited Assessor in accordance with the Thermal Comfort Protocol.			
(c) The details of the proposed development on the Assessor Certificate must be consistent with the details shown in this BASIX Certificate, including the details shown in the "Thermal Loads" table below.			
(d) The applicant must show on the plans accompanying the development application for the proposed development, all matters which the Thermal Comfort Protocol requires to be shown on those plans. Those plans must bear a stamp of endorsement from the Accredited Assessor, to certify that this is the case.			
(e) The applicant must show on the plans accompanying the application for a construction certificate (or complying development certificate, if applicable), all thermal performance specifications set out in the Assessor Certificate, and all aspects of the proposed development which were used to calculate those specifications.			

(iii) Thermal Comfort		Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(f) The applicant must construct the development in accordance with all thermal performance specifications set out in the Assessor Certificate, and in accordance with those aspects of the development application or application for a complying development certificate which were used to calculate those specifications.			✓	✓
(g) Where there is an in-slab heating or cooling system, the applicant must: (aa) Install insulation with an R-value of not less than 1.0 around the vertical edges of the perimeter of the slab; or (bb) On a suspended floor, install insulation with an R-value of not less than 1.0 underneath the slab and around the vertical edges of the perimeter of the slab.		✓	✓	✓
(h) The applicant must construct the floors and walls of the development in accordance with the specifications listed in the table below.		✓	✓	✓

Thermal loads		
Dwelling no.	Area adjusted heating load (in mJ/m ² /yr)	Area adjusted cooling load (in mJ/m ² /yr)
1301, 1401	22.9	26.0
1302, 1402	12.2	25.2
1303, 1403	12.6	30.2
1304, 1404	14.3	27.6
1305, 1405	31.8	31.2
1306, 1406	28.3	15.3
1307, 1407	7.5	25.6
1501, 1601, 1701, 1801, 1901, 2001, 2101	27.6	26.2
1502, 1602, 1702, 1802, 1902, 2002, 2102	18.0	32.0
1503, 1603, 1703, 1803, 1903, 2003, 2103	19.4	34.1
1504, 1604, 1704, 1804, 1904, 2004, 2104	19.9	22.4
1505, 1605, 1705, 1805, 1905, 2005, 2105	7.2	13.6

Thermal loads		
Dwelling no.	Area adjusted heating load (in mJ/m ² /yr)	Area adjusted cooling load (in mJ/m ² /yr)
1208, 1308, 1408, 1506, 1606, 1706, 1806, 1906, 2006	15.9	14.6
1209, 1309, 1409, 1507, 1607, 1707, 1807, 1907, 2007	9.9	20.0
All other dwellings	24.3	27.9

(b) Common areas and central systems/facilities

(i) Water		Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a showerhead, toilet, tap or clothes washer into a common area, then that item must meet the specifications listed for it in the table.			✓	✓
(b) The applicant must install (or ensure that the development is serviced by) the alternative water supply system(s) specified in the "Central systems" column of the table below. In each case, the system must be sized, be configured, and be connected, as specified in the table.		✓	✓	✓
(c) A swimming pool or spa listed in the table must not have a volume (in kLs) greater than that specified for the pool or spa in the table.		✓	✓	
(d) A pool or spa listed in the table must have a cover or shading if specified for the pool or spa in the table.			✓	
(e) The applicant must install each fire sprinkler system listed in the table so that the system is configured as specified in the table.			✓	✓
(f) The applicant must ensure that the central cooling system for a cooling tower is configured as specified in the table.			✓	✓

Common area	Showerheads rating	Toilets rating	Taps rating	Clothes washers rating
All common areas	3 star (> 7.5 but ≤ 9 L/min)	3 star	3 star	no common laundry facility

Central systems	Size	Configuration	Connection (to allow for...)
Central water tank - rainwater or stormwater (No. 1)	12500	To collect run-off from at least: - 250 square metres of roof area of buildings in the development - 0 square metres of impervious area in the development - 0 square metres of garden/lawn area in the development - 0 square metres of planter box area in the development (excluding, in each case, any area which drains to, or supplies, any other alternative water supply system).	- irrigation of 0 square metres of common landscaped area on the site - car washing in 0 car washing bays on the site

Central systems	Size	Configuration	Connection (to allow for...)
Central water tank - rainwater or stormwater (No. 2)	12500	To collect run-off from at least: - 0 square metres of roof area of buildings in the development - 0 square metres of impervious area in the development - 357.2 square metres of garden/lawn area in the development - 0 square metres of planter box area in the development (excluding, in each case, any area which drains to, or supplies, any other alternative water supply system).	- irrigation of 446.5 square metres of common landscaped area on the site - car washing in 0 car washing bays on the site
Pool (No. 1)	Volume: 15 kLs	Location: Indoor pool &/or spa area (No. 1)	-
Fire sprinkler system (No. 1)	-	-	-

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a ventilation system to service a common area specified in the table below, then that ventilation system must be of the type specified for that common area, and must meet the efficiency measure specified.		✓	✓
(b) In carrying out the development, the applicant must install, as the "primary type of artificial lighting" for each common area specified in the table below, the lighting specified for that common area. This lighting must meet the efficiency measure specified. The applicant must also install a centralised lighting control system or Building Management System (BMS) for the common area, where specified.		✓	✓
(c) The applicant must install the systems and fixtures specified in the "Central energy systems" column of the table below. In each case, the system or fixture must be of the type, and meet the specifications, listed for it in the table.	✓	✓	✓

Common area ventilation system				Common area lighting		
Common area	Ventilation system type	Ventilation efficiency measure	Primary type of artificial lighting	Lighting efficiency measure	Lighting control system/BMS	
Indoor pool &/or spa area (No. 1)	ventilation (supply + exhaust)	time clock or BMS controlled	compact fluorescent	manual on / manual off	No	
Gym (No. 1)	ventilation (supply + exhaust)	time clock or BMS controlled	compact fluorescent	manual on / manual off	No	
Car park area (No. 1)	ventilation (supply + exhaust)	carbon monoxide monitor + VSD fan	fluorescent	zoned switching with motion sensor	No	
Lift car (No. 1)	-	-	compact fluorescent	none	No	

Common area ventilation system		Common area lighting			
Common area	Ventilation system type	Ventilation efficiency measure	Primary type of artificial lighting	Lighting efficiency measure	Lighting control system/BMS
Lift car (No. 2)	-	-	compact fluorescent	none	No
Lift car (No. 3)	-	-	compact fluorescent	none	No
Lift car (No. 4)	-	-	compact fluorescent	none	No
Lift car (No. 5)	-	-	compact fluorescent	none	No
Lift car (No. 6)	-	-	compact fluorescent	none	No
Lift motor room (No. 1)	ventilation exhaust only	none ie. continuous	compact fluorescent	manual on / manual off	No
Switch room (No. 1)	ventilation exhaust only	none ie. continuous	compact fluorescent	manual on / manual off	No
Garbage room (No. 1)	ventilation exhaust only	-	compact fluorescent	manual on / manual off	No
Plant or service room (No. 1)	ventilation exhaust only	none ie. continuous	compact fluorescent	manual on / manual off	No
Ground floor lobby type (No. 1)	air conditioning system	time clock or BMS controlled	compact fluorescent	time clock and motion sensors	No
Ground floor lobby type (No. 2)	air conditioning system	time clock or BMS controlled	compact fluorescent	time clock and motion sensors	No
Hallway/lobby type (No. 1)	ventilation supply only	time clock or BMS controlled	compact fluorescent	time clock and motion sensors	No

Central energy systems		Specification
Central hot water system (No. 1)	gas-fired boiler	Piping insulation (ringmain & supply risers): (b) Piping internal to building: R1.0 (~38 mm)
Central cooling system (No. 1)	water source packaged units	Heat rejection method: cooling tower Unit efficiency (min): low - COP < 3.5
Central heating system (No. 1)	water source packaged units + heated water	Energy source: gas boiler Unit efficiency: low - COP < 3.5
Lift (No. 1)	gearless traction with V V V F motor	Number of levels (including basement): 12
Lift (No. 2)	gearless traction with V V V F motor	Number of levels (including basement): 12

Central energy systems	Type	Specification
Lift (No. 3)	gearless traction with V V V F motor	Number of levels (including basement): 12
Lift (No. 4)	gearless traction with V V V F motor	Number of levels (including basement): 12
Lift (No. 5)	gearless traction with V V V F motor	Number of levels (including basement): 3
Lift (No. 6)	gearless traction with V V V F motor	Number of levels (including basement): 3
Pool (No. 1)	Heating source: gas	Pump controlled by timer: yes
Sauna (No. 1)	Heating source: electric resistance	Efficiency measure: manual on / timer off

4. Commitments for common areas and central systems/facilities for the development (non-building specific)

(b) Common areas and central systems/facilities

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a showerhead, toilet, tap or clothes washer into a common area, then that item must meet the specifications listed for it in the table.		✓	✓
(b) The applicant must install (or ensure that the development is serviced by) the alternative water supply system(s) specified in the "Central systems" column of the table below. In each case, the system must be sized, be configured, and be connected, as specified in the table.	✓	✓	✓
(c) A swimming pool or spa listed in the table must not have a volume (in kLs) greater than that specified for the pool or spa in the table.	✓	✓	
(d) A pool or spa listed in the table must have a cover or shading if specified for the pool or spa in the table.		✓	
(e) The applicant must install each fire sprinkler system listed in the table so that the system is configured as specified in the table.		✓	✓
(f) The applicant must ensure that the central cooling system for a cooling tower is configured as specified in the table.		✓	✓

Common area	Showerheads rating	Toilets rating	Taps rating	Clothes washers rating
All common areas	3 star (> 7.5 but ≤ 9 L/min)	3 star	3 star	no common laundry facility

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a ventilation system to service a common area specified in the table below, then that ventilation system must be of the type specified for that common area, and must meet the efficiency measure specified.		✓	✓
(b) In carrying out the development, the applicant must install, as the "primary type of artificial lighting" for each common area specified in the table below, the lighting specified for that common area. This lighting must meet the efficiency measure specified. The applicant must also install a centralised lighting control system or Building Management System (BMS) for the common area, where specified.		✓	✓
(c) The applicant must install the systems and fixtures specified in the "Central energy systems" column of the table below. In each case, the system or fixture must be of the type, and meet the specifications, listed for it in the table.	✓	✓	✓

Notes

1. In these commitments, "applicant" means the person carrying out the development.
2. The applicant must identify each dwelling, building and common area listed in this certificate, on the plans accompanying any development application, and on the plans and specifications accompanying the application for a construction certificate / complying development certificate, for the proposed development, using the same identifying letter or reference as is given to that dwelling, building or common area in this certificate.
3. This note applies if the proposed development involves the erection of a building for both residential and non-residential purposes (or the change of use of a building for both residential and non-residential purposes). Commitments in this certificate which are specified to apply to a "common area" of a building or the development, apply only to that part of the building or development to be used for residential purposes.
4. If this certificate lists a central system as a commitment for a dwelling or building, and that system will also service any other dwelling or building within the development, then that system need only be installed once (even if it is separately listed as a commitment for that other dwelling or building).
5. If a star or other rating is specified in a commitment, this is a minimum rating.
6. All alternative water systems to be installed under these commitments (if any), must be installed in accordance with the requirements of all applicable regulatory authorities. NOTE: NSW Health does not recommend that stormwater, recycled water or private dam water be used to irrigate edible plants which are consumed raw, or that rainwater be used for human consumption in areas with potable water supply.

Legend

1. Commitments identified with a "✓" in the "Show on DA plans" column must be shown on the plans accompanying the development application for the proposed development (if a development application is to be lodged for the proposed development).
2. Commitments identified with a "✓" in the "Show on CC/CDC plans and specs" column must be shown in the plans and specifications accompanying the application for a construction certificate / complying development certificate for the proposed development.
3. Commitments identified with a "✓" in the "Certifier check" column must be certified by a certifying authority as having been fulfilled. (Note: a certifying authority must not issue an occupation certificate (either interim or final) for a building listed in this certificate, or for any part of such a building, unless it is satisfied that each of the commitments whose fulfilment it is required to monitor in relation to the building or part, has been fulfilled).

Certificate number: 323089M_04

This certificate confirms that the proposed development will meet the NSW government's requirements for sustainability, if it is built in accordance with the commitments set out below. Terms used in this certificate, or in the commitments, have the meaning given by the document entitled "BASIX Definitions" dated 29/06/2009 published by the Department of Planning. This document is available at www.basix.nsw.gov.au

Director-General

Date of issue: Friday, 23 July 2010



Planning

Project summary		
Project name	7 Railway Street, Chatswood (2106-32_04	
Street address	7 Railway Street Chatswood 2067	
Local Government Area	Willoughby City Council	
Plan type and plan number	deposited 1058962	
Lot no.	6	
Section no.	-	
No. of unit buildings	1	
No. of units in unit buildings	76	
No. of attached dwelling houses	0	
No. of separate dwelling houses	0	
Project score		
Water	✔ 41	Target 40
Thermal Comfort	✔ Pass	Target Pass
Energy	✔ 22	Target 20

Certificate Prepared by (please complete before submitting to Council or PCA)
Name / Company Name:
ABN (if applicable):

Description of project

Project address	
Project name	7 Railway Street, Chatswood (2106-32_04
Street address	7 Railway Street Chatswood 2067
Local Government Area	Willoughby City Council
Plan type and plan number	deposited 1058962
Lot no.	6
Section no.	-
Project type	
No. of unit buildings	1
No. of units in unit buildings	76
No. of attached dwelling houses	0
No. of separate dwelling houses	0
Site details	
Site area (m²)	1228.25
Roof area (m²)	293.75
Non-residential floor area (m²)	952.5
Residential car spaces	90
Non-residential car spaces	9

Common area landscape	
Common area lawn (m²)	121.5
Common area garden (m²)	325
Area of indigenous or low water use species (m²)	250
Assessor details	
Assessor number	20241
Certificate number	47266533
Climate zone	56
Project score	
Water	✓ 41 Target 40
Thermal Comfort	✓ Pass Target Pass
Energy	✓ 22 Target 20

Description of project

The tables below describe the dwellings and common areas within the project

Unit building - 2106-3201, 76 dwellings, 42 storeys above ground

Dwelling no.	No. of bedrooms	Conditioned floor area (m ²)	Unconditioned floor area (m ²)	Area of garden & lawn (m ²)	Indigenous species (min area m ²)
2106	2	104.0	0.0	0	0
2202	1	64.0	0.0	0	0
2206	2	104.0	0.0	0	0
2302	1	64.0	0.0	0	0
2306	2	104.0	0.0	0	0
2402	1	64.0	0.0	0	0
2406	2	104.0	0.0	0	0
2502	1	64.0	0.0	0	0
2508	3	135.0	0.0	0	0
2604	2	96.0	0.0	0	0
2701	3	133.0	0.0	0	0
2705	3	135.0	0.0	0	0
2802	1	64.0	0.0	0	0
2806	3	145.0	0.0	0	0
2903	2	99.0	0.0	0	0
2907	3	135.0	0.0	0	0
3004	2	96.0	0.0	0	0
3101	3	133.0	0.0	0	0

Dwelling no.	No. of bedrooms	Conditioned floor area (m ²)	Unconditioned floor area (m ²)	Area of garden & lawn (m ²)	Indigenous species (min area m ²)
2108	3	135.0	0.0	0	0
2204	2	96.0	0.0	0	0
2208	3	135.0	0.0	0	0
2304	2	96.0	0.0	0	0
2308	3	135.0	0.0	0	0
2404	2	96.0	0.0	0	0
2408	3	135.0	0.0	0	0
2506	2	104.0	0.0	0	0
2602	1	64.0	0.0	0	0
2606	3	145.0	0.0	0	0
2703	2	99.0	0.0	0	0
2707	3	135.0	0.0	0	0
2804	2	96.0	0.0	0	0
2901	3	133.0	0.0	0	0
2905	3	135.0	0.0	0	0
3002	1	64.0	0.0	0	0
3006	3	145.0	0.0	0	0
3103	2	99.0	0.0	0	0

Dwelling no.	No. of bedrooms	Conditioned floor area (m ²)	Unconditioned floor area (m ²)	Area of garden & lawn (m ²)	Indigenous species (min area m ²)
2201	3	130.0	0.0	0	0
2205	2	96.0	0.0	0	0
2301	3	130.0	0.0	0	0
2305	2	96.0	0.0	0	0
2401	3	130.0	0.0	0	0
2405	2	96.0	0.0	0	0
2501	3	130.0	0.0	0	0
2507	2	104.0	0.0	0	0
2603	2	99.0	0.0	0	0
2607	3	135.0	0.0	0	0
2704	2	96.0	0.0	0	0
2801	3	133.0	0.0	0	0
2805	3	135.0	0.0	0	0
2902	1	64.0	0.0	0	0
2906	3	145.0	0.0	0	0
3003	2	99.0	0.0	0	0
3007	3	135.0	0.0	0	0
3104	2	96.0	0.0	0	0

Dwelling no.	3105	No. of bedrooms	3	Conditioned floor area (m ²)	135.0	Unconditioned floor area (m ²)	0.0	Area of garden & lawn (m ²)	0	Indigenous species (min area m ²)	0
Dwelling no.	3106	No. of bedrooms	3	Conditioned floor area (m ²)	145.0	Unconditioned floor area (m ²)	0.0	Area of garden & lawn (m ²)	0	Indigenous species (min area m ²)	0

Dwelling no.	3107	No. of bedrooms	3	Conditioned floor area (m ²)	135.0	Unconditioned floor area (m ²)	0.0	Area of garden & lawn (m ²)	0	Indigenous species (min area m ²)	0
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Dwelling no.	3201	No. of bedrooms	3	Conditioned floor area (m ²)	133.0	Unconditioned floor area (m ²)	0.0	Area of garden & lawn (m ²)	0	Indigenous species (min area m ²)	0
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Description of project

The tables below describe the dwellings and common areas within the project

Common areas of unit building - 2106-3201

Common area	Floor area (m²)
Indoor pool &/or spa area (No. 1)	37
Lift car (No. 1)	-
Lift car (No. 4)	-
Lift motor room (No. 1)	14.25
Plant or service room (No. 1)	456.25
Hallway/lobby type (No. 1)	520

Common area	Floor area (m²)
Gym (No. 1)	8.25
Lift car (No. 2)	-
Lift car (No. 5)	-
Switch room (No. 1)	7.5
Ground floor lobby type (No. 1)	16

Common area	Floor area (m²)
Car park area (No. 1)	3665
Lift car (No. 3)	-
Lift car (No. 6)	-
Garbage room (No. 1)	35
Ground floor lobby type (No. 2)	30

Schedule of BASIX commitments

1. Commitments for unit building - 2106-3201

(a) Dwellings

- (i) Water
 - (ii) Energy
 - (iii) Thermal Comfort
- (b) Common areas and central systems/facilities
- (i) Water
 - (ii) Energy

2. Commitments for attached dwelling houses

3. Commitments for separate dwelling houses

4. Commitments for common areas and central systems/facilities for the development (non-building specific)

- (i) Water
- (ii) Energy

Schedule of BASIX commitments

The commitments set out below regulate how the proposed development is to be carried out. It is a condition of any development consent granted, or complying development certificate issued, for the proposed development, that BASIX commitments be complied with.

