

ESD Summary Report

**849-859 Pacific Highway
and 2 and 8 Wilson Street
Chatswood 2067**

Prepared for
BB Wilson Property Pty Ltd

Prepared by
GreenPerch Pty Ltd
November 2024



Prepared on behalf of

BB Wilson Property Pty Ltd
c/o Billbergia Group

Prepared by:

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REVISION	PREPARED	DRAWINGS
1 (14/12/23)	MP and checked JP	DA SET – 12.12.2023 PBD Architects
2 (15/12/23)	MP and checked JP	DA SET – 14.12.2023 PBD Architects
3 (19/11/24)	MP and checked SH	SDDA SET – 01.11.2024 PBD Architects
4 (21/11/24)	MP and checked SH	SDDA SET – 01.11.2024 PBD Architects

I, Martin Pinson (GREENPERCH PTY LTD), confirm this “ESD Summary Report” addresses the requirement of SEAR No. SSD-74319707 and relevant State and local legislation, policies, and guidelines (including SEARs 9, Sustainable Building SEPP, NCC 2022, BASIX v4 2024, NatHERS Protocol and Willoughby Development Control Plan). I further confirm that none of the information contained in this “ESD Summary Report” is deliberately false or misleading.

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1. Introduction and Site Context

The vision for the project is to deliver a new mixed-use development that fosters a dynamic live-work-play lifestyle. The development will feature a diverse range of housing options, including affordable housing, complemented by retail and commercial uses.

The proposal broadly seeks SSD approval for the construction and operation of a 36-storey mixed-use development with residential and commercial uses, on site car parking, landscaping and public domain works. Specifically, the SSDA seeks development consent for:

- Site preparation works including the demolition of existing structures and tree removal
- Bulk excavation to accommodate the proposed 6 level basement structure
- Construction of a 36-storey mixed use development comprising –
 - Retail and commercial uses
 - Childcare centre
 - Two residential towers with 332 apartments including 308 residential apartments and 24 x live-work units
- 6 levels of basement with access from O'Brien Street
- Public domain works, including landscaping, street trees, and publicly accessible open spaces
- Reticulation of site services and infrastructure



Site Context Photo - 849 - 859 Pacific Highway, and 2 and 8 Wilson Street, Chatswood



Site Location Plan - 849 - 859 Pacific Highway, and 2 and 8 Wilson Street, Chatswood (source: Urbis 2024)

Descriptor	Site Details
Proponent / Applicant	Billbergia (BB WILSON PROPERTY PTY LTD)
SSD Reference	SSD-74319707
Street Address	849, 853, and 859 Pacific Highway and 2 and 8 Wilson Street, Chatswood
Legal Description	▪ Lot 1 DP 1189541 (8 Wilson Street (Lot 1 O'Brien Street)) ▪ SP 52947 (2 Wilson Street) ▪ SP 1496 (849 Pacific Highway) ▪ SP 60178 (853 Pacific Highway) ▪ SP 10110 (859 Pacific Highway) ▪ SP2 land fronting Pacific Highway
Site Area	4,294 sqm
Land Configuration	The site has an irregular shaped configuration and an area of 4,294 sqm (excluding the parcel of land zoned SP2 Infrastructure). The site is bound by Wilson Street (to north), O'Brien Street (to south), Pacific Highway (to west) and the T1 North Shore and Western Line, T9 Northern Line, and Metro North-West Line (to east).
Existing Development	The site is currently occupied with a mixture of 3-5 storey multi-residential buildings and a commercial building at 8 Wilson Street.
Local Context	The site is located within the suburb of Chatswood in the Willoughby Local Government Area. Chatswood is located 6km north of the Sydney CBD within Sydney's Lower North Shore. The site is in proximity and highly accessible to the commercial centres of North Sydney and Macquarie Park. The site is located at the north-western extent of the Chatswood CBD within convenient walking distance of local amenities, facilities, and services. The area is well advanced in its transition from an older style commercial precinct into a thriving mixed-use area characterised by commercial and residential land uses.

This ESD report summarises the ESD, energy, water, BASIX, NatHERS and thermal comfort aspects for the proposed development, at 849 - 859 Pacific Highway, and 2 and 8 Wilson Street, Chatswood. The proponent and the design team have made a strong commitment to ESD, especially for items such as thermal comfort, water, energy, waste, materials, transportation, management and landscaping. This report discusses, in detail, how the proposal has embraced these sustainability principles. The design responds to the SEARs requirements for the SSDA (SSD-74319707), as discussed below. The design has also incorporated the sustainability controls outlined in the Willoughby DCP. The Principles of Ecologically Sustainable Development were all embraced, and these include: (a) the precautionary principle, (b) inter-generational equity, (c) conservation of biological diversity and ecological integrity, and (d) improved valuation, pricing and incentive mechanisms. The project will also be targeting a 5-star Green Star rating (possibly with an in-house analysis, with the Green Star Buildings Rating Tool).

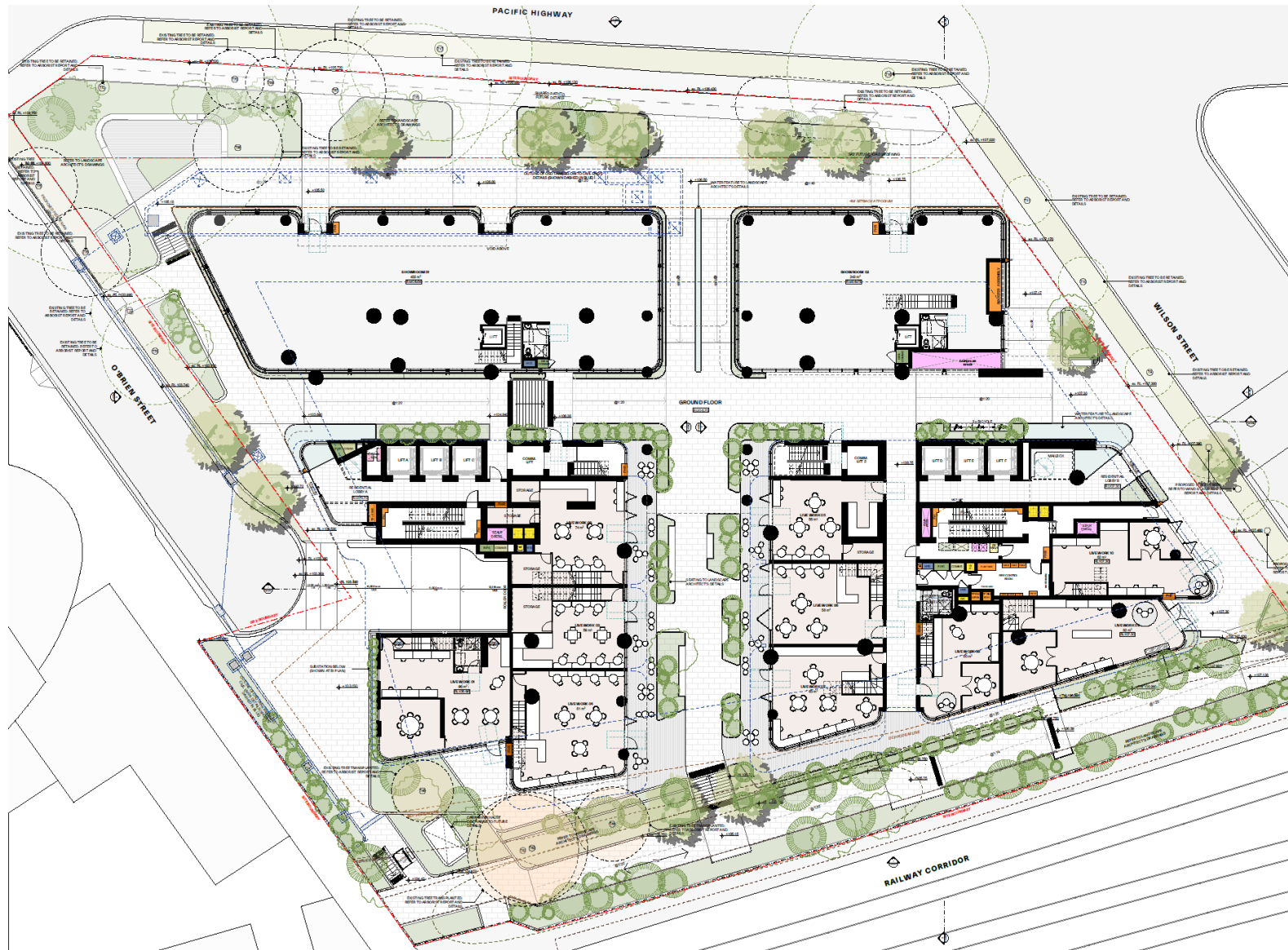


Site Aerial Photograph - 849 - 859 Pacific Highway, and 2 and 8 Wilson Street, Chatswood (source: Urbis 2024)

This report has been prepared to address the Secretary’s Environmental Assessment Requirements (SEARs) issued for the project (SSD-74319707). This report concludes that the proposed development is suitable, warrants approval, and satisfies SEAR 9 - Ecologically Sustainable Development (ESD), as summarised briefly below and detailed in the ESD report.

The report also details the mitigation measures implemented within the design such as water, energy, materials, thermal comfort and ESD strategies (as discussed in this report). This ESD analysis was developed under the guidance of BASIX v4, NatHERS, NCC 2022 and also the Willoughby DCP 2023. This ESD Summary Report was developed in response to the SEARs dated 09/08/2024 for the SSDA (SSD-74319707), addressing the items below:

SEAR 9. Ecologically Sustainable Development (ESD)	ESD Discussion
Identify how ESD principles (as defined in section 193 of the EP&A Regulation) are incorporated in the design and ongoing operation of the development.	Principles of ESD are discussed in pages 11-40 (refer to ESD specifications and ESD discussion). (a) the precautionary principle – this has guided all ESD decisions and the striving towards elevated scores. The site selection, planning, materials, water, energy and ESD aspects were all influenced. (b) inter-generational equity - likewise, this guided all ESD decisions and the striving towards elevated scores. The site selection, planning, materials, water, energy and ESD aspects were all influenced. (c) conservation of biological diversity and ecological integrity – the site selection, landscape design and ESD items adopted this. In particular a high % of locally indigenous plants (and natives) is proposed (d) improved valuation, pricing and incentive mechanisms – very high water, energy and NatHERS scores have been targeted to reduce running costs for residents. The fitout materials will also focus heavily on these principles. GECA, GreenTag and LCA tools will be used to reduce life cycle impacts.
Demonstrate how the development will meet or exceed the relevant industry recognised building sustainability and environmental performance standards.	See discussions within this ‘ESD Summary Report’ and Appendix B for compliant certificates, with elevated scores for all aspects, including NatHERS, water, energy and thermal comfort.
Demonstrate how the development minimises greenhouse gas emissions (reflecting the Government’s goal of net zero emissions by 2050) and consumption of energy, water (including water sensitive urban design) and material resources.	See pages 11-20 for the main ESD & Water, Energy, Thermal Comfort, BASIX specifications. See pages 26-40 for additional ESD discussions relating to water, energy and materials. A Net Zero approach will be adopted (as per Government’s goal of net zero emissions by 2050). Solar PV, NatHERS scores, excellent lights, natural ventilation and good HVAC will help energy performance. Extra green power and off-site PV will be used to hit net zero (typical for tall towers with PV solar power limitations). Embedded networks will ensure that green power and net zero targets are met.

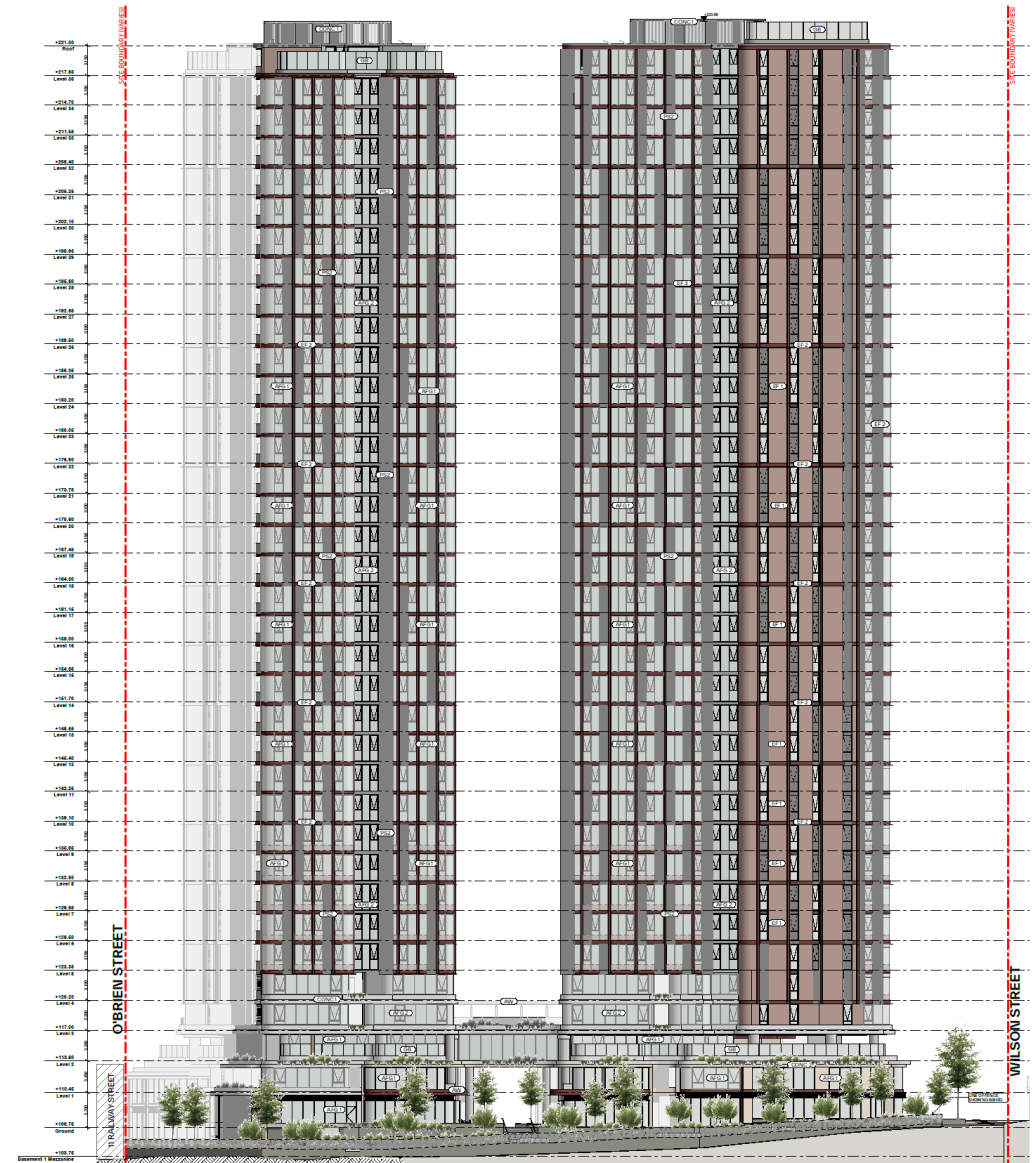


Ground Floor Plan - 849 - 859 Pacific Highway, and 2 and 8 Wilson Street, Chatswood

The GreenPerch team have worked very closely with the design team, to ensure a high level of energy-efficiency and environmental sustainability. Importantly, a strong emphasis was placed on the passive efficiency of the building (including passive heating, passive cooling, natural lighting and natural ventilation). The architects have done an excellent job to ensure that these passive systems are working effectively, through a very careful and intelligent blend of innovative architectural design and passive thermal comfort techniques.

For example, the use of building articulation and orientation was used to enhance natural lighting, passive heating and cross ventilation. These techniques are far too often neglected in buildings of this scale, especially in buildings with predominantly single-aspect dwellings. The excellent thermal comfort results are a testament to the success of this excellent architectural design, on a tricky site. Intelligent and high-tech facades have greatly helped this achievement, including shading devices and high-performance specifications for all windows and glazed doors (including double glazing and performance frames, for all units and most non-residential).

Façade- 849 - 859 Pacific Highway, and 2 and 8 Wilson Street, Chatswood



1.1 ESD Initiatives and Strategies - Summary

Some of the main ESD categories (for residential and non-residential) will be targeted as follows:

1. ESD - An ecologically sustainable design (ESD) consultant was part of the design team. GreenPerch have suggested and tested various suitable and effective ESD initiatives. GreenPerch has huge experience and includes engineers, architects and energy experts.
2. Climate Resilience – Approaches have included: designing for extreme rainfall events; inclusion of low-level and rooftop shade structures; use of cross ventilation for night-time flushing; cross-ventilation for fresh air and respite from extreme heat; materials selection (including generous thermal mass) which is supportive of passive cooling; drought-tolerant landscaping; and careful building design to cope with extended heatwave conditions. Passive cooling processes were also used cleverly, throughout the buildings, such as thermal mass, shading devices, dual-aspect designs, overhangs, eaves, winter gardens, water features and large window openings.
3. Passive Design - The buildings express a strong commitment to passive design (such as optimal orientation, shading devices, cross ventilation, thermal, mass, winter gardens and open plan living). Performance glazing is also proposed for all the development, including double glazing, appropriate tinting and high-performance frames. Importantly, the intelligent use of facades, rather than just ceiling fans should give an optimum summer performance, for the base building. That said, the ceiling fans, where proposed, are adding extra stars to the NatHERS scores and these are rewarded (correctly) as ‘passive systems’, since they are so energy-efficient.
4. Energy efficiency - To minimise energy use, the residential buildings have many low-energy initiatives, as discussed in the Energy and BASIX sections of this report. These include items such as PV solar power; generous insulation; performance glazing; shading devices; low-energy HVAC; efficient appliances; efficient lighting; timers/sensors; electric heat-pump hot water; and metering systems.
5. Waste reduction - Waste management plans have been prepared and are submitted with the SSD package. These plans demonstrate the application of principles of the waste management hierarchy of waste: avoid use, reduction, re-use and recycling. For example, high levels of recycling of construction and demolition waste will be targeted (over 90% waste). The project will also target a very high % for operational waste to be diverted from landfill including compostable organics and green waste.
6. Water efficiency - Rainwater for irrigation and pool top-ups is proposed. Water fixtures and fittings are also highly rated, including close-to-best ratings for taps, showers and toilets. Furthermore, at least 22% of planting uses locally indigenous or low-water species.
7. Eco Transport – Good access to public transport, car-sharing, electric car chargers and bicycle storage has been proposed. Electric car-charging has been included, with flexibility for current and future scenarios. Travel information kits for residents and workers will also be generated later. This will encourage public transport, walking, bicycles and carshare schemes (over private motor vehicle use).

Some of the other ESD initiatives are listed below. These are also listed later in the report, with respect to water, energy, ESD, thermal comfort, BASIX, etc. These aspects will be further refined and incorporated into the design as the design progresses to the detailed design stage.

