VIPAC

## Marchese & Partners

# Building 1, 5 Avon Rd, Pymble

# BASIX Assessment

Report No. 20C-12-0272-TRP-267435-0
27th November 2012

# DOCUMENT CONTROL

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| **Building 1, 5 Avon Rd, Pymble**<br><br>**BASIX Assessment** | | |
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# EXECUTIVE SUMMARY

VIPAC Engineers & Scientists Ltd. has been commissioned by Marchese & Partners to assess the interaction of the proposed Building 1, 5 Avon Rd, Pymble development with the local environment in terms of BASIX compliance.

The proposed development comprises of:

- Basement carparking
- 6 levels of apartments (44 Apartments)

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

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

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

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# 1. INTRODUCTION

BASIX is a NSW State Planning Policy Tool which assesses the environmental performance of new residential premises against a range water, energy and greenhouse gas emissions targets. The assessment has three core components, BASIX Thermal Comfort, BASIX Water and BASIX Energy.

The thermal comfort assessment requires that the thermal performance of dwellings are evaluated and measures put in place to ensure annual heating and cooling loads do not exceed pre-defined limits without compromising the occupants thermal comfort. This assessment uses computer simulation to evaluate the building fabric thermal performance and passive solar design features such as orientation and solar shading.

The energy section evaluates gas and electrical energy used for heating, cooling lighting, ventilation and appliances. The BASIX Energy target requires the development to uses less energy (ranging between 20% to 40% depending of development type and number of stories) than the NSW average.

The water assessment takes account of landscaping, stormwater management as well as water efficiency performance of fixtures and fitting such as taps and showers. The BASIX target for water requires that potable water consumption is at least 40% lower than the NSW average.

# 2. BASIX WATER SECTION

The water efficiency performance of the development has been assessed using the online BASIX Tool. The assessment has considers Common Area and Central System features including the landscape design, plant species, water catchment areas, rain water tank size and efficiency of preferred fixtures and fittings in the dwellings.

The proposed development will meet the mandatory BASIX water target of 40% as long as the water commitments detailed in Table 1 are installed. For details of the requirements necessary to achieve this target, please refer to the BASIX Certificate No. 457515M.

**Table 1: Water Commitments**

| | |
|---|---|
| ***Common Areas and Central Systems*** | |
| Area of Indigenous or low water species | • **See Appendix B** |
| Rainwater collection | • 7,000L rainwater tank<br>• Roof collection area – 300m$^2$<br>• Rainwater to be used for Common areas and private landscape irrigation |
| Fire Sprinkler | • Test water must be diverted to a closed system |
| ***Private Dwellings*** | |
| Fixtures for apartments | • 3-star (Water Rating) showerheads with a flow rate > 6.0L/min & ≤ 7.5L/min<br>• 4-star (Water Rating) toilets<br>• 4-star (Water Rating) kitchen taps<br>• 5-star (Water Rating) bathroom taps<br>• 4-star (Water Rating) dishwashers |

# 3. BASIX THERMAL COMFORT SECTION

The thermal performance of the development has been evaluated using BERS Pro 2nd Generation software. The BERS Pro computer simulation of residential developments forms part of the Nationwide House Energy Rating Scheme, and is used to assess the potential of a residential development to have low heating and cooling energy requirements once operational.

## 3.1 MODELLING ASSUMPTIONS

The following has been assumed for the thermal simulation:

- BERS Pro calculates the transient hourly heat gains and losses for each space inside a building taking into account the building's thermal storage, typical residential occupancy and operational profiles plus hourly weather data for the site
- Building geometry and orientation were modelled according to supplied drawings
- The area schedules used to determine heating and cooling loads (MJ/m2.yr) are contained in Appendix B
- The "base-case" building fabric and glazing and associated thermal performance specifications are described in Table 1 below: Note these assumptions are based on the nominated preferred construction materials indicated by the architect

**Table 2: Base Case Construction and Fabric**

| *Element* | *Material* | *Detail* |
|---|---|---|
| External walls | Tilt up Concrete | **Insulation: See Table 2** |
| | | Medium colour: 0.7<absorptance< 0.475 |
| Internal walls | Plasterboard | |
| Party walls | Concrete | |
| Windows | ▪ 6mm Single glazed, clear with Aluminium frame<br>▪ Double glazing clear with Aluminium frame (Only for glazing areas facing the Winter Garden) | Holland Blinds to all glazing except to bathrooms (BASIX Protocol, developer is not obligated to install the blinds during CC Stage) |
| | Total Window System Properties: | Single glazing clear: U-value 6.57 & SHGC 0.74<br>Double Glazing clear: U-value 4.27 & SHGC 0.67 |
| Roof | Concrete | Insulation: See Table 2 |
| | | Medium colour: 0.7<absorptance< 0.475 |
| Ceilings | Plasterboard | Insulation: See Table 2 |
| Floors | Concrete | Tiles: Wet areas only |
| | | Carpet: Elsewhere |

## 3.2 BERS PRO RESULTS (THERMAL COMFORT)

The simulated heating and cooling loads per dwelling are summarized in Table 3 below. Where the dwellings have failed to meet the thermal load targets additional thermal enhancements / treatments are provided. This is typically in the form of bulk insulation. These additional thermal treatments are required to pass the BASIX Thermal performance requirements.

