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ESD Technical Memo

79-81 Queens Road and 2-8 Spencer Street, Five Dock

Shop top housing development proposal

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Executive summary

This ESD Technical Memo has been prepared by Efficient Living for DPG Project 37 Pty Ltd to evaluate the sustainability performance and resilience of the proposed shop top housing development at 79-81 Queens Road and 2-8 Spencer Street, Five Dock, located within the Parramatta Road Corridor Urban Transformation Strategy (PRCUTS) area.

The proposal consists of retail tenancies (BCA Class 6) and residential apartments (BCA Class 2); comprising 134 residential apartments, communal amenity spaces, and ground-floor retail tenancies.

The assessment confirms that the project can achieve a BASIX Water score of 54 points and an Energy score of 69 points. While these results do not meet the numerical LEP outperformance targets of 60 points for Water and 78 points for Energy, the analysis demonstrates that the proposal aligns strongly with Canada Bay Council sustainability objectives which have been derived in part from the PRCUTS sustainability objectives. The shortfall arises from structural constraints including the post-2023 BASIX stringency uplift, the absence of precinct level reticulated recycled water infrastructure, and the limited rooftop area available for additional on-site solar generation.

As shown in Figure 1, the proposal uses approximately 2,683L/day less potable water compared to KINESIS PRCUTS proposed scenario and performs comparably to the LEP target, although the LEP scenario achieves greater total water offsets through recycled water. For energy (Figure 2), the proposed building generates approximately 10,776kg less CO_2 per year than the KINESIS PRCUTS proposed scenario and aligns with the LEP BASIX target. However, the full PV capacity required to offset operational energy cannot be met due to roof-space limitations.

To address the limitations associated with on-site renewable energy generation, Efficient Living notes that there are industry-standard mechanisms available to future building operators and occupants that may assist in reducing operational electricity emissions beyond minimum compliance pathways. This consolidated, all-electric operational profile provides a framework in which future operators and occupants may elect to explore whole-of-building renewable electricity procurement options, independent of the development approval process. The developer proposes to include education and guidance to building operators and occupants on purchasing Green Power to the body corporate and strata manager.