1. Commitments for unit building - 2106-3201

(a) Dwellings

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below.			
(b) The applicant must plant indigenous or low water use species of vegetation throughout the area of land specified for the dwelling in the "Indigenous species" column of the table below, as private landscaping for that dwelling. (This area of indigenous vegetation is to be contained within the "Area of garden and lawn" for the dwelling specified in the "Description of Project" table).	✓	✓	
(c) If a rating is specified in the table below for a fixture or appliance to be installed in the dwelling, the applicant must ensure that each such fixture and appliance meets the rating specified for it.		✓	✓
(d) The applicant must install an on demand hot water recirculation system which regulates all hot water use throughout the dwelling, where indicated for a dwelling in the "HW recirculation or diversion" column of the table below.		✓	✓
(e) The applicant must install:			
(aa) a hot water diversion system to all showers, kitchen sinks and all basins in the dwelling, where indicated for a dwelling in the "HW recirculation or diversion" column of the table below; and		✓	✓
(bb) a separate diversion tank (or tanks) connected to the hot water diversion systems of at least 100 litres. The applicant must connect the hot water diversion tank to all toilets in the dwelling.		✓	✓
(e) The applicant must not install a private swimming pool or spa for the dwelling, with a volume exceeding that specified for it in the table below.	✓	✓	
(f) If specified in the table, that pool or spa (or both) must have a pool cover or shading (or both).		✓	
(g) The pool or spa must be located as specified in the table.	✓	✓	
(h) The applicant must install, for the dwelling, each alternative water supply system, with the specified size, listed for that dwelling in the table below. Each system must be configured to collect run-off from the areas specified (excluding any area which supplies any other alternative water supply system), and to divert overflow as specified. Each system must be connected as specified.	✓	✓	✓

Dwelling no.	Fixtures					Appliances		Individual pool					Individual spa		
	All shower-heads	All toilet flushing systems	All kitchen taps	All bathroom taps	HW recirculation or diversion	All clothes washers	All dish-washers	Volume (max volume)	Pool cover	Pool location	Pool shaded	Volume (max volume)	Spa cover	Spa shaded	
All dwellings	3 star (> 7.5 but <= 9 L/min)	3 star	3 star	3 star	no	4 star	3 star	-	-	-	-	-	-	-	

Alternative water source									
Dwelling no.	Alternative water supply systems	Size	Configuration	Landscape connection	Toilet connection (s)	Laundry connection	Pool top-up	Spa top-up	
All dwellings	central water tank (no. 1)	See central systems	See central systems	no	yes	no	no	no	
None	-	-	-	-	-	-	-	-	

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below.			
(b) The applicant must install each hot water system specified for the dwelling in the table below, so that the dwelling's hot water is supplied by that system. If the table specifies a central hot water system for the dwelling, then the applicant must connect that central system to the dwelling, so that the dwelling's hot water is supplied by that central system.	✓	✓	✓
(c) The applicant must install, in each bathroom, kitchen and laundry of the dwelling, the ventilation system specified for that room in the table below. Each such ventilation system must have the operation control specified for it in the table.		✓	✓
(d) The applicant must install the cooling and heating system/s specified for the dwelling under the "Living areas" and "Bedroom areas" headings of the "Cooling" and "Heating" columns in the table below, in/for at least 1 living/bedroom area of the dwelling. If no cooling or heating system is specified in the table for "Living areas" or "Bedroom areas", then no systems may be installed in any such areas. If the term "zoned" is specified beside an air conditioning system, then the system must provide for day/night zoning between living areas and bedrooms.		✓	✓
(e) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Artificial lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that the "primary type of artificial lighting" for each such room in the dwelling is fluorescent lighting or light emitting diode (LED) lighting. If the term "dedicated" is specified for a particular room or area, then the light fittings in that room or area must only be capable of being used for fluorescent lighting or light emitting diode (LED) lighting.		✓	✓

(ii) Energy		Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(f) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Natural lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that each such room or area is fitted with a window and/or skylight.		✓	✓	✓
	(g) This commitment applies if the applicant installs a water heating system for the dwelling's pool or spa. The applicant must:			
	(aa) install the system specified for the pool in the "Individual Pool" column of the table below (or alternatively must not install any system for the pool). If specified, the applicant must install a timer, to control the pool's pump; and		✓	
	(bb) install the system specified for the spa in the "Individual Spa" column of the table below (or alternatively must not install any system for the spa). If specified, the applicant must install a timer to control the spa's pump.		✓	
(h) The applicant must install in the dwelling:				
	(aa) the kitchen cook-top and oven specified for that dwelling in the "Appliances & other efficiency measures" column of the table below;		✓	
	(bb) each appliance for which a rating is specified for that dwelling in the "Appliances & other efficiency measures" column of the table; and ensure that the appliance has that minimum rating; and		✓	✓
	(cc) any clothes drying line specified for the dwelling in the "Appliances & other efficiency measures" column of the table.		✓	
(i) If specified in the table, the applicant must carry out the development so that each refrigerator space in the dwelling is "well ventilated".			✓	

Dwelling no.	Hot water		Bathroom ventilation system		Kitchen ventilation system		Laundry ventilation system	
	Hot water system		Each bathroom	Operation control	Each kitchen	Operation control	Each laundry	Operation control
All dwellings	central hot water system 1		motorised damper into central duct + VSD	manual switch on/off	individual fan, not ducted	manual switch on/off	motorised damper into central duct + VSD	manual switch on/off

Dwelling no.	Cooling		Heating		Artificial Lighting						Natural lighting	
	living areas	bedroom areas	living areas	bedroom areas	No. of bedrooms &/or study	No. of living &/or dining rooms	Each kitchen	All bathrooms/toilets	Each laundry	All hallways	No. of bathrooms &/or toilets	Main kitchen
2202, 2302, 2402, 2502, 2602, 2702, 2802, 2902, 3002, 3102	central cooling system 1 (zoned)	central cooling system 1 (zoned)	central heating system 1 (zoned)	central heating system 1 (zoned)	1 (dedicated)	1 (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	0	yes

Dwelling no.	Cooling		Heating		Artificial Lighting						Natural lighting	
	living areas	bedroom areas	living areas	bedroom areas	No. of bedrooms &/or study	No. of living &/or dining rooms	Each kitchen	All bathrooms/toilets	Each laundry	All hallways	No. of bathrooms &/or toilets	Main kitchen
2106, 2107, 2203, 2204, 2205, 2206, 2207, 2303, 2304, 2305, 2306, 2307, 2403, 2404, 2405, 2406, 2407, 2505, 2506, 2507, 2603, 2604, 2703, 2704, 2803, 2804, 2903, 2904, 3003, 3004, 3103, 3104	central cooling system 1 (zoned)	central cooling system 1 (zoned)	central heating system 1 (zoned)	central heating system 1 (zoned)	2 (dedicated)	1 (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	0	yes

	Cooling		Heating		Artificial lighting							Natural lighting	
Dwelling no.	living areas	bedroom areas	living areas	bedroom areas	No. of bedrooms &/or study	No. of living &/or dining rooms	Each kitchen	All bathrooms/toilets	Each laundry	All hallways	No. of bathrooms &/or toilets	Main kitchen	
2108, 2201, 2208, 2301, 2308, 2401, 2408, 2501, 2508, 2601, 2605, 2606, 2607, 2701, 2705, 2706, 2707, 2801, 2805, 2806, 2807, 2901, 2905, 2906, 2907, 3001, 3005, 3006, 3007, 3101, 3105, 3106, 3107, 3201	central cooling system 1 (zoned)	central cooling system 1 (zoned)	central heating system 1 (zoned)	central heating system 1 (zoned)	3 (dedicated)	1 (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	0	yes	

Individual pool		Individual spa		Appliances & other efficiency measures								
Dwelling no.	Pool heating system	Timer	Spa heating system	Timer	Kitchen cooktop/oven	Refrigerator	Well ventilated fridge space	Dishwasher	Clothes washer	Clothes dryer	Indoor or sheltered clothes drying line	Private outdoor or unsheltered clothes drying line
All dwellings	-	-	-	-	gas cooktop & electric oven	-	yes	2.5 star	-	2 star	yes	no

(iii) Thermal Comfort	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must attach the certificate referred to under "Assessor details" on the front page of this BASIX certificate (the "Assessor Certificate") to the development application and construction certificate application for the proposed development (or, if the applicant is applying for a complying development certificate for the proposed development, to that application). The applicant must also attach the Assessor Certificate to the application for a final occupation certificate for the proposed development.			
(b) The Assessor Certificate must have been issued by an Accredited Assessor in accordance with the Thermal Comfort Protocol.			
(c) The details of the proposed development on the Assessor Certificate must be consistent with the details shown in this BASIX Certificate, including the details shown in the "Thermal Loads" table below.			
(d) The applicant must show on the plans accompanying the development application for the proposed development, all matters which the Thermal Comfort Protocol requires to be shown on those plans. Those plans must bear a stamp of endorsement from the Accredited Assessor, to certify that this is the case.			
(e) The applicant must show on the plans accompanying the application for a construction certificate (or complying development certificate, if applicable), all thermal performance specifications set out in the Assessor Certificate, and all aspects of the proposed development which were used to calculate those specifications.			
(f) The applicant must construct the development in accordance with all thermal performance specifications set out in the Assessor Certificate, and in accordance with those aspects of the development application or application for a complying development certificate which were used to calculate those specifications.		✓	✓
(g) Where there is an in-slab heating or cooling system, the applicant must: (aa) Install insulation with an R-value of not less than 1.0 around the vertical edges of the perimeter of the slab; or (bb) On a suspended floor, install insulation with an R-value of not less than 1.0 underneath the slab and around the vertical edges of the perimeter of the slab.	✓	✓	✓
(h) The applicant must construct the floors and walls of the development in accordance with the specifications listed in the table below.	✓	✓	✓

Thermal loads		
Dwelling no.	Area adjusted heating load (in mJ/m ² /yr)	Area adjusted cooling load (in mJ/m ² /yr)
2907	31.4	35.3
2203, 2303, 2403	19.4	34.1
2204, 2304, 2404	19.9	22.4
2201, 2301, 2401, 2501	27.6	26.2
2205, 2305, 2405, 2505	7.2	13.6
2206, 2306, 2406, 2506	15.9	14.6
2207, 2307, 2407, 2507	9.9	20.0
2108, 2208, 2308, 2408, 2508	24.3	27.9
2107, 2607, 2707, 2807, 3007, 3107	31.4	33.1
2603, 2703, 2803, 2903, 3003, 3103	26.2	37.1
2604, 2704, 2804, 2904, 3004, 3104	23.1	22.7
2605, 2705, 2805, 2905, 3005, 3105	10.1	18.8
2106, 2606, 2706, 2806, 2906, 3006, 3106	14.1	36.0
2601, 2701, 2801, 2901, 3001, 3101, 3201	29.6	27.9
All other dwellings	18.0	32.0

(b) Common areas and central systems/facilities

(i) Water		Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a showerhead, toilet, tap or clothes washer into a common area, then that item must meet the specifications listed for it in the table.			✓	✓
(b) The applicant must install (or ensure that the development is serviced by) the alternative water supply system(s) specified in the "Central systems" column of the table below. In each case, the system must be sized, be configured, and be connected, as specified in the table.		✓	✓	✓
(c) A swimming pool or spa listed in the table must not have a volume (in kLs) greater than that specified for the pool or spa in the table.		✓	✓	
(d) A pool or spa listed in the table must have a cover or shading if specified for the pool or spa in the table.			✓	
(e) The applicant must install each fire sprinkler system listed in the table so that the system is configured as specified in the table.			✓	✓
(f) The applicant must ensure that the central cooling system for a cooling tower is configured as specified in the table.			✓	✓

Common area	Showerheads rating	Toilets rating	Taps rating	Clothes washers rating
All common areas	3 star (> 7.5 but ≤ 9 L/min)	3 star	3 star	no common laundry facility

Central systems	Size	Configuration	Connection (to allow for...)
Central water tank - rainwater or stormwater (No. 1)	12500	To collect run-off from at least: - 250 square metres of roof area of buildings in the development - 0 square metres of impervious area in the development - 0 square metres of garden/lawn area in the development - 0 square metres of planter box area in the development (excluding, in each case, any area which drains to, or supplies, any other alternative water supply system).	- irrigation of 0 square metres of common landscaped area on the site - car washing in 0 car washing bays on the site

Central systems	Size	Configuration	Connection (to allow for...)
Central water tank - rainwater or stormwater (No. 2)	12500	To collect run-off from at least: - 0 square metres of roof area of buildings in the development - 0 square metres of impervious area in the development - 357.2 square metres of garden/lawn area in the development - 0 square metres of planter box area in the development (excluding, in each case, any area which drains to, or supplies, any other alternative water supply system).	- irrigation of 446.5 square metres of common landscaped area on the site - car washing in 0 car washing bays on the site
Pool (No. 1)	Volume: 15 kLs	Location: Indoor pool &/or spa area (No. 1)	-
Fire sprinkler system (No. 1)	-	-	-

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a ventilation system to service a common area specified in the table below, then that ventilation system must be of the type specified for that common area, and must meet the efficiency measure specified.		✓	✓
(b) In carrying out the development, the applicant must install, as the "primary type of artificial lighting" for each common area specified in the table below, the lighting specified for that common area. This lighting must meet the efficiency measure specified. The applicant must also install a centralised lighting control system or Building Management System (BMS) for the common area, where specified.		✓	✓
(c) The applicant must install the systems and fixtures specified in the "Central energy systems" column of the table below. In each case, the system or fixture must be of the type, and meet the specifications, listed for it in the table.	✓	✓	✓

Common area ventilation system				Common area lighting	
Common area	Ventilation system type	Ventilation efficiency measure	Primary type of artificial lighting	Lighting efficiency measure	Lighting control system/BMS
Indoor pool &/or spa area (No. 1)	ventilation (supply + exhaust)	time clock or BMS controlled	compact fluorescent	manual on / manual off	No
Gym (No. 1)	ventilation (supply + exhaust)	time clock or BMS controlled	compact fluorescent	manual on / manual off	No
Car park area (No. 1)	ventilation (supply + exhaust)	carbon monoxide monitor + VSD fan	fluorescent	zoned switching with motion sensor	No
Lift car (No. 1)	-	-	compact fluorescent	none	No

	Common area ventilation system		Common area lighting		
Common area	Ventilation system type	Ventilation efficiency measure	Primary type of artificial lighting	Lighting efficiency measure	Lighting control system/BMS
Lift car (No. 2)	-	-	compact fluorescent	none	No
Lift car (No. 3)	-	-	compact fluorescent	none	No
Lift car (No. 4)	-	-	compact fluorescent	none	No
Lift car (No. 5)	-	-	compact fluorescent	none	No
Lift car (No. 6)	-	-	compact fluorescent	none	No
Lift motor room (No. 1)	ventilation exhaust only	none ie. continuous	compact fluorescent	manual on / manual off	No
Switch room (No. 1)	ventilation exhaust only	none ie. continuous	compact fluorescent	manual on / manual off	No
Garbage room (No. 1)	ventilation exhaust only	-	compact fluorescent	manual on / manual off	No
Plant or service room (No. 1)	ventilation exhaust only	none ie. continuous	compact fluorescent	manual on / manual off	No
Ground floor lobby type (No. 1)	air conditioning system	time clock or BMS controlled	compact fluorescent	time clock and motion sensors	No
Ground floor lobby type (No. 2)	air conditioning system	time clock or BMS controlled	compact fluorescent	time clock and motion sensors	No
Hallway/lobby type (No. 1)	ventilation supply only	time clock or BMS controlled	compact fluorescent	time clock and motion sensors	No

Central energy systems		Type	Specification
Central hot water system (No. 1)		gas-fired boiler	Piping insulation (ringmain & supply risers): (b) Piping internal to building: R1.0 (~38 mm)
Central cooling system (No. 1)		water source packaged units	Heat rejection method: cooling tower Unit efficiency (min): low - COP < 3.5
Central heating system (No. 1)		water source packaged units + heated water	Energy source: gas boiler Unit efficiency: low - COP < 3.5
Lift (No. 1)		gearless traction with V V V F motor	Number of levels (including basement): 12
Lift (No. 2)		gearless traction with V V V F motor	Number of levels (including basement): 12

Central energy systems	Type	Specification
Lift (No. 3)	gearless traction with V V V F motor	Number of levels (including basement): 12
Lift (No. 4)	gearless traction with V V V F motor	Number of levels (including basement): 12
Lift (No. 5)	gearless traction with V V V F motor	Number of levels (including basement): 3
Lift (No. 6)	gearless traction with V V V F motor	Number of levels (including basement): 3
Pool (No. 1)	Heating source: gas	Pump controlled by timer: yes
Sauna (No. 1)	Heating source: electric resistance	Efficiency measure: manual on / timer off

4. Commitments for common areas and central systems/facilities for the development (non-building specific)

(b) Common areas and central systems/facilities

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a showerhead, toilet, tap or clothes washer into a common area, then that item must meet the specifications listed for it in the table.		✓	✓
(b) The applicant must install (or ensure that the development is serviced by) the alternative water supply system(s) specified in the "Central systems" column of the table below. In each case, the system must be sized, be configured, and be connected, as specified in the table.	✓	✓	✓
(c) A swimming pool or spa listed in the table must not have a volume (in kLs) greater than that specified for the pool or spa in the table.	✓	✓	
(d) A pool or spa listed in the table must have a cover or shading if specified for the pool or spa in the table.		✓	
(e) The applicant must install each fire sprinkler system listed in the table so that the system is configured as specified in the table.		✓	✓
(f) The applicant must ensure that the central cooling system for a cooling tower is configured as specified in the table.		✓	✓

Common area	Showerheads rating	Toilets rating	Taps rating	Clothes washers rating
All common areas	3 star (> 7.5 but ≤ 9 L/min)	3 star	3 star	no common laundry facility

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a ventilation system to service a common area specified in the table below, then that ventilation system must be of the type specified for that common area, and must meet the efficiency measure specified.		✓	✓
(b) In carrying out the development, the applicant must install, as the "primary type of artificial lighting" for each common area specified in the table below, the lighting specified for that common area. This lighting must meet the efficiency measure specified. The applicant must also install a centralised lighting control system or Building Management System (BMS) for the common area, where specified.		✓	✓
(c) The applicant must install the systems and fixtures specified in the "Central energy systems" column of the table below. In each case, the system or fixture must be of the type, and meet the specifications, listed for it in the table.	✓	✓	✓

Notes

1. In these commitments, "applicant" means the person carrying out the development.
2. The applicant must identify each dwelling, building and common area listed in this certificate, on the plans accompanying any development application, and on the plans and specifications accompanying the application for a construction certificate / complying development certificate, for the proposed development, using the same identifying letter or reference as is given to that dwelling, building or common area in this certificate.
3. This note applies if the proposed development involves the erection of a building for both residential and non-residential purposes (or the change of use of a building for both residential and non-residential purposes). Commitments in this certificate which are specified to apply to a "common area" of a building or the development, apply only to that part of the building or development to be used for residential purposes.
4. If this certificate lists a central system as a commitment for a dwelling or building, and that system will also service any other dwelling or building within the development, then that system need only be installed once (even if it is separately listed as a commitment for that other dwelling or building).
5. If a star or other rating is specified in a commitment, this is a minimum rating.
6. All alternative water systems to be installed under these commitments (if any), must be installed in accordance with the requirements of all applicable regulatory authorities. NOTE: NSW Health does not recommend that stormwater, recycled water or private dam water be used to irrigate edible plants which are consumed raw, or that rainwater be used for human consumption in areas with potable water supply.