- Energy-efficient whitegoods (high-rated dryers, dishwashers, etc)
- Water-efficient fixtures (very high ratings for toilets, showers and taps) and reduced flow to sewer
- Rainwater reuse for irrigation and swimming pool top-ups (10kL minimum rainwater storage)
- Recycling or reusing (closed loops) of water from fire pump testing.
- Efficient irrigation such as drip irrigation, timers and moisture -sensors for planters and gardens.
- At least 22% use by area of locally indigenous or “one-drop” water-efficient plants
- Generous deep-soil allocation and planter bed gardens.
- Recycling of construction and demolition waste (over 90% of total waste by mass).
- The use of re-usable formwork for internal floors and core walls on site.
- Paints and floor-coverings with low VOCs, wherever possible.
- Wood products with low formaldehyde (and VOCs), wherever possible.
- Water-based and low-emission paints where possible, for internal 'low-sheen' areas.
- Low-emission and (where practical) water-based paints for internal gloss or semi-gloss finishes.
- Intent to research and include, where possible, some products/materials certified by GreenTag/GECA.
- Specification of sustainable-timber, where possible, using FSC or PEFC (for structure, trims, etc).
- PV solar power to provide power lights, ventilation and other uses – minimum 30kW peak
- Motion-sensors and time-based controllers (time clocks) for lights, ventilation, etc.
- Air quality (CO/CO2) monitors for the car park ventilation system control and efficient VSD fans.
- Light-colour roofs, generous vegetation and passive cooling to reduce “urban heat-island effects”.
- Sensible access to and bus transport as well as an extensive network of bike paths.
- Generous Bicycle Parking and proposed ‘Travel Kits’ to educate residents
- Use of “Carshare” schemes, electric-car charging and other efficient-vehicle-alternatives
- Reduced topsoil removal, ecosystem renewal, many native and some locally indigenous plants
- Reduced Operating Costs (water, gas, electricity) due to the good ESD, BASIX and NatHERS scores



TYPICAL PLAN (Levels 14-25 - not to scale) - 849 - 859 Pacific Highway, and 2 and 8 Wilson Street, Chatswood

1.2 Thermal Comfort Summary

The development has achieved the following NatHERS scores:

- Average NatHERS rating > 7.3 stars
- Average cooling load = 7.7 MJ/m².year (permitted average is 20 MJ/m².year) – approx. 61% better than target
- Average heating load = 19.3 MJ/m².year (permitted average is 28 MJ/m².year) – approx. 31% better than target

NatHERS - Thermal Comfort for Units	Proposed Specifications
External Walls 1	Concrete wall +R2.5 added + thermal break R0.2
External Walls 2	Hebel 75mm +R2.0 added + thermal break R0.2
External Walls 3	Colorback glass +R2.5 added + thermal break R0.2
External Walls 4	Metal/FC cladding +R2.5 added + thermal break R0.2
Unit Walls next to halls/lobbies 1	Hebel 75mm wall + R2.0 added + thermal break R0.2
Unit Walls next to halls/lobbies 2	Concrete columns + R2.0 added + thermal break R0.2
Party walls 1	Plasterboard + 75mm Hebel + optional insulation
Party walls 2	Conc. columns + plasterboard + optional insulation
Walls next to lifts	Concrete ≥150mm and plasterboard + optional insulation
Walls next to stairs	Concrete ≥150mm and plasterboard + optional insulation
Internal Walls	Plasterboard (some concrete columns)
Internal Floors	Concrete floors, with plasterboard below
External Floors	Concrete slab with open air (or other conditioned) below
External Floor Insulation over Basement	Not applicable for apartments
External Floor Insulation over open air / open lobby	R2.0 added + thermal break R0.2
Floor Finishes in units	Tiles - wet areas, carpet - bedrooms, timber - living/dining
1. Roofs – for a3501, b3501 and a3404 only	Concrete roof + R5.0 + plasterboard + thermal break R0.2
2a. Penthouse and large roofs (except units above)	Concrete roof + R3.5 + plasterboard + thermal break R0.2
2b. Live/work unit roofs (if under terrace/balcony)	Concrete roof + R3.5 + plasterboard + thermal break R0.2
3. Roofs –units below small balconies/ small terraces	Concrete roof + R2.5 + plasterboard + thermal break R0.2
Roof Colour	Light colour roofs (some medium planting/terrace etc)
Skylights	None proposed for apartments
Window Shading and Devices	Eaves + screens as shown (fixed but b3501 adjust for stairwell +lounge awning N)

Weather Stripping	All external doors and windows
Ceiling Penetrations Lights	LED downlights - generic holes assumed, as per NatHERS protocol (TBC at CC)
Ceiling Penetrations Fans	Bathroom, laundry, kitchen: generic holes from NatHERS protocol (TBC at CC)
Ceilings fans	Fans 1400 diam in living zones – all units including LW1 to LW24 and Levels 5-35 Fans in beds also- a502-a1302 +a505-a3304 & b3501 =11 fans, stair +main rooms

1. WINDOWS – standard glazing, unless type 2/3 needed	WINDOWS for all residential except type 2/3 below
1. Window (AWNING or HINGED)	Aluminium frames and performance double-glazed
Windows - U-value	≤ 3.2
Windows – SHGC	0.44 to 0.48
2. Windows (FIXED GLAZING)	Aluminium frames and performance double-glazed
Windows - U-value	≤ 3.0
Windows – SHGC	0.53 to 0.59
3. Windows (SLIDERS/ HUNG)	Aluminium frames and performance double-glazed
Windows - U-value	≤ 3.0
Windows – SHGC	0.53 to 0.59

2. WINDOWS – high performance type 2	WINDOWS FOR LOWER LIVE-WORK DWELLINGS 1-10
1. Window	Aluminium frames and double-glazed
Windows - U-value	≤ 2.3 slider/fixed and ≤ 2.9 awning/hinged
Windows – SHGC	0.30 to 0.34 fix/slider, 0.31 to 0.35 awning/hinge

3. WINDOWS – high performance type 3	WINDOWS UPPER LIVE-WORK 11-24 AND LIST OVERPAGE
1. Window	Aluminium frames and double-glazed
Windows - U-value	≤ 2.6 slider/fixed and ≤ 3.2 awning/hinged
Windows – SHGC	0.50 to 0.56 fix/slider, 0.44 to 0.48 awning/hinge

WINDOWS – high performance type 3	GLAZING LOCATION FOR UPGRADED SLIDERS AND/OR FIXED
a501 to a1301	Upgrade Sliders (type 3 glazing)
b503 to b3303	Upgrade Sliders (type 3 glazing)
a3404	Upgrade Sliders (type 3 glazing)
b3501	Upgrade all glazing (use type 3 glazing) +awning too
LW 11-24	Upgrade all glazing (use type 3 glazing) +awning too

1.3 BASIX Summary

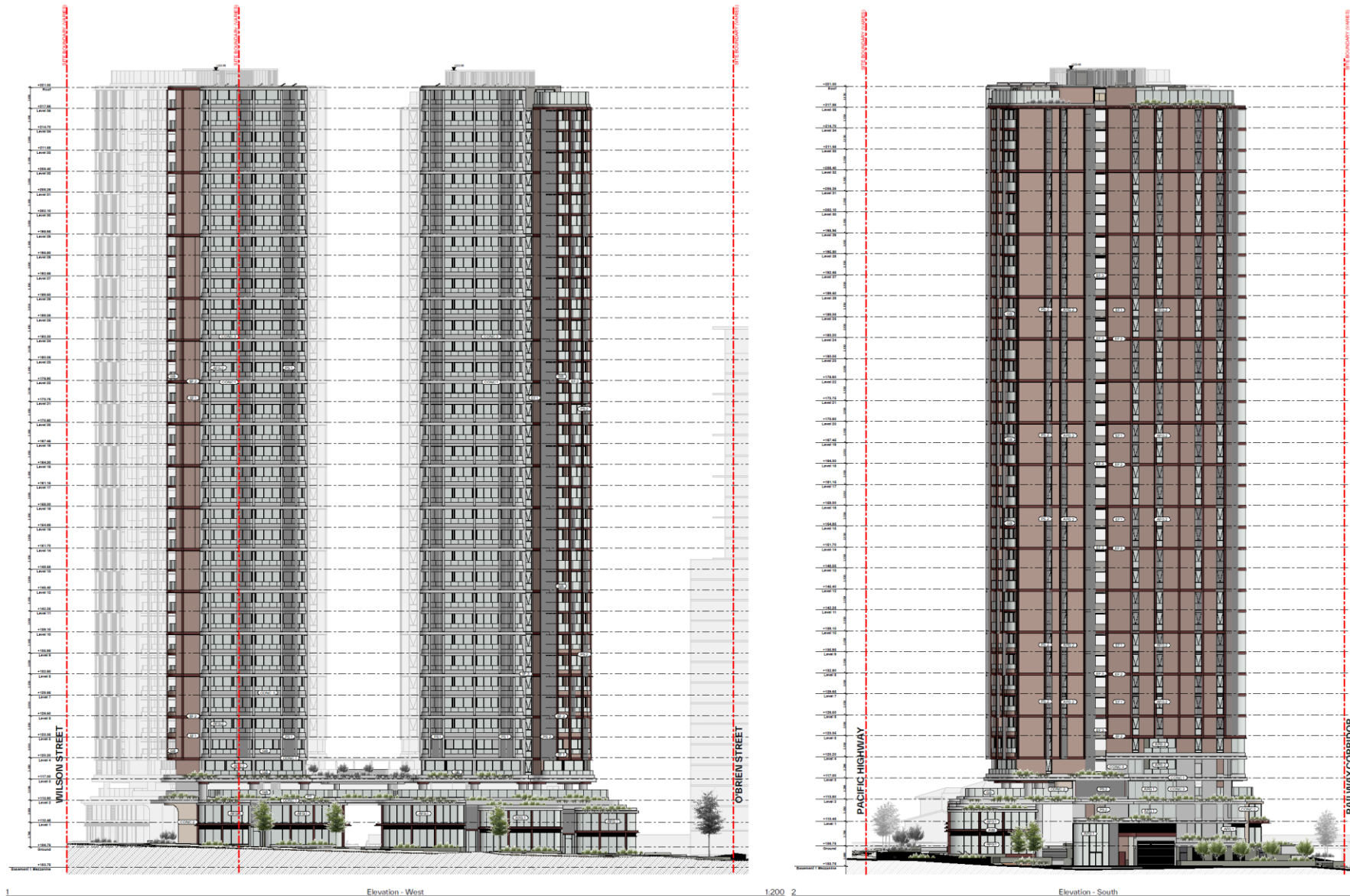
The BASIX scores are currently 66/63 for energy and 43/40 for water. To achieve these excellent scores, the initiatives listed below are proposed. For the additional BASIX testing results (conducted during the concept stage) please refer to the appendices.

BASIX Item - Water	Proposed Specifications
Rainwater Tank	10 kL tanks(s) to collect from 200 m2 roof (no planters)
Rainwater Tank use	Irrigation for planting and lawn (on ground and on-slab) and pool top-ups
Reticulated Treated Water use	Not available
Stormwater Tank	None (but non-trafficable roofs will drain to rainwater tank)
Blackwater/Greywater reuse	No treatment on site
Fire Sprinklers	Sprinklers in both basement + buildings
Fire Sprinkler Test Water	Fire test water reused in closed loops (for basement and building)
Showers	4 stars ≤ 6.0 L/min (low-flow in BASIX)
Toilets	4 stars
Kitchen Taps	5 stars
Bathroom Taps	5 stars
On demand hot recirculation	Not proposed
Clothes washers	No longer assessed by BASIX
Dishwashers	4 stars WELS or better
Planting areas (and lawn)	Approx 1,708 m2 + 43 m2 lawn
Planting – low water species	22% of planting approx is locally indigenous (>371 m2 of 1,708 m2)
Pools and spas	Pools with heat pump heating + pump timer + no covers, except spa covers
Pool and spa sizes (shared facility)	Pools <65 kL and spa <7 kL
Spa size private (private area – b3501)	Private spa <12 kL

BASIX Item - Energy	Proposed Specifications
Heating for Units -Beds	1 phase, EER = 3.0 – 3.5
Heating for Units -Living	1 phase, EER = 3.0 – 3.5
Cooling for Units -Beds	1 phase, EER = 2.5 - 3.0
Cooling for Units -Living	1 phase, EER = 2.5 - 3.0
AC zoning (day/night zoning)	Not used - hence AC sized can cool both bedrooms and living zones (at same time)
Laundry Exhaust	Fan to façade/roof, manual on and manual off
Bathroom Exhaust	Fan to façade/roof, manual on and manual off
Kitchen Exhaust	Fan to façade/roof, manual on and manual off
Lighting for Apartments – all rooms	LEDs ≥80% fittings all rooms (dedicated)
Cooking	Induction cooktop & electric oven
Vented fridge-spaces	Yes, venting into bulkhead cavity as “top open”
Dishwashers	4 stars energy or more
Dryers	8 stars energy or more
Fridges	No longer assessed by BASIX
Clothes washers	No longer assessed by BASIX
Indoor clothesline	Not used (since this needs 12m retractable lines for balcony / bathroom)
Hot Water	Electric Heat Pumps (air sourced) + R1 to ringmains/risers
BMS	Yes, included (including BMS common lights)
PFC - Power Factor Correction	Yes, included
PV Solar Power	30 kW peak
Lifts	VVVF gearless traction with regeneration drives
Pools and spas	Pools with heat pump heating + pump timer + no covers, except spa covers
Pool and spa sizes (common area)	Pools <65 kL and spa <5 kL (and <2.5 kL for 2701 spa)
Sauna	Infrared heating source and timer off

Common area name	Area (m ²)	Primary lighting system type * ⓘ	Efficiency measure *	Lighting control system / BMS ⓘ
Lift bank (No. 1)	n/a	light-emitting diode ▾	connected to lift call button ▾	☒ Yes ☐ No
Lift bank (No. 2)	n/a	light-emitting diode ▾	connected to lift call button ▾	☒ Yes ☐ No
Sauna	7	light-emitting diode ▾	zoned switching ▾	☒ Yes ☐ No
Undercover car park area	14488	light-emitting diode ▾	zoned switching with motion ▾	☒ Yes ☐ No
Switch rooms	47	light-emitting diode ▾	motion sensors ▾	☒ Yes ☐ No
Comms rooms	20	light-emitting diode ▾	motion sensors ▾	☒ Yes ☐ No
Substations	189	light-emitting diode ▾	motion sensors ▾	☒ Yes ☐ No
Garbage rooms (excl. bulky)	184	light-emitting diode ▾	motion sensors ▾	☒ Yes ☐ No
Amenities music, gym, etc	97	light-emitting diode ▾	zoned switching with motion ▾	☒ Yes ☐ No
Bulky Store room	59	light-emitting diode ▾	motion sensors ▾	☒ Yes ☐ No
Other store rooms	157	light-emitting diode ▾	zoned switching with motion ▾	☒ Yes ☐ No
WC rooms communal	14	light-emitting diode ▾	zoned switching with motion ▾	☒ Yes ☐ No
Fire and pump rooms	224	light-emitting diode ▾	motion sensors ▾	☒ Yes ☐ No
Cold water plant rooms	40	light-emitting diode ▾	motion sensors ▾	☒ Yes ☐ No
Fan rooms basement	93	light-emitting diode ▾	davlight sensor and motion s ▾	☒ Yes ☐ No
Other small plant in basement	65	light-emitting diode ▾	zoned switching with motion ▾	☒ Yes ☐ No
Other small plant upper levels	511	light-emitting diode ▾	zoned switching with motion ▾	☒ Yes ☐ No
Ground floor lobbies	66	light-emitting diode ▾	zoned switching with davligh ▾	☒ Yes ☐ No
Hallway/lobby lower levels	452	light-emitting diode ▾	zoned switching with motion ▾	☒ Yes ☐ No
Hallway/lobby upper levels	2522	light-emitting diode ▾	zoned switching with motion ▾	☒ Yes ☐ No

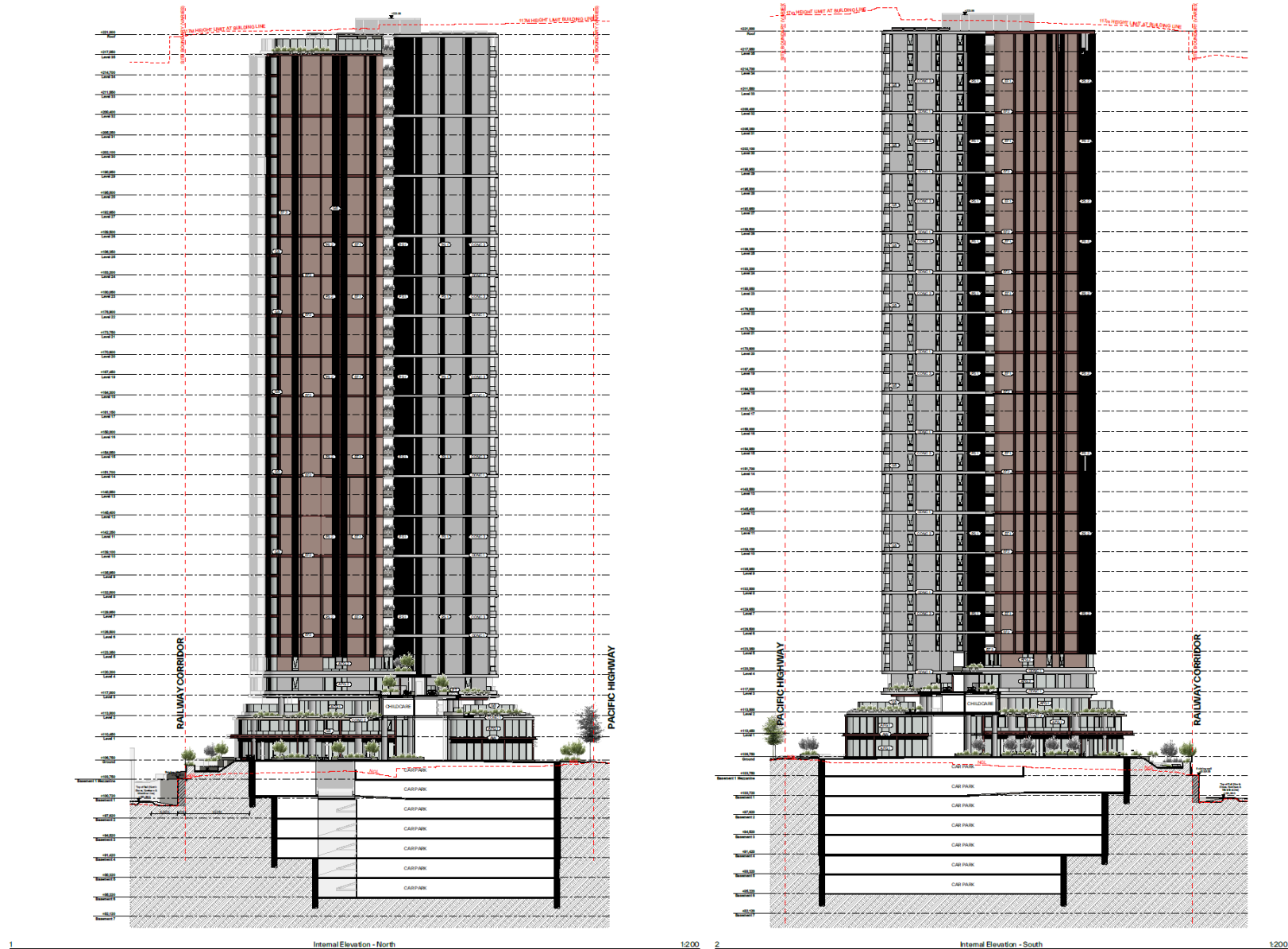
Common area name	Floor area (m ²)	Select the ventilation system type *	Select the efficiency measure *
Sauna	7	ventilation (supply + exhaust) ▾	time clock or BMS controlled ▾
Undercover car park area	14488	ventilation (supply + exhaust) ▾	carbon monoxide monitor + VSD fan ▾
Switch rooms	47	ventilation supply only ▾	none i.e.. continuous ▾
Comms rooms	20	ventilation supply only ▾	none i.e.. continuous ▾
Substations	189	no mechanical ventilation ▾	n/a
Garbage rooms (excl. bulky)	184	ventilation exhaust only ▾	n/a
Amenities music, gym, etc	97	no mechanical ventilation ▾	n/a
Bulky Store room	59	ventilation supply only ▾	time clock or BMS controlled ▾
Other store rooms	157	ventilation supply only ▾	time clock or BMS controlled ▾
WC rooms communal	14	ventilation exhaust only ▾	time clock or BMS controlled ▾
Fire and pump rooms	224	ventilation exhaust only ▾	time clock or BMS controlled ▾
Cold water plant rooms	40	ventilation supply only ▾	time clock or BMS controlled ▾
Fan rooms basement	93	no mechanical ventilation ▾	n/a
Other small plant in basement	65	ventilation supply only ▾	time clock or BMS controlled ▾
Other small plant upper levels	511	no mechanical ventilation ▾	n/a
Ground floor lobbies	66	ventilation supply only ▾	time clock or BMS controlled ▾
Hallway/lobby lower levels	452	no mechanical ventilation ▾	n/a
Hallway/lobby upper levels	2522	no mechanical ventilation ▾	n/a