Figure 1: BASIX Water score analysis

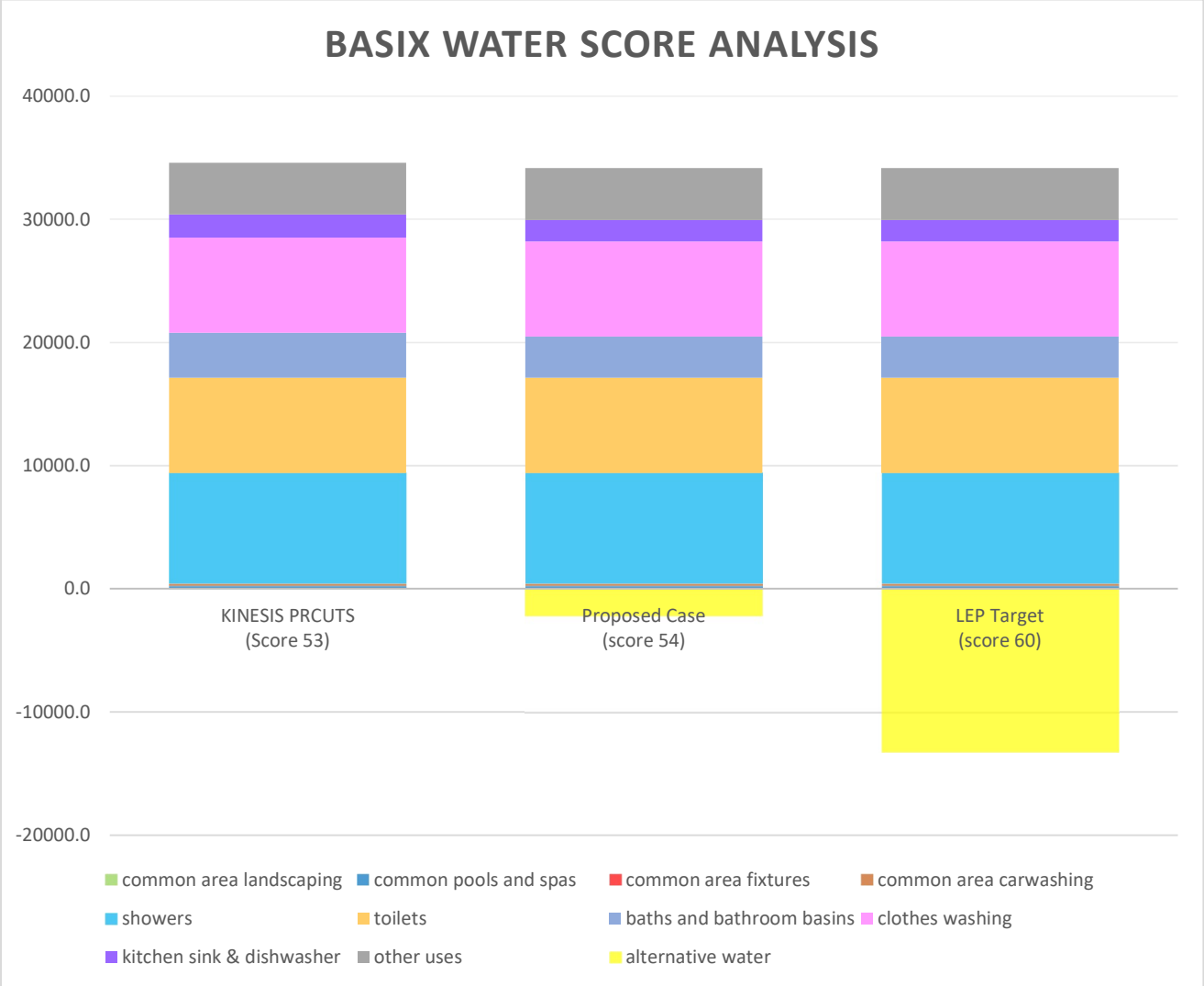
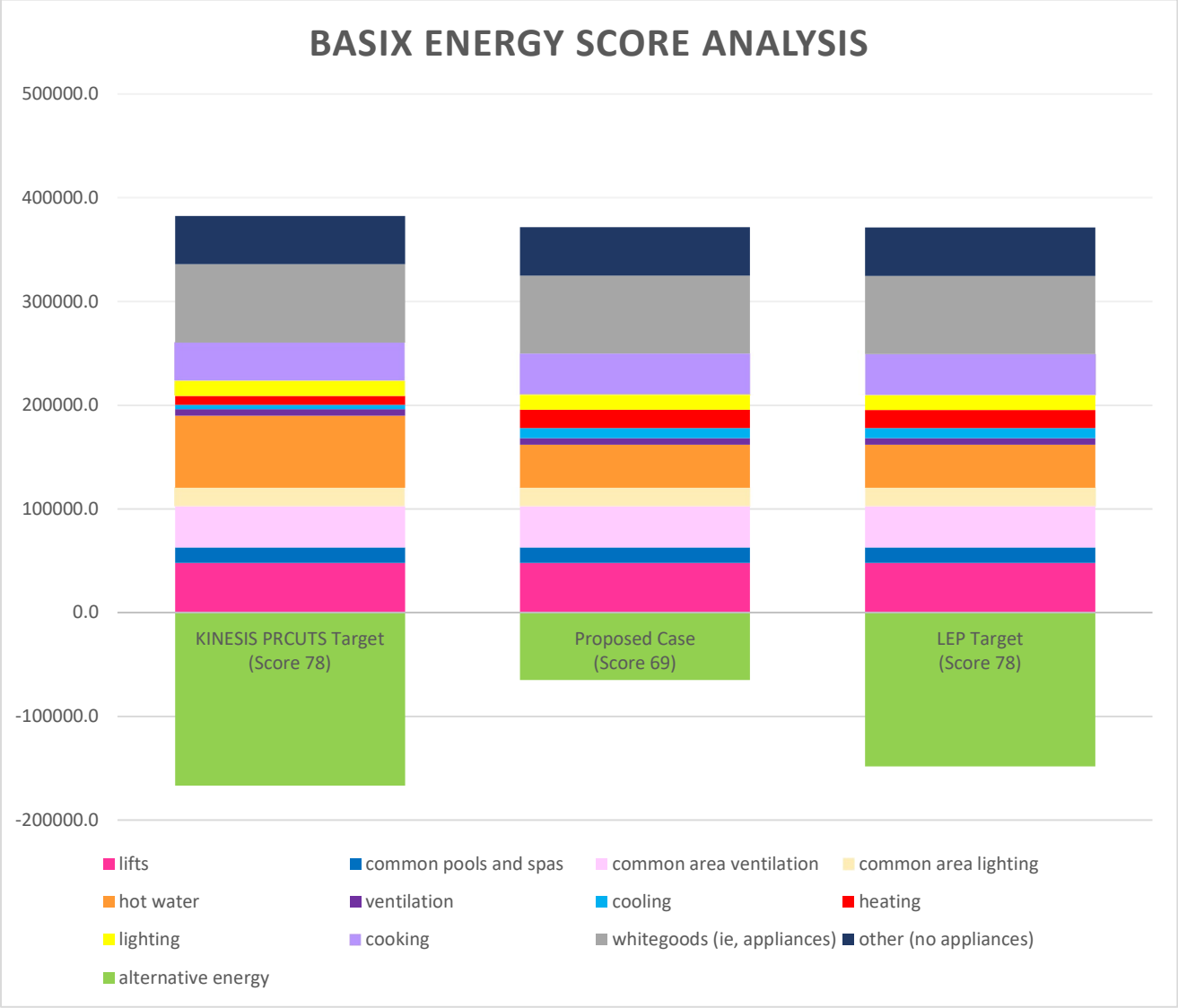