Legend

1. Commitments identified with a "✓" in the "Show on DA plans" column must be shown on the plans accompanying the development application for the proposed development (if a development application is to be lodged for the proposed development).
2. Commitments identified with a "✓" in the "Show on CC/CDC plans and specs" column must be shown in the plans and specifications accompanying the application for a construction certificate / complying development certificate for the proposed development.
3. Commitments identified with a "✓" in the "Certifier check" column must be certified by a certifying authority as having been fulfilled. (Note: a certifying authority must not issue an occupation certificate (either interim or final) for a building listed in this certificate, or for any part of such a building, unless it is satisfied that each of the commitments whose fulfilment it is required to monitor in relation to the building or part, has been fulfilled).

Certificate number: 323130M_05

This certificate confirms that the proposed development will meet the NSW government's requirements for sustainability, if it is built in accordance with the commitments set out below. Terms used in this certificate, or in the commitments, have the meaning given by the document entitled "BASIX Definitions" dated 29/06/2009 published by the Department of Planning. This document is available at www.basix.nsw.gov.au

Director-General

Date of issue: Friday, 23 July 2010



Planning

Project summary		
Project name	7 Railway Street, Chatswood (3202-42_05	
Street address	7 Railway Street Chatswood 2067	
Local Government Area	Willoughby City Council	
Plan type and plan number	deposited 1058962	
Lot no.	6	
Section no.	-	
No. of unit buildings	1	
No. of units in unit buildings	76	
No. of attached dwelling houses	0	
No. of separate dwelling houses	0	
Project score		
Water	✓ 41	Target 40
Thermal Comfort	✓ Pass	Target Pass
Energy	✓ 22	Target 20

Certificate Prepared by (please complete before submitting to Council or PCA)	
Name / Company Name:	
ABN (if applicable):	

Description of project

Project address	
Project name	7 Railway Street, Chatswood (3202-42_05
Street address	7 Railway Street Chatswood 2067
Local Government Area	Willoughby City Council
Plan type and plan number	deposited 1058962
Lot no.	6
Section no.	-
Project type	
No. of unit buildings	1
No. of units in unit buildings	76
No. of attached dwelling houses	0
No. of separate dwelling houses	0
Site details	
Site area (m²)	1228.25
Roof area (m²)	293.75
Non-residential floor area (m²)	952.5
Residential car spaces	90
Non-residential car spaces	10

Common area landscape	
Common area lawn (m²)	121.5
Common area garden (m²)	325
Area of indigenous or low water use species (m²)	250
Assessor details	
Assessor number	20241
Certificate number	56752311
Climate zone	56
Project score	
Water	✓ 41 Target 40
Thermal Comfort	✓ Pass Target Pass
Energy	✓ 22 Target 20

Description of project

The tables below describe the dwellings and common areas within the project

Unit building - 3202-4207, 76 dwellings, 42 storeys above ground

Dwelling no.	No. of bedrooms	Conditioned floor area (m ²)	Unconditioned floor area (m ²)	Area of garden & lawn (m ²)	Indigenous species (min area m ²)
3202	1	64.0	0.0	0	0
3206	3	145.0	0.0	0	0
3303	2	99.0	0.0	0	0
3307	3	135.0	0.0	0	0
3404	2	96.0	0.0	0	0
3501	3	133.0	0.0	0	0
3505	3	135.0	0.0	0	0
3602	1	64.0	0.0	0	0
3606	3	145.0	0.0	0	0
3703	2	99.0	0.0	0	0
3707	3	135.0	0.0	0	0
3804	2	96.0	0.0	0	0
3901	3	133.0	0.0	0	0
3905	3	135.0	0.0	0	0
4002	1	64.0	0.0	0	0
4006	3	145.0	0.0	0	0
4103	2	99.0	0.0	0	0
4107	3	135.0	0.0	0	0

Dwelling no.	No. of bedrooms	Conditioned floor area (m ²)	Unconditioned floor area (m ²)	Area of garden & lawn (m ²)	Indigenous species (min area m ²)
3204	2	96.0	0.0	0	0
3301	3	133.0	0.0	0	0
3305	3	135.0	0.0	0	0
3402	1	64.0	0.0	0	0
3406	3	145.0	0.0	0	0
3503	2	99.0	0.0	0	0
3507	3	135.0	0.0	0	0
3604	2	96.0	0.0	0	0
3701	3	133.0	0.0	0	0
3705	3	135.0	0.0	0	0
3802	1	64.0	0.0	0	0
3806	3	145.0	0.0	0	0
3903	2	99.0	0.0	0	0
3907	3	135.0	0.0	0	0
4004	2	96.0	0.0	0	0
4101	3	133.0	0.0	0	0
4105	3	135.0	0.0	0	0
4202	1	64.0	0.0	0	0

Dwelling no.	No. of bedrooms	Conditioned floor area (m ²)	Unconditioned floor area (m ²)	Area of garden & lawn (m ²)	Indigenous species (min area m ²)
3205	3	135.0	0.0	0	0
3302	1	64.0	0.0	0	0
3306	3	145.0	0.0	0	0
3403	2	99.0	0.0	0	0
3407	3	135.0	0.0	0	0
3504	2	96.0	0.0	0	0
3601	3	133.0	0.0	0	0
3605	3	135.0	0.0	0	0
3702	1	64.0	0.0	0	0
3706	3	145.0	0.0	0	0
3803	2	99.0	0.0	0	0
3807	3	135.0	0.0	0	0
3904	2	96.0	0.0	0	0
4001	3	133.0	0.0	0	0
4005	3	135.0	0.0	0	0
4102	1	64.0	0.0	0	0
4106	3	145.0	0.0	0	0
4203	2	99.0	0.0	0	0

Dwelling no.	4204	No. of bedrooms	2	Conditioned floor area (m ²)	96.0	Unconditioned floor area (m ²)	0.0	Area of garden & lawn (m ²)	0	Indigenous species (min area m ²)	0
Dwelling no.	4205	No. of bedrooms	3	Conditioned floor area (m ²)	135.0	Unconditioned floor area (m ²)	0.0	Area of garden & lawn (m ²)	0	Indigenous species (min area m ²)	0

Dwelling no.	4206	No. of bedrooms	3	Conditioned floor area (m ²)	145.0	Unconditioned floor area (m ²)	0.0	Area of garden & lawn (m ²)	0	Indigenous species (min area m ²)	0
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Dwelling no.	4207	No. of bedrooms	3	Conditioned floor area (m ²)	135.0	Unconditioned floor area (m ²)	0.0	Area of garden & lawn (m ²)	0	Indigenous species (min area m ²)	0
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Description of project

The tables below describe the dwellings and common areas within the project

Common areas of unit building - 3202-4207

Common area	Floor area (m²)
Indoor pool &/or spa area (No. 1)	37
Lift car (No. 1)	-
Lift car (No. 4)	-
Lift motor room (No. 1)	14.25
Plant or service room (No. 1)	456.25
Hallway/lobby type (No. 1)	520

Common area	Floor area (m²)
Gym (No. 1)	8.25
Lift car (No. 2)	-
Lift car (No. 5)	-
Switch room (No. 1)	7.5
Ground floor lobby type (No. 1)	16

Common area	Floor area (m²)
Car park area (No. 1)	3665
Lift car (No. 3)	-
Lift car (No. 6)	-
Garbage room (No. 1)	35
Ground floor lobby type (No. 2)	30

Schedule of BASIX commitments

1. Commitments for unit building - 3202-4207

(a) Dwellings

- (i) Water
 - (ii) Energy
 - (iii) Thermal Comfort
- (b) Common areas and central systems/facilities
- (i) Water
 - (ii) Energy

2. Commitments for attached dwelling houses

3. Commitments for separate dwelling houses

4. Commitments for common areas and central systems/facilities for the development (non-building specific)

- (i) Water
- (ii) Energy

Schedule of BASIX commitments

The commitments set out below regulate how the proposed development is to be carried out. It is a condition of any development consent granted, or complying development certificate issued, for the proposed development, that BASIX commitments be complied with.

1. Commitments for unit building - 3202-4207

(a) Dwellings

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below.			
(b) The applicant must plant indigenous or low water use species of vegetation throughout the area of land specified for the dwelling in the "Indigenous species" column of the table below, as private landscaping for that dwelling. (This area of indigenous vegetation is to be contained within the "Area of garden and lawn" for the dwelling specified in the "Description of Project" table).	✓	✓	
(c) If a rating is specified in the table below for a fixture or appliance to be installed in the dwelling, the applicant must ensure that each such fixture and appliance meets the rating specified for it.		✓	✓
(d) The applicant must install an on demand hot water recirculation system which regulates all hot water use throughout the dwelling, where indicated for a dwelling in the "HW recirculation or diversion" column of the table below.		✓	✓
(e) The applicant must install:			
(aa) a hot water diversion system to all showers, kitchen sinks and all basins in the dwelling, where indicated for a dwelling in the "HW recirculation or diversion" column of the table below; and		✓	✓
(bb) a separate diversion tank (or tanks) connected to the hot water diversion systems of at least 100 litres. The applicant must connect the hot water diversion tank to all toilets in the dwelling.		✓	✓
(e) The applicant must not install a private swimming pool or spa for the dwelling, with a volume exceeding that specified for it in the table below.	✓	✓	
(f) If specified in the table, that pool or spa (or both) must have a pool cover or shading (or both).		✓	
(g) The pool or spa must be located as specified in the table.	✓	✓	
(h) The applicant must install, for the dwelling, each alternative water supply system, with the specified size, listed for that dwelling in the table below. Each system must be configured to collect run-off from the areas specified (excluding any area which supplies any other alternative water supply system), and to divert overflow as specified. Each system must be connected as specified.	✓	✓	✓

Dwelling no.	Fixtures					Appliances		Individual pool					Individual spa		
	All shower-heads	All toilet flushing systems	All kitchen taps	All bathroom taps	HW recirculation or diversion	All clothes washers	All dish-washers	Volume (max volume)	Pool cover	Pool location	Pool shaded	Volume (max volume)	Spa cover	Spa shaded	
All dwellings	3 star (> 7.5 but <= 9 L/min)	3 star	3 star	3 star	no	4 star	3 star	-	-	-	-	-	-	-	

Alternative water source												
Dwelling no.	Alternative water supply systems	Size	Configuration	Landscape connection	Toilet connection (s)	Laundry connection	Pool top-up	Spa top-up				
All dwellings	central water tank (no. 1)	See central systems	See central systems	no	yes	no	no	no				
None	-	-	-	-	-	-	-	-				

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below.			
(b) The applicant must install each hot water system specified for the dwelling in the table below, so that the dwelling's hot water is supplied by that system. If the table specifies a central hot water system for the dwelling, then the applicant must connect that central system to the dwelling, so that the dwelling's hot water is supplied by that central system.	✓	✓	✓
(c) The applicant must install, in each bathroom, kitchen and laundry of the dwelling, the ventilation system specified for that room in the table below. Each such ventilation system must have the operation control specified for it in the table.		✓	✓
(d) The applicant must install the cooling and heating system/s specified for the dwelling under the "Living areas" and "Bedroom areas" headings of the "Cooling" and "Heating" columns in the table below, in/for at least 1 living/bedroom area of the dwelling. If no cooling or heating system is specified in the table for "Living areas" or "Bedroom areas", then no systems may be installed in any such areas. If the term "zoned" is specified beside an air conditioning system, then the system must provide for day/night zoning between living areas and bedrooms.		✓	✓
(e) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Artificial lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that the "primary type of artificial lighting" for each such room in the dwelling is fluorescent lighting or light emitting diode (LED) lighting. If the term "dedicated" is specified for a particular room or area, then the light fittings in that room or area must only be capable of being used for fluorescent lighting or light emitting diode (LED) lighting.		✓	✓

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(f) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Natural lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that each such room or area is fitted with a window and/or skylight.	✓	✓	✓
(g) This commitment applies if the applicant installs a water heating system for the dwelling's pool or spa. The applicant must: (aa) install the system specified for the pool in the "Individual Pool" column of the table below (or alternatively must not install any system for the pool). If specified, the applicant must install a timer, to control the pool's pump; and (bb) install the system specified for the spa in the "Individual Spa" column of the table below (or alternatively must not install any system for the spa). If specified, the applicant must install a timer to control the spa's pump.		✓ ✓	
(h) The applicant must install in the dwelling: (aa) the kitchen cook-top and oven specified for that dwelling in the "Appliances & other efficiency measures" column of the table below; (bb) each appliance for which a rating is specified for that dwelling in the "Appliances & other efficiency measures" column of the table, and ensure that the appliance has that minimum rating; and (cc) any clothes drying line specified for the dwelling in the "Appliances & other efficiency measures" column of the table.		✓ ✓ ✓	✓
(i) If specified in the table, the applicant must carry out the development so that each refrigerator space in the dwelling is "well ventilated".		✓	

Dwelling no.	Bathroom ventilation system		Kitchen ventilation system		Laundry ventilation system	
	Hot water system	Each bathroom	Operation control	Each kitchen	Operation control	Each laundry
All dwellings	central hot water system 1	motorised damper into central duct + VSD	manual switch on/off	individual fan, not ducted	manual switch on/off	motorised damper into central duct + VSD
						manual switch on/off

	Cooling		Heating		Artificial lighting							Natural lighting	
Dwelling no.	living areas	bedroom areas	living areas	bedroom areas	No. of bedrooms &/or study	No. of living &/or dining rooms	Each kitchen	All bathrooms/toilets	Each laundry	All hallways	No. of bathrooms &/or toilets	Main kitchen	
3202, 3302, 3402, 3502, 3602, 3702, 3802, 3902, 4002, 4102, 4202	central cooling system 1 (zoned)	central cooling system 1 (zoned)	central heating system 1 (zoned)	central heating system 1 (zoned)	1 (dedicated)	1 (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	0	yes	
3203, 3204, 3303, 3304, 3403, 3404, 3503, 3504, 3603, 3604, 3703, 3704, 3803, 3804, 3903, 3904, 4003, 4004, 4103, 4104, 4203, 4204	central cooling system 1 (zoned)	central cooling system 1 (zoned)	central heating system 1 (zoned)	central heating system 1 (zoned)	2 (dedicated)	1 (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	0	yes	

	Cooling		Heating		Artificial lighting							Natural lighting	
Dwelling no.	living areas	bedroom areas	living areas	bedroom areas	No. of bedrooms &/or study	No. of living &/or dining rooms	Each kitchen	All bathrooms/toilets	Each laundry	All hallways	No. of bathrooms &/or toilets	Main kitchen	
3205, 3206, 3207, 3301, 3305, 3306, 3307, 3401, 3405, 3406, 3407, 3501, 3505, 3506, 3507, 3601, 3605, 3606, 3607, 3701, 3705, 3706, 3707, 3801, 3805, 3806, 3807, 3901, 3905, 3906, 3907, 4001, 4005, 4006, 4007, 4101, 4105, 4106, 4107,	central cooling system 1 (zoned)	central cooling system 1 (zoned)	central heating system 1 (zoned)	central heating system 1 (zoned)	3 (dedicated)	1 (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	0	yes	

	Cooling		Heating		Artificial lighting						Natural lighting	
	living areas	bedroom areas	living areas	bedroom areas	No. of bedrooms &/or study	No. of living &/or dining rooms	Each kitchen	All bathrooms/toilets	Each laundry	All hallways	No. of bathrooms &/or toilets	Main kitchen
Dwelling no.												
4201, 4205, 4206, 4207												

Individual pool		Individual spa		Appliances & other efficiency measures								
Dwelling no.	Pool heating system	Timer	Spa heating system	Timer	Kitchen cooktop/oven	Refrigerator	Well ventilated fridge space	Dishwasher	Clothes washer	Clothes dryer	Indoor or sheltered clothes drying line	Private outdoor or unsheltered clothes drying line
All dwellings	-	-	-	-	gas cooktop & electric oven	-	yes	2.5 star	-	2 star	yes	no

(iii) Thermal Comfort	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must attach the certificate referred to under "Assessor details" on the front page of this BASIX certificate (the "Assessor Certificate") to the development application and construction certificate application for the proposed development (or, if the applicant is applying for a complying development certificate for the proposed development, to that application). The applicant must also attach the Assessor Certificate to the application for a final occupation certificate for the proposed development.			
(b) The Assessor Certificate must have been issued by an Accredited Assessor in accordance with the Thermal Comfort Protocol.			
(c) The details of the proposed development on the Assessor Certificate must be consistent with the details shown in this BASIX Certificate, including the details shown in the "Thermal Loads" table below.			
(d) The applicant must show on the plans accompanying the development application for the proposed development, all matters which the Thermal Comfort Protocol requires to be shown on those plans. Those plans must bear a stamp of endorsement from the Accredited Assessor, to certify that this is the case.			
(e) The applicant must show on the plans accompanying the application for a construction certificate (or complying development certificate, if applicable), all thermal performance specifications set out in the Assessor Certificate, and all aspects of the proposed development which were used to calculate those specifications.			