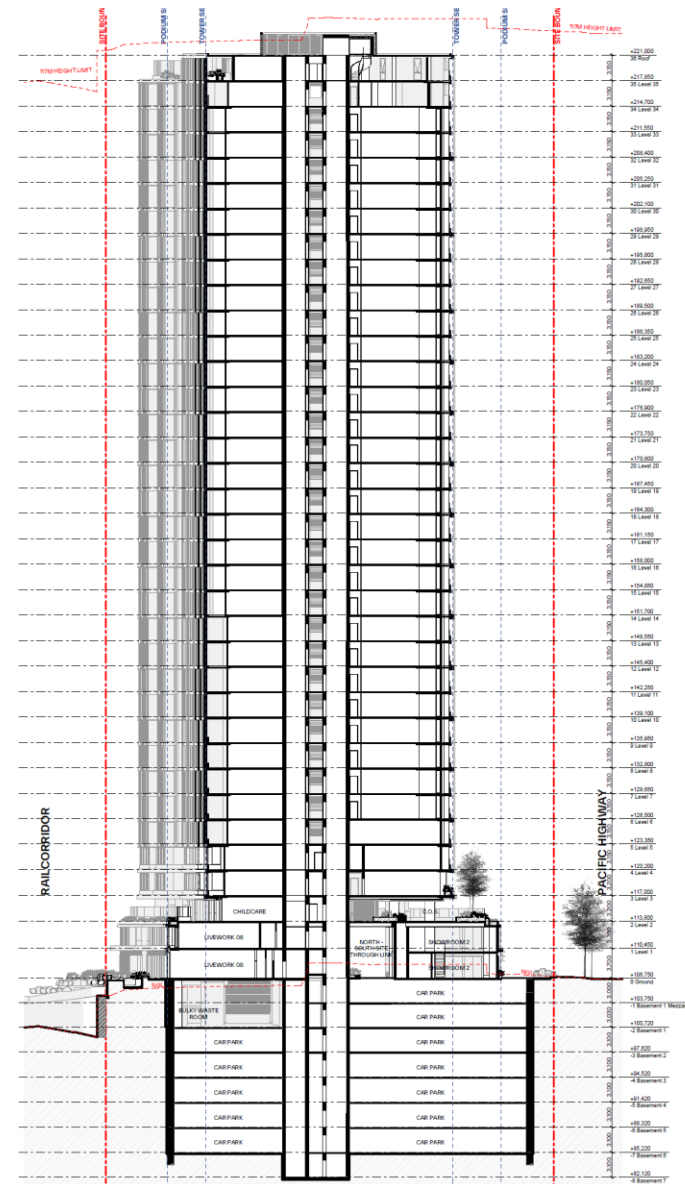
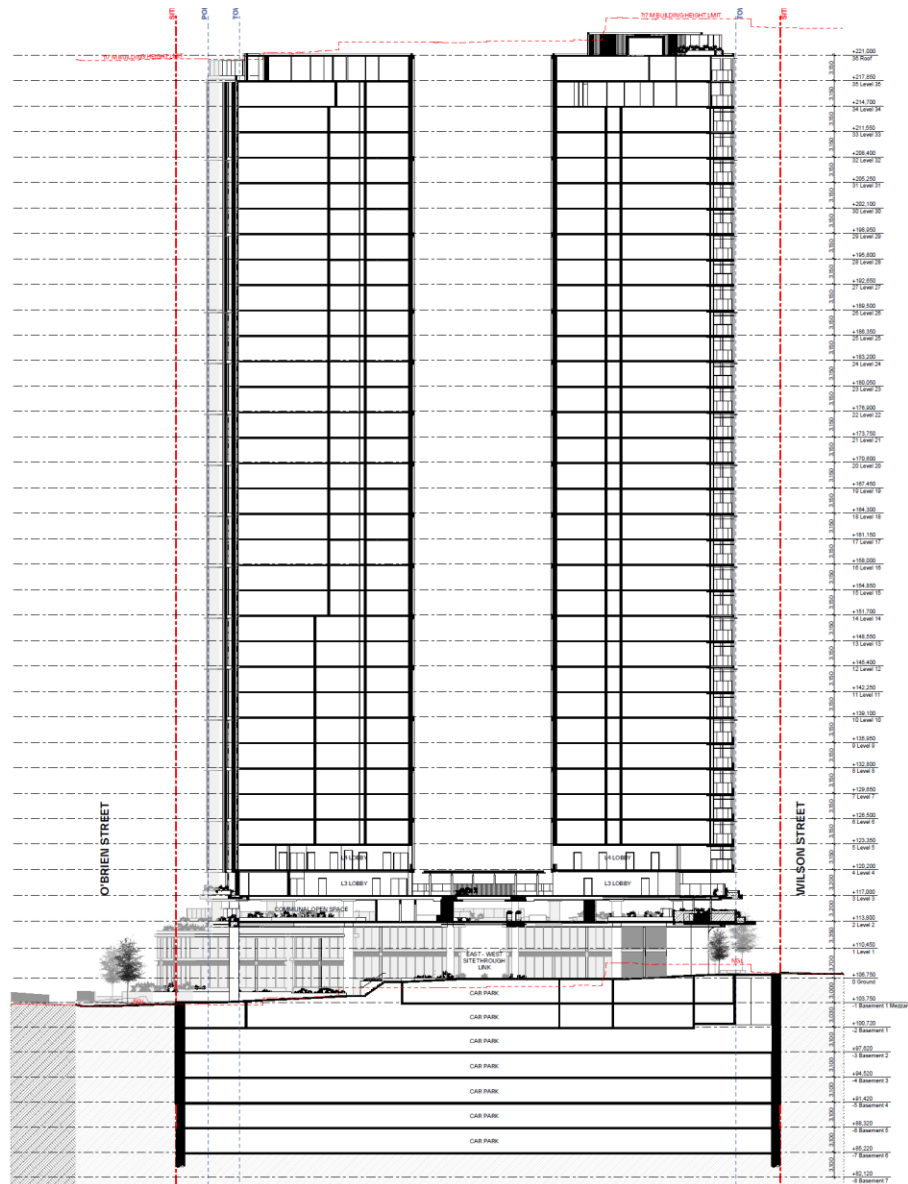
ELEVATION 1 (West and South, not to scale) - 849 - 859 Pacific Highway, and 2 and 8 Wilson Street, Chatswood



ELEVATION 2 (East and North, not to scale) - 849 - 859 Pacific Highway, and 2 and 8 Wilson Street, Chatswood



ELEVATION 3 (Internal South and North, not to scale) - 849 - 859 Pacific Highway, and 2 and 8 Wilson Street, Chatswood



SECTION 1 (not to scale) 849 - 859 Pacific Highway, and 2 and 8 Wilson Street, Chatswood

1.4 EER – Energy Efficiency Report

The mechanisms for energy assessment will be Section J and JV3 (for Retail / Commercial portions) and BASIX (for residential and common areas). The energy strategies below have been implemented in the proposed design. Some of these items were listed previously in this BASIX report.

Greenhouse-gas reduction and energy-efficiency initiatives include:

- Development has well-surpassed the BASIX Energy Target of 63 (target for 5+ stories).
- Project scoring an average >7.3-star NatHERS rating across the development. This is above the minimum required to pass BASIX and this contributed towards the excellent energy performance.
- Average cooling load = 7.7 MJ/m².year (permitted average is 20 MJ/m².year) – approx. 61% better than target
- Average heating load = 19.3 MJ/m².year (permitted average is 28.1 MJ/m².year) – approx. 31% better than target
- PV solar power to provide power for common lighting or other uses
- Lighting throughout the development will use LED technology (or high efficiency CFL's where appropriate).
- Fixtures, fittings and HVAC are very low-energy and include highly rated whitegoods and energy-efficient AC for units
- A building engineer/manager will be used to undertake building commissioning, for required systems, upon completion.
- Unit design included effective cross-ventilation, generous insulation, operable glazing and suitable shading devices. In particular, the corner dwellings, the dual aspect dwellings, the thermal mass and the large openings (such as sliders) all helped the passive cooling and heating.
- Glazing was appropriately designed to reduce heat losses in winter, and to give opportunities for natural cooling in summer. Furthermore, performance glazing is proposed for all of the development, including double-glazing for all apartments, retail and commercial areas.
- External walls, floors and roofs will all contain very generous added insulation, to help reduce the reliance on mechanical heating & cooling.
- Good Section J results were achieved, due to generous insulation, shading, thermal mass and high-end double-glazing throughout.

2. ESD Strategy (Environmentally Sustainable Development)

This project will be designed and built in accordance with many best practice principles of "Ecologically Sustainable Development" (ESD). This following ESD discussion describes some of the initiatives relating to governance, indoor environmental quality, energy, water, transport, emissions, ecology, materials and community.

2.1 Governance

The proposed development will establish and maintain strong governance practices. These, in turn, will promote engagement, transparency and resilience to the conditions of a changing climate.

Good environmental management practices will be adopted, including enhanced commissioning, ongoing tuning and the production of building-user information. Best practice construction environmental management processes will also be implemented. Furthermore, waste diversion from landfill will be targeted, through intensive recycling of construction and operational waste, wherever possible. Metering and monitoring strategies will also ensure operational performance can be tracked and optimised, for water, energy and HVAC.

2.1.1 Commissioning and Tuning

Relevant subcontractors will undertake detailed commissioning and building tuning for all major systems in the building. These systems will relate to water, energy and HVAC.

2.1.2 Adaptation and Resilience

Climate change adaptation and resilience has been considered in detail. This "futureproofing" strategy will enable the building to adapt to potential climate change challenges and future extreme weather events (with the intention of minimising both risk and disruption to the occupants, the building and the community). In particular, the use of rainwater tanks will help reduce the impact of drought periods, for irrigation. The use of performance glass, generous insulation and other thermal comfort techniques will help to deal with changes in climatic conditions, without the excessive reliance on AC. Light colours, shading and generous planting will also reduce heat-island effects.

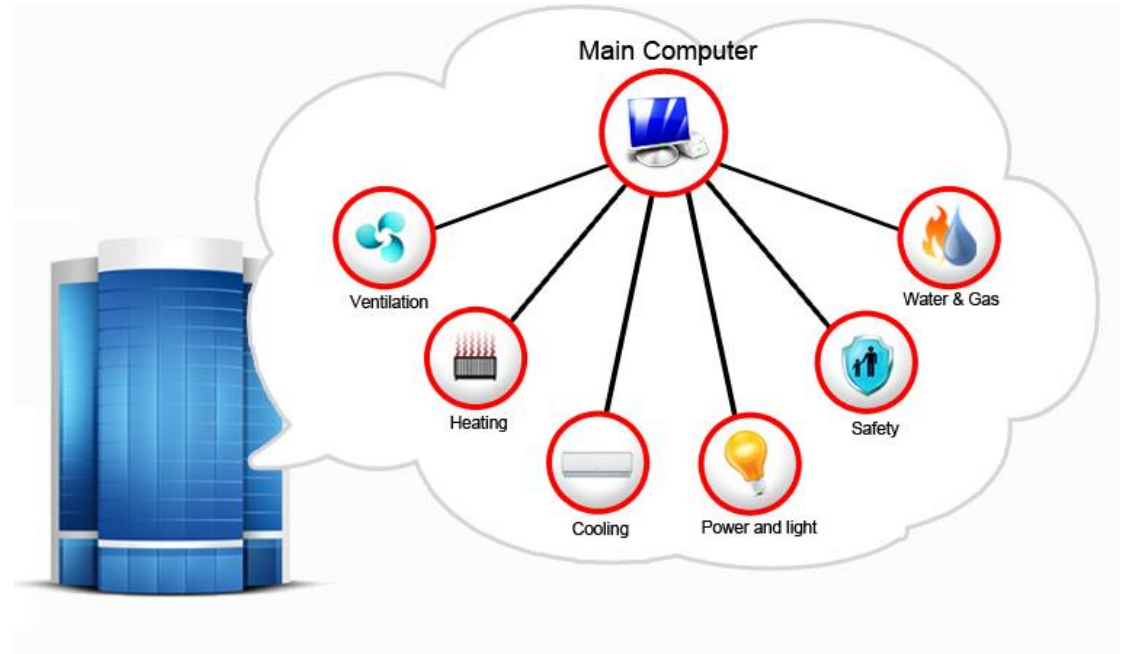


2.1.3 Building Information

Building operation and maintenance information will be provided and this information may be used to educate building occupants and visitors on the sustainability features of the buildings and how to use these features effectively, in order to reduce potential environmental impacts.

2.1.4 Metering and Monitoring

A metering and monitoring strategy will be implemented to track energy and water use. This system will also monitor progress against performance targets and assist with the identification of leaks, faults or excessive consumption. Sub-metering will be provided for major energy and water uses, supplying data to a Data Collection Point and/or a Building Management System (BMS). Energy sub-metering will be provided for end users. Likewise, water sub-metering may be provided for a variety of uses, pending the final design.



2.1.5 Construction Environmental Management

A Construction Environmental Management Plan (CEMP) will be developed and implemented by the head contractor. This CEMP will be critical to assist with managing the environmental performance, conditions, and impacts arising from excavations, the demolition work and the construction of the proposed buildings.

2.1.6 Operational Waste

Facilities will be provided for the collection, storage and separation of distinct waste streams for collection by the relevant waste contractors. A Waste Management Plan (WMP) will be provided for building operations. In addition, strategies such as well-located recycling facilities (for both the residential and retail/commercial zones) will be incorporated, to increase the ease of recycling.

A detailed operational waste management plan (OWMP) has also been prepared. This document, prepared by Elephants Foot, is called "849, 853 & 859 Pacific Highway & 2 & 8 Wilson St, Chatswood NSW 2067 - Mixed Use Development - OPERATIONAL WASTE MANAGEMENT PLAN". This OWMP details all recycling and waste management for the various building zones, during the operational phase.

2.2 Indoor Environmental Quality

Indoor Environmental Quality (IEQ) will be improved through consideration of indoor air quality, acoustic conditions, thermal comfort, visual comfort, daylighting and external views. The various IEQ strategies are outlined in more detail below.

2.2.1 Indoor Air Quality

The ventilation system for the building will be designed under the guidance of ASHRAE Standards, for issues such as separation distances between pollution sources and air intakes. Ductwork will also be protected during construction to ensure it remains free of moisture and debris prior to occupation.

Preference will be given to paints, adhesives, sealants, floor coverings and engineered wood products with low Volatile Organic Compound (VOC) emissions and low formaldehyde emissions. This will help to minimise indoor air contamination and to promote occupant health. For products with potential VOC emissions, priority will be given to E0 and Super E0, where possible, since these have significantly lower emissions than products with E2 ratings and below.

2.2.2 Acoustic Comfort

The design has considered acoustic comfort in detail, including general noise levels, reverberation and noise separation. For example, acoustic insulation has been proposed between apartments and corridors and this was selected to provide both acoustic and thermal comfort benefits.

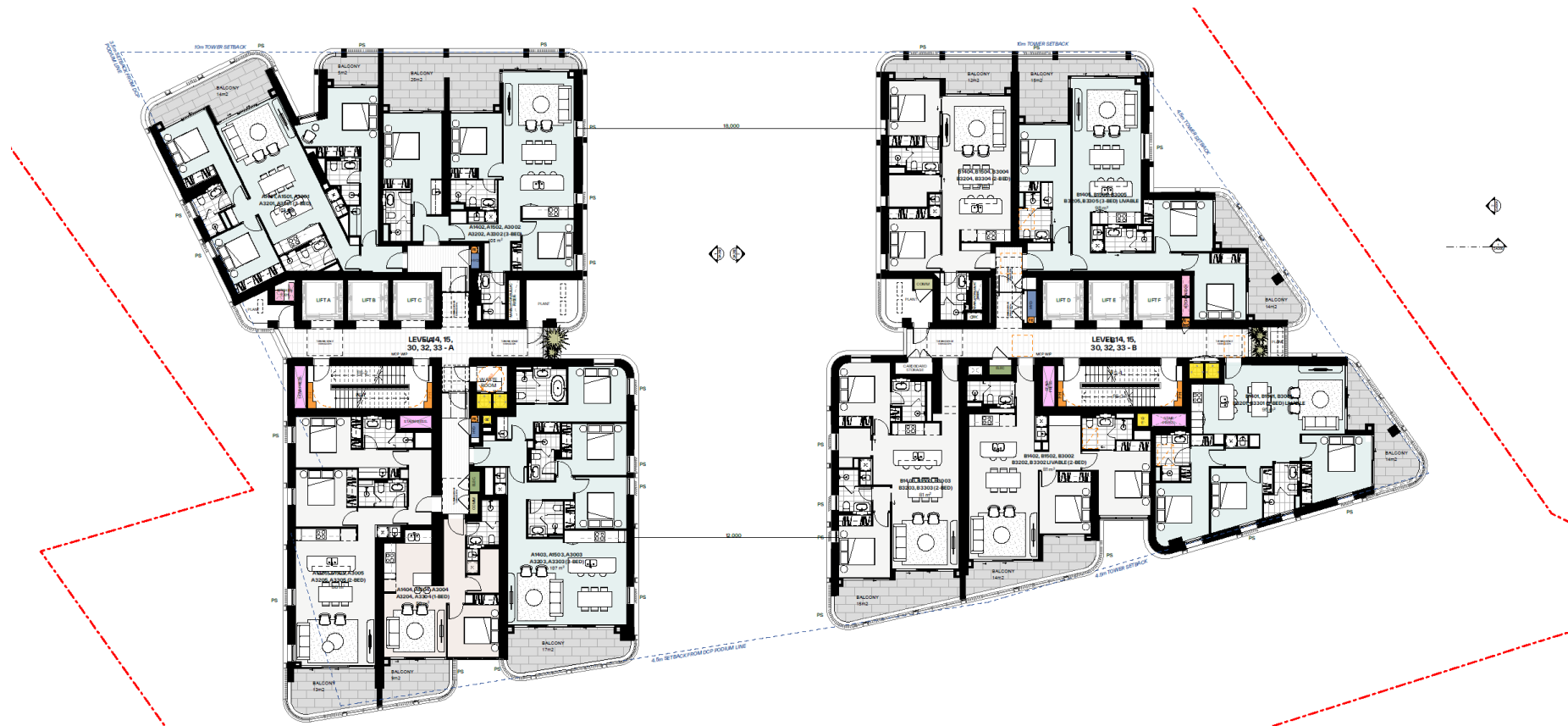
2.2.3 Visual Comfort

Glare control mechanisms such as internal blinds and shading devices will assist in maximizing visual comfort for the occupants. The design has also carefully considered the availability of daylight and external views. Furthermore, artificial lighting will consider appropriate colour perception and lighting levels, reduced glare from lamps and uniformity.

2.2.4 Daylighting

Simulations by the design team have shown excellent solar access to most dwellings, across the building. The fortunate position, orientation and surrounding environment, have allowed for this. The increased daylighting will improve the indoor environment and reduce the reliance on electric lighting. It will also improve productivity, health and overall well-being. The good thermal comfort results have shown that daylighting was not implemented at the expense of overheating. The NatHERS results were excellent and cooling estimates were superb, as discussed.





Solar Access through building dual aspects, plan layout and form (typical level) - 849 - 859 Pacific Highway, and 2 and 8 Wilson Street, Chatswood

2.2.5 Thermal Comfort

Performance glazing with some external shading will be utilised intelligently to improve thermal comfort for the occupants. Indeed, passive heating, passive cooling and natural ventilation have been carefully considered. To balance daylighting and views with thermal comfort, various performance-glazing products have been proposed (such as double-glazing for all apartments and priority zones). The glazing specifications were based on BASIX thermal comfort scores, to ensure that the correct glass is utilised for various orientations and building types.



It is also recognised that thermal comfort is extremely important for BASIX and sustainable design, however the windows also affect other important ESD issues. Therefore, a very careful and deliberate balance was made by the design team, to ensure good thermal comfort, minimal glare, good daylighting and connection to external views.

For example, the use of some darker tinting was implemented for thermal comfort, privacy and glare reduction. However, too much tinting can make rooms unnecessarily dark (and less effective with passive heating in winter) so lighter tints were often selected, if they were passing BASIX targets. The use of glazed balustrades was also implemented, to create exciting building aesthetics and to optimise passive heating and daylighting, through the building facades.

2.3 Energy

The design will seek to reduce energy consumption and greenhouse gas (GHG) emissions, by combining a well-designed building envelope and high-efficiency systems and services. Furthermore, smart controls, meters and automation will ensure that the major building services only operate when needed. Passive design principles have also been integrated (as discussed above) to reduce the demand on active systems such as HVAC and lighting.

2.3.1 National Construction Code Section J for Energy Efficiency

The NCC's Section J (National Construction Code) determines the minimum energy performance requirements for all new developments in Australia. The proposed design will meet all the NCC's Section J energy efficiency requirements. A detailed Section J summary report has already been prepared, to demonstrate the design strategies to comply with NCC 2022 Section J, under the DTS assessment. Section J DTS testing has indicated that the retail zones will pass comfortably, since generous insulation and performance glazing is also being proposed in these zones, similar to the apartment designs.