Figure 2: BASIX Energy score



1. Introduction

This report has been prepared by Efficient Living Pty Ltd on behalf of DPG Project 37 Pty Ltd for the proposed shop top housing development at 79-81 Queens Road and 2-8 Spencer Street, Five Dock. The assessment evaluates the project's sustainability performance using the BASIX framework to determine its capacity to meet or exceed the City of Canada Bay's BASIX outperformance targets, which provide eligibility for up to 5% FSR uplift for residential developments in specific areas.

The project is located on the corner of Queens Road, Williams Street and Spencer Street, Five Dock, and falls under the jurisdiction of the City of Canada Bay Council. The Parramatta Road Corridor in Sydney is a significant urban axis approximately 23 km long running from the city centre (via Broadway/Ultimo) to Parramatta. Because of its length, linear alignment, historical importance and proximity to many inner-west suburbs, successive governments have identified it as a major focus for urban renewal and regeneration.

In November 2016, the NSW Government released the Parramatta Road Corridor Urban Transformation Strategy (PRCUTS), presenting a 30-year vision to guide growth, improve transport and place outcomes, diversify land uses, activate precincts, and establish a coordinated planning framework for the Corridor. Within the published Strategy, Principle 6: Sustainability and Resilience emphasises that world-class urban renewal outcomes require sustainability performance that exceeds minimum regulatory requirements. The PRCUTS (2016) explicitly calls for "best practice BASIX energy and water targets, incorporating significant renewable energy and water reuse requirements" as part of its strategic actions to reduce operational energy demand, carbon emissions, and potable water use, and to improve long-term household affordability through adaptive sustainability practices.