**Table 3: BERS Pro Thermal Loads**

| *Unit No.* | *Repeated Units* | *Additional Treatments Required* | *Heating Load ($MJ/m^2.yr$)* | *Cooling Load ($MJ/m^2.yr$)* | *Star Rating* | *Max BASIX Heat Load ($MJ/m^2.yr$)* | *Max BASIX Cool Load ($MJ/m^2.yr$)* | *Pass/Fail* |
|---|---|---|---|---|---|---|---|---|
| 101 | | R1.0 Bulk Insulation to all external wall areas | 29.2 | 24.4 | 5.5 | 66.0 | 59.0 | Pass |
| 102 | | R1.0 Bulk Insulation to all external wall areas | 21.7 | 10.5 | 7.0 | 66.0 | 59.0 | Pass |
| 201 | 301, 401, 501 | R1.0 Bulk Insulation to all external wall areas | 26.8 | 32.5 | 5.0 | 66.0 | 59.0 | Pass |
| 202 | 302, 402, 502 | R1.0 Bulk Insulation to all external wall areas | 11.4 | 15.0 | 7.5 | 66.0 | 59.0 | Pass |
| 203 | | R1.0 Floor Insulation, R1.0 Bulk Insulation to all external wall areas | 20.2 | 41.0 | 5.0 | 66.0 | 59.0 | Pass |
| 204 | 205 | R1.0 Floor Insulation, R1.0 Bulk Insulation to all external wall areas | 35.1 | 11.2 | 6.0 | 66.0 | 59.0 | Pass |
| 206 | | R1.0 Floor Insulation, R1.0 Bulk Insulation to all external wall areas | 31.4 | 26.2 | 5.5 | 66.0 | 59.0 | Pass |
| 207 | | R1.0 Floor Insulation, R1.0 Bulk Insulation to all external wall areas | 44.7 | 20.8 | 5.0 | 66.0 | 59.0 | Pass |
| 208 | 209 | R1.0 Floor Insulation, R1.0 Bulk Insulation to all external wall areas | 39.9 | 20.6 | 5.0 | 66.0 | 59.0 | Pass |
| 303 | 403, 503 | R1.0 Bulk Insulation to all external wall areas | 14.0 | 46.3 | 5.0 | 66.0 | 59.0 | Pass |
| 304 | 305, 404, 405, 504, 505 | R1.0 Bulk Insulation to all external wall areas | 20.0 | 13.4 | 7.0 | 66.0 | 59.0 | Pass |
| 306 | 406, 506 | R1.0 Bulk Insulation to all external wall areas | 19.1 | 27.9 | 6.0 | 66.0 | 59.0 | Pass |
| 307 | 407 | R1.0 Bulk Insulation to all external wall areas | 31.3 | 23.4 | 5.5 | 66.0 | 59.0 | Pass |
| 308 | 309, 408, 409 | R1.0 Bulk Insulation to all external wall areas | 18.6 | 23.0 | 6.5 | 66.0 | 59.0 | Pass |
| 507 | | R1.0 Bulk Insulation to all external wall areas | 42.3 | 27.4 | 4.5 | 66.0 | 59.0 | Pass |
| 508 | 509 | R1.0 Bulk Insulation to all external wall areas | 31.4 | 27.7 | 5.0 | 66.0 | 59.0 | Pass |
| 601 | | R1.0 Bulk Insulation to all external wall areas, R2.0 Ceiling/Roof Insulation | 38.4 | 38.7 | 4.0 | 66.0 | 59.0 | Pass |

| Unit No. | Repeated Units | Additional Treatments Required | Heating Load ($MJ/m^2.yr$) | Cooling Load ($MJ/m^2.yr$) | Star Rating | Max BASIX Heat Load ($MJ/m^2.yr$) | Max BASIX Cool Load ($MJ/m^2.yr$) | Pass/Fail |
|---|---|---|---|---|---|---|---|---|
| 602 | | R1.0 Bulk Insulation to all external wall areas, R2.0 Ceiling/Roof Insulation | 26.0 | 19.5 | 6.0 | 66.0 | 59.0 | Pass |
| 603 | | R1.0 Bulk Insulation to all external wall areas, R2.0 Ceiling/Roof Insulation | 22.3 | 53.7 | 4.0 | 66.0 | 59.0 | Pass |
| 604 | 605 | R1.0 Bulk Insulation to all external wall areas, R2.0 Ceiling/Roof Insulation | 33.3 | 16.8 | 6.0 | 66.0 | 59.0 | Pass |
| 606 | | R1.0 Bulk Insulation to all external wall areas, R2.0 Ceiling/Roof Insulation | 30.8 | 31.2 | 5.0 | 66.0 | 59.0 | Pass |

## 4. BASIX ENERGY SECTION

The Energy performance of the development has been assessed using the online BASIX Tool. The assessment has considered Common Area and Central System features including the lifts, ventilation and lighting for common areas (corridors, lobbies, car park etc), centralised domestic hot water and the efficiency of preferred lighting and appliances in the dwellings.