(iii) Thermal Comfort		Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(f) The applicant must construct the development in accordance with all thermal performance specifications set out in the Assessor Certificate, and in accordance with those aspects of the development application or application for a complying development certificate which were used to calculate those specifications.			✓	✓
(g) Where there is an in-slab heating or cooling system, the applicant must: (aa) Install insulation with an R-value of not less than 1.0 around the vertical edges of the perimeter of the slab; or (bb) On a suspended floor, install insulation with an R-value of not less than 1.0 underneath the slab and around the vertical edges of the perimeter of the slab.		✓	✓	✓
(h) The applicant must construct the floors and walls of the development in accordance with the specifications listed in the table below.		✓	✓	✓

Thermal loads		
Dwelling no.	Area adjusted heating load (in mJ/m ² /yr)	Area adjusted cooling load (in mJ/m ² /yr)
4201	37.4	27.0
4202	29.3	34.2
4203	37.9	39.5
4204	39.4	24.5
3301, 3401, 3501, 3601, 3701, 3801, 3901, 4001, 4101	29.6	27.9
3202, 3302, 3402, 3502, 3602, 3702, 3802, 3902, 4002, 4102	18.0	32.0
3203, 3303, 3403, 3503, 3603, 3703, 3803, 3903, 4003, 4103	26.2	37.1
3204, 3304, 3404, 3504, 3604, 3704, 3804, 3904, 4004, 4104	23.1	22.7
3205, 3305, 3405, 3505, 3605, 3705, 3805, 3905, 4005, 4105, 4205	10.1	18.8
3206, 3306, 3406, 3506, 3606, 3706, 3806, 3906, 4006, 4106, 4206	14.1	36.0

Thermal loads		
Dwelling no.	Area adjusted heating load (in mJ/m ² /yr)	Area adjusted cooling load (in mJ/m ² /yr)
All other dwellings	31.4	33.1

(b) Common areas and central systems/facilities

(i) Water		Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a showerhead, toilet, tap or clothes washer into a common area, then that item must meet the specifications listed for it in the table.			✓	✓
(b) The applicant must install (or ensure that the development is serviced by) the alternative water supply system(s) specified in the "Central systems" column of the table below. In each case, the system must be sized, be configured, and be connected, as specified in the table.		✓	✓	✓
(c) A swimming pool or spa listed in the table must not have a volume (in kLs) greater than that specified for the pool or spa in the table.		✓	✓	
(d) A pool or spa listed in the table must have a cover or shading if specified for the pool or spa in the table.			✓	
(e) The applicant must install each fire sprinkler system listed in the table so that the system is configured as specified in the table.			✓	✓
(f) The applicant must ensure that the central cooling system for a cooling tower is configured as specified in the table.			✓	✓

Common area	Showerheads rating	Toilets rating	Taps rating	Clothes washers rating
All common areas	3 star (> 7.5 but ≤ 9 L/min)	3 star	3 star	no common laundry facility

Central systems	Size	Configuration	Connection (to allow for...)
Central water tank - rainwater or stormwater (No. 1)	12500	To collect run-off from at least: - 250 square metres of roof area of buildings in the development - 0 square metres of impervious area in the development - 0 square metres of garden/lawn area in the development - 0 square metres of planter box area in the development (excluding, in each case, any area which drains to, or supplies, any other alternative water supply system).	- irrigation of 0 square metres of common landscaped area on the site - car washing in 0 car washing bays on the site

Central systems	Size	Configuration	Connection (to allow for...)
Central water tank - rainwater or stormwater (No. 2)	12500	To collect run-off from at least: - 0 square metres of roof area of buildings in the development - 0 square metres of impervious area in the development - 357.2 square metres of garden/lawn area in the development - 0 square metres of planter box area in the development (excluding, in each case, any area which drains to, or supplies, any other alternative water supply system).	- irrigation of 446.5 square metres of common landscaped area on the site - car washing in 0 car washing bays on the site
Pool (No. 1)	Volume: 15 kLs	Location: Indoor pool &/or spa area (No. 1) Pool shaded: yes	-
Fire sprinkler system (No. 1)	-	-	-

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a ventilation system to service a common area specified in the table below, then that ventilation system must be of the type specified for that common area, and must meet the efficiency measure specified.		✓	✓
(b) In carrying out the development, the applicant must install, as the "primary type of artificial lighting" for each common area specified in the table below, the lighting specified for that common area. This lighting must meet the efficiency measure specified. The applicant must also install a centralised lighting control system or Building Management System (BMS) for the common area, where specified.		✓	✓
(c) The applicant must install the systems and fixtures specified in the "Central energy systems" column of the table below. In each case, the system or fixture must be of the type, and meet the specifications, listed for it in the table.	✓	✓	✓

Common area ventilation system				Common area lighting		
Common area	Ventilation system type	Ventilation efficiency measure	Primary type of artificial lighting	Lighting efficiency measure	Lighting control system/BMS	
Indoor pool &/or spa area (No. 1)	ventilation (supply + exhaust)	time clock or BMS controlled	compact fluorescent	manual on / manual off	No	
Gym (No. 1)	ventilation (supply + exhaust)	time clock or BMS controlled	compact fluorescent	manual on / manual off	No	
Car park area (No. 1)	ventilation (supply + exhaust)	carbon monoxide monitor + VSD fan	fluorescent	zoned switching with motion sensor	No	

Common area	Common area ventilation system		Common area lighting		
	Ventilation system type	Ventilation efficiency measure	Primary type of artificial lighting	Lighting efficiency measure	Lighting control system/BMS
Lift car (No. 1)	-	-	compact fluorescent	none	No
Lift car (No. 2)	-	-	compact fluorescent	none	No
Lift car (No. 3)	-	-	compact fluorescent	none	No
Lift car (No. 4)	-	-	compact fluorescent	none	No
Lift car (No. 5)	-	-	compact fluorescent	none	No
Lift car (No. 6)	-	-	compact fluorescent	none	No
Lift motor room (No. 1)	ventilation exhaust only	none ie. continuous	compact fluorescent	manual on / manual off	No
Switch room (No. 1)	ventilation exhaust only	none ie. continuous	compact fluorescent	manual on / manual off	No
Garbage room (No. 1)	ventilation exhaust only	-	compact fluorescent	manual on / manual off	No
Plant or service room (No. 1)	ventilation exhaust only	none ie. continuous	compact fluorescent	manual on / manual off	No
Ground floor lobby type (No. 1)	air conditioning system	time clock or BMS controlled	compact fluorescent	time clock and motion sensors	No
Ground floor lobby type (No. 2)	air conditioning system	time clock or BMS controlled	compact fluorescent	time clock and motion sensors	No
Hallway/lobby type (No. 1)	ventilation supply only	time clock or BMS controlled	compact fluorescent	time clock and motion sensors	No

Central energy systems		Type	Specification
Central hot water system (No. 1)		gas-fired boiler	Piping insulation (ringmain & supply risers): (b) Piping internal to building: R1.0 (~38 mm)
Central cooling system (No. 1)		water source packaged units	Heat rejection method: cooling tower Unit efficiency (min): low - COP < 3.5
Central heating system (No. 1)		water source packaged units + heated water	Energy source: gas boiler Unit efficiency: low - COP < 3.5
Lift (No. 1)		gearless traction with V V V F motor	Number of levels (including basement): 12
Lift (No. 2)		gearless traction with V V V F motor	Number of levels (including basement): 12

Central energy systems	Type	Specification
Lift (No. 3)	gearless traction with V V V F motor	Number of levels (including basement): 12
Lift (No. 4)	gearless traction with V V V F motor	Number of levels (including basement): 12
Lift (No. 5)	gearless traction with V V V F motor	Number of levels (including basement): 3
Lift (No. 6)	gearless traction with V V V F motor	Number of levels (including basement): 3
Pool (No. 1)	Heating source: gas	Pump controlled by timer: yes
Sauna (No. 1)	Heating source: electric resistance	Efficiency measure: manual on / timer off

4. Commitments for common areas and central systems/facilities for the development (non-building specific)

(b) Common areas and central systems/facilities

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a showerhead, toilet, tap or clothes washer into a common area, then that item must meet the specifications listed for it in the table.		✓	✓
(b) The applicant must install (or ensure that the development is serviced by) the alternative water supply system(s) specified in the "Central systems" column of the table below. In each case, the system must be sized, be configured, and be connected, as specified in the table.	✓	✓	✓
(c) A swimming pool or spa listed in the table must not have a volume (in kLs) greater than that specified for the pool or spa in the table.	✓	✓	
(d) A pool or spa listed in the table must have a cover or shading if specified for the pool or spa in the table.		✓	
(e) The applicant must install each fire sprinkler system listed in the table so that the system is configured as specified in the table.		✓	✓
(f) The applicant must ensure that the central cooling system for a cooling tower is configured as specified in the table.		✓	✓

Common area	Showerheads rating	Toilets rating	Taps rating	Clothes washers rating
All common areas	3 star (> 7.5 but ≤ 9 L/min)	3 star	3 star	no common laundry facility

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a ventilation system to service a common area specified in the table below, then that ventilation system must be of the type specified for that common area, and must meet the efficiency measure specified.		✓	✓
(b) In carrying out the development, the applicant must install, as the "primary type of artificial lighting" for each common area specified in the table below, the lighting specified for that common area. This lighting must meet the efficiency measure specified. The applicant must also install a centralised lighting control system or Building Management System (BMS) for the common area, where specified.		✓	✓
(c) The applicant must install the systems and fixtures specified in the "Central energy systems" column of the table below. In each case, the system or fixture must be of the type, and meet the specifications, listed for it in the table.	✓	✓	✓

Notes

1. In these commitments, "applicant" means the person carrying out the development.
2. The applicant must identify each dwelling, building and common area listed in this certificate, on the plans accompanying any development application, and on the plans and specifications accompanying the application for a construction certificate / complying development certificate, for the proposed development, using the same identifying letter or reference as is given to that dwelling, building or common area in this certificate.
3. This note applies if the proposed development involves the erection of a building for both residential and non-residential purposes (or the change of use of a building for both residential and non-residential purposes). Commitments in this certificate which are specified to apply to a "common area" of a building or the development, apply only to that part of the building or development to be used for residential purposes.
4. If this certificate lists a central system as a commitment for a dwelling or building, and that system will also service any other dwelling or building within the development, then that system need only be installed once (even if it is separately listed as a commitment for that other dwelling or building).
5. If a star or other rating is specified in a commitment, this is a minimum rating.
6. All alternative water systems to be installed under these commitments (if any), must be installed in accordance with the requirements of all applicable regulatory authorities. NOTE: NSW Health does not recommend that stormwater, recycled water or private dam water be used to irrigate edible plants which are consumed raw, or that rainwater be used for human consumption in areas with potable water supply.

Legend

1. Commitments identified with a "✓" in the "Show on DA plans" column must be shown on the plans accompanying the development application for the proposed development (if a development application is to be lodged for the proposed development).
2. Commitments identified with a "✓" in the "Show on CC/CDC plans and specs" column must be shown in the plans and specifications accompanying the application for a construction certificate / complying development certificate for the proposed development.
3. Commitments identified with a "✓" in the "Certifier check" column must be certified by a certifying authority as having been fulfilled. (Note: a certifying authority must not issue an occupation certificate (either interim or final) for a building listed in this certificate, or for any part of such a building, unless it is satisfied that each of the commitments whose fulfilment it is required to monitor in relation to the building or part, has been fulfilled).

Mirvac Projects Pty Ltd

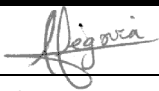
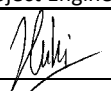
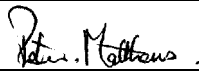
7 Railway St, Chatswood
BCA Section J Assessment



Report No. 20C-10-0128-TRP-461831-1

23 July 2010

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7 Railway St, Chatswood		
BCA Section J Assessment		
REPORT NO: 20C-10-0128-TRP-461831-1		LIBRARY CODE:
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REVISION HISTORY:		
Revision No.	Date Issued:	Reason/Comments:
0	21 July 2010	Initial Issue
1	23 July 2010	Update to glazing calculator
DISTRIBUTION:		
Copy No.	Location	
2		
1		Project
2	Uncontrolled Copy	Client (PDF Format)
KEYWORDS: Mirvac Projects Pty Ltd, 7 Railway St, Chatswood , BCA Section J Assessment		

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EXECUTIVE SUMMARY

This document contains commercial, conceptual and engineering information which is proprietary to VIPAC Engineers & Scientists Ltd. We specifically state that inclusion of this information does not grant the Client any license to use the information without VIPAC's written permission. We further require that the information not be divulged to a third party without our written consent.

VIPAC Engineers & Scientists Limited has been commissioned to assess the proposed 7 Railway St, Chatswood development in terms of compliance with BCA 2010 Section J (Energy Efficiency). The proposed development is assessed as a Class 7a for car park areas, Class 5 for commercial suites, Class 6 for Retail spaces and Class 2 for residential areas.

The need for this study is a result of a development approval & condition of consent for the developer, namely Section J in the BCA. The main objective of Section J (Energy Efficiency) is to reduce greenhouse gas emissions by efficiently using energy. It requires that a building, including its services, must have, to the degree necessary, features that facilitate efficient use of energy. Performance requirements for the following areas are included in BCA section J:

- J1: Building fabric
- J2: Glazing
- J3: Building Sealing
- J4: Air Movement
- J5: Air conditioning and ventilation systems
- J6: Artificial Lighting & Power
- J7: Hot water supply
- J8: Access to maintenance

As a result of compliance with the BCA 2010 Section J, the improved development will reduce the need for non-renewable energy sources, minimising both energy costs and atmospheric air pollution while maintaining acceptable levels of comfort.

Compliance with BCA is achieved through a mix of passive and active measures:

- The building fabric has a high thermal performance in terms of effective wall and roof insulation where required. This has ensured compliance with BCA requirements.
- The development achieves compliance with the air-infiltration requirements. The roof/wall construction is sealed in accordance to fire safety requirements. Windows are to have compliance with the relevant Australian Standard for sealing requirements.
- A hot water system with efficient insulation and lagging and an efficient HVAC system achieve compliance with BCA.

- The development complies with the requirement for access for maintenance by making necessary provisions.

This study is based on the latest drawings of the improved development. The specific energy performance requirements and criteria required in Section J (energy efficiency) of BCA 2010 are listed in the text boxes for reference. Subsequently a brief response is provided to demonstrate compliance with the BCA requirement.

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1. RESIDENTIAL BCA SECTION J ASSESSMENT

1.1 PART J0: ENERGY EFFICIENCY

NSW Subsection J(A) Energy Efficiency - Class 2 buildings and Class 4 parts

This Subsection contains energy efficiency requirements for Class 2 buildings and Class 4 parts of buildings.

The need for separating these requirements from the requirements for Class 3 buildings arises because, in NSW, Class 2 buildings and Class 4 parts of buildings are subject to BASIX (the Building Sustainability Index), however Class 3 buildings are not. BASIX is the web-based planning tool designed to assess the potential performance of certain residential buildings against a range of sustainability indices including thermal comfort and energy. Commitments made under BASIX become a condition of the relevant development consent or complying development certificate.

BASIX applies in NSW to all new Class 1 and 2 buildings, and Class 4 parts of buildings; and to alterations and additions to buildings of those classes where the work is subject to BASIX and also where an applicant elects to comply with BASIX.

The provisions of NSW Subsection J(A) are therefore designed to complement requirements that arise under BASIX and which are implemented via the development consent. Where BASIX is not applied to alterations and additions to Class 1 and 2 buildings, and Class 4 parts of buildings, these provisions will also complement council development controls that require energy efficiency measures to be incorporated as part of the alterations and additions.

All residential areas have been assessed under the NSW Subsection J(A) of the BCA. BASIX requirements can be found in VIPAC report 20C-10-0128-TRP-461887-3 - BASIX and BASIX Certificate No. 323344M_04, 323058M_04, 323089M_04 & 323130M_05.

1.1.1 J1.2: Thermal Construction General

- (a) Where *required*, insulation must comply with AS/NZS 4859.1 and be installed so that it
 - (i) abuts or overlaps adjoining insulation other than at supporting members such as studs, noggings, joists, furring channels and the like where the insulation must be against the member; and
 - (ii) forms a continuous barrier with ceilings, walls, bulkheads, floors or the like that inherently contribute to the thermal barrier; and
 - (iii) does not affect the safe or effective operation of a *service* or fitting.
- (b) Where *required*, *reflective insulation* must be installed with
 - (i) the necessary airspace to achieve the *required R-Value* between a reflective side of the *reflective insulation* and a building lining or cladding; and
 - (ii) the *reflective insulation* closely fitted against any penetration, door or *window* opening; and
 - (iii) the *reflective insulation* adequately supported by framing members; and
 - (iv) each adjoining sheet of roll membrane being
 - (A) overlapped not less than 50 mm; or
 - (B) taped together.
- (c) Where *required*, bulk insulation must be installed so that
 - (i) it maintains its position and thickness, other than where it is compressed between cladding and supporting members, water pipes, electrical cabling or the like; and
 - (ii) in a ceiling, where there is no bulk insulation or *reflective insulation* in the wall beneath, it overlaps the wall by not less than 50 mm.
- (d) Roof, ceiling, wall and floor materials, and associated surfaces are deemed to have the thermal properties listed in Specification J1.2.

BASIX requirements can be found in VIPAC report 20C-10-0128-TRP-461887-3 - BASIX and BASIX Certificate No. 323344M_04, 323058M_04, 323089M_04 & 323130M_05.

Compliance will be achieved through appropriate installation practices undertaken to ensure that insulation forms a continuous barrier with the thermal fabric of the building. Installation techniques such as using several layers of insulation with staggered joints are to be used to avoid air voids and to make sure that insulation fills out the available space.

Installation will be done in accordance with the safety and accessibility requirements around various fittings and services such as water pipes and electrical cabling etc.

1.1.2 J1.3: Roof and Ceiling Construction

- (a) A roof or ceiling that is part of the *envelope*, other than of a *sole-occupancy unit* of a Class 2 building or a Class 4 part of a building, must achieve the *Total R-Value* specified in Table J1.3a for the direction of heat flow.
- (b) For compliance with Table J1.3a, roof and ceiling construction is deemed to have the thermal properties listed in Specification J1.3.
- (c) Where, for operational or safety reasons associated with exhaust fans, flues or recessed downlights, the area of *required* ceiling insulation is reduced, the loss of insulation must be compensated for by increasing the *R-Value* of the insulation in the remainder of the ceiling in accordance with Table J1.3b.
- (d) A roof that
 - (i) is *required* to achieve a minimum *Total R-Value*; and
 - (ii) has metal sheet roofing fixed to metal purlins, metal rafters or metal battens; and
 - (iii) does not have a ceiling lining or has a ceiling lining fixed directly to those metal purlins, metal rafters or metal battens (see Specification J1.3 Figure 2(c) and (f)), must have a thermal break, consisting of a material with an *R-Value* of not less than R0.2, installed between the metal sheet roofing and its supporting metal purlins, metal rafters or metal battens.

BASIX requirements can be found in VIPAC report 20C-10-0128-TRP-461887-3 - BASIX and BASIX Certificate No. 323344M_04, 323058M_04, 323089M_04 & 323130M_05.

1.1.3 J1.4 Roof Lights

There are no roof lights in this development hence Section J1.4 is not applicable.

1.1.4 J1.5 Walls

BASIX requirements can be found in VIPAC report 20C-10-0128-TRP-461887-3 - BASIX and BASIX Certificate No. 323344M_04, 323058M_04, 323089M_04 & 323130M_05.