Figure 1: PRCUTS timeline (Canada Bay Website)

In line with the NSW Government's PRCUTS, local councils within the corridor, including the City of Canada Bay, introduced sustainability-based development incentives. As part of these initiatives, Council allows for a Floor Space Ratio (FSR) exceedance of up to 5% where residential developments can demonstrate that they exceed the BASIX Water and Energy target by a specified margin. This mechanism was established to promote higher environmental performance, encourage greater uptake of renewable energy systems and water-efficiency measures, and align local planning outcomes with PRCUTS Principle 6: Sustainability and Resilience. These planning controls were implemented prior to the Sustainable Building SEPP increased standards in 2022.

In the City of Canada Bay, the PRCUTS Planning Proposal to deliver Stage 1 of the Parramatta Road Corridor Urban Transformation Strategy (2016–2023 release areas) was finalised, with the associated amendments to the Local Environmental Plan (LEP) made by the NSW Department of Planning and Environment on 16 December 2022. According to Council's documentation, one the key sustainability evidence base informing the LEP and DCP updates was the sustainability strategy report prepared by Kinesis for Canada Bay Council (20 July 2020). This study provided the technical foundation for establishing elevated sustainability expectations across the Parramatta Road precinct, including revised BASIX performance targets, renewable energy considerations, and water efficiency commitments in line with PRCUTS Principle 6: Sustainability and Resilience.

Figure 2: PRCUTS – (KINESIS Report)

After reviewing all relevant policies, action plans, and State Government strategies, the Kinesis study provides Council with a clear pathway for delivering high-performance sustainability outcomes across the Canada Bay precincts. To develop this pathway, the report analyzed the performance of the precincts under three scenarios:

1. Base Case: A reference case scenario simulating BASIX compliance standard.
2. PRCUTS Target: The Parramatta Road Urban Corridor Transformation Strategy prescribes a set of BASIX targets higher than just compliance.
3. Stretch: Going beyond the PRCUTS targets to achieve sustainability best practice. This is modelled as an all-electric scenario given that the emissions intensity of gas will be higher than electricity beyond 2036.

Figure 3: BASIX Strategy for PRCUTS (KINESIS)

Assumptions used in scenario modelling	Base Case	PRCUTS Target	Stretch
Thermal Efficiency (NatHERS)	6 * NatHERS	7 * NatHERS	7 * NatHERS
Space conditioning	2.5 * RCAC	5 * RCAC	5 * RCAC
Hot Water	Gas Instantaneous	Gas Instantaneous	Electric Heat Pump
Lighting	Standard (Halogen/ CFL)	Efficient LED	Efficient LED
Cooking	Gas cooktops, Electric oven	Gas cooktops, Electric oven	Electric cooktop, Electric oven
Appliances	No appliances installed	5* Energy & Water Fridge, Washing Machine, Dishwasher and Heat pump clothes dryer	5* Energy & Water Fridge, Washing Machine, Dishwasher and Heat pump clothes dryer
Water Fixtures	Best Practice (4- 5 star WELS taps, shower heads and toilets)	Best Practice (4- 5 star WELS taps, shower heads and toilets)	Best Practice (4- 5 star WELS taps, shower heads and toilets)
Irrigation Efficiency	Low water use species	Low water use species	Additional greening delivered through recycled water
Solar PV	None	None	0.5 kW per dwelling
Water Reuse	None	None	Recycled Water for irrigation, toilet, laundry
Parking*	0.9 cars per dwelling	0.9 cars per dwelling	Zero Parking
EV Charging	None	Not included	Each space
BASIX Outcomes			
BASIX Energy	**25**	**40**	**50**
BASIX Water	**40**	**50**	**60**

As per the 2020 analysis report, the nominated BASIX exceedance targets for PRCUTS are +15 points above the base Energy target (25) and +10 points above the base Water target (40) if no precinct recycled water scheme is available.

While the KINESIS report recommends a BASIX exceedance of +15 points for Energy and +10 points for Water, Canada Bay's LEP Part 8 requires a higher exceedance of +15 points for Energy and +20 points for Water.