The Section J report also looks in detail at each of the following energy categories:

- o Part J1 Energy efficiency performance requirements
- o Part J2 Energy efficiency
- o Part J3 Elemental provisions for a sole-occupancy unit of a Class 2 or Class 4
- o Part J4 Building fabric
- o Part J5 Building sealing
- o Part J6 Air-conditioning and ventilation
- o Part J7 Artificial lighting and power
- o Part J8 Heated water supply and swimming pool and spa pool plant
- o Part J9 Energy monitoring and on-site distributed energy resources

Importantly, the "conditioned" zones will include the retail and apartment zones (but not hallways, plant rooms, pool rooms or back-of-house zones such as plant rooms or fire stairs). Even if air-conditioning is not proposed for some "habitable" parts of those building types, those zones will still be classified as "conditioned", for the purpose of the DTS analysis. This will ensure that all those high-importance areas have an excellent level of passive thermal comfort.

2.3.2 Energy reduction strategies

The following strategies have been implemented into the design to improve energy efficiency:

- Use of renewable energy sources including generous PV solar power.
- Low-carbon hot water systems (electric heat pumps, air-sourced)
- Efficient heating, ventilation and cooling (HVAC) systems including:
 - High efficiency condensers, pumps, fans, etc
 - Sensors or BMS to monitor and control building systems
 - Ventilation with efficiency controls such as zoning and occupancy sensors
 - Carbon Monoxide sensors and variable VSD fans in basement levels
 - Common area ventilation to include efficiency controls such as zoning, motion sensors and time clock controls



- Passive systems such as passive heating, passive cooling and natural ventilation (through the intelligent use and positioning of thermal mass, window openings, glazing, shading devices, etc).
- Efficient lighting, sensors and efficiency controls (with mainly LED lights). This includes internal, external and public domain lighting.
- Efficient whitegoods, fixtures and fittings for energy. In particular, the whitegoods have a huge influence (on per capita energy use) so excellent dryers and dishwashers will be provided (to educate the residents and also to boost the already high BASIX scores).
- Some areas with shut-off switches for lights and non-essential power to be turned off when unoccupied.
- Appliances and whitegoods (as listed previously) will have very high energy efficiency ratings.
- Efficient taps, showers and water-consuming whitegoods, which will hence reduce the hot water use, per capita.
- Minimised infiltration through weather stripping for doors and windows, dampers for exhaust fans and compliance with Section J.

These energy strategies will also contribute to reducing peak electrical demand from the development. This factor is very important when it comes to reducing the stress on the surrounding energy networks and infrastructure.

2.4 Transport

The following alternative transport initiatives are being proposed to improve amenity, to promote occupant health and to reduce transport related GHG emissions.

2.4.1 Active Transport Facilities

Secured bicycle parking and associated facilities have been provided for patrons and visitors. Travel information kits for residents and workers will be generated later. This will encourage public transport, walking, bicycles and carshare schemes (over private motor vehicle use). The provision of shared bathroom facilities has also been implemented for non-residential components of the building, and this will encourage staff to cycle to work.



2.4.2 Walkable Neighbourhood & Public Transport

The site is located close to numerous amenities, with a 'walk score' of 21 and a transit score of 78 (see below).

849 Pacific Highway

Chatswood, Sydney, 2067

Commute to **Downtown Sydney**

 15 min
  33 min
  60+ min
  60+ min
 [View Routes](#)

[Favorite](#)
[Map](#)
[Nearby Apartments](#)

Walk Score

21

Car-Dependent

Almost all errands require a car.

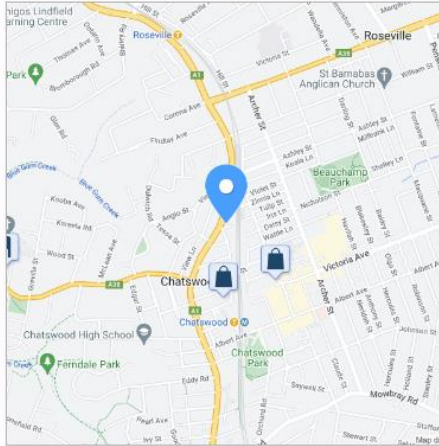
Transit Score

78

Excellent Transit

Transit is convenient for most trips.

[About your score](#)



About this Location



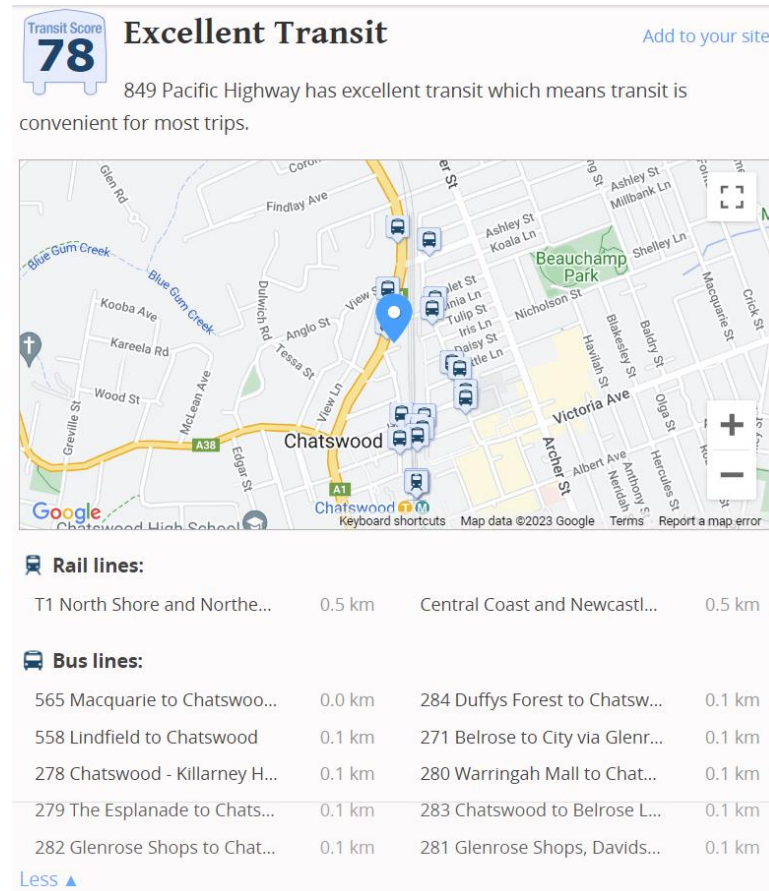
849 Pacific Highway has a Walk Score of 21 out of 100. This location is a Car-Dependent neighborhood so almost all errands require a car.

849 Pacific Highway is a seven minute walk from the T1 North Shore and Northern Line at the Chatswood Station Platform 2 stop.

This location is in the Chatswood neighborhood in Sydney. Nearby parks include Kenneth Slessor Park, Beauchamp Park and Currey Park.

Consequently, the project has been designed to optimise connectivity and pedestrian links within the site itself for "enhanced walkability". This will allow access to the numerous features within the site itself. The corner aspect of the site has been taken advantage of and there are now numerous (easily accessed) entrance zones to the buildings.

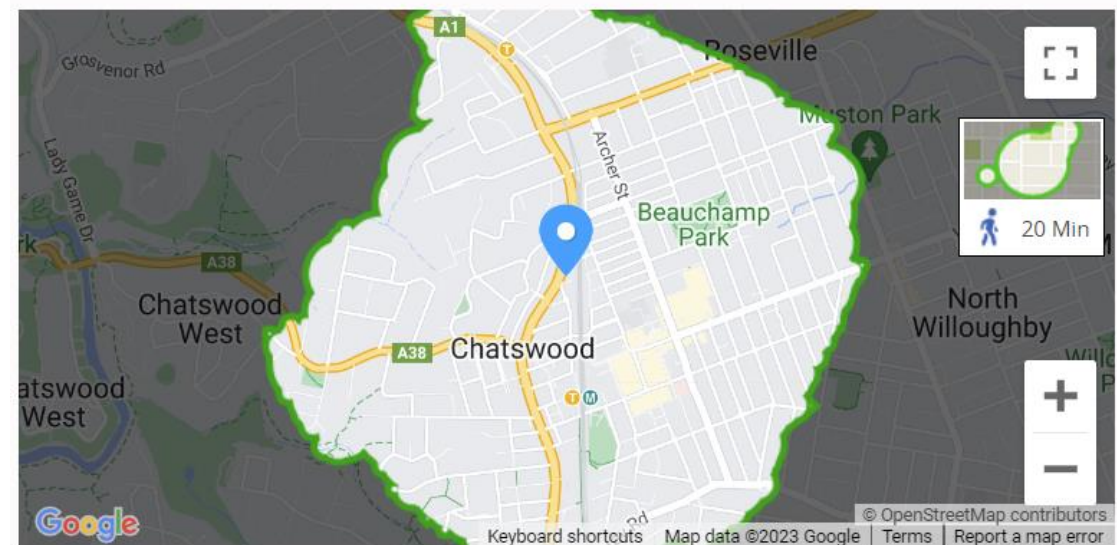
The convenience, aesthetics and safety of the design have been carefully considered to encourage users to walk and cycle, rather than driving cars.



Travel Time Map

[Add to your site](#)

Explore how far you can travel by car, bus, bike and foot from 849 Pacific Highway.



2.4.2 Electric car recharging stations

In order to encourage the future use of sustainable motor-vehicle transportation, electric car recharging facilities have been factored in for future incorporation. The design team have made the provisions for the future installation of EV chargers (with compliant switchboards and electrical infrastructure, in line with NCC 2022 requirements). The Section J report describes these provisions, in more detail.

2.5 Water

Potable water consumption will be minimised for the project by selecting very water-efficient fittings, fixtures and appliances. As shown by the BASIX specifications, products were generally selected within 1 star of the top star rating (using the WELS website). For example, toilets can be awarded up to 5 stars, so the architects chose 4-star ratings. Importantly, the top ratings can be very difficult from a cost, availability or functionality perspective. For example, a 5-star toilet requires a basin above the toilet cistern, and this is clearly not suitable for most designs.

2.5.1 Water strategies

The following strategies will be used to reduce potable water consumption. These initiatives may change slightly as detailed design is developed.

- Water efficient fittings and fixtures (especially taps, showers and toilets)
- Water efficient appliances (especially dishwashers)
- Rainwater harvesting and re-use on the site (10kL minimum, for rainwater storage)
- Rainwater reuse for irrigation and pool top-ups
- Recycling or reuse (closed loops) of any water required for fire testing.
- Efficient irrigation such as drip irrigation to planters and gardens
- At least 22% use by area of locally indigenous or “one-drop” water-efficient plants
- Generous deep-soil allocation
- Generous garden areas and green-roof gardens/planters, with low-water species



2.6 Materials

2.6.1 Material Selection

Materials used in the building industry are responsible for significant waste generation, resource depletion, GHG emissions and water consumption. To minimise these environmental impacts, the following principles will be considered for material selection on the site, as the design progresses:

- Selection of certified timbers, especially those with FSC-certification
- Consider Best Practice PVC products (or aim for avoidance of PVC, if possible)
- Design major building components for longevity, adaptation, disassembly, re-use and recycling
- Local procurement to support the local economy and reduce transport emissions
- Design for robustness - review the design and the materials to ensure durability for high-traffic surfaces and high-use fittings.
- Specification of sustainable products where appropriate, such as those with recycled content or potential for recycling
- Specification of products with third-party certifications (e.g., GECA or GreenTag) or those with EPDs (Environmental Product Declarations)
- Consider and implement 'green steel products', where feasible, from accredited steel makers and fabricators
- Consider and implement cement-replacements in concrete, where feasible, by using low-carbon options and fly ash. Detailed studies will be undertaken in design development to maximise this low-carbon approach.



2.6.2 Waste minimisation

A Waste Minimisation Plan has also been prepared to outline best practice waste management during the design, construction and operation of the project. The proposed waste strategy looks at issues such as:

- Establish waste targets (including minimum construction and demolition waste recycling targets).
- ‘Design out’ waste: Reduce the amount of materials used in the construction processes, wherever practical
- Implement best practice construction waste management plans and engage with the supply chain.
- Provide infrastructure and clear guidance (for the building users) to maximise waste recycling during operation.

The Head Contractor will develop a Construction Waste Management Plan (CWMP) in accordance with waste targets and this will:

- Define responsibilities and actions to prevent, reduce and recover waste
- Strive to recycle >90% by weight of construction and demolition waste
- Set a target of 70% operational waste to be diverted from landfill including compostable organics and green waste.
- Identify the waste arising from construction and detail waste reuse and recycling routes
- Record waste movements and quantities during construction and benchmark the results against best practice targets



2.7 Land Use & Ecology

The project will enhance existing ecological value by reusing a previously developed site. Consequently, the objective of the landscaping and ecology strategies will be to restore the ecological value of the site and use locally indigenous species around the site. This will help to reduce water consumption and also to enhance biodiversity and the restoration of native flora and fauna in the area.

2.8 Emissions

Emissions to water, soil and the sky will be minimised during construction and operation. A CEMP will be prepared for the site demolition and construction and the emissions will be addressed in this document.

2.8.1 Reduced Peak Discharge to Stormwater

The post-development peak event stormwater discharge from the site will not exceed the pre-development peak event stormwater discharge.

Stormwater discharged from the site will be designed to achieve high levels of pollution removal for pollutants such as total suspended solids, gross pollutants, total nitrogen, total phosphorus, petroleum hydrocarbons and free oils.

2.8.2 Light Pollution

Outdoor lighting on the project will generally be designed in accordance with AS 4282:1997 and external light pollution will be minimised. The reduction in light pollution will alleviate the risk of impacts on neighbours and wildlife.



2.8.3 Heat Island Effect

Lighter-coloured pavements, walls and roofs (and generous planting) have been proposed, in most locations, as shown in the plans, sections, renders and elevations. This strategy was mainly conceived in order to reduce the potential heat island effect on the site and surrounding areas. Furthermore, this strategy will also improve internal thermal comfort, significantly, in summer.

2.8.4 Refrigerant impacts

Refrigerants will be selected to try and target an Ozone Depletion Potential (ODP) of zero.

This includes most air conditioning systems and other refrigeration equipment. This may entail various HVAC&R systems and cold/freezer rooms found in the premises.

Environmental impacts from refrigerants leaking into the atmosphere must be minimised as far as possible, in order for this objective to be achieved.

2.8.5 Solar Reflectivity

Glass surfaces (and some other cladding materials) can be highly reflective. Various measures will be used to negate this effect and, in particular, low-reflectivity glass will be used, in accordance with council requirements.

The main issues with reflectivity will typically occur at the lower levels, since this is where motorists, pedestrians and public transport operators will be focusing their gaze. This zone of peripheral vision is extremely important for solar reflectance, especially for motorists and train/bus drivers.

With this in mind, the building will use exclusively low-reflective materials and glass at the lower levels. This building (and other similar buildings nearby) have been investigated, for potential reflectivity. It was concluded that a conservative “reflectivity target” of 20% should be adequate to prevent negative issues with solar reflectance. Most councils support that conservative figure and (reflectivity index permitted for external glazed elements should not exceed a 20% value).

If the 20% reflectivity target is successful for the lower levels, then the higher levels will work as well (or even better) with that same solar reflectivity. Hence, overall, the 20% target should work well, for the proposed facades of the towers.

In addition to the low-reflectivity glazing, various other measures will also be used to negate unwanted reflection. In particular, vertical fins and building articulation, will be used, in accordance with council's general recommendations. The additional shading devices have been incorporated for thermal benefits, privacy and reflectivity benefits, at all levels.

The final glazing products will be carefully selected, with these targets in mind. Importantly, the thermal comfort, acoustic and reflectivity targets should all be compatible, with the targets listed above.

2.9 Community

The project will be designed to maximise community benefit. In particular, it will encourage active lifestyles, maintain good pedestrian and cyclist linkages and facilitate ample, safe social interaction. The project will also be designed to minimise other undesirable impacts on the community such as glare and light pollution.

The following strategies will be considered:

- Marketing and education strategies to convey the numerous sustainability practices to wider audiences
- Ensuring that the design and the building materials do not lead to hazardous, undesirable or uncomfortable glare to pedestrians, motorists or occupants of surrounding buildings
- Minimise light spill to the sky.
- Promotion of healthy and active living through various design and education strategies (for example, with cycling storage and facilities)
- Incorporation of crime prevention through environmental design (CPTED)

3. Conclusion

The numerous initiatives outlined in this report demonstrate how the proposed development will incorporate best practice ESD initiatives into its design, construction and ongoing operation. Through a combination of energy, water and other ESD strategies, the project will indeed exceed the minimum requirements for sustainable development. The mitigation measures have also been discussed in detail and these measures support the high BASIX, water, energy, NatHERS and Section J scores, measured so far.

It is acknowledged that some strategies will need further refinement, during the latter stages of design. Strategies to be explored and refined in the future design stages include:

- Refinement of renewable energy design (such as final PV type and sizing, to optimise all available space)
- Energy-efficient building fabric and services to deliver optimal energy savings
- Energy-efficient windows (double-glazing and performance frames) to maximise thermal comfort, natural daylighting and views
- Careful lighting design (further refinement for both energy efficiency and "indoor environment quality")
- Selection of non-toxic materials, finishes, adhesives and products to improve Indoor Environmental Quality (IEQ)
- Final brand and model selection for efficient fittings, fixtures and appliances (noting that better options may be available in 1-2 years)
- Water-reuse balance, with an intelligent synergy between the reuse strategies for rainwater and future treated-wastewater supply
- Active transport facilities to encourage healthier living while reducing carbon emissions from transport
- Selective procurement of materials and internal finishings (to minimise any possible environmental and social impacts)
- Management and governance procedures (which will improve sustainability outcomes during operation).

As detailed earlier, the project was designed under the guidance of BASIX v4, NatHERS, NCC 2022 and also the Willoughby DCP 2023. The development's ESD principles were also developed in response to the SEARs dated 09/08/2024 for the SSDA (SSD-74319707).

4. Appendix 1 – BASIX and NatHERS Certificates

BASIX[®]Certificate

Building Sustainability Index www.basix.nsw.gov.au

Multi Dwelling

Certificate number: 1730554M_03

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 10/09/2020 published by the Department. This document is available at www.basix.nsw.gov.au

Secretary

Date of issue: Wednesday, 20 November 2024

To be valid, this certificate must be submitted with a development application or lodged with a complying development certificate application within 3 months of the date of issue.