1.1.5 J1.6 Floors

BASIX requirements can be found in VIPAC report 20C-10-0128-TRP-461887-3 - BASIX and BASIX Certificate No. 323344M_04, 323058M_04, 323089M_04 & 323130M_05.

1.2 PART J2: EXTERNAL GLAZING

1.2.1 J2.1 Application of Part

BASIX requirements can be found in VIPAC report 20C-10-0128-TRP-461887-3 - BASIX and BASIX Certificate No. 323344M_04, 323058M_04, 323089M_04 & 323130M_05.

1.3 PART J3: BUILDING SEALING

1.3.1 J3.1 Application of Part

The *Deemed-to-Satisfy Provisions* of this Part apply to elements forming the *envelope* of a Class 2 to 9 building, other than:

- (a) a building in *climate zones* 1, 2, 3 and 5 where the only means of *air-conditioning* is by using an evaporative cooler; or
- (b) a permanent building opening, in a space where a gas appliance is located, that is necessary for the safe operation of a gas appliance; or
- (c) a Class 6, 7, 8 and 9b building that does not have a *conditioned space*; or
- (d) a building or space where the mechanical ventilation *required* by Part F4 provides sufficient pressurisation to prevent infiltration; or
- (e) an atrium or solarium that is not a *conditioned space* and is separated from the remainder of the building by an *envelope*.

BASIX requirements can be found in VIPAC report 20C-10-0128-TRP-461887-3 - BASIX and BASIX Certificate No. 323344M_04, 323058M_04, 323089M_04 & 323130M_05.

1.3.2 J3.2 Chimneys and Flues

There is no chimney or flue in this development hence J3.2 is not applicable.

1.3.3 J3.3 Roof lights

There are no roof lights in this development hence Section J3.3 is not applicable.

1.3.4 J3.4 Windows and Doors

- (a) A seal to restrict air infiltration must be fitted to each edge of a door, openable *window* or the like forming part of:
 - (i) the *envelope* of a *conditioned space*; or
 - (ii) the external fabric of a *habitable room* or public area in *climate zones* 4, 5, 6, 7 and 8.
- (b) The requirements of (a) do not apply to:
 - (i) a *window* complying with AS 2047; or
 - (ii) a fire door or smoke door; or
 - (iii) a roller shutter door, roller shutter grille or other security door or device installed only for out-of-hours security.
- (c) A seal *required* by (a):
 - (i) for the bottom edge of an external swing door, must be a draft protection device; and
 - (ii) for the other edges of an external door or the edges of an openable *window* or other

such opening, may be a foam or rubber compression strip, fibrous seal or the like.

- (d) An entrance to a building, if leading to a *conditioned space* must have an airlock, *self-closing* door, revolving door or the like, other than
 - (i) where the *conditioned space* has a *floor area* of not more than 50 m²; or
 - (ii) where a cafe, restaurant, open front shop or the like has
 - (A) a 3 m deep un-conditioned zone between the main entrance, including an open front, and the *conditioned space*; and
 - (B) at all other entrances to the cafe, restaurant, open front shop or the like, *self-closing* doors.

BASIX requirements can be found in VIPAC report 20C-10-0128-TRP-461887-3 - BASIX and BASIX Certificate No. 323344M_04, 323058M_04, 323089M_04 & 323130M_05.

1.3.5 J3.5 Exhaust Fans

A miscellaneous exhaust fan, such as a bathroom or domestic kitchen exhaust fan, must be fitted with a sealing device such as a self-closing damper, filter or the like when serving

- a) a *conditioned space*; or
- b) a *habitable room* in *climate zones* 4, 6, 7 and 8.

BASIX requirements can be found in VIPAC report 20C-10-0128-TRP-461887-3 - BASIX and BASIX Certificate No. 323344M_04, 323058M_04, 323089M_04 & 323130M_05.

1.3.6 J3.6 Construction of Roofs, Walls and Floors

- (a) Roofs, ceilings, walls, floors and any opening such as a *window* frame, door frame, *roof light* frame or the like must be constructed to minimise air leakage in accordance with
 - (b) when forming part of
 - (i) the *envelope*; or
 - (ii) the external *fabric* of a *habitable room* or a public area in *climate zones* 4, 6, 7 and 8.
- (b) Construction *required* by (a) must be
 - (i) enclosed by internal lining systems that are close fitting at ceiling, wall and floor junctions; or
 - (ii) sealed by caulking, skirting, architraves, cornices or the like.
- (c) The requirements of (a) do not apply to openings, grilles and the like *required* for smoke hazard management.

The proposed development will comply. The walls and ceilings will be constructed to comply with Fire Rating regulations and also the acoustic requirements of the BCA. This will result in effective sealing of the external fabric.

Reducing air leakage can significantly cut heating and cooling loads by reducing escape of conditioned air. In addition, it can increase indoor environmental quality by reducing drafts, noise and moisture and keeping pollutants out.

1.3.7 J3.7 Evaporative Coolers

There are no evaporative coolers in this development hence Section J3.7 is not applicable.

1.4 PART J4

This part has deliberately been left blank

1.5 PART J5: AIR CONDITIONING AND VENTILATION SYSTEMS

1.5.1 J5.2 Air-Conditioning and Ventilation Systems

- (a) An *air-conditioning* unit or system must
- (i) be capable of being deactivated when the *sole-occupancy unit*, building or part of the building served is not occupied; and
 - (ii) where the *air-conditioning* unit or system has motorised outside air and return dampers, close the dampers when the *air-conditioning* unit or system is deactivated; and
 - (iii) when serving a *sole-occupancy unit* of a Class 3 building, not operate when any external door including a door opening to a balcony, patio, courtyard or the like is open for more than 1 minute; and
 - (iv) have any supply and return ductwork sealed and insulated in accordance with Specification J5.2; and
 - (v) when serving more than one *sole-occupancy unit*, *air-conditioning* zone or area with different heating and cooling needs
 - (A) thermostatically control the temperature of each *sole-occupancy unit*, zone or area; and
 - (B) not control the temperature by mixing actively heated air and actively cooled air; and
 - (C) limit reheating to not more than
 - (aa) for a fixed supply air rate, a 7.5 K rise in temperature; and
 - (bb) for a variable supply air rate, a 7.5 K rise in temperature at the nominal supply air rate but increased or decreased at the same rate that the supply air rate is respectively increased or decreased; and
 - (vi) other than where a packaged *air-conditioning* unit is used, have a variable speed fan when its supply air quantity is varied; and
 - (vii) where the *air-conditioning* system provides the *required* mechanical ventilation, have

- an *outdoor air economy cycle*?
- (A) in *climate zone 2* and 3, when the *air-conditioning* unit capacity is over 50 kW_r; and
 - (B) in *climate zones 4, 5, 6, 7* and 8 when the *air-conditioning* unit capacity is over 35 kW_r; and
- (viii) in a Class 3 building, be capable of controlling the temperature of a *sole-occupancy unit* at a different temperature during sleeping periods than during other periods; and
- (ix) when the air flow rate is greater than 1000 L/s, be designed so that the total *fan power* of the fans in the system is in accordance with Table J5.2, except the following need not comply with this requirement:
- (A) The power for an energy reclaiming system that preconditions outdoor air.
 - (B) The power for process related components such as high efficiency particulate air filters.
 - (C) The power for miscellaneous exhaust systems complying with J5.5.
- (b) A system that provides mechanical ventilation to other than a *sole-occupancy unit* in a Class 2 building or a Class 4 part of a building, either as part of an *air-conditioning* system or as a separate ventilation system, must?
- (i) be capable of being deactivated when the building or part of the building served by that system is not occupied; and
 - (ii) when serving a *conditioned space*?
 - (A) not provide mechanical ventilation in excess of the minimum quantity *required* by Part F4 for a mechanical ventilation system, where relevant, by more than 20% other than where there is?
 - (aa) additional unconditioned outside air supplied to provide free cooling or to balance process exhaust such as from a *health-care building* or laboratory; or
 - (bb) additional exhaust ventilation needed to balance the *required* mechanical ventilation; or
 - (cc) an energy reclaiming system that preconditions outside air; and
 - (B) in other than *climate zone 2*, where the number of square metres per person is 1 or less as specified in D1.13 and the air flow rate is more than 1000 L/s, have?
 - (aa) an energy reclaiming system that preconditions outside air; or
 - (bb) the ability to automatically modulate the mechanical ventilation *required* by Part F4 in proportion to the number of occupants; and
 - (iii) when the mechanical ventilation is provided by means other than an *air-conditioning* system and the air flow rate is more than 1000 L/s?
 - (A) have a *fan power* to air flow rate ratio of 0.5 W/(L/s) without filters or 0.75 W/(L/s) with filters for a general mechanical ventilation system; and

- (B) for *carpark* exhaust, when serving over 40 vehicles
 - (aa) be controlled by an atmospheric contaminant monitoring system in accordance with AS 1668.2; and
 - (bb) maintain an average minimum air-change rate of 0.5 air changes per hour other than when the *carpark* is not occupied for a period of more than 2 hours.
- (c) The requirements of (a) and (b) must not inhibit
 - (i) the smoke hazard management operation of *air-conditioning* and mechanical ventilation systems; and
 - (ii) essential ventilation such as for a garbage room, lift motor room, gas meter enclosure or gas regulator enclosure or the like.
- (d) The provisions of (b)(iii) do not apply to the following:
 - (i) The power for an energy reclaiming system that preconditions outside air.
 - (ii) The power for process related components such as high efficiency particulate air filters.
 - (iii) The power for a miscellaneous exhaust system complying with J5.5.

BASIX requirements can be found in VIPAC report 20C-10-0128-TRP-461887-3 - BASIX and BASIX Certificate No. 323344M_04, 323058M_04, 323089M_04 & 323130M_05.

1.5.2 J5.3 Time Switch

- (a) A time switch in accordance with Specification J6 must be provided to control each of the following:
 - (i) An *air-conditioning* system of more than 10 kW_r.
 - (ii) A ventilation system with an air flow rate of more than 1000 L/s.
 - (iii) A heating system of more than 10 kW_{heating}.
- (b) The requirements of (a) do not apply to
 - (i) an *air-conditioning* system or ventilation system that serves only one *sole-occupancy unit* of
 - (A) a Class 2 or 3 building; or
 - (B) a Class 4 part of a building; or
 - (C) a Class 9c *aged care building*; or
 - (ii) a building where *air-conditioning* or ventilation is needed for 24 hour occupancy such as a manufacturing process or emergency services.

BASIX requirements can be found in VIPAC report 20C-10-0128-TRP-461887-3 - BASIX and BASIX Certificate No. 323344M_04, 323058M_04, 323089M_04 & 323130M_05.

1.5.3 J5.4 Heating and Cooling systems

- (a) Systems that provide heating or cooling for *air-conditioning* systems must
 - (i) have any *piping*, vessels, heat exchangers or tanks containing heated or chilled fluid, other than those with insulation levels covered by Minimum Energy Performance Standards (MEPS), insulated in accordance with Specification J5.4; and
 - (ii) where water is circulated by pumping at greater than 2 L/s
 - (A) be designed so that the total of the *pump power* to the pump is in accordance with Table J5.4a; and
 - (B) have the pump capable of varying its speed in response to varying load when it is rated at more than 3 kW of *pump power*, except where the pump is needed to run at full speed for safe or efficient operation; and
 - (iii) if the system contains more than one water heater used for heating a building, chiller or coil, be capable of stopping the flow of water to those not operating.
- (b) A heater
 - (i) for heating a space via water, such as a boiler, that is part of an *air-conditioning* system, must
 - (A) achieve a thermal efficiency complying with Table J5.4b when tested in accordance with BS 7190; and
 - (B) use reticulated gas where it is available at the allotment boundary; and
 - (ii) for heating a space other than via water, must be
 - (A) a solar heater; or
 - (B) a gas heater; or
 - (C) an oil heater if reticulated gas is not available at the allotment boundary; or
 - (D) a heat pump heater; or
 - (E) a solid-fuel burning heater; or
 - (F) a heater using reclaimed heat from another process such as reject heat from refrigeration plant; or
 - (G) a combination of 2 or more of (A) to (F); and
 - (iii) that is a fixed space heating appliance installed outdoors, must be controlled to automatically turn off when not needed by an outdoor air temperature sensor, timer, motion detector, or the like.
- (c) Package *air-conditioning* equipment with a capacity of not less than 65 kW_r, including a split unit and a heat pump, must have an energy efficiency ratio complying with Table J5.4c when tested in accordance with AS/NZS 3823.1.2 at test condition T1.
- (d) A refrigerant chiller up to 350 kW_r capacity that is part of an *air-conditioning* system, must have an energy efficiency ratio complying with Table J5.4d when determined in accordance with ARI 550/590.
- (e) The fan motor of an air cooled condenser that is part of an *air-conditioning* system, other

than one that is part of package *air-conditioning* equipment in (c) or that is part of a Liquid Chilling Package, using the vapour compression cycle in (d), must not use more than 42 W of *fan power*, for each kW of heat rejected from the refrigerant when determined in accordance with ARI 460.

- (f) The fan of a cooling tower that is part of an *air-conditioning* system must not use more than
 - (i) if a propeller or axial fan, 310 W of *fan power* for each L/s of cooling water circulated; or
 - (ii) if a centrifugal fan, 590 W of *fan power* for each L/s of cooling water circulated.
- (g) The fan of a closed circuit cooler that is part of an *air-conditioning* system must not use more than
 - (i) if a propeller or axial fan, 500 W of *fan power* for each L/s of cooled fluid circulated; and
 - (ii) if a centrifugal fan, 670 W of *fan power* for each L/s of cooled fluid circulated.
- (h) The fan of an evaporative condenser that is part of an *air-conditioning* system must not use more than
 - (i) if a propeller or axial fan, 18 W of *fan power* for each kW of heat rejected; and
 - (ii) if a centrifugal fan, 22 W of *fan power* for each kW of heat rejected.
- (i) The spray water pump of a closed circuit cooler or evaporative condenser that is part of an *air-conditioning* system must not use more than 150 W of *pump power* for each L/s of spray water circulated.

BASIX requirements can be found in VIPAC report 20C-10-0128-TRP-461887-3 - BASIX and BASIX Certificate No. 323344M_04, 323058M_04, 323089M_04 & 323130M_05.

1.5.4 J5.5 Miscellaneous Exhaust System

- (a) A miscellaneous exhaust system with an air flow rate of more than 1000 L/s, that is associated with equipment having a variable demand such as a stove in a commercial kitchen or a chemical bath in a factory, must
 - (i) have the means for the operator to
 - (A) reduce the energy used, such as by a variable speed fan, and
 - (B) stop the motor when the system is not needed; and
 - (ii) be designed to minimise the exhausting of conditioned air.
- (b) The requirements of (a) do not apply
 - (i) within a *sole-occupancy unit* of a Class 2 or 3 building, Class 4 part of a building or Class 9c *aged care building*; or
 - (ii) where additional exhaust ventilation is needed to balance the *required* outside air for ventilation; or
 - (iii) where air flow must be maintained for safe operation.

BASIX requirements can be found in VIPAC report 20C-10-0128-TRP-461887-3 - BASIX and BASIX Certificate No. 323344M_04, 323058M_04, 323089M_04 & 323130M_05.

1.6 PART 6: ARTIFICIAL LIGHTING AND POWER

1.6.1 J6.2 Interior Artificial Lighting

- (a) In a *sole-occupancy unit* of a Class 2 building or a Class 4 part of a building
 - (i) the *lamp power density* or *illumination power density* of artificial lighting must not exceed
 - (A) within the building, 5 W/m²; and
 - (B) on a verandah or balcony of the building 4 W/m²; and
 - (ii) the *illumination power density* in (i) may be increased by dividing it by the *illumination power density* adjustment factor for a control device in Table J6.2b; and
 - (iii) when designing the *lamp power density* or *illumination power density*, the power of the proposed installation must be used rather than nominal allowances for exposed batten holders or luminaires; and
 - (iv) where lamps are used that have a transformer or ballast, the transformer or ballast must be of the electronic type; and
 - (v) halogen lamps must be separately switched from fluorescent lamps.

BASIX requirements for DA1 North can be found in VIPAC report 20C-10-0110-TRP-461804-2 and BASIX Certificate No's 320670M & 320759M for Building A, 318724M for Building B and 320290M for Building C.

1.6.2 J6.3 Interior Artificial Lighting and Power Control

- (a) Artificial lighting of a room or space must be individually operated by a switch or other control device.
- (b) An occupant activated device, such as a room security device, a motion detector in accordance with Specification J6, or the like, must be provided in the *sole-occupancy unit* of a Class 3 building, other than where providing accommodation for people with a disability or the aged, to cut power to the artificial lighting, air-conditioner, local exhaust fans and bathroom heater when the *sole-occupancy unit* is unoccupied.
- (c) An artificial lighting switch or other control device in (a) must
 - (i) if an artificial lighting switch, be located in a visible position
 - (A) in the room or space being switched; or
 - (B) in an adjacent room or space from where the lighting being switched is visible; and
 - (ii) for other than a single functional space such as an auditorium, theatre, *swimming pool*, sporting stadium or warehouse
 - (A) not operate lighting for an area of more than 250 m² if in a Class 5 building or a Class 8

- laboratory; or
- (B) not operate lighting for an area of more than
- (aa) 250 m² for a space of not more than 2000 m²; or
- (bb) 1000 m² for a space of more than 2000 m²,
If in a Class 3, 6, 7, 8 (other than a laboratory) or 9 building.
- (d) 95% of the lighting in a building or *storey* of a building, other than a Class 2 or 3 building or a Class 4 part, of more than 250 m² must be controlled by
- (i) a time switch in accordance with Specification J6; or
- (ii) an occupant sensing device such as
- (A) a security key card reader; or
- (B) a motion detector in accordance with Specification J6.
- (e) Artificial lighting in a natural lighting zone adjacent to windows in a *storey* of a Class 5, 6 or 8 building, of more than 250 m² must be separately controlled from artificial lighting not in a natural lighting zone except where
- (i) the room containing the natural lighting zone is less than 20 m²; or
- (ii) the room's natural lighting zone contains less than 4 luminaires; or
- (iii) the luminaires in the natural lighting zone are not more than 70% of the luminaires in the room.
- (f) The requirements of (a), (b), (c), (d) and (e) do not apply to the following:
- (i) Emergency lighting in accordance with Part E4.
- (ii) Where artificial lighting is needed for 24-hour occupancy such as for a manufacturing process, parts of a hospital, an airport control tower or within a *detention centre*.
- (g) The requirements of (d) do not apply to the following:
- (i) Artificial lighting in a space where the sudden loss of artificial lighting would cause an unsafe situation such as in a *patient care area* in a Class 9a building or in a Class 9c *aged care building*.
- (ii) A heater where the heater also emits light, such as in bathrooms.

BASIX requirements can be found in VIPAC report 20C-10-0128-TRP-461887-3 - BASIX and BASIX Certificate No. 323344M_04, 323058M_04, 323089M_04 & 323130M_05.