(1) A BASIX building on land to which this Part applies may exceed the maximum permissible FSR by up to 5% if the building—

(a) exceeds the BASIX commitment for energy for the building by at least 15 points, and

(b) exceeds the BASIX commitment for water for the building by at least 20 points.

Figure 4: Part 8 - Canda Bay's LEP

2. BASIX October 2023 update

Prior to October 2023, the BASIX minimum requirements for this scale of project and site were 25 points for Energy and 40 points for Water, which formed the basis of the Canada Bay LEP. However, with the 2023 BASIX update, the Energy target has since increased to 63 points for Energy. Because of this uplift, achieving a BASIX 63-point energy target plus an additional 15-point exceedance now represents a much higher level of stringency than before. In practice, this 15-points energy exceedance under the new BASIX framework is equivalent to an increase of approximately 25 points compared to the previous BASIX 25-point base used by both the Council's LEP and the Kinesis study. In other words, the new BASIX standards already embed stricter energy requirements that were not accounted for when the original LEP and Kinesis recommendations were developed.

In Efficient Living's opinion, taking into account the BASIX 2023 +10 point increase in stringency, and the initial LEP target of +15 point stringency over the previous BASIX standards, this implies a like for like target of approximately BASIX Energy 68 (BASIX Energy 63 +5 points) in the Sustainable Buildings SEPP BASIX environment.

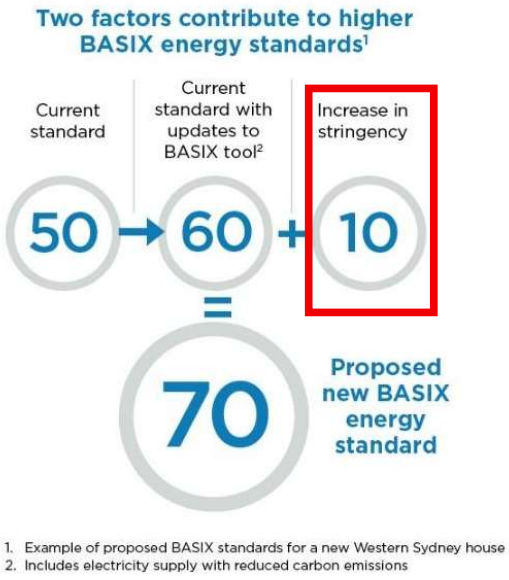


Figure 5: BASIX Energy upgrade

3. Project description

The proposed development is to be built at 79-81 Queens Road and 2-8 Spencer Street, Five Dock.

The project is a shop top housing development with 134 residential apartments, communal amenity spaces, and ground-floor retail tenancies.

This report is based on the following plans prepared by Plus Studio Architects:

DA-0101 – DA0109 [Revision B], dated 19/01/2026.

3.1. Planning policy considerations for energy and water efficiency

Most residential projects are classified as BASIX-affected developments and are required to comply with BASIX and NatHERS assessment pathways under the Sustainable Buildings SEPP. For this project and site, the apartments must achieve a minimum 7-star NatHERS thermal comfort rating (average across all dwellings), 63 points in carbon emissions/energy savings and 40 points in potable water savings in accordance with the NSW BASIX SEPP and the National Construction Code (NCC) 2022 energy efficiency provisions.

As per Canada Bay Council requirements, residential developments that exceed BASIX targets by +15 points above the base energy target and +20 points above the base water target could receive a 5% bonus development FSR. Under the upgraded BASIX targets introduced in October 2023, this equates to an energy target of 78 and a water target of 60 for this type of development within the precinct.