Project summary

Project name	849 - 859 PACIFIC HIGHWAY CHATSWOOD 2067_03
Street address	849 - 859 PACIFIC HIGHWAY CHATSWOOD 2067
Local Government Area	WILLOUGHBY
Plan type and plan number	Deposited Plan DP1189541
Lot no.	1
Section no.	-
No. of residential flat buildings	1
Residential flat buildings: no. of dwellings	332
Multi-dwelling housing: no. of dwellings	0
No. of single dwelling houses	0

Project score

Water	✓ 43	Target 40
Thermal Performance	✓ Pass	Target Pass
Energy	✓ 66	Target 63
Materials	✓ -60	Target n/a

Certificate Prepared by

Name / Company Name: INTEGREGO CONSULTING PTY LTD

ABN (if applicable): 42630013008

Description of project

Project address	
Project name	849 - 859 PACIFIC HIGHWAY CHATSWOOD 2067_03
Street address	849 - 859 PACIFIC HIGHWAY CHATSWOOD 2067
Local Government Area	WILLOUGHBY
Plan type and plan number	Deposited Plan DP1189541
Lot no.	1
Section no.	-
Project type	
No. of residential flat buildings	1
Residential flat buildings: no. of dwellings	332
Multi-dwelling housing: no. of dwellings	0
No. of single dwelling houses	0
Site details	
Site area (m²)	4294
Roof area (m²)	1427
Non-residential floor area (m²)	4442
Residential car spaces	337
Non-residential car spaces	48

Common area landscape		
Common area lawn (m²)	43	
Common area garden (m²)	1708	
Area of indigenous or low water use species (m²)	371	
Assessor details and thermal loads		
Assessor number	DMN/19/1921	
Certificate number	0009127410	
Climate zone	56	
Project score		
Water	✓ 43	Target 40
Thermal Performance	✓ Pass	Target Pass
Energy	✓ 66	Target 63
Materials	✓ -60	Target n/a

Description of project

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

Residential flat buildings - Building1, 332 dwellings, 36 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)
A0501	2	76	0	0	0
A0505	1	50	0	0	0
A0603	2	78	0	0	0
A0701	2	76	0	0	0
A0705	1	50	0	0	0
A0803	2	78	0	0	0
A0901	2	76	0	0	0
A0905	1	50	0	0	0
A1003	2	78	0	0	0
A1101	2	76	0	0	0
A1105	1	50	0	0	0
A1203	2	78	0	0	0
A1301	2	76	0	0	0
A1305	1	50	0	0	0
A1403	3	107	0	0	0
A1502	3	105	0	0	0
A1601	3	103	0	0	0
A1605	2	86	0	0	0
A1704	1	50	0	0	0
A1803	3	107	0	0	0
A1902	3	105	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)
A0502	1	53	0	0	0
A0506	2	86	0	0	0
A0604	3	107	0	0	0
A0702	1	53	0	0	0
A0706	2	86	0	0	0
A0804	3	107	0	0	0
A0902	1	53	0	0	0
A0906	2	86	0	0	0
A1004	3	107	0	0	0
A1102	1	53	0	0	0
A1106	2	86	0	0	0
A1204	3	107	0	0	0
A1302	1	53	0	0	0
A1306	2	86	0	0	0
A1404	1	50	0	0	0
A1503	3	107	0	0	0
A1602	3	105	0	0	0
A1701	3	103	0	0	0
A1705	2	86	0	0	0
A1804	1	50	0	0	0
A1903	3	107	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)
A0503	2	78	0	0	0
A0601	2	76	0	0	0
A0605	1	50	0	0	0
A0703	2	78	0	0	0
A0801	2	76	0	0	0
A0805	1	50	0	0	0
A0903	2	78	0	0	0
A1001	2	76	0	0	0
A1005	1	50	0	0	0
A1103	2	78	0	0	0
A1201	2	76	0	0	0
A1205	1	50	0	0	0
A1303	2	78	0	0	0
A1401	3	103	0	0	0
A1405	2	86	0	0	0
A1504	1	50	0	0	0
A1603	3	107	0	0	0
A1702	3	105	0	0	0
A1801	3	103	0	0	0
A1805	2	86	0	0	0
A1904	1	50	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)
A0504	3	107	0	0	0
A0602	1	53	0	0	0
A0606	2	86	0	0	0
A0704	3	107	0	0	0
A0802	1	53	0	0	0
A0806	2	86	0	0	0
A0904	3	107	0	0	0
A1002	1	53	0	0	0
A1006	2	86	0	0	0
A1104	3	107	0	0	0
A1202	1	53	0	0	0
A1206	2	86	0	0	0
A1304	3	107	0	0	0
A1402	3	105	0	0	0
A1501	3	103	0	0	0
A1505	2	86	0	0	0
A1604	1	50	0	0	0
A1703	3	107	0	0	0
A1802	3	105	0	0	0
A1901	3	103	0	0	0
A1905	2	86	0	0	0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
A2001	3	103	0	0	0
A2005	2	86	0	0	0
A2104	1	50	0	0	0
A2203	3	107	0	0	0
A2302	3	105	0	0	0
A2401	3	103	0	0	0
A2405	2	86	0	0	0
A2504	1	50	0	0	0
A2603	3	107	0	0	0
A2702	3	105	0	0	0
A2801	3	103	0	0	0
A2805	2	86	0	0	0
A2904	1	50	0	0	0
A3003	3	107	0	0	0
A3102	3	105	0	0	0
A3201	3	104	0	0	0
A3205	2	86	0	0	0
A3304	1	50	0	0	0
A3403	3	138	0	0	0
b0502	1	55	0	0	0
b0601	3	108	0	0	0
b0605	3	98	0	0	0
b0704	2	77	0	0	0
b0803	2	81	0	0	0
b0902	1	55	0	0	0
b1001	3	108	0	0	0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
A2002	3	105	0	0	0
A2101	3	103	0	0	0
A2105	2	86	0	0	0
A2204	1	50	0	0	0
A2303	3	107	0	0	0
A2402	3	105	0	0	0
A2501	3	103	0	0	0
A2505	2	86	0	0	0
A2604	1	50	0	0	0
A2703	3	107	0	0	0
A2802	3	105	0	0	0
A2901	3	103	0	0	0
A2905	2	86	0	0	0
A3004	1	50	0	0	0
A3103	3	107	0	0	0
A3202	3	105	0	0	0
A3301	3	104	0	0	0
A3305	2	86	0	0	0
A3404	3	116	0	0	0
b0503	2	81	0	0	0
b0602	1	55	0	0	0
b0701	3	108	0	0	0
b0705	3	98	0	0	0
b0804	2	77	0	0	0
b0903	2	81	0	0	0
b1002	1	55	0	0	0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
A2003	3	107	0	0	0
A2102	3	105	0	0	0
A2201	3	103	0	0	0
A2205	2	86	0	0	0
A2304	1	50	0	0	0
A2403	3	107	0	0	0
A2502	3	105	0	0	0
A2601	3	103	0	0	0
A2605	2	86	0	0	0
A2704	1	50	0	0	0
A2803	3	107	0	0	0
A2902	3	105	0	0	0
A3001	3	104	0	0	0
A3005	2	86	0	0	0
A3104	1	50	0	0	0
A3203	3	107	0	0	0
A3302	3	105	0	0	0
A3401	3	109	0	0	0
A3501	4+	230	0	0	0
b0504	2	77	0	0	0
b0603	2	81	0	0	0
b0702	1	55	0	0	0
b0801	3	108	0	0	0
b0805	3	98	0	0	0
b0904	2	77	0	0	0
b1003	2	81	0	0	0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
A2004	1	50	0	0	0
A2103	3	107	0	0	0
A2202	3	105	0	0	0
A2301	3	103	0	0	0
A2305	2	86	0	0	0
A2404	1	50	0	0	0
A2503	3	107	0	0	0
A2602	3	105	0	0	0
A2701	3	103	0	0	0
A2705	2	86	0	0	0
A2804	1	50	0	0	0
A2903	3	107	0	0	0
A3002	3	105	0	0	0
A3101	3	104	0	0	0
A3105	2	86	0	0	0
A3204	1	50	0	0	0
A3303	3	107	0	0	0
A3402	3	105	0	0	0
b0501	3	108	0	0	0
b0505	3	98	0	0	0
b0604	2	77	0	0	0
b0703	2	81	0	0	0
b0802	1	55	0	0	0
b0901	3	108	0	0	0
b0905	3	98	0	0	0
b1004	2	77	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)
b1005	3	98	0	0	0
b1104	2	77	0	0	0
b1203	2	81	0	0	0
b1302	1	55	0	0	0
b1401	3	90	5	0	0
b1405	3	98	0	0	0
b1504	2	77	0	0	0
b1603	2	81	0	0	0
b1702	2	81	0	0	0
b1801	3	90	5	0	0
b1805	3	98	0	0	0
b1904	2	77	0	0	0
b2003	2	81	0	0	0
b2102	2	81	0	0	0
b2201	3	90	5	0	0
b2205	3	98	0	0	0
b2304	2	77	0	0	0
b2403	2	81	0	0	0
b2502	2	81	0	0	0
b2601	3	90	5	0	0
b2605	3	98	0	0	0
b2704	2	77	0	0	0
b2803	2	81	0	0	0
b2902	2	81	0	0	0
b3001	3	90	5	0	0
b3005	3	98	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)
b1101	3	108	0	0	0
b1105	3	98	0	0	0
b1204	2	77	0	0	0
b1303	2	81	0	0	0
b1402	2	81	0	0	0
b1501	3	90	5	0	0
b1505	3	98	0	0	0
b1604	2	77	0	0	0
b1703	2	81	0	0	0
b1802	2	81	0	0	0
b1901	3	90	5	0	0
b1905	3	98	0	0	0
b2004	2	77	0	0	0
b2103	2	81	0	0	0
b2202	2	81	0	0	0
b2301	3	90	5	0	0
b2305	3	98	0	0	0
b2404	2	77	0	0	0
b2503	2	81	0	0	0
b2602	2	81	0	0	0
b2701	3	90	5	0	0
b2705	3	98	0	0	0
b2804	2	77	0	0	0
b2903	2	81	0	0	0
b3002	2	81	0	0	0
b3101	3	90	5	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)
b1102	1	55	0	0	0
b1201	3	108	0	0	0
b1205	3	98	0	0	0
b1304	2	77	0	0	0
b1403	2	81	0	0	0
b1502	2	81	0	0	0
b1601	3	90	5	0	0
b1605	3	98	0	0	0
b1704	2	77	0	0	0
b1803	2	81	0	0	0
b1902	2	81	0	0	0
b2001	3	90	5	0	0
b2005	3	98	0	0	0
b2104	2	77	0	0	0
b2203	2	81	0	0	0
b2302	2	81	0	0	0
b2401	3	90	5	0	0
b2405	3	98	0	0	0
b2504	2	77	0	0	0
b2603	2	81	0	0	0
b2702	2	81	0	0	0
b2801	3	90	5	0	0
b2805	3	98	0	0	0
b2904	2	77	0	0	0
b3003	2	81	0	0	0
b3102	2	81	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)
b1103	2	81	0	0	0
b1202	1	55	0	0	0
b1301	3	108	0	0	0
b1305	3	98	0	0	0
b1404	2	77	0	0	0
b1503	2	81	0	0	0
b1602	2	81	0	0	0
b1701	3	90	5	0	0
b1705	3	98	0	0	0
b1804	2	77	0	0	0
b1903	2	81	0	0	0
b2002	2	81	0	0	0
b2101	3	90	5	0	0
b2105	3	98	0	0	0
b2204	2	77	0	0	0
b2303	2	81	0	0	0
b2402	2	81	0	0	0
b2501	3	90	5	0	0
b2505	3	98	0	0	0
b2604	2	77	0	0	0
b2703	2	81	0	0	0
b2802	2	81	0	0	0
b2901	3	90	5	0	0
b2905	3	98	0	0	0
b3004	2	77	0	0	0
b3103	2	81	0	0	0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
b3104	2	77	0	0	0
b3203	2	81	0	0	0
b3302	2	81	0	0	0
b3401	3	114	0	0	0
LW1	1	35	0	0	0
LW13	1	35	0	0	0
LW17	1	35	0	0	0
LW20	1	35	0	0	0
LW24	1	35	0	0	0
LW6	1	35	0	0	0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
b3105	3	98	0	0	0
b3204	2	77	0	0	0
b3303	2	81	0	0	0
b3402	3	141	0	0	0
LW10	1	35	0	0	0
LW14	1	35	0	0	0
LW18	1	35	0	0	0
LW21	1	35	0	0	0
LW3	1	35	0	0	0
LW7	1	35	0	0	0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
b3201	3	90	5	0	0
b3205	3	98	0	0	0
b3304	2	77	0	0	0
b3403	4+	185	0	0	0
LW11	1	35	0	0	0
LW15	1	35	0	0	0
LW19	1	35	0	0	0
LW22	1	40	0	0	0
LW4	1	35	0	0	0
LW8	1	35	0	0	0

Dwelling no.	No. of bedrooms	Conditioned floor area (m²)	Unconditioned floor area (m²)	Area of garden & lawn (m²)	Indigenous species (min area m²)
b3202	2	81	0	0	0
b3301	3	90	5	0	0
b3305	3	98	0	0	0
b3501	4+	436	0	0	0
LW12	1	35	0	0	0
LW16	1	35	0	0	0
LW2	1	31	4	0	0
LW23	1	34	4	0	0
LW5	1	35	0	0	0
LW9	1	36	0	0	0

Description of project

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

Common areas of unit building - Building1

Common area	Floor area (m²)	Common area	Floor area (m²)	Common area	Floor area (m²)
Lift bank (No. 1)	-	Lift bank (No. 2)	-	Sauna	7
Undercover car park area	14488	Switch rooms	47	Comms rooms	20
Substations	189	Garbage rooms (excl. bulky)	184	Bulky Store room	59
Other store rooms	157	WC rooms communal	14	Fire and pump rooms	224
Cold water plant rooms	40	Fan rooms basement	93	Other small plant in basement	65
Other small plant upper levels	511	Ground floor lobbies	66	Hallway/lobby lower levels	475
Hallway/lobby upper levels	392				

Schedule of BASIX commitments

1. Commitments for Residential flat buildings - Building1

(a) Buildings

(i) Materials

(b) Dwellings

(i) Water

(ii) Energy

(iii) Thermal Performance

(c) Common areas and central systems/facilities

(i) Water

(ii) Energy

2. Commitments for multi-dwelling housing

(a) Dwellings

(i) Water

(ii) Energy

(iii) Thermal Performance and Materials

3. Commitments for single dwelling houses

(a) Dwellings

(i) Water

(ii) Energy

(iii) Thermal Performance and Materials

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

(b) Common areas and central systems/facilities

(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 Residential flat buildings - Building1

(a) Buildings

(i) Materials	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) 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 "Floor types", "External wall types", "Internal wall types", "Ceiling and roof types", "Frames" and "Glazing" tables below.			✓
(b) The applicant must show on the plans accompanying the application for a construction certificate (or complying development certificate, if applicable), all specifications included in the tables below.		✓	
(c) The applicant must construct the floors, walls, roof, ceiling and roof, windows, glazed doors and skylights of the development in accordance with the specifications listed in the tables below. In the case of glazing, a 5% variance from the area values listed in the "Frames" and "Glazing" tables is permitted.	✓	✓	✓
(d) The applicant must show through receipts that the materials purchased for construction are consistent with the specifications listed in the below tables.			✓

Floor types

Floor type	Area (m2)	Insulation	Low emissions option
suspended floor above open subfloor, frame: suspended concrete slab	340	rockwool batts, roll or pump-in	-
suspended floor above enclosed subfloor, frame: suspended concrete slab	1520	-	-
floors above habitable rooms, frame: suspended concrete slab	42741	-	none

External wall types

External wall type	Construction type	Area (m2)	Low emissions option	Insulation
External wall type 1	AAC veneer, frame: light steel frame	4166	none	rockwool batts, roll or pump-in
External wall type 2	concrete panel/ plasterboard, frame: light steel frame	10083	-	rockwool batts, roll or pump-in

External wall types				
External wall type	Construction type	Area (m2)	Low emissions option	Insulation
External wall type 3	framed (metal clad), frame:light steel frame	14490	-	rockwool batts, roll or pump-in

Internal wall types			
Internal wall type	Construction type	Area (m2)	Insulation
Internal wall type 1	plasterboard, frame:light steel frame	52183	-
Internal wall type 2	75 mm AAC panel, frame:light steel frame	15624	-

Reinforcement concrete frames/columns		
Building has reinforced concrete frame/columns?	Volume (m³)	Low emissions option
yes	4614	-

Ceiling and roof types			
Ceiling and roof type	Area (m²)	Roof Insulation	Ceiling Insulation
concrete - plasterboard internal, frame: light steel frame	1427	-	foil-foam composite board

Glazing types			Frame types				
Single glazing (m²)	Double glazing (m²)	Triple glazing (m²)	Aluminium frames (m²)	Timber frames (m²)	uPVC frames (m²)	Steel frames (m²)	Composite frames (m²)
0	22075	0	22075	0	0	0	0

(b) 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.	✓	✓	✓

	Fixtures					Appliances		Individual pool				Individual spa		
Dwelling no.	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
b3501	4 star (> 4.5 but <= 6 L/min)	4 star	5 star	5 star	-	not specified	4 star	-	-	-	-	12	yes	no

	Fixtures					Appliances		Individual pool				Individual spa		
Dwelling no.	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 other dwellings	4 star (> 4.5 but <= 6 L/min)	4 star	5 star	5 star	-	not specified	4 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	No alternative water supply	-	-	-	-	-	-	-

(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.		✓	✓
(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.	✓	✓	✓

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(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
All dwellings	Central hot water system (No. 1)	individual fan, ducted to façade or roof	manual switch on/off	individual fan, ducted to façade or roof	manual switch on/off	individual fan, ducted to façade or roof	manual switch on/off

	Cooling		Heating		Natural lighting	
Dwelling no.	living areas	bedroom areas	living areas	bedroom areas	No. of bathrooms or toilets	Main kitchen
b3501	1-phase airconditioning - ducted / EER 2.5 - 3.0	1-phase airconditioning - ducted / EER 2.5 - 3.0	1-phase airconditioning - ducted / EER 3.0 - 3.5	1-phase airconditioning - ducted / EER 3.0 - 3.5	1	yes
A0503, A0603, A0703, A0803, A0903, A1003, A1103, A1203, A1303, A1402, A1502, A1602, A1702, A1802,	1-phase airconditioning - ducted / EER 2.5 - 3.0	1-phase airconditioning - ducted / EER 2.5 - 3.0	1-phase airconditioning - ducted / EER 3.0 - 3.5	1-phase airconditioning - ducted / EER 3.0 - 3.5	0	yes

	Cooling		Heating		Natural lighting	
Dwelling no.	living areas	bedroom areas	living areas	bedroom areas	No. of bathrooms or toilets	Main kitchen
A1902, A2002, A2102, A2202, A2302, A2402, A2502, A2602, A2702, A2802, A2902, A3002, A3102, A3202, A3402, A3501, b0501, b0601, b0701, b0801, b0901, b1001, b1101, b1201, b1301, b3401, LW11, LW12, LW13, LW14, LW15, LW18, LW19, LW20, LW21, LW24, LW3, LW5, LW7, LW8, LW9						
A0501, A0601, A0701, A0801, A0901, A1001, A1101, A1201, A1301, A1401, A1501, A1601, A1701, A1801, A1901, A2001, A2101, A2201, A2301, A2401, A2501, A2601, A2701, A2801, A2901, A3001, A3101, A3201, A3301, A3401, b0503, b0603, b0703, b0803, b0903, b1003, b1103, b1203, b1303, b1401,	1-phase airconditioning - ducted / EER 2.5 - 3.0	1-phase airconditioning - ducted / EER 2.5 - 3.0	1-phase airconditioning - ducted / EER 3.0 - 3.5	1-phase airconditioning - ducted / EER 3.0 - 3.5	1	no

	Cooling		Heating		Natural lighting	
Dwelling no.	living areas	bedroom areas	living areas	bedroom areas	No. of bathrooms or toilets	Main kitchen
b1403, b1501, b1503, b1601, b1603, b1701, b1703, b1801, b1803, b1901, b1903, b2001, b2003, b2101, b2103, b2201, b2203, b2301, b2303, b2401, b2403, b2501, b2503, b2601, b2603, b2701, b2703, b2801, b2803, b2901, b2903, b3001, b3003, b3101, b3103, b3201, b3203, b3301, b3303, LW2, LW23						
All other dwellings	1-phase airconditioning - ducted / EER 2.5 - 3.0	1-phase airconditioning - ducted / EER 2.5 - 3.0	1-phase airconditioning - ducted / EER 3.0 - 3.5	1-phase airconditioning - ducted / EER 3.0 - 3.5	0	no

	Individual pool			Individual spa		Appliances other efficiency measures				
Dwelling no.	Pool heating system	Pool Pump	Timer	Spa heating system	Timer	Kitchen cooktop/oven	Dishwasher	Clothes dryer	Indoor or sheltered clothes drying line	Private outdoor or unsheltered clothes drying line
b3501	-	-	-	electric heat pump	yes	induction cooktop & electric oven	4 star	8.0 star	no	no
All other dwellings	-	-	-	-	-	induction cooktop & electric oven	4 star	8.0 star	no	no

(iii) Thermal Performance	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.	✓	✓	✓
(i) The applicant must show on The plans accompanying The development application for The proposed development, The locations of ceiling fans set out in The Assessor Certificate.	✓		
(j) The applicant must show on the plans accompanying the application for a construction certificate (or complying development certificate, if applicable), the locations of ceiling fans set out in the Assessor Certificate.		✓	

	Thermal loads		
Dwelling no.	Area adjusted heating load (in MJ/m ² /yr)	Area adjusted cooling load (in MJ/m ² /yr)	Area adjusted total load (in MJ/m ² /yr)
A0501	20.50	10.00	30.500
A0502	7.90	8.00	15.900
A0503	24.10	6.80	30.900
A0504	11.90	7.90	19.800

	Thermal loads		
Dwelling no.	Area adjusted heating load (in MJ/m ² /yr)	Area adjusted cooling load (in MJ/m ² /yr)	Area adjusted total load (in MJ/m ² /yr)
A0505	12.10	13.70	25.800
A0506	22.30	4.80	27.100
A0601	20.90	10.10	31.000
A0602	8.00	8.10	16.100
A0604	11.20	7.90	19.100
A0605	10.20	13.10	23.300
A0606	20.40	5.20	25.600
A0701	21.20	9.80	31.000
A0702	8.50	8.00	16.500
A0703	24.60	6.60	31.200
A0704	11.80	7.80	19.600
A0705	10.50	12.80	23.300
A0706	22.50	5.00	27.500
A0801	22.90	9.10	32.000
A0802	8.50	8.20	16.700
A0804	11.90	7.70	19.600
A0805	10.80	12.50	23.300
A0806	21.30	5.20	26.500
A0901	23.20	9.00	32.200
A0902	8.90	7.30	16.200
A0903	25.40	6.90	32.300
A0904	12.30	7.80	20.100
A0905	11.00	12.50	23.500
A0906	23.30	5.10	28.400
A1001	23.30	8.90	32.200
A1002	9.900	7.20	17.100
A1003	26.40	6.60	33.000
A1004	13.40	7.60	21.000
A1005	12.40	11.10	23.500
A1006	23.20	5.40	28.600
A1101	23.60	9.00	32.600