1.6.3 J6.4 Interior Decorative and Display Lighting

- (a) Interior decorative and display lighting, such as for a foyer mural or art display, must be controlled
- (i) separately from other artificial lighting; and
- (ii) by a manual switch for each area other than when the operating times of the displays are the same in a number of areas such as in a museum, art gallery or the like, in which case
- (iii) by a time switch in accordance with Specification J6 where the display lighting exceeds

- (iii) by a time switch in accordance with Specification J6 where the display lighting exceeds 1 kW.
- (b) Window display lighting must be controlled separately from other display lighting.

All interior decorative and display lighting will comply with J6.4 of the BCA.

1.6.4 J6.5 Artificial Lighting Around the Perimeter of a Building

- (a) Artificial lighting around the perimeter of a building, must
 - (i) be controlled by
 - (A) a daylight sensor; or
 - (B) a time switch that is capable of switching on and off electric power to the system at variable pre-programmed times and on variable pre-programmed days; and
 - (ii) when the total perimeter lighting load exceeds 100 W
 - (A) have an average *light source efficacy* of not less than 60 Lumens/W; or
 - (B) be controlled by a motion detector in accordance with Specification J6; and
 - (iii) when used for decorative purposes, such as facade lighting or signage lighting, have a separate time switch in accordance with Specification J6.
- (b) The requirements of (a)(ii) do not apply to the following:
 - (i) Emergency lighting in accordance with Part E4.
 - (ii) Lighting around a *detention centre*.

All artificial lighting around the perimeter will comply with J6.5 of the BCA.

1.6.5 J6.6 Boiling Water and Chilled Water Storage Units

Power supply to a boiling water or chilled water storage unit must be controlled by a time switch in accordance with Specification J6.

All power supply installation for a boiler and chilled water storage units will comply with J6.6 of the BCA.

1.7 PART J7: HOT WATER SUPPLY

1.7.1 J7.2 Hot Water Supply

A hot water supply system for food preparation and sanitary purposes, other than a solar hot water supply system in *climate zones* 1, 2 and 3, must be designed and installed in accordance with Section 8 of AS/NZS 3500.4.

BASIX requirements can be found in VIPAC report 20C-10-0128-TRP-461887-3 - BASIX and BASIX Certificate No. 323344M_04, 323058M_04, 323089M_04 & 323130M_05.

Gas should be considered for the hot water supply system, as the use of gas as the energy source for hot water system means lower greenhouse gas emissions, efficiency and lower running costs. Using a natural gas hot water system generates about one third of the greenhouse gas emissions of a conventional electric hot water heater¹.

1.7.2 J7.3 Swimming Pool Heating and Pumping

BASIX requirements can be found in VIPAC report 20C-10-0128-TRP-461887-3 - BASIX and BASIX Certificate No. 323344M_04, 323058M_04, 323089M_04 & 323130M_05.

1.7.3 J7.4 Spa Pool Heating and Pumping

BASIX requirements can be found in VIPAC report 20C-10-0128-TRP-461887-3 - BASIX and BASIX Certificate No. 323344M_04, 323058M_04, 323089M_04 & 323130M_05.

1.8 PART J8: ACCESS FOR MAINTENANCE

1.8.1 J8.1 Application of Part

The *Deemed-to-Satisfy Provisions* of this Part do not apply within a *sole-occupancy unit* of a Class 2 building or a Class 4 part of a building.

1.8.2 NSWJ8.2 Access for Maintenance

Access for maintenance must be provided to²

- (a) adjustable or motorised shading devices; and
- (b) time switches and motion detectors; and
- (c) room temperature thermostats; and
- (d) plant thermostats such as on boilers or refrigeration units; and
- (e) motorised air dampers and control valves; and
- (f) reflectors, lenses and diffusers of light fittings; and
- (g) heat transfer equipment; and
- (h) plant that receives a concession under JV3(b) for the use of energy obtained from²
 - (i) a source that is renewable on-site such as solar, geothermal or wind; or
 - (ii) another process as reclaimed energy.

The developer intends to comply. Necessary measures will be taken to ensure access for maintenance to all services and their components. It is envisaged at this stage that

¹ Australian Gas Association, Research Paper No. 16

through regular maintenance, an ongoing evaluation of systems can be done to ensure that the systems are delivering maximum efficiency.

1.9 J8.3 FACILITIES FOR ENERGY MONITORING

- (a) A building or *sole-occupancy unit* with a *floor area* of more than 500 m² must have the facility to record the consumption of gas and electricity.
- (b) A building with a *floor area* of more than 2,500 m² must have the facility to record individually the energy consumption of
 - (i) *air-conditioning* plant including, where appropriate, heating plant, cooling plant and air handling fans; and
 - (ii) artificial lighting; and
 - (iii) appliance power; and
 - (iv) central hot water supply; and
 - (v) internal transport devices including lifts, escalators and travelators where there is more than one serving the building; and
 - (vi) other ancillary plant.
- (c) The provisions of (b) do not apply to a Class 2 building with a *floor area* of more than 2,500 m² where the total area of the common areas is less than 500 m².

If the buildings total floor area exceeds 500m², the facility must be able to record the consumption of gas and electricity as per J8.3 of the BCA.

2. COMMERCIAL & RETAIL BCA SECTION J ASSESSMENT

2.1 PART J1: BUILDING FABRIC

The *Deemed-to-Satisfy Provisions* of this Part apply to building elements forming the *envelope* of a Class 2 to 9 building other than

- (a) a Class 7, 8 or 9b building that does not have a *conditioned space*; or
- (b) an atrium or solarium that is not a *conditioned space* and is separated from the remainder of the building by an

2.1.1 J1.2: Thermal Construction General

- (a) Where *required*, insulation must comply with AS/NZS 4859.1 and be installed so that it
 - (i) abuts or overlaps adjoining insulation other than at supporting members such as studs, noggings, joists, furring channels and the like where the insulation must be against the member; and
 - (ii) forms a continuous barrier with ceilings, walls, bulkheads, floors or the like that inherently contribute to the thermal barrier; and
 - (iii) does not affect the safe or effective operation of a *service* or fitting.
- (b) Where *required*, *reflective insulation* must be installed with
 - (i) the necessary airspace to achieve the *required R-Value* between a reflective side of the *reflective insulation* and a building lining or cladding; and
 - (ii) the *reflective insulation* closely fitted against any penetration, door or *window* opening; and
 - (iii) the *reflective insulation* adequately supported by framing members; and
 - (iv) each adjoining sheet of roll membrane being
 - (A) overlapped not less than 50 mm; or
 - (B) taped together.
- (c) Where *required*, bulk insulation must be installed so that
 - (i) it maintains its position and thickness, other than where it is compressed between cladding and supporting members, water pipes, electrical cabling or the like; and
 - (ii) in a ceiling, where there is no bulk insulation or *reflective insulation* in the wall beneath, it overlaps the wall by not less than 50 mm.
- (d) Roof, ceiling, wall and floor materials, and associated surfaces are deemed to have the thermal properties listed in Specification J1.2.

The external walls of all commercial & retails areas are currently not insulated. A total ***R-Value of 2.8*** for all external walls is required to satisfy the requirements for BCA compliance.

Compliance will be achieved through appropriate installation practices undertaken to ensure that insulation forms a continuous barrier with the thermal fabric of the building. Installation techniques such as using several layers of insulation with staggered joints are to be used to avoid air voids and to make sure that insulation fills out the available space.

Installation will be done in accordance with the safety and accessibility requirements around various fittings and services such as water pipes and electrical cabling etc.

2.1.2 J1.3: Roof and Ceiling Construction

- (a) A roof or ceiling that is part of the *envelope*, other than of a *sole-occupancy unit* of a Class 2 building or a Class 4 part of a building, must achieve the *Total R-Value* specified in Table J1.3a for the direction of heat flow.
- (b) For compliance with Table J1.3a, roof and ceiling construction is deemed to have the thermal properties listed in Specification J1.3.
- (c) Where, for operational or safety reasons associated with exhaust fans, flues or recessed downlights, the area of *required* ceiling insulation is reduced, the loss of insulation must be compensated for by increasing the *R-Value* of the insulation in the remainder of the ceiling in accordance with Table J1.3b.
- (d) A roof that
 - (i) is *required* to achieve a minimum *Total R-Value*; and
 - (ii) has metal sheet roofing fixed to metal purlins, metal rafters or metal battens; and
 - (iii) does not have a ceiling lining or has a ceiling lining fixed directly to those metal purlins, metal rafters or metal battens (see Specification J1.3 Figure 2(c) and (f)), must have a thermal break, consisting of a material with an *R-Value* of not less than R0.2, installed between the metal sheet roofing and its supporting metal purlins, metal rafters or metal battens.

Table 1: Table J1.3a ROOFS AND CEILINGS - MINIMUM TOTAL R-VALUE FOR EACH CLIMATE ZONE

<i>Climate zone</i>	1, 2 and 3	4, 5 and 6	7	8
Direction of heat flow	Downwards		Upwards	
Minimum <i>Total R-Value</i> for a roof or ceiling with a roof upper surface solar absorptance value of not more than 0.5	3.2	3.2	3.7	4.8
Minimum <i>Total R-Value</i> for a roof or ceiling with a roof upper surface solar absorptance value of more than 0.5 but not more than 0.6	3.7	3.2	3.7	4.8
Minimum <i>Total R-Value</i> for a roof or ceiling with a roof upper surface solar absorptance value of more than 0.6	4.2	3.2	3.7	4.8

Table 2: Table J1.3b ADJUSTMENT OF MINIMUM R-VALUE FOR LOSS OF CEILING INSULATION

Percentage of ceiling area uninsulated	Minimum <i>R-Value</i> of ceiling insulation <i>required</i> to satisfy J1.3(a)							
	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0
	Adjusted minimum <i>R-Value</i> of ceiling insulation <i>required</i> to compensate for loss of ceiling area insulation							
0.5% to less than 1.0%	2.8	3.4	4.0	4.7	5.4	6.2	6.9	
1.0% to less than 1.5%	2.9	3.6	4.4	5.2	6.1	7.0		
1.5% to less than 2.0%	3.1	3.9	4.8	5.8	6.8			
2.0% to less than 2.5%	3.3	4.2	5.3	6.5				
2.5% to less than 3.0%	3.6	4.6	5.9					
3.0% to less than 4.0%	4.2	5.7	Not Permitted					
4.0% to less than 5.0%	5.0							
5.0% or more								
Note: Where the minimum <i>R-Value</i> of ceiling insulation <i>required</i> to satisfy J1.3(a) is between the values stated, interpolation may be used to determine the adjusted minimum <i>R-Value</i> .								

Commercial Premises have exposed ceilings/roof consisted of:

- Concrete slab, roof airspace, and plasterboard/gypsum.
- The total R-value of this system calculated using the individual R-values of the outdoor air film, water proof membrane, roof construction and indoor air film is 0.57².
- Therefore an additional R2.7 roof/ceiling insulation is required to comply with BCA requirements.

2.1.3 J1.4 Roof Lights

There are no roof lights in this development hence Section J1.4 is not applicable.

² BCA Specification J1.3 Figure 2(g)

2.1.4 J1.5 Walls

- (a) Each part of an *external wall* that is part of the *envelope*, other than of a *sole-occupancy unit* of a Class 2 building or a Class 4 part of a building, must satisfy one of the options in Table J1.5a except for
 - (i) opaque non-glazed openings in *external walls* such as doors (including garage doors), vents, penetrations, shutters and the like; and
 - (ii) *glazing*; and
 - (iii) an earth retaining wall or earth-berm, in other than *climate zone* 8.
- (b) Any wall, other than an *external wall*, that is part of the *envelope* must achieve the *Total R-Value* in Table J1.5b.
- (c) A wall that
 - (i) is *required* to achieve a minimum *Total R-Value*; and
 - (ii) has lightweight external cladding such as weatherboards, fibre cement or metal sheeting fixed to a metal frame; and
 - (iii) does not have a wall lining or has a wall lining that is fixed directly to the same metal frame, must have a thermal break, consisting of a material with an *R-Value* of not less than R0.2, installed between the external cladding and the metal frame.
- (d) For compliance with Table J1.5a and Table J1.5b, wall construction is deemed to have the thermal properties listed in Specification J1.5.

Table 3: Table J1.5a OPTIONS FOR EACH PART OF AN EXTERNAL WALL THAT IS PART OF AN ENVELOPE

Climate zone	Options				
1, 2 and 3	(a)	(i)	Achieve a minimum <i>Total R-Value</i> of 3.3.		
		(ii)	The minimum <i>Total R-Value</i> in (i) is reduced		
		(A)	for a wall with a surface density of not less than 220 kg/m ² , by 0.5; and		
		(B)	for a wall that is		
		(aa)	facing the south orientation as described in Figure J2.3, by 0.5; or		
		(bb)	shaded with a projection shade angle in accordance with Figure J1.5 of		
		(AA)	15 degrees to not more than 45 degrees, by 0.5; or		
		(BB)	more than 45 degrees, by 1.0; and		
		(C)	if the outer surface solar absorptance value is not more than 0.6, by 0.5.		
	(b)	Where the only space for insulation is provided by a furring channel, top hat section, batten or the like			
		(i)	achieve a minimum <i>Total R-Value</i> of 1.4; and		

Climate zone	Options					
		(ii)	satisfy <i>glazing</i> energy index Option B of Table J2.4a.			
4, 5 and 6	(a)	(i)	Achieve a minimum <i>Total R-Value</i> of 2.8.			
		(ii)	The minimum <i>Total R-Value</i> in (i) is reduced☐			
			(A)	for a wall with a surface density of not less than 220 kg/m ² , by 0.5; and		
			(B)	for a wall that is☐		
				(aa)	facing the south orientation as described in Figure J2.3, by 0.5; or	
				(bb)	shaded with a projection shade angle in accordance with Figure J1.5 of☐	
					(AA)	30 degrees to not more than 60 degrees, by 0.5; or
					(BB)	more than 60 degrees, by 1.0.
		(b)	Where the only space for insulation is provided by a furring channel, top hat section, batten or the like☐			
			(i)	achieve a minimum <i>Total R-Value</i> of 1.4; and		
			(ii)	satisfy <i>glazing</i> energy index Option B of Table J2.4a.		
	7	(a)	Achieve a minimum <i>Total R-Value</i> of 2.8.			
(b)		Where the only space for insulation is provided by a furring channel, top hat section, batten or the like☐				
		(i)	achieve a minimum <i>Total R-Value</i> of 1.4; and			
		(ii)	satisfy <i>glazing</i> energy index Option B of Table J2.4a.			
8	(a)	Achieve a minimum <i>Total R-Value</i> of 3.8.				
	(b)	Where the wall is an earth retaining wall or earth-berm, achieve a minimum <i>Total R-Value</i> of 2.0.				

Table 4: Table J1.5b AN ENVELOPE WALL OTHER THAN AN EXTERNAL WALL MINIMUM TOTAL R-VALUE

Location		Climate zone							
		1	2	3	4	5	6	7	8
(a)	With the non- conditioned space								
	(i) enclosed, with mechanical ventilation of not more than 1.5 air changes per hour of outside air; and	1.0	1.0	Nil	Nil	1.0	1.0	1.5	2.5
	(ii) <i>glazing</i> not more than that required by Part J2.								
(b)	For other than (a)	2.3	2.3	2.3	1.8	1.8	1.8	2.8	3.8

External walls of Retail spaces and commercial premises are constituted of:

- **Precast Concrete Panel** (outdoor air film, prestressed hollow-core concrete panels, air gap (non-reflective and unventilated), plasterboard, indoor air film³) construction has a total R-value of 0.53. Therefore an **additional minimum R2.3 wall insulation is required** to comply with BCA requirements.

Thermal mass is important in decreasing temperature variations that would otherwise cause discomfort or increase auxiliary heating and cooling requirements. Thermal mass serves multiple purposes by reducing sound transmission from an adjoining space.

2.1.5 J1.6 Floors

- (a) A floor that is part of the *envelope* of a building, other than a *sole-occupancy unit* of a Class 2 building or a Class 4 part of a building, including a floor above or below a *carpark* or a plant room²
 - (i) must achieve the *Total R-Value* specified in Table J1.6; and
 - (ii) with an in-slab heating or cooling system, must be insulated around the vertical edge of its perimeter with insulation having an *R-Value* of not less than 1.0.
- (b) In *climate zones* 1 to 6, the minimum *Total R-Value required* in (a) may be reduced by R0.5 provided R0.75 is added to the *Total R-Value required* for the roof and ceiling construction.
- (c) A concrete slab-on-ground²
 - (i) with an in-slab heating or cooling system; or
 - (ii) located in *climate zone* 8, must have insulation installed around the vertical edge of its perimeter.
- (d) Insulation *required* by (c) must²
 - (i) have an *R-Value* of not less than 1.0; and
 - (ii) be water resistant; and
 - (iii) be continuous from the adjacent finished ground level²
 - (A) to a depth of not less than 300 mm; or
 - (B) for the full depth of the vertical edge of the concrete slab-on-ground.
- (e) Floor construction is deemed to have the thermal properties listed in Specification J1.6.

³ BCA Specification J1.5 (g) adjusted for 180mm

Table 5: Table J1.6 FLOORS ² MINIMUM TOTAL R-VALUE

Location		Climate zone							
		1	2	3	4	5	6	7	8
(a)	A slab on ground:								
	(i) Without an in-slab heating or cooling system	Nil	Nil	Nil	Nil	Nil	Nil	1.0	2.0
	(ii) With an in-slab heating or cooling system	1.25	1.25	1.25	1.25	1.25	1.25	1.25	2.25
(b)	A suspended floor without an in-slab heating or cooling system where the non- conditioned space is ²								
	(i) enclosed; and	1.0	1.0	Nil	Nil	1.0	1.0	1.5	2.5
	(ii) where mechanically ventilated by not more than 1.5 air changes per hour.								
(c)	A suspended floor with an in-slab heating or cooling system where the non- conditioned space is ²								
	(i) enclosed; and	1.25	1.25	1.25	1.25	1.25	1.25	1.75	2.75
	(ii) where mechanically ventilated by not more than 1.5 air changes per hour								
(d)	For other than (a), (b) or (c)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	3.5
Note: A sub-floor space with not more than 150% of the <i>required</i> sub-floor ventilation is considered enclosed.									

The **Retail areas** located on the Ground level have floor areas that are above a car park. The floor manufactured of:

- Solid concrete suspended slab.
- The total R-value of this system calculated using the individual R-values of the outdoor air film, floor construction and indoor air film is 0.30⁴.

The **Commercial spaces** located on the Level 2 have floor areas that are exposed. The floor manufactured of:

- Solid concrete suspended slab.
- The total R-value of this system calculated using the individual R-values of the outdoor air film, floor construction and indoor air film is 0.30⁵.

Therefore an **additional minimum R1.7 floor insulation** is required to comply with BCA requirements.