4. Feasibility assessment of the proposed Five Dock project against Canada Bay's LEP BASIX outperformance target

4.1. BASIX Water

The summary of the BASIX Water score achieved compared to LEP target and KINESIS PRCUTS target is as follows:

Table 1: Key Water Efficiency and Water Saving Measures and Testing

Key Water Efficiency and Water Saving Measures	KINESIS PRCUTS Water target (50 pt)	Proposed Five Dock development (54 pt)	LEP Target (60 pt)
Water Fixtures	(4-5 star WELS taps, shower heads & toilets)	- 6 star taps -4 star >6 but ≤7.5L/min showers -4 star toilets	- 6 star taps -4 star >6 but ≤7.5L/min showers -4 star toilets
Water Reuse	None	Rainwater tank for landscape irrigation and toilet flushing and laundry taps to all apartments	None
Irrigation Efficiency	Low water use species	Low water use species	None
Fire sprinkler system	Not Identified	Closed loop for test water saving.	Closed loop for test water saving.
Appliances	5 star Clothes Washer, Dish Washer	4.5 star clothes washer 5.5 Star dishwasher	5 star clothes washer, dishwasher
Recycled Water	None	None	Recycled water connected to landscape, toilets, Laundries

As shown in Table 1, the proposed development applies strong initiatives across water efficiency and water saving measures. This achieves a +10 BASIX water outperformance target as identified in the Kinesis PRCUTS study. However, achieving the LEP-required target of 60 points is unreasonable as it would necessitate the provision of recycled water, which is not available for this site.

The inclusion of recycled water requires coordinated planning between Canada Bay City's council, the water utility, and the broader precinct development. Recycled water is not considered a business-as-usual infrastructure item and typically relies on a critical mass of precinct-scale development to justify the establishment of a new recycled water network. Although recycled water can deliver long-term benefits such as a resilient water supply and greener, drought-resistant landscapes, no recycled water reticulation infrastructure currently exists within the study area.

Given the scale of the project, establishing an on-site recycled water system on site is not considered viable due to the significant capital cost and ongoing maintenance requirements.

Efficient Living therefore recommends that the BASIX Water 60 target required by the LEP be varied to a BASIX 50 equivalent target

- *BASIX Water 60 is practically unreasonable and unachievable for the proposal*
- *BASIX Water 50 represents a very strong water sustainability outcome suitable as an outperformance target to be utilised for measured development incentives such as a 5% floor space bonus*
- *We note that the current proposal achieves BASIX Water 54*

4.2. BASIX Energy

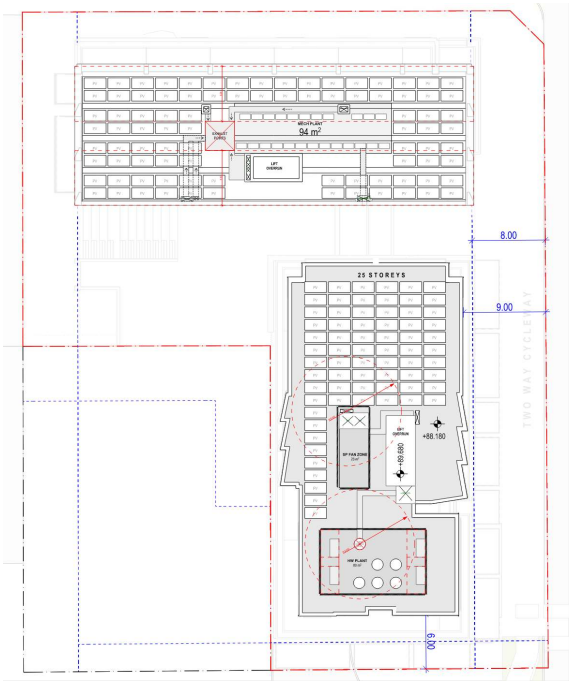
The summary of the BASIX Energy score achieved compared to LEP target and KINESIS PRCUTS target is as follows:

Table 2: Key Energy and Carbon Saving Measures and Testing

Key Energy and Carbon Saving Measures	KINESIS PRCUT Energy target (40 pt) (Old BASIX Tool)	Proposed Co-Living (70 pt) energy pt, New BASIX tool	LEP Target (78 pt)
Hot water	Gas Instantaneous	Electric heat pump - air sourced (3.5 < COP ≤ 4.0)	Electric heat pump - air sourced (3.5 < COP ≤ 4.0)
Solar PV	None	70 kW	160 kW
Lighting	Efficient LED	Efficient LED	Efficient LED
Cooking	Gas cooktops, Electric oven	Induction, Electric Oven	Induction, Electric Oven
Heating and Cooling system	5 star RCAC	Individual ducted AC Cooling rating EER 3.5 – 4.0 Heating rating EER > 4.0	Individual ducted AC Cooling rating EER 3.5 – 4.0 Heating rating EER > 4.0
Appliances	*5 star dishwasher and heat pump clothes dryer	*4.5 star dishwasher, and 9.0 star heat pump clothes dryer	*4.5 star dishwasher, and 9.0 star heat pump clothes dryer

*The highest available dishwasher to be address in BASIX is 4.5 Star.

Figure 6:Estimated PV Capacity of project (c. 70-78kwh)



Based on the analysis undertaken, the project can achieve a BASIX equivalent energy score of 70. The development is proposed to be fully electric (residential uses), supported by an on-site PV system of approximately 70 kW. While the proposed design specifications exceed the performance assumptions recommended in the Kinesis PRCUTS study, the 2023 BASIX stringency update has resulted in the project falling short of a strict interpretation of the LEP Energy target by 8 points. However, achieving the LEP target would require an estimated 160 kW PV system; which is unachievable on the roof space of this proposal. The proposal has already maximized the available roof space to achieve a provision of 70 kW PV system.

To address the limitations associated with on-site renewable energy generation, Efficient Living notes that there are industry-standard mechanisms available to future building operators that may assist in reducing operational electricity emissions beyond minimum compliance pathways. The consolidated, all-electric operational profile provides a framework in which future building operators and occupants may elect to explore renewable electricity procurement options, such as a Green Power or power purchase agreement, independent of the development approval process.

Efficient Living therefore recommends that the BASIX 78 Energy target required by the LEP be varied to allow a BASIX 68 equivalent target since

- *BASIX 78 for tall and slender apartment towers will often be unachievable due to limited roof space to provide solar electricity*
- *Efficient Living recommends that BASIX Energy 68 target may be more reasonable as an LEP outperformance target*
- *We note that the current proposal achieves BASIX Energy 69*

4.3. Thermal Comfort assumptions

The project has NatHERS thermal ratings to meet NCC2022 requirements. Each unit has individual heating, cooling and total loads applied resulting in a minimum rating of 6.0 stars NatHERS. In addition, the building has average heating, cooling and total loads which results in the minimum compliance measure of 7.0 stars NatHERS.

For this report, and to demonstrate compliance with BASIX requirements, an area-adjusted heating load of 15 MJ/m²/yr and an area-adjusted cooling load of 15 MJ/m²/yr were adopted (total 30 MJ/m²/yr).

Conclusion

A review of City of Canada Bay's LEP and the supporting studies prepared for the LEP update in late 2022 highlights that, while the 5% FSR incentive is a positive initiative to promote PRCUTS objectives, the current provisions are no longer aligned with the BASIX update introduced in October 2023.

This misalignment weakens sustainability outcomes and departs from the policy's original intent. Applying the LEP BASIX outperformance controls rigidly, without considering the specific circumstances of individual sites, creates unintended consequences, discouraging developers from exceeding minimum statutory sustainability requirements. The discrepancy reinforces the need for a future review and update of the LEP to ensure consistency with contemporary sustainability requirements.

Efficient Living recommends that BASIX Water 50 and BASIX Energy 68 are more appropriate LEP outperformance targets. The current proposal achieves BASIX Water 54 and BASIX Energy 69, which exceeds what we believe are reasonable LEP outperformance targets in this case.

We note that for residential buildings over a certain height (c. 6-7 storeys), the potential for solar/PV array provision to achieve strong BASIX exceedance, or objectives to achieve net zero operational CO2 emissions, will be limited. The proposed all-electric operational profile (residential uses) provides a framework in which future building operators and occupants can elect to explore renewable electricity procurement options, that would achieve a net zero carbon emissions outcome.