	Thermal loads		
Dwelling no.	Area adjusted heating load (in MJ/m²/yr)	Area adjusted cooling load (in MJ/m²/yr)	Area adjusted total load (in MJ/m²/yr)
A1102	10.40	6.50	16.900
A1103	27.40	6.70	34.100
A1104	13.90	7.90	21.800
A1105	12.60	11.00	23.600
A1106	25.30	5.00	30.300
A1201	23.70	9.00	32.700
A1202	10.20	7.00	17.200
A1203	26.80	6.40	33.200
A1204	13.80	7.70	21.500
A1205	12.70	10.90	23.600
A1206	23.70	5.40	29.100
A1301	23.90	8.90	32.800
A1302	10.90	7.00	17.900
A1303	28.10	6.70	34.800
A1304	14.20	7.60	21.800
A1305	13.00	10.60	23.600
A1306	25.80	5.00	30.800
A1401	23.10	6.40	29.500
A1402	24.80	7.60	32.400
A1403	14.10	7.40	21.500
A1404	13.10	10.40	23.500
A1405	24.00	5.50	29.500
A1501	23.10	6.50	29.600
A1502	25.70	7.20	32.900
A1503	14.40	7.40	21.800
A1504	13.20	10.20	23.400
A1505	25.90	5.10	31.000
A1601	23.40	6.50	29.900
A1602	25.00	7.80	32.800
A1603	14.30	7.30	21.600
A1604	13.30	10.20	23.500

	Thermal loads		
Dwelling no.	Area adjusted heating load (in MJ/m ² /yr)	Area adjusted cooling load (in MJ/m ² /yr)	Area adjusted total load (in MJ/m ² /yr)
A1605	24.30	5.50	29.800
A1701	23.40	6.40	29.800
A1702	25.90	7.00	32.900
A1703	14.60	7.40	22.000
A1704	13.40	10.00	23.400
A1705	26.30	4.90	31.200
A1801	23.70	6.50	30.200
A1802	25.40	7.40	32.800
A1803	14.60	7.60	22.200
A1804	13.60	10.00	23.600
A1805	24.70	5.40	30.100
A1901	23.80	6.30	30.100
A1902	26.30	7.00	33.300
A1903	14.90	7.70	22.600
A1904	13.60	9.80	23.400
A1905	26.60	5.20	31.800
A2001	24.00	6.50	30.500
A2002	25.60	7.70	33.300
A2003	14.80	7.60	22.400
A2004	13.50	9.90	23.400
A2005	25.10	5.20	30.300
A2101	23.90	6.50	30.400
A2102	26.40	7.20	33.600
A2103	15.00	7.70	22.700
A2104	13.40	9.80	23.200
A2105	26.90	5.00	31.900
A2201	24.10	6.40	30.500
A2202	25.70	7.50	33.200
A2203	14.90	7.50	22.400
A2204	13.40	9.70	23.100
A2205	25.00	5.40	30.400

	Thermal loads		
Dwelling no.	Area adjusted heating load (in MJ/m ² /yr)	Area adjusted cooling load (in MJ/m ² /yr)	Area adjusted total load (in MJ/m ² /yr)
A2301	24.10	6.50	30.600
A2302	26.60	7.20	33.800
A2304	13.70	9.80	23.500
A2305	27.00	4.90	31.900
A2402	26.00	7.40	33.400
A2403	15.10	7.60	22.700
A2404	14.00	9.60	23.600
A2405	25.50	5.20	30.700
A2502	26.90	7.10	34.000
A2503	15.40	7.50	22.900
A2504	14.20	9.80	24.000
A2505	27.40	4.80	32.200
A2602	26.10	7.50	33.600
A2604	14.30	9.80	24.100
A2605	25.40	5.20	30.600
A2701	24.50	6.20	30.700
A2702	26.20	7.50	33.700
A2703	15.30	7.40	22.700
A2705	25.60	5.40	31.000
A2801	24.60	6.20	30.800
A2802	27.10	7.30	34.400
A2803	15.60	7.60	23.200
A2805	27.50	5.20	32.700
A2904	14.60	9.80	24.400
A3003	15.30	7.50	22.800
A3004	14.40	9.80	24.200
A3101	24.80	6.20	31.000
A3102	27.10	7.00	34.100
A3104	14.70	9.90	24.600
A3105	27.90	4.90	32.800
A3201	25.00	6.30	31.300

	Thermal loads		
Dwelling no.	Area adjusted heating load (in MJ/m²/yr)	Area adjusted cooling load (in MJ/m²/yr)	Area adjusted total load (in MJ/m²/yr)
A3202	26.00	7.50	33.500
A3203	14.90	7.60	22.500
A3205	26.10	5.50	31.600
A3301	25.00	6.20	31.200
A3302	25.40	7.50	32.900
A3303	5.70	7.80	13.500
A3305	27.30	5.40	32.700
A3401	31.60	6.40	38.000
A3402	18.60	8.70	27.300
A3403	17.50	10.80	28.300
A3404	27.00	10.50	37.500
A3501	25.5	10.0	35.500
b0501	12.80	10.20	23.000
b0502	8.60	13.60	22.200
b0503	25.60	6.20	31.800
b0504	23.70	7.40	31.100
b0505	15.50	6.20	21.700
b0601	11.60	10.50	22.100
b0602	5.80	13.50	19.300
b0604	22.60	7.40	30.000
b0605	12.80	6.60	19.400
b0701	13.50	10.20	23.700
b0702	6.00	13.40	19.400
b0703	25.40	6.20	31.600
b0704	23.40	7.00	30.400
b0705	14.20	6.20	20.400
b0801	12.20	10.10	22.300
b0802	6.20	13.00	19.200
b0803	25.20	6.40	31.600
b0804	23.40	7.10	30.500
b0805	13.60	6.60	20.200

	Thermal loads		
Dwelling no.	Area adjusted heating load (in MJ/m ² /yr)	Area adjusted cooling load (in MJ/m ² /yr)	Area adjusted total load (in MJ/m ² /yr)
b0901	13.20	10.00	23.200
b0902	6.40	12.90	19.300
b0903	26.00	6.10	32.100
b0904	24.00	6.70	30.700
b0905	14.70	6.40	21.100
b1001	13.90	10.00	23.900
b1002	7.40	11.80	19.200
b1003	27.20	6.40	33.600
b1004	25.30	6.60	31.900
b1005	15.30	6.50	21.800
b1101	15.80	10.00	25.800
b1102	7.60	11.50	19.100
b1103	28.00	6.10	34.100
b1104	26.00	5.70	31.700
b1105	16.40	6.20	22.600
b1201	14.30	10.10	24.400
b1202	7.70	11.40	19.100
b1203	27.70	6.30	34.000
b1204	25.70	6.30	32.000
b1205	15.70	6.60	22.300
b1301	16.00	9.80	25.800
b1302	7.90	11.40	19.300
b1303	28.50	6.00	34.500
b1304	26.40	5.90	32.300
b1305	16.80	6.10	22.900
b1401	5.60	6.50	12.100
b1402	17.30	10.50	27.800
b1403	28.00	6.30	34.300
b1404	26.10	6.60	32.700
b1405	16.00	6.70	22.700
b1501	6.70	6.20	12.900

	Thermal loads		
Dwelling no.	Area adjusted heating load (in MJ/m ² /yr)	Area adjusted cooling load (in MJ/m ² /yr)	Area adjusted total load (in MJ/m ² /yr)
b1502	16.90	10.40	27.300
b1503	28.70	5.90	34.600
b1504	26.60	6.00	32.600
b1505	17.00	6.10	23.100
b1601	5.70	6.40	12.100
b1602	16.50	10.30	26.800
b1603	28.20	6.20	34.400
b1604	26.30	6.30	32.600
b1605	16.20	6.60	22.800
b1701	6.50	6.10	12.600
b1702	17.10	10.20	27.300
b1703	29.00	5.80	34.800
b1705	17.30	6.10	23.400
b1801	6.00	6.40	12.400
b1802	16.80	10.10	26.900
b1803	28.70	6.30	35.000
b1804	26.70	6.30	33.000
b1805	16.60	6.80	23.400
b1901	7.00	6.10	13.100
b1902	17.50	10.10	27.600
b1903	29.20	6.00	35.200
b1904	27.20	5.70	32.900
b1905	17.60	6.10	23.700
b2001	6.10	6.20	12.300
b2002	17.00	10.20	27.200
b2005	16.80	6.60	23.400
b2101	7.10	6.20	13.300
b2102	17.60	10.20	27.800
b2103	29.40	5.90	35.300
b2104	27.40	5.70	33.100
b2105	17.70	6.10	23.800

	Thermal loads		
Dwelling no.	Area adjusted heating load (in MJ/m ² /yr)	Area adjusted cooling load (in MJ/m ² /yr)	Area adjusted total load (in MJ/m ² /yr)
b2201	6.20	6.20	12.400
b2202	17.20	10.10	27.300
b2203	29.00	6.20	35.200
b2204	27.00	6.20	33.200
b2205	16.90	6.80	23.700
b2301	7.20	6.10	13.300
b2302	17.90	10.00	27.900
b2303	29.70	5.90	35.600
b2304	27.60	5.70	33.300
b2305	17.90	6.30	24.200
b2401	5.60	6.20	11.800
b2402	17.40	9.70	27.100
b2404	27.30	6.20	33.500
b2405	17.10	7.10	24.200
b2501	7.50	5.80	13.300
b2502	18.10	10.00	28.100
b2503	30.00	5.80	35.800
b2504	27.80	5.80	33.600
b2505	18.20	6.40	24.600
b2602	17.50	9.50	27.000
b2603	29.00	6.30	35.300
b2604	27.40	5.90	33.300
b2605	17.20	7.10	24.300
b2702	17.70	9.60	27.300
b2703	29.20	6.30	35.500
b2704	27.50	6.00	33.500
b2705	17.30	7.00	24.300
b2801	7.50	5.90	13.400
b2802	18.30	9.90	28.200
b2803	30.20	5.70	35.900
b2804	28.10	5.70	33.800

	Thermal loads		
Dwelling no.	Area adjusted heating load (in MJ/m ² /yr)	Area adjusted cooling load (in MJ/m ² /yr)	Area adjusted total load (in MJ/m ² /yr)
b2901	6.50	6.00	12.500
b2902	17.90	9.60	27.500
b2905	17.50	6.80	24.300
b3001	6.60	6.10	12.700
b3002	17.90	9.50	27.400
b3005	17.60	7.10	24.700
b3101	7.60	5.80	13.400
b3102	18.60	9.70	28.300
b3103	30.40	5.70	36.100
b3104	28.30	5.70	34.000
b3202	18.10	9.30	27.400
b3203	29.60	6.30	35.900
b3204	28.00	6.20	34.200
b3205	12.30	7.20	19.500
b3302	18.90	8.90	27.800
b3303	29.60	6.40	36.000
b3304	28.90	6.10	35.000
b3305	12.70	8.10	20.800
b3401	14.7	12.9	27.600
b3402	31.2	6.2	37.400
b3403	19.9	8.7	28.600
b3501	30.6	7.2	37.800
LW1	22.30	12.40	34.700
LW10	10.10	6.90	17.000
LW11	18.40	6.80	25.200
LW12	20.30	8.20	28.500
LW13	15.40	11.50	26.900
LW14	32.00	4.80	36.800
LW15	16.10	4.50	20.600
LW16	12.90	15.80	28.700
LW17	21.40	14.40	35.800

	Thermal loads		
Dwelling no.	Area adjusted heating load (in MJ/m ² /yr)	Area adjusted cooling load (in MJ/m ² /yr)	Area adjusted total load (in MJ/m ² /yr)
LW18	19.10	6.30	25.400
LW19	17.40	11.30	28.700
LW2	31.00	6.70	37.700
LW20	18.00	10.80	28.800
LW21	8.00	13.20	21.200
LW22	14.90	11.00	25.900
LW23	19.70	17.00	36.700
LW24	18.40	8.50	26.900
LW3	16.60	7.00	23.600
LW4	23.90	8.60	32.500
LW5	27.20	6.90	34.100
LW6	10.60	5.30	15.900
LW7	19.10	13.60	32.700
LW8	15.90	7.30	23.200
LW9	4.60	17.60	22.200
A0603, A0803	24.30	6.80	31.100
A2303, A2603	15.20	7.40	22.600
A2401, A2501	24.30	6.50	30.800
A2601, b0603	24.40	6.50	30.900
A2704, A2804	14.40	9.70	24.100
A2901, A3001	24.80	6.40	31.200
A2902, A3002	26.40	7.50	33.900
A2903, A3103	15.40	7.60	23.000
A2905, A3005	26.00	5.20	31.200
A3204, A3304	14.90	9.70	24.600
b1704, b2004	26.90	6.00	32.900
b2003, b2403	28.90	6.30	35.200
b2601, b2701	6.40	6.20	12.600
b2805, b3105	12.50	7.20	19.700
b2903, b3003	29.40	6.30	35.700
b2904, b3004	27.80	6.00	33.800

	Thermal loads		
Dwelling no.	Area adjusted heating load (in MJ/m ² /yr)	Area adjusted cooling load (in MJ/m ² /yr)	Area adjusted total load (in MJ/m ² /yr)
All other dwellings	6.70	6.10	12.800

(c) 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	no common facility	4 star	5 star	no common laundry facility

Central systems	Size	Configuration	Connection (to allow for...)
Swimming pool (No. 1)	Volume: 65 kLs	Location: Building1 Pool shaded: no	-
Spa (No. 2)	Volume: 7 kLs	Location: Building1 Spa shaded: no Spa cover: yes	-
Central water tank - rainwater or stormwater (No. 1)	10000	To collect run-off from at least: - 200 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 1751 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...)
Fire sprinkler system (No. 1)	-	So that fire sprinkler test water is contained within the fire sprinkler system for re-use, rather than disposed.	-
Fire sprinkler system (No. 2)	-	So that fire sprinkler test water is contained within the fire sprinkler system for re-use, rather than disposed.	-

(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
Lift bank (No. 1)	-	-	light-emitting diode	connected to lift call button	yes
Lift bank (No. 2)	-	-	light-emitting diode	connected to lift call button	yes
Sauna	ventilation (supply + exhaust)	time clock or BMS controlled	light-emitting diode	zoned switching	yes
Undercover car park area	ventilation (supply + exhaust)	carbon monoxide monitor + VSD fan	light-emitting diode	zoned switching with motion sensor	yes
Switch rooms	ventilation supply only	none i.e., continuous	light-emitting diode	motion sensors	yes
Comms rooms	ventilation supply only	none i.e., continuous	light-emitting diode	motion sensors	yes
Substations	no mechanical ventilation	-	light-emitting diode	motion sensors	yes
Garbage rooms (excl. bulky)	ventilation exhaust only	-	light-emitting diode	motion sensors	yes
Bulky Store room	ventilation supply only	time clock or BMS controlled	light-emitting diode	motion sensors	yes
Other store rooms	ventilation supply only	time clock or BMS controlled	light-emitting diode	zoned switching with motion sensor	yes
WC rooms communal	ventilation exhaust only	time clock or BMS controlled	light-emitting diode	zoned switching with motion sensor	yes
Fire and pump rooms	ventilation exhaust only	time clock or BMS controlled	light-emitting diode	motion sensors	yes

	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
Cold water plant rooms	ventilation supply only	time clock or BMS controlled	light-emitting diode	motion sensors	yes
Fan rooms basement	no mechanical ventilation	time clock or BMS controlled	light-emitting diode	daylight sensor and motion sensor	yes
Other small plant in basement	ventilation supply only	time clock or BMS controlled	light-emitting diode	zoned switching with motion sensor	yes
Other small plant upper levels	no mechanical ventilation	-	light-emitting diode	zoned switching with motion sensor	yes
Ground floor lobbies	ventilation supply only	time clock or BMS controlled	light-emitting diode	zoned switching with daylight sensor	yes
Hallway/lobby lower levels	no mechanical ventilation	time clock or BMS controlled	light-emitting diode	zoned switching with motion sensor	yes
Hallway/lobby upper levels	no mechanical ventilation	-	light-emitting diode	zoned switching with motion sensor	yes

Central energy systems	Type	Specification
Swimming pool (No. 1)	Heating source: electric heat pump	Pump controlled by timer: yes
Spa (No. 2)	Heating system: electric heat pump	Pump controlled by timer: yes
Sauna (No. 1)	Heating source: electric infrared	Efficiency measure: manual on / timer off
Lift bank (No. 1)	gearless traction with V V V F motor and regenerative drive	Number of levels (including basement): 33 number of levels from the bottom of the lift shaft to the top of the lift shaft: 43 number of lifts: 3 lift load capacity: >= 1001 kg but <= 1500kg
Lift bank (No. 2)	gearless traction with V V V F motor and regenerative drive	Number of levels (including basement): 33 number of levels from the bottom of the lift shaft to the top of the lift shaft: 44 number of lifts: 3 lift load capacity: >= 1001 kg but <= 1500kg
Central hot water system (No. 1)	electric heat pump – air sourced	Piping insulation (ringmain & supply risers): (a) Piping external to building: R1.0 (~38 mm); (b) Piping internal to building: R1.0 (~38 mm) (c) Unit Efficiency: 2.5 < COP <= 3.0

2. Commitments for multi-dwelling housing

(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.	✓	✓	✓
(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.		✓	✓

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(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.		✓	✓
(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".		✓	
(iii) Thermal Performance and Materials	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.			

(iii) Thermal Performance and Materials	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(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.	✓	✓	✓
(i) The applicant must show on The plans accompanying The development application for The proposed development, The locations of ceiling fans set out in The Assessor Certificate.	✓		
(j) The applicant must show on the plans accompanying the application for a construction certificate (or complying development certificate, if applicable), the locations of ceiling fans set out in the Assessor Certificate.		✓	

3. Commitments for single dwelling houses

(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.	✓	✓	✓
(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.		✓	✓

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(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.			
(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".			
(iii) Thermal Performance and Materials	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.			

(iii) Thermal Performance and Materials	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(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.	✓	✓	✓
(i) The applicant must show on The plans accompanying The development application for The proposed development, The locations of ceiling fans set out in The Assessor Certificate.	✓		
(j) The applicant must show on the plans accompanying the application for a construction certificate (or complying development certificate, if applicable), the locations of ceiling fans set out in the Assessor Certificate.		✓	

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	no common facility	4 star	5 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.	✓	✓	✓

Central energy systems	Type	Specification
Alternative energy supply	Photovoltaic system	Rated electrical output (min): 30 peak kW
Other	Building management system installed?: yes Active power factor correction installed?: yes	-

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).

Nationwide House Energy Rating Scheme®

Class 2 Summary

NatHERS® Certificate No. 0009127410

Generated on 20 Nov 2024 using BERS Pro v5.2.3 (3.23)

Property

Address 849 - 859 Pacific Highway,
Chatswood , NSW , 2067

Lot/DP Lot 1 DP 1189541

NatHERS Climate Zone 56 Mascot (Sydney Airport)



Accredited assessor

Name Martin Pinson

Business name INTEGRECO

Email consulting@integreco.com

Phone 0422144603

Accreditation No. DMN/19/1921

Assessor Accrediting Organisation
Design Matters National

Verification

To verify this certificate, scan the QR code or visit hstar.com.au/QR/Generate?p=jhsvrryt. When using either link, ensure you are visiting hstar.com.au



National Construction Code (NCC) requirements

The NCC allows the use of NatHERS accredited software to comply with the energy efficiency requirements for houses (Class 1 buildings) and apartments (Class 2 sole-occupancy units and Class 4 parts of buildings). The applicable requirements for houses are detailed in Specification 42 of NCC Volume Two. For apartments the requirements are detailed in clauses J3D3 and J3D15 of NCC Volume One.

NCC 2022 includes enhanced thermal performance requirements for houses and apartments. It also includes a new whole-of-home annual energy use budget which applies to the major equipment in the home.

The NCC, and associated ABCB Standards and support material, can be accessed at www.abcb.gov.au.

Note, variations and additions to the NCC energy efficiency requirements may apply in some states and territories.