⁴ BCA Specification J1.6 Figure 2(c)

⁵ BCA Specification J1.6 Figure 2(c)

2.2 PART J2: EXTERNAL GLAZING

2.2.1 J2.1 Application of Part

The *Deemed-to-Satisfy Provisions* of this Part apply to elements forming the *envelope* of a building other than⁶

- (a) a *sole-occupancy unit* of a Class 2 building or a Class 4 part of a building; or
- (b) a Class 7, 8 or 9b building that does not have a *conditioned space*; or
- (c) an atrium or solarium that is not a *conditioned space* and is separated from the remainder of the building by an *envelope*.

2.2.2 Applicable Glazing Provisions

J2.4 Glazing - Method 2

- (a) The *glazing* in each *storey*, including any *mezzanine*, of a building must be assessed separately in accordance with (b) and (c) for⁷
 - (i) *glazing* in the external *fabric* facing each orientation; and
 - (ii) *glazing* in the internal *fabric* using the south orientation sector energy constants in Table J2.4b and shading multipliers in Table J2.4c and Table J2.4d.
- (b) The aggregate *air-conditioning* energy value attributable to the *glazing* must not exceed the allowance obtained by multiplying the facade area that is exposed to the *conditioned space* for the orientation by the energy index in Table J2.4a.

For these retail & commercial premises, Section J2.4 is used.

2.2.3 J2.4 Glazing

It is assumed that all commercial offices glazing on Levels 2 to 4 will be installed with Clear 6mm Single Glazed glass. The NFRC⁶ U-value is 6.3 and the SHGC is 0.72.

It is assumed that all lobbies and retail space glazing on Ground level will be installed with 6mm Eclipse Advantage Evergreen. The NFRC⁷ U-value of 4.6 and SHGC of 0.33.

It is assumed that there are no internal glazing areas.

⁶ 2009 WERS Products Directory ☐ G James Type 425 (fixed)

⁷ 2009 WERS Products Directory ☐ G James Type 425 (fixed)

2.2.3.1 Glazing Calculator

BCA VOLUME ONE GLAZING CALCULATOR (first issued with BCA 2010) HELP

Building name/description: **Railway St, Chatswood Commercial Lobby** Application: **shop display** Climate zone: **5**

Storey: **Ground**

Facade areas:

	N	NE	E	SE	S	SW	W	NW	internal
Option A					45m²	27.5m²		36m²	
Option B								n/a	

Glazing area (A): 39m² 20m² 24m²

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 U-Value (AFRC)	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	Retail	NW		4.00	6.00		4.6	0.33	5.000	4.000	1.25	0.00	0.00	0.28	24.00	100% of 22%
2	Retail	S		4.00	9.75		4.6	0.33	3.200	4.000	0.80	0.00	0.77	0.68	39.00	100% of 100%
3	Retail	SW		4.00	5.00		4.6	0.33	3.000	4.000	0.75	0.00	0.68	0.59	20.00	100% of 76%
6																
7																
8																
9																
10																

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BCA VOLUME ONE GLAZING CALCULATOR (first issued with BCA 2010) HELP

Building name/description: **Railway St, Chatswood Commercial Lobby** Application: **other** Climate zone: **5**

Storey: **Ground**

Facade areas:

	N	NE	E	SE	S	SW	W	NW	internal
Option A							36m²	4m²	
Option B								n/a	

Glazing area (A): 30.4m² 3.8m²

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 U-Value (AFRC)	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	Lobby	NW		3.80	1.00		4.6	0.33	4.000	3.800	1.05	0.00	0.11	0.33	3.80	100% of 54%
2	Lobby	W		3.80	8.00		4.6	0.33	5.500	3.800	1.45	0.00	0.11	0.33	30.40	100% of 100%
4																
5																
6																
7																
8																
9																
10																

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BCA VOLUME ONE GLAZING CALCULATOR (first issued with BCA 2010) HELP

Building name/description: **Railway St, Chatswood Residential Lobby** Application: **other** Climate zone: **5**

Storey: **Ground**

Facade areas:

	N	NE	E	SE	S	SW	W	NW	internal
Option A	48m²						24m²	20.8m²	
Option B									n/a

Glazing area (A): 42.6m² 20.3m² 19m²

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 U-Value (AFRC)	SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (Sh)	Cooling (Sc)	Area used (m²)	Element share of % of allowance used
1	Lobby	NW		3.80	5.00		4.6	0.33	14.000	3.800	3.68	0.00	0.00	0.21	19.00	100% of 26%
2	Lobby	W		3.80	5.35		4.6	0.33	5.500	3.800	1.45	0.00	0.11	0.33	20.33	100% of 100%
3	Lobby	N		3.80	6.00		4.6	0.33	13.000	3.800	3.42	0.00	0.00	0.19	22.80	
4	Lobby	N		3.80	3.20		4.6	0.33	10.000	3.800	2.63	0.00	0.00	0.19	12.16	
5	Lobby	N		3.80	2.00		4.6	0.33	10.500	3.800	2.76	0.00	0.00	0.19	7.60	
6																
7																
8																
9																
10																

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BCA VOLUME ONE GLAZING CALCULATOR (first issued with BCA 2010) HELP

Building name/description: **Railway St, Chatswood Commercial L2** Application: **other** Climate zone: **5**

Storey: **2**

Facade areas:

	N	NE	E	SE	S	SW	W	NW	internal
Option A	110m²				90m²	28m²	137m²		
Option B									n/a

Glazing area (A): 76m² 61.3m² 20m² 100m²

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 U-Value (AFRC)	SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (Sh)	Cooling (Sc)	Area used (m²)	Element share of % of allowance used
1	Commercial	N		1.90	30.40		2.7	0.26	0.300	1.900	0.16	0.00	0.97	0.85	57.76	85% of 90%
2	Commercial	S		1.90	24.50		2.7	0.26	0.300	1.900	0.16	0.00	0.95	0.92	46.55	76% of 67%
3	Commercial	SW		1.90	8.00		2.7	0.26	0.300	1.900	0.16	0.00	0.94	0.91	15.20	78% of 76%
4	Commercial	W		1.90	40.00		2.7	0.26	0.300	1.900	0.16	0.00	0.94	0.90	76.00	80% of 99%
5	Commercial	N		0.60	30.40		2.7	0.26	0.300	0.600	0.50	0.00	0.76	0.54	18.24	15% of 90%
6	Commercial	S		0.60	24.50		2.7	0.26	0.300	0.600	0.50	0.00	0.84	0.78	14.70	24% of 67%
7	Commercial	SW		0.60	8.00		2.7	0.26	0.300	0.600	0.50	0.00	0.79	0.70	4.80	22% of 76%
8	Commercial	W		0.60	40.00		2.7	0.26	0.300	0.600	0.50	0.00	0.73	0.66	24.00	20% of 99%
9																
10																

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BCA VOLUME ONE GLAZING CALCULATOR (first issued with BCA 2010) HELP

Building name/description: **Railway St, Chatswood Commercial L3 (same as L4)** Application: **other** Climate zone: **5**

Storey: **3**

Facade areas:

	N	NE	E	SE	S	SW	W	NW	Internal
Option A	110m²				90m²	28m²	137m²		
Option B									n/a

Glazing area (A): 76m² 61.3m² 20m² 100m²

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 U-Value (AFRC)	SHGC (AFRC)	P (m)	H (m)	P/H	G (m)	Heating (SH)	Cooling (SC)	Area used (m²)	Element share of % of allowance used
1	Commercial	N		1.90	30.40		2.7	0.26	0.300	1.900	0.16	0.00	0.97	0.85	57.76	85% of 90%
2	Commercial	S		1.90	24.50		2.7	0.26	0.300	1.900	0.16	0.00	0.95	0.92	46.55	76% of 67%
3	Commercial	SW		1.90	8.00		2.7	0.26	0.300	1.900	0.16	0.00	0.94	0.91	15.20	78% of 76%
4	Commercial	W		1.90	40.00		2.7	0.26	0.300	1.900	0.16	0.00	0.94	0.90	76.00	80% of 99%
5	Commercial	N		0.60	30.40		2.7	0.26	0.300	0.600	0.50	0.00	0.76	0.54	18.24	15% of 90%
6	Commercial	S		0.60	24.50		2.7	0.26	0.300	0.600	0.50	0.00	0.84	0.78	14.70	24% of 67%
7	Commercial	SW		0.60	8.00		2.7	0.26	0.300	0.600	0.50	0.00	0.79	0.70	4.80	22% of 76%
8	Commercial	W		0.60	40.00		2.7	0.26	0.300	0.600	0.50	0.00	0.73	0.66	24.00	20% of 99%
9																
10																

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Table 6 below lists the required additional treatments for each room. Using the methods above, the glazing areas in the proposed development comply with BCA requirements.

Table 6: Additional treatments.

Location	Level	Glazing Treatment
Retail Spaces	Ground	1. None.
Commercial Lobby	Ground	1. None.
Residential Lobby	Ground	1. None.
Commercial Premises	2	1. All glazing to use performance glass with U-value 2.7 & SHGC 0.26.
Commercial Premises	3 to 4	1. All glazing to use performance glass with U-value 2.7 & SHGC 0.26.

Glazing Type Example⁸:

- Total (glazing + frame) U-value of 2.7 and SHGC of 0.26 = G James Type 651-500 Series Aluminium Curtain Wall ☐ Structural ☐ Double Glazed 6LE54iGy/12/6 (GJA-045-38).
- Total (glazing + frame) U-value of 4.6 and SHGC of 0.33 = G James Type 425 (fixed) 6mm Eclipse Advantage Evergreen (GJA-028-22).

⁸ Glazing outlined below are WERS certified

<http://werssearch.freehostia.com/tables/werstablecommercial.php?Manufacturer=GJA>

2.2.4 J2.5 Shading

Where shading is *required* to comply with J2.4, it must

- (a) be provided by an external permanent projection, such as a verandah, balcony, fixed canopy, eaves or shading hood, which
 - (i) extends horizontally on both sides of the *glazing* for the same projection distance P in Figure J2.4; or
 - (ii) provides the equivalent shading to (i) with a reveal or the like; or
- (b) be provided by an external shading device, such as a shutter, blind, vertical or horizontal building screen with blades, battens or slats, which
 - (i) is capable of restricting at least 80% of summer solar radiation; and
 - (ii) if adjustable, is operated automatically in response to the level of solar radiation.

All shading devices must comply with Section J2.5.

2.3 PART J3: BUILDING SEALING

2.3.1 J3.1 Application of Part

The *Deemed-to-Satisfy Provisions* of this Part apply to elements forming the *envelope* of a Class 2 to 9 building, other than

- (a) a building in *climate zones* 1, 2, 3 and 5 where the only means of *air-conditioning* is by using an evaporative cooler; or
- (b) a permanent building opening, in a space where a gas appliance is located, that is necessary for the safe operation of a gas appliance; or
- (c) a Class 6, 7, 8 and 9b building that does not have a *conditioned space*; or
- (d) a building or space where the mechanical ventilation *required* by Part F4 provides sufficient pressurisation to prevent infiltration; or
- (e) an atrium or solarium that is not a *conditioned space* and is separated from the remainder of the building by an *envelope*.

2.3.2 J3.2 Chimneys and Flues

The chimney or flue of an open solid-fuel burning appliance must be provided with a damper or flap that can be closed to seal the chimney or flue.

There is no chimney or flue in this development hence J3.2 is not applicable.

2.3.3 J3.3 Roof Lights

- (a) A *roof light* must be sealed, or capable of being sealed when serving
 - (i) a *conditioned space*; or
 - (ii) a *habitable room* in *climate zones* 4, 6, 7 and 8.

- (b) A *roof light* required by (a) must be constructed with
- (i) an imperforate ceiling diffuser or the like installed at the ceiling or internal lining level; or
 - (ii) a weatherproof seal if it is a *roof window*; or
 - (iii) a shutter system readily operated either manually, mechanically or electronically by the occupant.

There are no roof lights in this development hence Section J3.3 is not applicable.

2.3.4 J3.4 Windows and Doors

- (a) A seal to restrict air infiltration must be fitted to each edge of a door, openable *window* or the like forming part of
- (i) the *envelope* of a *conditioned space*; or
 - (ii) the external fabric of a *habitable room* or public area in *climate zones* 4, 5, 6, 7 and 8.
- (b) The requirements of (a) do not apply to
- (i) a *window* complying with AS 2047; or
 - (ii) a fire door or smoke door; or
 - (iii) a roller shutter door, roller shutter grille or other security door or device installed only for out-of-hours security.
- (c) A seal required by (a)
- (i) for the bottom edge of an external swing door, must be a draft protection device; and
 - (ii) for the other edges of an external door or the edges of an openable *window* or other such opening, may be a foam or rubber compression strip, fibrous seal or the like.
- (d) An entrance to a building, if leading to a *conditioned space* must have an airlock, *self-closing* door, revolving door or the like, other than
- (i) where the *conditioned space* has a *floor area* of not more than 50 m²; or
 - (ii) where a cafe, restaurant, open front shop or the like has
 - (A) a 3 m deep un-conditioned zone between the main entrance, including an open front, and the *conditioned space*; and
 - (B) at all other entrances to the cafe, restaurant, open front shop or the like, *self-closing* doors.

For all commercial areas, the developer intends on installing windows complying with AS 2047. Therefore the offices comply with BCA requirements.

2.3.5 J3.5 Exhaust Fans

A miscellaneous exhaust fan, such as a bathroom or domestic kitchen exhaust fan, must be fitted with a sealing device such as a self-closing damper, filter or the like when serving

- c) a *conditioned space*; or
- d) a *habitable room* in *climate zones* 4, 6, 7 and 8.

The developer intends that all bathrooms and kitchens (if any) in all commercial areas will be fitted with a sealing device where applicable hence Section J3.5 will comply with BCA requirements.

2.3.6 J3.6 Construction of Roofs, Walls and Floors

- (a) Roofs, ceilings, walls, floors and any opening such as a *window* frame, door frame, *roof light* frame or the like must be constructed to minimise air leakage in accordance with
 - (b) when forming part of
 - (i) the *envelope*; or
 - (ii) the external *fabric* of a *habitable room* or a public area in *climate zones* 4, 6, 7 and 8.
- (b) Construction *required* by (a) must be
 - (i) enclosed by internal lining systems that are close fitting at ceiling, wall and floor junctions; or
 - (ii) sealed by caulking, skirting, architraves, cornices or the like.
- (c) The requirements of (a) do not apply to openings, grilles and the like *required* for smoke hazard management.

The proposed development will comply. The walls and ceilings will be constructed to comply with Fire Rating regulations and also the acoustic requirements of the BCA. This will result in effective sealing of the external fabric.

Reducing air leakage can significantly cut heating and cooling loads by reducing escape of conditioned air. In addition, it can increase indoor environmental quality by reducing drafts, noise and moisture and keeping pollutants out.

2.3.7 J3.7 Evaporative Coolers

An evaporative cooler must be fitted with a self-closing damper or the like when serving

- (a) a heated space; or
- (b) a *habitable room* or a public area of a building in *climate zones* 4, 5, 6, 7 and 8.

There are no evaporative coolers in this development hence Section J3.7 is not applicable.

2.4 PART J4

This part has deliberately been left blank

2.5 PART J5: AIR CONDITIONING AND VENTILATION SYSTEMS

2.5.1 J5.2 Air-Conditioning and Ventilation Systems

- (a) An *air-conditioning* unit or system must?
 - (i) be capable of being deactivated when the *sole-occupancy unit*, building or part of the building served is not occupied; and
 - (ii) where the *air-conditioning* unit or system has motorised outside air and return dampers, close the dampers when the *air-conditioning* unit or system is deactivated; and
 - (iii) when serving a *sole-occupancy unit* of a Class 3 building, not operate when any external door including a door opening to a balcony, patio, courtyard or the like is open for more than 1 minute; and
 - (iv) have any supply and return ductwork sealed and insulated in accordance with Specification J5.2; and
 - (v) when serving more than one *sole-occupancy unit*, *air-conditioning* zone or area with different heating and cooling needs?
 - (A) thermostatically control the temperature of each *sole-occupancy unit*, zone or area; and
 - (B) not control the temperature by mixing actively heated air and actively cooled air; and
 - (C) limit reheating to not more than?
 - (aa) for a fixed supply air rate, a 7.5 K rise in temperature; and
 - (bb) for a variable supply air rate, a 7.5 K rise in temperature at the nominal supply air rate but increased or decreased at the same rate that the supply air rate is respectively increased or decreased; and
 - (vi) other than where a packaged *air-conditioning* unit is used, have a variable speed fan when its supply air quantity is varied; and
 - (vii) where the *air-conditioning* system provides the *required* mechanical ventilation, have an *outdoor air economy cycle*?
 - (A) in *climate zone* 2 and 3, when the *air-conditioning* unit capacity is over 50 kW_r; and
 - (B) in *climate zones* 4, 5, 6, 7 and 8 when the *air-conditioning* unit capacity is over 35 kW_r; and
 - (viii) in a Class 3 building, be capable of controlling the temperature of a *sole-occupancy unit* at a different temperature during sleeping periods than during other periods; and

- (ix) when the air flow rate is greater than 1000 L/s, be designed so that the total *fan power* of the fans in the system is in accordance with Table J5.2, except the following need not comply with this requirement:
 - (A) The power for an energy reclaiming system that preconditions outdoor air.
 - (B) The power for process related components such as high efficiency particulate air filters.
 - (C) The power for miscellaneous exhaust systems complying with J5.5.
- (b) A system that provides mechanical ventilation to other than a *sole-occupancy unit* in a Class 2 building or a Class 4 part of a building, either as part of an *air-conditioning* system or as a separate ventilation system, must
 - (i) be capable of being deactivated when the building or part of the building served by that system is not occupied; and
 - (ii) when serving a *conditioned space*
 - (A) not provide mechanical ventilation in excess of the minimum quantity *required* by Part F4 for a mechanical ventilation system, where relevant, by more than 20% other than where there is
 - (aa) additional unconditioned outside air supplied to provide free cooling or to balance process exhaust such as from a *health-care building* or laboratory; or
 - (bb) additional exhaust ventilation needed to balance the *required* mechanical ventilation; or
 - (cc) an energy reclaiming system that preconditions outside air; and
 - (B) in other than *climate zone 2*, where the number of square metres per person is 1 or less as specified in D1.13 and the air flow rate is more than 1000 L/s, have
 - (aa) an energy reclaiming system that preconditions outside air; or
 - (bb) the ability to automatically modulate the mechanical ventilation *required* by Part F4 in proportion to the number of occupants; and
 - (iii) when the mechanical ventilation is provided by means other than an *air-conditioning* system and the air flow rate is more than 1000 L/s
 - (A) have a *fan power* to air flow rate ratio of 0.5 W/(L/s) without filters or 0.75 W/(L/s) with filters for a general mechanical ventilation system; and
 - (B) for *carpark* exhaust, when serving over 40 vehicles
 - (aa) be controlled by an atmospheric contaminant monitoring system in accordance with AS 1668.2; and
 - (bb) maintain an average minimum air-change rate of 0.5 air changes per hour other than when the *carpark* is not occupied for a period of more than 2 hours.
- (c) The requirements of (a) and (b) must not inhibit

- (i) the smoke hazard management operation of *air-conditioning* and mechanical ventilation systems; and
- (ii) essential ventilation such as for a garbage room, lift motor room, gas meter enclosure or gas regulator enclosure or the like.
- (d) The provisions of (b)(iii) do not apply to the following:
 - (i) The power for an energy reclaiming system that preconditions outside air.
 - (ii) The power for process related components such as high efficiency particulate air filters.
 - (iii) The power for a miscellaneous exhaust system complying with J5.5.