Appendix A – BASIX Inclusions

BASIX Water inclusions

Water Score 54/40

Landscape - indigenous and low water use species

500m² indigenous or low water use planting

Central rainwater storage

Tank size: 30,000L

Collecting from 1,000m² roof area

Connected to outdoor tap for irrigation of 700m² common area landscaping, toilets & laundries in all apartments

Common area swimming pools and spas

Pool volume: 44 kL

Pool shaded: yes

Spa volume: 11 kL

Spa cover: no Spa shaded: yes

Fire sprinkler test water

Three sprinkler systems nominated in BASIX: one for parking areas, one per residential building

All systems: Fire sprinkler test water must be contained in a closed loop system (tank required)

Fixtures within common areas

Showerheads: 4 star mid flow (>6L but ≤7.5L/min)

Toilets: 4 star

Taps: 6 star

Fixtures and appliances within units

Showerheads: 4 star mid flow (>6L but ≤7.5L/min)

Toilets: 4 star

Kitchen taps: 6 star

Bathroom vanity taps: 6 star

Clothes washers: 4.5 star

Dishwashers: 5.5 star

BASIX Energy Inclusions

Energy Score 69/63

Hot water system

Central electric heat pump – air sourced with unit efficiency of 3.5 < COP ≤ 4.0 and R1.0 (~38mm) insulation to ring main and supply risers

Alternative energy

Photovoltaic system: rated electrical output (min.) 70 peak kW

Lift motors

North building: Lifts to have gearless traction with VVVF motor with lift load capacity of ≥1,0001kg to ≤1,500kg

East building: Lifts to have gearless traction with VVVF motor and regenerative drive with lift load capacity of ≥1,0001kg to ≤1,500kg

Common area swimming pools and spas

Pool heating source: no heating

Pool pump: controlled by timer

Spa heating source: electric heat pump

Spa pump: controlled by timer

Common areas – ventilation and lighting

Lighting control system / BMS : no

Common Area	Ventilation	Lighting
Pool and entertainment area	No mechanical ventilation	LEDs with time clocks
Wellness area	Air conditioning, time clock or BMS controlled	LEDs with time clocks
Car park area	Supply and exhaust air with a carbon monoxide monitor & VSD fan	LEDs with time clock and motion sensors
Garbage rooms	Exhaust air only, running continuously	LEDs with motion sensors
Plant / service rooms (enclosed)	Supply and exhaust air, thermostatically controlled	LEDs with manual on / off switch
Plant / service rooms (naturally ventilated)	No mechanical ventilation	LEDs with motion sensors
Communal WC and change rooms	Supply and exhaust air, time clock or BMS controlled	LEDs with motion sensors
Storage rooms	Supply air only, time clock or BMS controlled	LEDs with motion sensors

Entry lobbies	Supply air only, time clock or BMS controlled	LEDs with time clock and motion sensors
Hallways (breezeways)	No mechanical ventilation	LEDs with time clock and motion sensors
BOH hallways and store	Supply air only, time clock or BMS controlled	LEDs with time clock and motion sensors
Lifts		LEDs connected to lift call button

Dwelling ventilation

Bathroom: individual fan, ducted to roof or façade – interlocked to light, timer off

Kitchen range hood: Individual fan, ducted to roof or façade – manual on / off switch

Laundry: individual fan, ducted to roof or façade – manual on / off switch

Dwelling cooling and heating

All units to have individual, single phase, ducted air conditioning to living areas, and at least 1 bedroom

A minimum efficiency of EER 3.5 – 4.0 is required for cooling; and

A minimum efficiency of EER > 4.0 is required for heating

Dwelling artificial lighting

Minimum of 80% of all light fittings within each room are to have dedicated LED fixtures installed

Dwelling appliances and other efficiency measures

Induction cooktop & electric oven

Dishwashers: 4.5 star

Clothes dryers: 9.0 star