Thermal performance Star rating



NCC heating and cooling maximum loads (MJ/m²/p.a.)

Limits taken from ABCB Standard 2022

	Heating	Cooling
Modelled block average	19.3	7.7
Maximum block limit	N/A	N/A

Whole of Home performance rating

No Whole of Home performance rating conducted for this summary certificate or not completed for all dwellings

Summary of all dwellings

Certificate number and link	Unit Number	Heating load (load limit) [MJ/m ² /p.a.]	Cooling load (load limit) [MJ/m ² /p.a.]	Total load [MJ/m ² /p.a.]	Star Rating	Whole of Home Rating
0011518099-03	A-501	20.5 (N/A)	10.0 (N/A)	30.5	6.9	0
0011518123-03	A-502	7.9 (N/A)	8.0 (N/A)	15.9	8.5	0



Summary of all dwellings (continued)

Certificate number and link	Unit Number	Heating load (load limit) [MJ/m ² /p.a.]	Cooling load (load limit) [MJ/m ² /p.a.]	Total load [MJ/m ² /p.a.]	Star Rating	Whole of Home Rating
0011518149-03	A-503	24.1 (N/A)	6.8 (N/A)	30.9	6.9	0
0011518164-03	A-504	11.9 (N/A)	7.9 (N/A)	19.7	8.1	0
0011518214-05	A-505	12.1 (N/A)	13.7 (N/A)	25.8	7.4	0
0011518230-02	A-506	22.3 (N/A)	4.8 (N/A)	27.1	7.3	0
0011518271-03	A-601	20.9 (N/A)	10.1 (N/A)	31.0	6.9	0
0011518297-03	A-602	8.0 (N/A)	8.1 (N/A)	16.0	8.5	0
0011518321-03	A-603	24.3 (N/A)	6.8 (N/A)	31.1	6.9	0
0011518347-03	A-604	11.2 (N/A)	7.9 (N/A)	19.1	8.2	0
0011518107-05	A-605	10.2 (N/A)	13.1 (N/A)	23.2	7.7	0
0011518156-02	A-606	20.4 (N/A)	5.2 (N/A)	25.6	7.4	0
0011518180-03	A-701	21.2 (N/A)	9.8 (N/A)	31.0	6.9	0
0011518206-03	A-702	8.5 (N/A)	8.0 (N/A)	16.4	8.4	0
0011518248-03	A-703	24.6 (N/A)	6.6 (N/A)	31.3	6.8	0
0011518263-03	A-704	11.8 (N/A)	7.8 (N/A)	19.5	8.2	0
0011518305-05	A-705	10.5 (N/A)	12.8 (N/A)	23.3	7.7	0
0011518339-02	A-706	22.5 (N/A)	5.0 (N/A)	27.5	7.3	0
0011518354-03	A-801	22.9 (N/A)	9.1 (N/A)	32.0	6.8	0
0011518115-03	A-802	8.5 (N/A)	8.2 (N/A)	16.7	8.4	0
0011518131-03	A-803	24.3 (N/A)	6.8 (N/A)	31.1	6.9	0
0011518172-03	A-804	11.9 (N/A)	7.7 (N/A)	19.6	8.1	0
0011518198-05	A-805	10.8 (N/A)	12.5 (N/A)	23.3	7.7	0
0011518222-02	A-806	21.3 (N/A)	5.2 (N/A)	26.5	7.4	0
0011518255-03	A-901	23.2 (N/A)	9.0 (N/A)	32.2	6.7	0
0011518289-03	A-902	8.9 (N/A)	7.3 (N/A)	16.2	8.4	0
0011518313-03	A-903	25.4 (N/A)	6.9 (N/A)	32.2	6.7	0
0011518362-03	A-904	12.3 (N/A)	7.8 (N/A)	20.1	8.1	0
0011518396-05	A-905	11.0 (N/A)	12.5 (N/A)	23.5	7.7	0
0011518420-02	A-906	23.3 (N/A)	5.1 (N/A)	28.4	7.2	0
0011518453-03	A-1001	23.3 (N/A)	8.9 (N/A)	32.3	6.7	0
0011518487-03	A-1002	9.9 (N/A)	7.2 (N/A)	17.1	8.4	0
0011518511-03	A-1003	26.4 (N/A)	6.6 (N/A)	33.0	6.6	0
0011518545-03	A-1004	13.4 (N/A)	7.6 (N/A)	21.0	8	0
0011518578-05	A-1005	12.4 (N/A)	11.1 (N/A)	23.5	7.7	0
0011518602-02	A-1006	23.2 (N/A)	5.4 (N/A)	28.6	7.1	0



<u>0011518636-03</u>	A-1101	23.6 (N/A)	9.0 (N/A)	32.6	6.7	0
<u>0011518651-03</u>	A-1102	10.4 (N/A)	6.5 (N/A)	16.9	8.4	0
<u>0011518685-03</u>	A-1103	27.4 (N/A)	6.7 (N/A)	34.1	6.4	0
<u>0011518719-03</u>	A-1104	13.9 (N/A)	7.9 (N/A)	21.7	7.9	0
<u>0011518743-05</u>	A-1105	12.6 (N/A)	11.0 (N/A)	23.7	7.7	0
<u>0011518776-02</u>	A-1106	25.3 (N/A)	5.0 (N/A)	30.3	6.9	0
<u>0011518800-03</u>	A-1201	23.7 (N/A)	9.0 (N/A)	32.7	6.7	0
<u>0011518834-03</u>	A-1202	10.2 (N/A)	7.0 (N/A)	17.2	8.4	0
<u>0011518859-03</u>	A-1203	26.8 (N/A)	6.4 (N/A)	33.2	6.6	0
<u>0011518891-03</u>	A-1204	13.8 (N/A)	7.7 (N/A)	21.5	7.9	0
<u>0011518925-05</u>	A-1205	12.7 (N/A)	10.9 (N/A)	23.7	7.7	0
<u>0011518941-02</u>	A-1206	23.7 (N/A)	5.4 (N/A)	29.0	7.1	0
<u>0011518974-03</u>	A-1301	23.9 (N/A)	8.9 (N/A)	32.8	6.7	0
<u>0011519006-03</u>	A-1302	10.9 (N/A)	7.0 (N/A)	17.9	8.3	0
<u>0011519030-03</u>	A-1303	28.1 (N/A)	6.7 (N/A)	34.8	6.4	0
<u>0011519063-03</u>	A-1304	14.2 (N/A)	7.6 (N/A)	21.8	7.9	0
<u>0011519097-05</u>	A-1305	13.0 (N/A)	10.6 (N/A)	23.5	7.7	0
<u>0011519121-02</u>	A-1306	25.8 (N/A)	5.0 (N/A)	30.8	6.9	0
<u>0011519147-03</u>	A-1401	23.1 (N/A)	6.4 (N/A)	29.6	7	0
<u>0011519170-03</u>	A-1402	24.8 (N/A)	7.6 (N/A)	32.4	6.7	0
<u>0011519204-03</u>	A-1403	14.1 (N/A)	7.4 (N/A)	21.5	7.9	0
<u>0011519238-05</u>	A-1404	13.1 (N/A)	10.4 (N/A)	23.5	7.7	0
<u>0011519261-02</u>	A-1405	24.0 (N/A)	5.5 (N/A)	29.6	7	0
<u>0011519295-03</u>	A-1501	23.1 (N/A)	6.5 (N/A)	29.6	7	0
<u>0011519329-03</u>	A-1502	25.7 (N/A)	7.2 (N/A)	32.9	6.6	0
<u>0011519352-03</u>	A-1503	14.4 (N/A)	7.4 (N/A)	21.8	7.9	0
<u>0011519386-05</u>	A-1504	13.2 (N/A)	10.2 (N/A)	23.4	7.7	0
<u>0011519410-02</u>	A-1505	25.9 (N/A)	5.1 (N/A)	31.0	6.9	0
<u>0011519444-03</u>	A-1601	23.4 (N/A)	6.5 (N/A)	29.8	7	0
<u>0011519477-03</u>	A-1602	25.0 (N/A)	7.8 (N/A)	32.8	6.7	0
<u>0011519501-03</u>	A-1603	14.3 (N/A)	7.3 (N/A)	21.6	7.9	0
<u>0011519535-05</u>	A-1604	13.3 (N/A)	10.2 (N/A)	23.5	7.7	0
<u>0011519568-02</u>	A-1605	24.3 (N/A)	5.5 (N/A)	29.8	7	0
<u>0011519584-03</u>	A-1701	23.4 (N/A)	6.4 (N/A)	29.8	7	0
<u>0011518388-03</u>	A-1702	25.9 (N/A)	7.0 (N/A)	33.0	6.6	0
<u>0011518412-03</u>	A-1703	14.6 (N/A)	7.4 (N/A)	22.0	7.9	0
<u>0011518446-05</u>	A-1704	13.4 (N/A)	10.0 (N/A)	23.5	7.7	0
<u>0011518479-02</u>	A-1705	26.3 (N/A)	4.9 (N/A)	31.3	6.8	0



<u>0011518495-03</u>	A-1801	23.7 (N/A)	6.5 (N/A)	30.2	6.9	0
<u>0011518529-03</u>	A-1802	25.4 (N/A)	7.4 (N/A)	32.8	6.7	0
<u>0011518552-03</u>	A-1803	14.6 (N/A)	7.6 (N/A)	22.2	7.9	0
<u>0011518586-05</u>	A-1804	13.6 (N/A)	10.0 (N/A)	23.7	7.7	0
<u>0011518610-02</u>	A-1805	24.7 (N/A)	5.4 (N/A)	30.1	6.9	0
<u>0011518644-03</u>	A-1901	23.8 (N/A)	6.3 (N/A)	30.1	6.9	0
<u>0011518677-03</u>	A-1902	26.3 (N/A)	7.0 (N/A)	33.3	6.6	0
<u>0011518701-03</u>	A-1903	14.9 (N/A)	7.7 (N/A)	22.6	7.8	0
<u>0011518735-05</u>	A-1904	13.6 (N/A)	9.8 (N/A)	23.5	7.7	0
<u>0011518768-02</u>	A-1905	26.6 (N/A)	5.2 (N/A)	31.8	6.8	0
<u>0011518784-03</u>	A-2001	24.0 (N/A)	6.5 (N/A)	30.4	6.9	0
<u>0011518818-03</u>	A-2002	25.6 (N/A)	7.7 (N/A)	33.3	6.6	0
<u>0011518842-03</u>	A-2003	14.8 (N/A)	7.6 (N/A)	22.4	7.8	0
<u>0011518875-05</u>	A-2004	13.5 (N/A)	9.9 (N/A)	23.3	7.7	0
<u>0011518909-02</u>	A-2005	25.1 (N/A)	5.2 (N/A)	30.3	6.9	0
<u>0011518933-03</u>	A-2101	23.9 (N/A)	6.5 (N/A)	30.4	6.9	0
<u>0011518966-03</u>	A-2102	26.4 (N/A)	7.2 (N/A)	33.6	6.6	0
<u>0011518990-03</u>	A-2103	15.0 (N/A)	7.7 (N/A)	22.7	7.8	0
<u>0011519022-05</u>	A-2104	13.4 (N/A)	9.8 (N/A)	23.1	7.7	0
<u>0011519055-02</u>	A-2105	26.9 (N/A)	5.0 (N/A)	31.9	6.8	0
<u>0011519089-03</u>	A-2201	24.1 (N/A)	6.4 (N/A)	30.5	6.9	0
<u>0011519113-03</u>	A-2202	25.7 (N/A)	7.5 (N/A)	33.2	6.6	0
<u>0011519154-03</u>	A-2203	14.9 (N/A)	7.5 (N/A)	22.4	7.8	0
<u>0011519188-05</u>	A-2204	13.4 (N/A)	9.7 (N/A)	23.0	7.8	0
<u>0011519212-02</u>	A-2205	25.0 (N/A)	5.4 (N/A)	30.4	6.9	0
<u>0011519246-03</u>	A-2301	24.1 (N/A)	6.5 (N/A)	30.6	6.9	0
<u>0011519279-03</u>	A-2302	26.6 (N/A)	7.2 (N/A)	33.8	6.5	0
<u>0011519303-03</u>	A-2303	15.2 (N/A)	7.4 (N/A)	22.7	7.8	0
<u>0011519337-05</u>	A-2304	13.7 (N/A)	9.8 (N/A)	23.4	7.7	0
<u>0011519360-02</u>	A-2305	27.0 (N/A)	4.9 (N/A)	31.9	6.8	0
<u>0011519394-03</u>	A-2401	24.3 (N/A)	6.5 (N/A)	30.8	6.9	0
<u>0011519428-03</u>	A-2402	26.0 (N/A)	7.4 (N/A)	33.4	6.6	0
<u>0011519451-03</u>	A-2403	15.1 (N/A)	7.6 (N/A)	22.7	7.8	0
<u>0011519485-05</u>	A-2404	14.0 (N/A)	9.6 (N/A)	23.6	7.7	0
<u>0011519519-02</u>	A-2405	25.5 (N/A)	5.2 (N/A)	30.7	6.9	0
<u>0011519543-03</u>	A-2501	24.3 (N/A)	6.5 (N/A)	30.9	6.9	0
<u>0011519576-03</u>	A-2502	26.9 (N/A)	7.1 (N/A)	34.0	6.5	0
<u>0011519600-03</u>	A-2503	15.4 (N/A)	7.5 (N/A)	22.9	7.8	0



<u>0011519626-05</u>	A-2504	14.2 (N/A)	9.8 (N/A)	24.0	7.6	0
<u>0011518370-02</u>	A-2505	27.4 (N/A)	4.8 (N/A)	32.2	6.7	0
<u>0011518404-03</u>	A-2601	24.4 (N/A)	6.5 (N/A)	30.9	6.9	0
<u>0011518438-03</u>	A-2602	26.1 (N/A)	7.5 (N/A)	33.5	6.6	0
<u>0011518461-03</u>	A-2603	15.2 (N/A)	7.4 (N/A)	22.6	7.8	0
<u>0011518503-05</u>	A-2604	14.3 (N/A)	9.8 (N/A)	24.1	7.6	0
<u>0011518537-02</u>	A-2605	25.4 (N/A)	5.2 (N/A)	30.7	6.9	0
<u>0011518560-03</u>	A-2701	24.5 (N/A)	6.2 (N/A)	30.7	6.9	0
<u>0011518594-03</u>	A-2702	26.2 (N/A)	7.5 (N/A)	33.6	6.6	0
<u>0011518628-03</u>	A-2703	15.3 (N/A)	7.4 (N/A)	22.7	7.8	0
<u>0011518669-05</u>	A-2704	14.4 (N/A)	9.7 (N/A)	24.1	7.6	0
<u>0011518693-02</u>	A-2705	25.6 (N/A)	5.4 (N/A)	30.9	6.9	0
<u>0011518727-03</u>	A-2801	24.6 (N/A)	6.2 (N/A)	30.7	6.9	0
<u>0011518750-03</u>	A-2802	27.1 (N/A)	7.3 (N/A)	34.3	6.4	0
<u>0011518792-03</u>	A-2803	15.6 (N/A)	7.6 (N/A)	23.2	7.7	0
<u>0011518826-05</u>	A-2804	14.4 (N/A)	9.7 (N/A)	24.1	7.6	0
<u>0011518867-02</u>	A-2805	27.5 (N/A)	5.2 (N/A)	32.7	6.7	0
<u>0011518883-03</u>	A-2901	24.8 (N/A)	6.4 (N/A)	31.1	6.9	0
<u>0011518917-03</u>	A-2902	26.4 (N/A)	7.5 (N/A)	33.8	6.5	0
<u>0011518958-03</u>	A-2903	15.4 (N/A)	7.6 (N/A)	23.0	7.8	0
<u>0011518982-05</u>	A-2904	14.6 (N/A)	9.8 (N/A)	24.4	7.6	0
<u>0011519014-02</u>	A-2905	26.0 (N/A)	5.2 (N/A)	31.2	6.9	0
<u>0011519048-03</u>	A-3001	24.8 (N/A)	6.4 (N/A)	31.2	6.9	0
<u>0011519071-03</u>	A-3002	26.4 (N/A)	7.5 (N/A)	33.9	6.5	0
<u>0011519105-03</u>	A-3003	15.3 (N/A)	7.5 (N/A)	22.9	7.8	0
<u>0011519139-05</u>	A-3004	14.4 (N/A)	9.8 (N/A)	24.2	7.6	0
<u>0011519162-02</u>	A-3005	26.0 (N/A)	5.2 (N/A)	31.2	6.9	0
<u>0011519196-03</u>	A-3101	24.8 (N/A)	6.2 (N/A)	30.9	6.9	0
<u>0011519220-03</u>	A-3102	27.1 (N/A)	7.0 (N/A)	34.1	6.4	0
<u>0011519253-03</u>	A-3103	15.4 (N/A)	7.6 (N/A)	23.0	7.8	0
<u>0011519287-05</u>	A-3104	14.7 (N/A)	9.9 (N/A)	24.6	7.6	0
<u>0011519311-02</u>	A-3105	27.9 (N/A)	4.9 (N/A)	32.8	6.7	0
<u>0011519345-03</u>	A-3201	25.0 (N/A)	6.3 (N/A)	31.3	6.8	0
<u>0011519378-03</u>	A-3202	26.0 (N/A)	7.5 (N/A)	33.5	6.6	0
<u>0011519402-03</u>	A-3203	14.9 (N/A)	7.6 (N/A)	22.6	7.8	0
<u>0011519436-05</u>	A-3204	14.9 (N/A)	9.7 (N/A)	24.5	7.6	0
<u>0011519469-02</u>	A-3205	26.1 (N/A)	5.5 (N/A)	31.6	6.8	0
<u>0011519493-04</u>	A-3301	25.0 (N/A)	6.2 (N/A)	31.2	6.9	0



<u>0011519527-04</u>	A-3302	25.4 (N/A)	7.5 (N/A)	32.9	6.6	0
<u>0011519550-03</u>	A-3303	5.7 (N/A)	7.8 (N/A)	13.5	8.8	0
<u>0011519592-05</u>	A-3304	14.9 (N/A)	9.7 (N/A)	24.6	7.6	0
<u>0011519618-02</u>	A-3305	27.3 (N/A)	5.4 (N/A)	32.7	6.7	0
<u>0011520210-02</u>	A-3401	31.6 (N/A)	6.4 (N/A)	37.9	6	0
<u>0011520228-04</u>	A-3402	18.6 (N/A)	8.7 (N/A)	27.2	7.3	0
<u>0011520236-03</u>	A-3403	17.5 (N/A)	10.8 (N/A)	28.3	7.2	0
<u>0011520293-02</u>	A-3404	27.0 (N/A)	10.5 (N/A)	37.5	6.1	0
<u>0011520285-02</u>	A-3501	25.5 (N/A)	10.0 (N/A)	35.5	6.3	0
<u>0011519642-04</u>	b-501	12.8 (N/A)	10.2 (N/A)	23.0	7.8	0
<u>0011519675-05</u>	b-502	8.6 (N/A)	13.6 (N/A)	22.2	7.9	0
<u>0011520715-03</u>	b-503	25.6 (N/A)	6.2 (N/A)	31.7	6.8	0
<u>0011521093-08</u>	b-504	23.7 (N/A)	7.4 (N/A)	31.1	6.9	0
<u>0011520756-09</u>	b-505	15.5 (N/A)	6.2 (N/A)	21.7	7.9	0
<u>0011519709-04</u>	b-601	11.6 (N/A)	10.5 (N/A)	22.1	7.9	0
<u>0011519733-05</u>	b-602	5.8 (N/A)	13.5 (N/A)	19.3	8.2	0
<u>0011520749-03</u>	b-603	24.4 (N/A)	6.5 (N/A)	30.9	6.9	0
<u>0011521127-08</u>	b-604	22.6 (N/A)	7.4 (N/A)	29.9	7	0
<u>0011520640-09</u>	b-605	12.8 (N/A)	6.6 (N/A)	19.4	8.2	0
<u>0011519766-04</u>	b-701	13.5 (N/A)	10.2 (N/A)	23.6	7.7	0
<u>0011519782-05</u>	b-702	6.0 (N/A)	13.4 (N/A)	19.4	8.2	0
<u>0011520681-03</u>	b-703	25.4 (N/A)	6.2 (N/A)	31.6	6.8	0
<u>0011521069-08</u>	b-704	23.4 (N/A)	7.0 (N/A)	30.4	6.9	0
<u>0011520780-09</u>	b-705	14.2 (N/A)	6.2 (N/A)	20.3	8.1	0
<u>0011519816-04</u>	b-801	12.2 (N/A)	10.1 (N/A)	22.4	7.8	0
<u>0011519840-05</u>	b-802	6.2 (N/A)	13.0 (N/A)	19.3	8.2	0
<u>0011520772-03</u>	b-803	25.2 (N/A)	6.4 (N/A)	31.6	6.8	0
<u>0011521150-08</u>	b-804	23.4 (N/A)	7.1 (N/A)	30.5	6.9	0
<u>0011520673-09</u>	b-805	13.6 (N/A)	6.6 (N/A)	20.1	8.1	0
<u>0011519865-04</u>	b-901	13.2 (N/A)	10.0 (N/A)	23.2	7.7	0
<u>0011519659-05</u>	b-902	6.4 (N/A)	12.9 (N/A)	19.3	8.2	0
<u>0011520657-03</u>	b-903	26.0 (N/A)	6.1 (N/A)	32.1	6.7	0
<u>0011521044-08</u>	b-904	24.0 (N/A)	6.7 (N/A)	30.8	6.9	0
<u>0011520814-09</u>	b-905	14.7 (N/A)	6.4 (N/A)	21.1	7.9	0
<u>0011519683-04</u>	b-1001	13.9 (N/A)	10.0 (N/A)	23.9	7.6	0
<u>0011519717-05</u>	b-1002	7.4 (N/A)	11.8 (N/A)	19.2	8.2	0
<u>0011520830-03</u>	b-1003	27.2 (N/A)	6.4 (N/A)	33.6	6.6	0
<u>0011521184-08</u>	b-1004	25.3 (N/A)	6.6 (N/A)	31.9	6.8	0