The proposed development will meet the mandatory BASIX Energy target of 20% as long as the energy commitments detailed in Table 4 are installed.

**Table 4: Energy Commitments**

| Component | | Commitment |
|---|---|---|
| Common Areas and Central Systems | Central Hot Water System | • Centralised Gas Fired Boiler Hot Water System<br>• External and Internal Piping insulation: R0.6 (approximately 25mm) |
| | Lifts | • All lifts to use Gearless traction with VVVF motor servicing all levels |
| | Ventilation | • Carpark: Ventilation (supply & exhaust) with a CO monoxide monitor & VSD fan<br>• Garbage Rooms: Continuous ventilation (exhaust only)<br>• Lift Motor Room: Ventilation (Exhaust Only), continuous<br>• Hallways & lobbies: Ventilation (Supply Only), connected to time clock/BMS |
| | Lighting | • Carpark: Fluorescent lighting with time clocks and motion sensors<br>• Lift Cars: Fluorescent lighting<br>• Garbage Rooms: Fluorescent lighting with manual on/off switch<br>• Lift Motor Room: Fluorescent lighting with manual on/off switch<br>• Hallways & lobbies: Compact Fluorescent lighting with motion sensors + time clock |
| Private Dwellings | Hot Water System | • Central Hot Water System |
| | Ventilation | • Kitchen Exhaust: Individual fan, not ducted, with manual on/off switch.<br>• Bathroom & Laundry Exhaust: Individual fan, ducted to roof or façade, with manual on/off switch |
| | Heating & Cooling | • Heat: Living & Beds to have individual 1-phase air-conditioning with COP 2.5 – 3.0<br>• Cool: Living & Beds to have individual 1 phase air-conditioning with EER 2.5 – 3.0 |
| | Lighting | • No lighting commitments |
| | Other | • Gas cook top and electric oven<br>• All units must install 2-star (energy rating) clothes dryers |

## 5. SUMMARY & CONCLUSION

The proposed development has been assessed to optimise its thermal performance (passive and fabric design) using the Nationwide House Energy Rating scheme (NatHERS).

The proposed development has also been assessed in terms of its ability to conserve water and minimise energy consumption.

With the recommendations contained within this report the proposed development is able to achieve the BASIX requirements and is eligible for BASIX certification.

For further details, please refer to the BASIX Certificate No. 457515M provided.

# APPENDIX A – ARCHITECTURAL DRAWINGS

The building sustainability performance assessment carried out in this report was based on the following architectural drawings supplied by Marchese + Partners received on 15 November 2012.

| |
|---|
| DA 02.01 LOWER GROUND |
| DA 02.02 GROUND LEVEL |
| DA 02.03 LEVEL 1 |
| DA 02.04 LEVEL 2 |
| DA 02.05 LEVEL 3 |
| DA 02.06 LEVEL 4 |
| DA 02.00 ROOF |
| DA 03.01 ELEVATION EAST |
| DA 03.02 ELEVATION SOUTH |
| DA 03.03 ELEVATION NORTH |
| DA 03.04 ELEVATION WEST |
| DA 04.01 SECTION AA |
| DA 04.02 SECTION BB |

# APPENDIX B – LANDSCAPING AREAS

## BASIX for multi dwelling - Landscpe

### WATER - Central systems and common areas

Complete this section **only if** your development has central systems/facilities or common areas

**Common area landscape**

| | |
|---|---|
| Number of Unit-Buildings | 1 |
| Building Name(s) | "Building 1" |
| Common area of lawn (m²) | 63m² |
| Common area of garden (exlcuding lawn) (m²) | 1,855m² |
| Common area of indigenous species (m²) | 1,2500m² |

### WATER - dwellings

**For *each dwelling*, gather the following information:**

How many units have private garden & lawn. Please list these separately below: 8

| Unit No. | Total area of Private garden (m²) | Total area of Private lawn (m²) | Area of indigenous species (m²) |
|---|---|---|---|
| 201 | 13 | | 4 |
| 202 | 11 | | 3.5 |
| 203 | 39 | | 12 |
| 204 | 7 | | 2 |
| 205 | 7 | | 2 |
| 206 | 17 | | 5 |
| 207 | 39 | | 12 |
| 209 | 39 | | 12 |
| | | | |