The developer intends that the proposed Air Conditioning & Mechanical Ventilation system will comply with Part J5 of the BCA.

2.5.2 J5.3 Time Switch

- (a) A time switch in accordance with Specification J6 must be provided to control each of the following:
 - (i) An *air-conditioning* system of more than 10 kW_r.
 - (ii) A ventilation system with an air flow rate of more than 1000 L/s.
 - (iii) A heating system of more than 10 kW_{heating}.
- (b) The requirements of (a) do not apply to
 - (i) an *air-conditioning* system or ventilation system that serves only one *sole-occupancy unit* of
 - (A) a Class 2 or 3 building; or
 - (B) a Class 4 part of a building; or
 - (C) a Class 9c *aged care building*; or
 - (ii) a building where *air-conditioning* or ventilation is needed for 24 hour occupancy such as a manufacturing process or emergency services.

Any time switch to be installed in this development will comply with J5.3.

2.5.3 J5.4 Heating and Cooling Systems

- (a) Systems that provide heating or cooling for *air-conditioning* systems must
 - (i) have any *pipng*, vessels, heat exchangers or tanks containing heated or chilled fluid, other than those with insulation levels covered by Minimum Energy Performance Standards
 - (ii) where water is circulated by pumping at greater than 2 L/s

- (A) be designed so that the total of the *pump power* to the pump is in accordance with Table J5.4a; and
 - (B) have the pump capable of varying its speed in response to varying load when it is rated at more than 3 kW of *pump power*, except where the pump is needed to run at full speed for safe or efficient operation; and
 - (iii) if the system contains more than one water heater used for heating a building, chiller or coil, be capable of stopping the flow of water to those not operating.
- (b) A heater
- (i) for heating a space via water, such as a boiler, that is part of an *air-conditioning* system, must
 - (A) achieve a thermal efficiency complying with Table J5.4b when tested in accordance with BS 7190; and
 - (B) use reticulated gas where it is available at the allotment boundary; and
 - (ii) for heating a space other than via water, must be
 - (A) a solar heater; or
 - (B) a gas heater; or
 - (C) an oil heater if reticulated gas is not available at the allotment boundary; or
 - (D) a heat pump heater; or
 - (E) a solid-fuel burning heater; or
 - (F) a heater using reclaimed heat from another process such as reject heat from refrigeration plant; or
 - (G) a combination of 2 or more of (A) to (F); and
 - (iii) that is a fixed space heating appliance installed outdoors, must be controlled to automatically turn off when not needed by an outdoor air temperature sensor, timer, motion detector, or the like.
- (c) Package *air-conditioning* equipment with a capacity of not less than 65 kW_r, including a split unit and a heat pump, must have an energy efficiency ratio complying with Table J5.4c when tested in accordance with AS/NZS 3823.1.2 at test condition T1.
- (d) A refrigerant chiller up to 350 kW_r capacity that is part of an *air-conditioning* system, must have an energy efficiency ratio complying with Table J5.4d when determined in accordance with ARI 550/590.
- (e) The fan motor of an air cooled condenser that is part of an *air-conditioning* system, other than one that is part of package *air-conditioning* equipment in (c) or that is part of a Liquid Chilling Package, using the vapour compression cycle in (d), must not use more than 42 W of *fan power*, for each kW of heat rejected from the refrigerant when determined in accordance with ARI 460.
- (f) The fan of a cooling tower that is part of an *air-conditioning* system must not use more than
- (i) if a propeller or axial fan, 310 W of *fan power* for each L/s of cooling water circulated;

or

- (ii) if a centrifugal fan, 590 W of *fan power* for each L/s of cooling water circulated.
- (g) The fan of a closed circuit cooler that is part of an *air-conditioning* system must not use more than
 - (i) if a propeller or axial fan, 500 W of *fan power* for each L/s of cooled fluid circulated; and
 - (ii) if a centrifugal fan, 670 W of *fan power* for each L/s of cooled fluid circulated.
- (h) The fan of an evaporative condenser that is part of an *air-conditioning* system must not use more than
 - (i) if a propeller or axial fan, 18 W of *fan power* for each kW of heat rejected; and
 - (ii) if a centrifugal fan, 22 W of *fan power* for each kW of heat rejected.
- (i) The spray water pump of a closed circuit cooler or evaporative condenser that is part of an *air-conditioning* system must not use more than 150 W of *pump power* for each L/s of spray water circulated.

The heating & cooling system to be installed in the development will comply with J5.4.

2.5.4 J5.5 Miscellaneous Exhaust System

- (a) A miscellaneous exhaust system with an air flow rate of more than 1000 L/s, that is associated with equipment having a variable demand such as a stove in a commercial kitchen or a chemical bath in a factory, must
 - (i) have the means for the operator to
 - (A) reduce the energy used, such as by a variable speed fan, and
 - (B) stop the motor when the system is not needed; and
 - (ii) be designed to minimise the exhausting of conditioned air.
- (b) The requirements of (a) do not apply
 - (i) within a *sole-occupancy unit* of a Class 2 or 3 building, Class 4 part of a building or Class 9c *aged care building*; or
 - (ii) where additional exhaust ventilation is needed to balance the *required* outside air for ventilation; or
 - (iii) where air flow must be maintained for safe operation.

The miscellaneous exhaust system to be installed in the development will comply with J5.5.

2.6 PART 6: ARTIFICIAL LIGHTING AND POWER

2.6.1 J6.2 Interior Artificial Lighting

- (b) In a Class 5, 6, 7, 8, 9a or 9b building
 - (i) for artificial lighting, the aggregate design illumination power load must not exceed the sum of the allowances obtained by multiplying the area of each space by the
 - (ii) the aggregate design illumination power load in (i) is the sum of the design illumination power loads in each of the spaces served; and

(ii) the aggregate design illumination power load in (i) is the sum of the design illumination power loads in each of the spaces served; and (iii) in determining the design illumination power load for (ii) the following must be used: (A) Where there are multiple lighting systems serving the same space (aa) the total illumination power load of all systems; or (bb) for a control system that permits only one system to operate at a time, the design illumination power load is (AA) based on the highest illumination power load; or (BB) determined by the formula
$\frac{[H \times T/2 + P \times (100 - T/2)]}{100}$ Where: H = the highest illumination power load; and T = the time for which the maximum illumination power load will occur, expressed as a percentage; and P = the predominant illumination power load.
(B) Where there is adjustable position lighting such as trapeze lighting or track lighting other than trunking systems that accept fluorescent lamps (aa) the rating of the circuit breaker protecting the track; or (bb) of extra low voltage, 80% of the power rating of the transformer; or (cc) of mains voltage, 100 W per metre of track. (c) The requirements of (a) and (b) do not apply to the following: (i) Emergency lighting in accordance with Part E4. (ii) Signage and display lighting within cabinets and display cases that are fixed in place. (iii) Lighting for accommodation within the residential part of a <i>detention centre</i>. (iv) A heater where the heater also emits light, such as in bathrooms. (v) Lighting of a specialist process nature such as in an operating theatre, fume cupboard or clean workstation. (vi) Lighting of performances such as theatrical or sporting. (vii) Lighting for the permanent display and preservation of works of art or objects in a museum or gallery other than for retail sale, purchase or auction.

Lighting requirements:

Maximum lighting intensities recommended by VIPAC is outlined below in Table 7.

Table 7: Maximum lighting intensity for all commercial and retail areas

Area name	Maximum illumination power density (W/m ²)
Carpark ☐ Entry Zone (first 20 metres of travel)	25
Carpark - General	6
Commercial Spaces	9
Retails	22
Plant rooms	5
Common areas toilets & bathrooms	6
Any service areas, cleaner's room etc	5
Entry lobbies	15
Corridors	8

Therefore each area of the development complies with the BCA requirements.

2.6.2 J6.3 Interior Artificial Lighting and Power Control

- (a) Artificial lighting of a room or space must be individually operated by a switch or other control device.
 - (b) An occupant activated device, such as a room security device, a motion detector in accordance with Specification J6, or the like, must be provided in the *sole-occupancy unit* of a Class 3 building, other than where providing accommodation for people with a disability or the aged, to cut power to the artificial lighting, air-conditioner, local exhaust fans and bathroom heater when the *sole-occupancy unit* is unoccupied.
 - (c) An artificial lighting switch or other control device in (a) must☐
 - (i) if an artificial lighting switch, be located in a visible position☐
 - (A) in the room or space being switched; or
 - (B) in an adjacent room or space from where the lighting being switched is visible; and
 - (ii) for other than a single functional space such as an auditorium, theatre, *swimming pool*, sporting stadium or warehouse☐
 - (A) not operate lighting for an area of more than 250 m² if in a Class 5 building or a Class 8 laboratory; or
 - (B) not operate lighting for an area of more than☐
 - (aa) 250 m² for a space of not more than 2000 m²; or
 - (bb) 1000 m² for a space of more than 2000 m²,
- If in a Class 3, 6, 7, 8 (other than a laboratory) or 9 building.
- (d) 95% of the lighting in a building or *storey* of a building, other than a Class 2 or 3 building or a Class 4 part, of more than 250 m² must be controlled by☐
 - (i) a time switch in accordance with Specification J6; or
 - (ii) an occupant sensing device such as☐
 - (A) a security key card reader; or

- (B) a motion detector in accordance with Specification J6.
- (e) Artificial lighting in a natural lighting zone adjacent to windows in a *storey* of a Class 5, 6 or 8 building, of more than 250 m² must be separately controlled from artificial lighting not in a natural lighting zone except where
 - (i) the room containing the natural lighting zone is less than 20 m²; or
 - (ii) the room's natural lighting zone contains less than 4 luminaires; or
 - (iii) the luminaires in the natural lighting zone are not more than 70% of the luminaires in the room.
- (f) The requirements of (a), (b), (c), (d) and (e) do not apply to the following:
 - (i) Emergency lighting in accordance with Part E4.
 - (ii) Where artificial lighting is needed for 24-hour occupancy such as for a manufacturing process, parts of a hospital, an airport control tower or within a *detention centre*.
- (g) The requirements of (d) do not apply to the following:
 - (i) Artificial lighting in a space where the sudden loss of artificial lighting would cause an unsafe situation such as in a *patient care area* in a Class 9a building or in a Class 9c *aged care building*.
 - (ii) A heater where the heater also emits light, such as in bathrooms.

Any lighting power control to be installed in the development will comply with J6.3 of the BCA.

2.6.3 J6.4 Interior Decorative and Display Lighting

- (a) Interior decorative and display lighting, such as for a foyer mural or art display, must be controlled
 - (i) separately from other artificial lighting; and
 - (ii) by a manual switch for each area other than when the operating times of the displays are the same in a number of areas such as in a museum, art gallery or the like, in which case they may be combined; and
 - (iii) by a time switch in accordance with Specification J6 where the display lighting exceeds 1 kW.
- (b) Window display lighting must be controlled separately from other display lighting.

All interior decorative and display lighting will comply with J6.4 of the BCA.

2.6.4 J6.5 Artificial Lighting Around the Perimeter of a Building

- (a) Artificial lighting around the perimeter of a building, must
 - (i) be controlled by
 - (A) a daylight sensor; or
 - (B) a time switch that is capable of switching on and off electric power to the system at

- variable pre-programmed times and on variable pre-programmed days; and
- (ii) when the total perimeter lighting load exceeds 100 W²
 - (A) have an average *light source efficacy* of not less than 60 Lumens/W; or
 - (B) be controlled by a motion detector in accordance with Specification J6; and
 - (iii) when used for decorative purposes, such as facade lighting or signage lighting, have a separate time switch in accordance with Specification J6.
- (b) The requirements of (a)(ii) do not apply to the following:
- (i) Emergency lighting in accordance with Part E4.
 - (ii) Lighting around a *detention centre*.

All artificial lighting around the perimeter will comply with J6.5 of the BCA.

2.6.5 J6.6 Boiling Water and Chilled Water Storage Units

Power supply to a boiling water or chilled water storage unit must be controlled by a time switch in accordance with Specification J6.

All power supply installation for a boiler and chilled water storage units will comply with J6.6 of the BCA.

2.7 PART J7: HOT WATER SUPPLY

2.7.1 J7.2 Hot Water Supply

A hot water supply system for food preparation and sanitary purposes, other than a solar hot water supply system in *climate zones* 1, 2 and 3, must be designed and installed in accordance with Section 8 of AS/NZS 3500.4.

The developer intends that the proposed Hot Water System will comply with Part J7.2 of the BCA.

Gas should be considered for the hot water supply system, as the use of gas as the energy source for hot water system means lower greenhouse gas emissions, efficiency and lower running costs. Using a natural gas hot water system generates about one third of the greenhouse gas emissions of a conventional electric hot water heater⁹.

2.7.2 J7.3 Swimming Pool Heating and Pumping

Pool requirements can be found in the Residential Section of this BCA Section J report.

⁹ Australian Gas Association, Research Paper No. 16

2.7.3 J7.4 Spa Pool Heating and Pumping

- (a) Heating for a spa pool having a capacity of 680 L or more must be by
 - (i) a solar heater; or
 - (ii) a heater using reclaimed energy; or
 - (iii) a gas heater; or
 - (iv) a heat pump; or
 - (v) a combination of 2 or more of (i), (ii), (iii) and (iv).
- (b) Where some or all of the heating *required* by (a) is by a gas heater or a heat pump, the spa pool must have
 - (i) a cover; and
 - (ii) a push button and a time switch in accordance with Specification J6 to control the operation of the heater.
- (c) A time switch must be provided in accordance with Specification J6 to control the operation of a circulation pump for a spa pool having a capacity of 680 L or more.

Pool requirements can be found in the Residential Section of this BCA Section J report.

2.8 PART J8: ACCESS FOR MAINTENANCE

The *Deemed-to-Satisfy Provisions* of this Part do not apply within a *sole-occupancy unit* of a Class 2 building or a Class 4 part of a building.

2.8.1 NSWJ8.2 Access for Maintenance

- Access for maintenance must be provided to
- (a) adjustable or motorised shading devices; and
 - (b) time switches and motion detectors; and
 - (c) room temperature thermostats; and
 - (d) plant thermostats such as on boilers or refrigeration units; and
 - (e) motorised air dampers and control valves; and
 - (f) reflectors, lenses and diffusers of light fittings; and
 - (g) heat transfer equipment; and
 - (h) plant that receives a concession under JV3(b) for the use of energy obtained from
 - (i) a source that is renewable on-site such as solar, geothermal or wind; or
 - (ii) another process as reclaimed energy.

The developer intends to comply. Necessary measures will be taken to ensure access for maintenance to all services and their components. It is envisaged at this stage that

through regular maintenance, an ongoing evaluation of systems can be done to ensure that the systems are delivering maximum efficiency.

2.8.2 J8.3 Facilities for Energy Monitoring

- (a) A building or *sole-occupancy unit* with a *floor area* of more than 500 m² must have the facility to record the consumption of gas and electricity.
- (b) A building with a *floor area* of more than 2,500 m² must have the facility to record individually the energy consumption of
 - (i) *air-conditioning* plant including, where appropriate, heating plant, cooling plant and air handling fans; and
 - (ii) artificial lighting; and
 - (iii) appliance power; and
 - (iv) central hot water supply; and
 - (v) internal transport devices including lifts, escalators and travelators where there is more than one serving the building; and
 - (vi) other ancillary plant.
- (c) The provisions of (b) do not apply to a Class 2 building with a *floor area* of more than 2,500 m² where the total area of the common areas is less than 500 m².

If the buildings total floor area exceeds 500m², the facility must be able to record the consumption of gas and electricity as per J8.3 of the BCA.

3. CONCLUSION

The following recommendations have been made with the aim to achieve compliance of BCA Section J:

- BASIX requirements can be found in VIPAC report 20C-10-0128-TRP-461887-3 - BASIX and BASIX Certificate No. 323344M_04, 323058M_04, 323089M_04 & 323130M_05.
- An additional R2.7 roof/ceiling insulation is required for exposed ceilings/roof of all commercial premises.
- All retail and commercial space require an additional R2.3 external wall insulation in order to satisfy the requirements for BCA compliance.
- An additional minimum R1.7 floor insulation is required for retail areas above the car park and commercial spaces with elevated floor areas to comply with BCA requirements.
- Recommendations regarding glazing and lighting have been made within the body of the report.

While every endeavour has been made to provide a realistic energy rating for the proposed development, we note that the energy calculating process using computer program simulation is not 100% accurate.

The energy efficiency of any building is determined not only by the design but also by the energy consumption requirements and practices of the occupants. Actual energy consumption will not be known until a building is occupied and operational.

4. ARCHITECTURAL DRAWINGS

The assessment carried out in this report was based on the drawings prepared and supplied by Mirvac Design.

- PA1000[1] DRAWING REGISTER
- PA1001[1] LOCALITY & CONTEXT PLAN
- PA1002[1] SITE PLAN
- PA1003[1] SITE ANALYSIS PLAN
- PA1004[1] B6 & B7 FLOOR PLANS
- PA1005[1] B5 & B4 FLOOR PLANS
- PA1006[1] B3 & B2 FLOOR PLANS
- PA1007[1] B1 FLOOR PLANS
- PA1008[1] LEVEL 1 (GROUND) FLOOR PLAN
- PA1009[1] LEVELS 2-4 & 5 FLOOR PLANS
- PA1010[1] LEVELS 6-13 FLOOR PLANS
- PA1011[1] LEVELS 14- 25 FLOOR PLANS
- PA1012[1] LEVELS 26-39 & 41 FLOOR PLANS
- PA1013[1] LEVELS 40 & 42 FLOOR PLANS
- PA1014[1] LEVELS 43, 43 MEZZANINE & ROOF PLAN
- PA1015[1] NORTH ELEVATION
- PA1016[1] SOUTH ELEVATION
- PA1017[1] EAST ELEVATION
- PA1018[1] WEST ELEVATION
- PA1019[1] SECTION A-A
- PA1020[1] SECTION B-B

**This Report Has Been Prepared for
MIRVAC PROJECTS PTY LTD**

**By
VIPAC ENGINEERS & SCIENTISTS Ltd**