<u>0011520723-09</u>	b-1005	15.3 (N/A)	6.5 (N/A)	21.9	7.9	0
<u>0011519741-04</u>	b-1101	15.8 (N/A)	10.0 (N/A)	25.8	7.4	0
<u>0011519774-05</u>	b-1102	7.6 (N/A)	11.5 (N/A)	19.1	8.2	0
<u>0011520624-03</u>	b-1103	28.0 (N/A)	6.1 (N/A)	34.1	6.4	0
<u>0011521028-08</u>	b-1104	26.0 (N/A)	5.7 (N/A)	31.7	6.8	0
<u>0011520848-09</u>	b-1105	16.4 (N/A)	6.2 (N/A)	22.6	7.8	0
<u>0011519808-04</u>	b-1201	14.3 (N/A)	10.1 (N/A)	24.3	7.6	0
<u>0011519832-05</u>	b-1202	7.7 (N/A)	11.4 (N/A)	19.1	8.2	0
<u>0011520863-03</u>	b-1203	27.7 (N/A)	6.3 (N/A)	33.9	6.5	0
<u>0011521218-08</u>	b-1204	25.7 (N/A)	6.3 (N/A)	32.0	6.8	0
<u>0011520707-09</u>	b-1205	15.7 (N/A)	6.6 (N/A)	22.3	7.8	0
<u>0011519857-04</u>	b-1301	16.0 (N/A)	9.8 (N/A)	25.8	7.4	0
<u>0011519873-05</u>	b-1302	7.9 (N/A)	11.4 (N/A)	19.2	8.2	0
<u>0011520590-03</u>	b-1303	28.5 (N/A)	6.0 (N/A)	34.5	6.4	0
<u>0011520996-08</u>	b-1304	26.4 (N/A)	5.9 (N/A)	32.3	6.7	0
<u>0011520871-09</u>	b-1305	16.8 (N/A)	6.1 (N/A)	22.9	7.8	0
<u>0011519634-04</u>	b-1401	5.6 (N/A)	6.5 (N/A)	12.1	8.9	0
<u>0011519667-05</u>	b-1402	17.3 (N/A)	10.5 (N/A)	27.8	7.2	0
<u>0011520897-03</u>	b-1403	28.0 (N/A)	6.3 (N/A)	34.4	6.4	0
<u>0011521242-08</u>	b-1404	26.1 (N/A)	6.6 (N/A)	32.6	6.7	0
<u>0011520392-09</u>	b-1405	16.0 (N/A)	6.7 (N/A)	22.7	7.8	0
<u>0011519691-04</u>	b-1501	6.7 (N/A)	6.2 (N/A)	12.9	8.9	0
<u>0011519725-05</u>	b-1502	16.9 (N/A)	10.4 (N/A)	27.3	7.3	0
<u>0011520400-04</u>	b-1503	28.7 (N/A)	5.9 (N/A)	34.5	6.4	0
<u>0011520962-08</u>	b-1504	26.6 (N/A)	6.0 (N/A)	32.6	6.7	0
<u>0011520905-09</u>	b-1505	17.0 (N/A)	6.1 (N/A)	23.2	7.7	0
<u>0011519758-04</u>	b-1601	5.7 (N/A)	6.4 (N/A)	12.1	8.9	0
<u>0011519790-05</u>	b-1602	16.5 (N/A)	10.3 (N/A)	26.8	7.3	0
<u>0011520384-03</u>	b-1603	28.2 (N/A)	6.2 (N/A)	34.5	6.4	0
<u>0011520947-08</u>	b-1604	26.3 (N/A)	6.3 (N/A)	32.6	6.7	0
<u>0011520731-09</u>	b-1605	16.2 (N/A)	6.6 (N/A)	22.9	7.8	0
<u>0011519824-04</u>	b-1701	6.5 (N/A)	6.1 (N/A)	12.7	8.9	0
<u>0011519923-04</u>	b-1702	17.1 (N/A)	10.2 (N/A)	27.3	7.3	0
<u>0011520574-03</u>	b-1703	29.0 (N/A)	5.8 (N/A)	34.8	6.4	0
<u>0011520921-08</u>	b-1704	26.9 (N/A)	6.0 (N/A)	32.8	6.7	0
<u>0011520426-09</u>	b-1705	17.3 (N/A)	6.1 (N/A)	23.4	7.7	0
<u>0011519949-03</u>	b-1801	6.0 (N/A)	6.4 (N/A)	12.3	8.9	0
<u>0011519972-04</u>	b-1802	16.8 (N/A)	10.1 (N/A)	26.9	7.3	0



<u>0011520418-03</u>	b-1803	28.7 (N/A)	6.3 (N/A)	34.9	6.4	0
<u>0011520970-08</u>	b-1804	26.7 (N/A)	6.3 (N/A)	33.0	6.6	0
<u>0011520764-09</u>	b-1805	16.6 (N/A)	6.8 (N/A)	23.4	7.7	0
<u>0011519998-03</u>	b-1901	7.0 (N/A)	6.1 (N/A)	13.1	8.9	0
<u>0011520012-04</u>	b-1902	17.5 (N/A)	10.1 (N/A)	27.6	7.2	0
<u>0011520541-03</u>	b-1903	29.2 (N/A)	6.0 (N/A)	35.2	6.4	0
<u>0011521226-08</u>	b-1904	27.2 (N/A)	5.7 (N/A)	33.0	6.6	0
<u>0011520459-09</u>	b-1905	17.6 (N/A)	6.1 (N/A)	23.7	7.7	0
<u>0011520038-03</u>	b-2001	6.1 (N/A)	6.2 (N/A)	12.2	8.9	0
<u>0011520053-04</u>	b-2002	17.0 (N/A)	10.2 (N/A)	27.2	7.3	0
<u>0011520442-03</u>	b-2003	28.9 (N/A)	6.3 (N/A)	35.2	6.4	0
<u>0011521002-08</u>	b-2004	26.9 (N/A)	6.0 (N/A)	33.0	6.6	0
<u>0011520798-09</u>	b-2005	16.8 (N/A)	6.6 (N/A)	23.4	7.7	0
<u>0011520079-03</u>	b-2101	7.1 (N/A)	6.2 (N/A)	13.3	8.8	0
<u>0011520095-04</u>	b-2102	17.6 (N/A)	10.2 (N/A)	27.8	7.2	0
<u>0011520517-03</u>	b-2103	29.4 (N/A)	5.9 (N/A)	35.3	6.3	0
<u>0011521192-08</u>	b-2104	27.4 (N/A)	5.7 (N/A)	33.0	6.6	0
<u>0011520491-09</u>	b-2105	17.7 (N/A)	6.1 (N/A)	23.9	7.6	0
<u>0011520111-03</u>	b-2201	6.2 (N/A)	6.2 (N/A)	12.4	8.9	0
<u>0011520137-04</u>	b-2202	17.2 (N/A)	10.1 (N/A)	27.3	7.3	0
<u>0011520475-03</u>	b-2203	29.0 (N/A)	6.2 (N/A)	35.2	6.4	0
<u>0011521036-08</u>	b-2204	27.0 (N/A)	6.2 (N/A)	33.3	6.6	0
<u>0011520822-09</u>	b-2205	16.9 (N/A)	6.8 (N/A)	23.7	7.7	0
<u>0011520152-03</u>	b-2301	7.2 (N/A)	6.1 (N/A)	13.3	8.8	0
<u>0011520178-04</u>	b-2302	17.9 (N/A)	10.0 (N/A)	27.9	7.2	0
<u>0011520483-03</u>	b-2303	29.7 (N/A)	5.9 (N/A)	35.6	6.3	0
<u>0011521168-08</u>	b-2304	27.6 (N/A)	5.7 (N/A)	33.3	6.6	0
<u>0011520525-09</u>	b-2305	17.9 (N/A)	6.3 (N/A)	24.3	7.6	0
<u>0011520194-03</u>	b-2401	5.6 (N/A)	6.2 (N/A)	11.8	9	0
<u>0011520202-04</u>	b-2402	17.4 (N/A)	9.7 (N/A)	27.2	7.3	0
<u>0011520509-03</u>	b-2403	28.9 (N/A)	6.3 (N/A)	35.2	6.4	0
<u>0011521051-08</u>	b-2404	27.3 (N/A)	6.2 (N/A)	33.5	6.6	0
<u>0011520855-09</u>	b-2405	17.1 (N/A)	7.1 (N/A)	24.2	7.6	0
<u>0011519881-03</u>	b-2501	7.5 (N/A)	5.8 (N/A)	13.3	8.8	0
<u>0011519899-04</u>	b-2502	18.1 (N/A)	10.0 (N/A)	28.1	7.2	0
<u>0011520467-03</u>	b-2503	30.0 (N/A)	5.8 (N/A)	35.8	6.3	0
<u>0011521135-08</u>	b-2504	27.8 (N/A)	5.8 (N/A)	33.6	6.6	0
<u>0011520558-09</u>	b-2505	18.2 (N/A)	6.4 (N/A)	24.6	7.6	0



<u>0011519907-03</u>	b-2601	6.4 (N/A)	6.2 (N/A)	12.6	8.9	0
<u>0011519915-04</u>	b-2602	17.5 (N/A)	9.5 (N/A)	27.1	7.3	0
<u>0011520533-03</u>	b-2603	29.0 (N/A)	6.3 (N/A)	35.3	6.3	0
<u>0011521085-08</u>	b-2604	27.4 (N/A)	5.9 (N/A)	33.3	6.6	0
<u>0011520889-09</u>	b-2605	17.2 (N/A)	7.1 (N/A)	24.3	7.6	0
<u>0011519931-03</u>	b-2701	6.4 (N/A)	6.2 (N/A)	12.6	8.9	0
<u>0011519956-04</u>	b-2702	17.7 (N/A)	9.6 (N/A)	27.3	7.3	0
<u>0011520566-03</u>	b-2703	29.2 (N/A)	6.3 (N/A)	35.5	6.3	0
<u>0011521119-08</u>	b-2704	27.5 (N/A)	6.0 (N/A)	33.5	6.6	0
<u>0011520913-09</u>	b-2705	17.3 (N/A)	7.0 (N/A)	24.3	7.6	0
<u>0011519964-03</u>	b-2801	7.5 (N/A)	5.9 (N/A)	13.4	8.8	0
<u>0011519980-04</u>	b-2802	18.3 (N/A)	9.9 (N/A)	28.2	7.2	0
<u>0011520434-03</u>	b-2803	30.2 (N/A)	5.7 (N/A)	35.9	6.3	0
<u>0011521101-08</u>	b-2804	28.1 (N/A)	5.7 (N/A)	33.8	6.5	0
<u>0011520582-09</u>	b-2805	12.5 (N/A)	7.2 (N/A)	19.7	8.1	0
<u>0011520004-03</u>	b-2901	6.5 (N/A)	6.0 (N/A)	12.6	8.9	0
<u>0011520020-04</u>	b-2902	17.9 (N/A)	9.6 (N/A)	27.5	7.3	0
<u>0011520608-03</u>	b-2903	29.4 (N/A)	6.3 (N/A)	35.7	6.3	0
<u>0011521143-08</u>	b-2904	27.8 (N/A)	6.0 (N/A)	33.7	6.5	0
<u>0011520939-09</u>	b-2905	17.5 (N/A)	6.8 (N/A)	24.3	7.6	0
<u>0011520046-03</u>	b-3001	6.6 (N/A)	6.1 (N/A)	12.7	8.9	0
<u>0011520061-04</u>	b-3002	17.9 (N/A)	9.5 (N/A)	27.4	7.3	0
<u>0011520632-03</u>	b-3003	29.4 (N/A)	6.3 (N/A)	35.7	6.3	0
<u>0011521176-08</u>	b-3004	27.8 (N/A)	6.0 (N/A)	33.7	6.5	0
<u>0011520954-09</u>	b-3005	17.6 (N/A)	7.1 (N/A)	24.6	7.6	0
<u>0011520087-03</u>	b-3101	7.6 (N/A)	5.8 (N/A)	13.5	8.8	0
<u>0011520103-04</u>	b-3102	18.6 (N/A)	9.7 (N/A)	28.3	7.2	0
<u>0011531530-02</u>	b-3103	30.4 (N/A)	5.7 (N/A)	36.2	6.2	0
<u>0011521077-08</u>	b-3104	28.3 (N/A)	5.7 (N/A)	34.1	6.4	0
<u>0011520616-09</u>	b-3105	12.5 (N/A)	7.2 (N/A)	19.7	8.1	0
<u>0011520129-03</u>	b-3201	6.7 (N/A)	6.1 (N/A)	12.8	8.9	0
<u>0011520145-04</u>	b-3202	18.1 (N/A)	9.3 (N/A)	27.4	7.3	0
<u>0011520665-03</u>	b-3203	29.6 (N/A)	6.3 (N/A)	35.9	6.3	0
<u>0011521200-08</u>	b-3204	28.0 (N/A)	6.2 (N/A)	34.3	6.4	0
<u>0011520988-09</u>	b-3205	12.3 (N/A)	7.2 (N/A)	19.4	8.2	0
<u>0011520160-03</u>	b-3301	6.7 (N/A)	6.1 (N/A)	12.8	8.9	0
<u>0011520186-04</u>	b-3302	18.9 (N/A)	8.9 (N/A)	27.8	7.2	0
<u>0011520699-03</u>	b-3303	29.6 (N/A)	6.4 (N/A)	36.0	6.3	0



<u>0011521234-08</u>	b-3304	28.9 (N/A)	6.1 (N/A)	35.0	6.4	0
<u>0011521010-09</u>	b-3305	12.7 (N/A)	8.1 (N/A)	20.8	8	0
<u>0011520277-03</u>	b-3401	14.7 (N/A)	12.9 (N/A)	27.5	7.3	0
<u>0011520269-03</u>	b-3402	31.2 (N/A)	6.2 (N/A)	37.4	6.1	0
<u>0011520251-03</u>	b-3403	19.9 (N/A)	8.7 (N/A)	28.6	7.1	0
<u>0011520244-03</u>	b-3501	30.6 (N/A)	7.2 (N/A)	37.8	6	0
<u>0009126756-06</u>	LW-01	22.3 (N/A)	12.4 (N/A)	34.7	6.4	0
<u>0009127176-05</u>	LW-02	31.0 (N/A)	6.7 (N/A)	37.7	6	0
<u>0009127200-05</u>	LW-03	16.6 (N/A)	7.0 (N/A)	23.6	7.7	0
<u>0009127234-05</u>	LW-04	23.9 (N/A)	8.6 (N/A)	32.5	6.7	0
<u>0009127259-05</u>	LW-05	27.2 (N/A)	6.9 (N/A)	34.1	6.4	0
<u>0009127283-05</u>	LW-06	10.6 (N/A)	5.3 (N/A)	15.9	8.5	0
<u>0009127325-05</u>	LW-07	19.1 (N/A)	13.6 (N/A)	32.7	6.7	0
<u>0009127341-05</u>	LW-08	15.9 (N/A)	7.3 (N/A)	23.2	7.7	0
<u>0009127127-05</u>	LW-09	4.6 (N/A)	17.6 (N/A)	22.2	7.9	0
<u>0009127150-05</u>	LW-10	10.1 (N/A)	6.9 (N/A)	17.0	8.4	0
<u>0009127291-04</u>	LW-11	18.4 (N/A)	6.8 (N/A)	25.1	7.4	0
<u>0009127267-04</u>	LW-12	20.3 (N/A)	8.2 (N/A)	28.5	7.2	0
<u>0009127218-04</u>	LW-13	15.4 (N/A)	11.5 (N/A)	27.0	7.3	0
<u>0009127192-04</u>	LW-14	32.0 (N/A)	4.8 (N/A)	36.8	6.2	0
<u>0009127143-04</u>	LW-15	16.1 (N/A)	4.5 (N/A)	20.6	8	0
<u>0009127317-04</u>	LW-16	12.9 (N/A)	15.8 (N/A)	28.7	7.1	0
<u>0009127119-04</u>	LW-17	21.4 (N/A)	14.4 (N/A)	35.8	6.3	0
<u>0009127358-04</u>	LW-18	19.1 (N/A)	6.3 (N/A)	25.4	7.4	0
<u>0009127242-04</u>	LW-19	17.4 (N/A)	11.3 (N/A)	28.8	7.1	0
<u>0009127085-04</u>	LW-20	18.0 (N/A)	10.8 (N/A)	28.8	7.1	0
<u>0009127101-04</u>	LW-21	8.0 (N/A)	13.2 (N/A)	21.2	7.9	0
<u>0009127168-04</u>	LW-22	14.9 (N/A)	11.0 (N/A)	25.9	7.4	0
<u>0009127093-04</u>	LW-23	19.7 (N/A)	17.0 (N/A)	36.8	6.2	0
<u>0009127135-04</u>	LW-24	18.4 (N/A)	8.5 (N/A)	26.9	7.3	0

Explanatory notes

About this ratings

The thermal performance star rating in this Certificate is the average rating of all NCC Class 2 dwellings in an apartment block. Individual unit ratings are listed in the ‘Summary of all dwellings’ section of this Certificate.

NatHERS ratings use computer modelling to evaluate a home’s energy efficiency and performance. They use localised climate

data and standard assumptions on how people use their home to predict the energy loads and societal cost. The thermal performance star rating uses the home’s building specifications, layout, orientation and fabric (i.e. walls, windows, floors, roofs and ceilings) to predict the heating and cooling energy loads.



For more details about an individual dwelling's assessment, refer to the individual dwelling's NatHERS Certificate (accessible via link).

Accredited Assessors

For high quality NatHERS Certificates, always use an accredited or licenced assessor registered with an Assessor Accrediting Organisation (AAO). AAOs have strict quality assurance processes, and professional development requirements ensuring consistently high standards for assessments.

Non-accredited assessors (Raters) have no ongoing training requirements and are not quality assured.

Licensed assessors in the Australian Capital Territory (ACT) can produce assessments for regulatory purposes only, using endorsed software, as listed on the ACT licensing register.

Any queries about this report should be directed to the assessor. If the assessor is unable to address questions or concerns, contact the AAO specified on the front of this certificate.

Disclaimer

The NatHERS Certificate format is developed by the NatHERS Administrator. However, the content in certificates is entered by the assessor. It is the assessor's responsibility to use NatHERS accredited software correctly and follow the NatHERS Technical

Note to produce a NatHERS Certificate.

The predicted annual energy use, cost and greenhouse gas emissions in this NatHERS Certificate are an estimate based on an assessment of the dwelling's design by the assessor. It is not a prediction of actual energy use, cost or emissions. The information and ratings may be used to compare how other dwellings are likely to perform when used in a similar way.

Information presented in this report relies on a range of standard assumptions (both embedded in NatHERS accredited software and made by the assessor who prepared this report), including assumptions about occupancy, behaviour, appliance performance, indoor air temperature and local climate.

Not all assumptions made by the assessor while using the NatHERS accredited software tool are presented in this report and further details or data files may be available from the assessor.