



# 45 McLaren St, North Sydney

## Sustainability Strategy

FINAL  
25.06.2021

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## ACKNOWLEDGEMENT OF COUNTRY

Integral Group acknowledges the traditional owners and custodians of the land on which it works and pays its respects to Elders past, present and future.

VERSION	DATE	AUTHOR	SUMMARY OF CHANGES
0.1	30 September 2020	Richard Palmer	DRAFT for Comment
0.2	20 October 2020	Richard Palmer	FINAL for submission
0.3	25 June 2021	David Arnott	Updated to address council comments

# VISION FOR A REGENERATIVE CITY

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*Our vision is for a regenerative urban place.*

*A place that meaningfully and materially addresses the pressing environmental, social and economic challenges facing our City, our nation and our species.*

*A place that sets North Sydney on a new trajectory towards long-term sustainability.*

*A place that moves beyond business as usual by implementing innovative strategic initiatives in the built form, in building systems and in support for- and relationship to a renewed public realm.*

*To implement our vision we will set the baseline at current best practice through our commitments, and seek to meaningfully contribute to a more sustainable Sydney through investment in innovative and emerging approaches to urban renewal.*



# INTRODUCTION

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The process of urban renewal presents cities with an opportunity to address the major environmental challenges facing our society:

- Climate change;
- Resilience;
- Biodiversity loss;
- Resource depletion;
- Health and Wellbeing.

It also presents an opportunity to embed the benefits of changing technology; in digital systems, energy and transportation as well as the creation of urban places that support high quality lifestyles.

The intersection of environmental challenges, technology opportunities and creation of high quality urban places contribute to the future competitiveness of our cities.

This report presents the sustainability principles and ambitions for 45 McLaren St in North Sydney, that give effect to this broad agenda for more sustainable, attractive and competitive cities.

It presents two frameworks for sustainability:

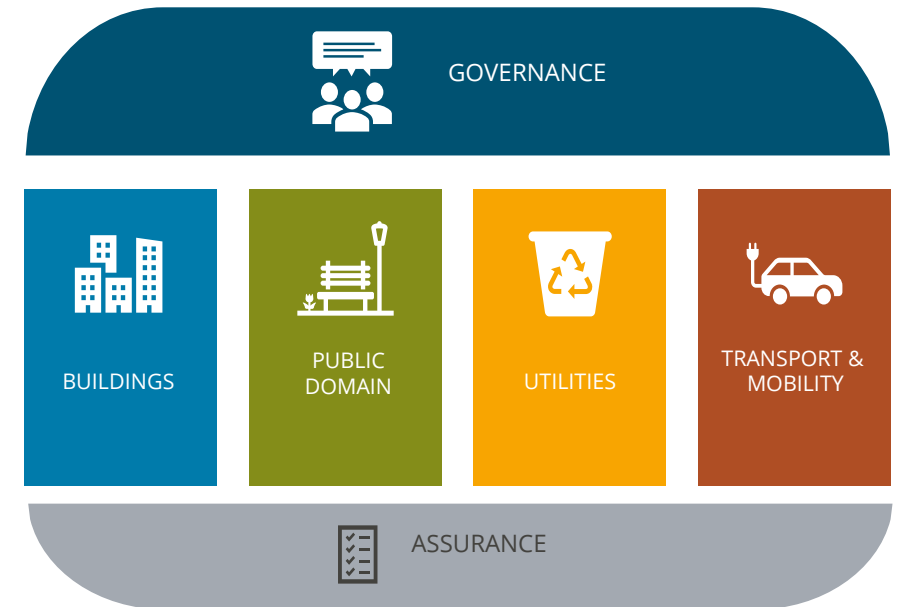
- A schedule of certification commitments;
- A selection of strategic next generation initiatives in support of an ambitious sustainability agenda.

# APPROACH | URBAN SYSTEMS

The delivery of sustainability principles and approaches are best understood in the context of the systems within the built environment and the planning, governance and procurement frameworks by which they are implemented.

The strategy is structured in line with the planning and delivery instruments and the specific systems which will be procured:

- **Planning Governance** | The framework of planning instruments and operational strategies which will be created or amended for the precinct – VPA, Tenders and Contracts.
- **Buildings** | The development control of individual buildings to shape design and ensure connection to better sustainability systems of the larger precinct.
- **Public Domain** | The public domain design and management; including amenity, biodiversity, resource intensity, green infrastructure and mechanisms for place-based reconciliation with Indigenous Australians.
- **Utilities** | Electricity, water, gas, sewer, and communications utilities would typically be serviced by the appropriate supply authorities; however could be procured from private precinct operators for a more innovative, long-term outcome.
- **Transport and Mobility** | Opportunities for how public transport, active transport, shared mobility, ticketing, digital mobility and conventional car-based transport solutions that could deliver better connection and mobility to and around the precinct.
- **Assurance** | Mechanisms by which the non-financial performance of the precinct can be assured within the procurement documents over the course of the program lifecycle to deliver better social license and risk management.



Urban Systems Model

# CONTEXT | GLOBAL AND AUSTRALIAN POLICY

The project provides an opportunity to advance the comprehensive policy sustainability-related framework that exists for a global, Commonwealth, state and local government jurisdictions.

**UN Sustainable Development Goals** | At least seven of the UN Sustainable Development Goals are advanced through sustainability in cities and urban renewal precincts.

**Commitments under the Paris Agreement** | Cities are critical to the global goal to reduce GHG emissions able keep warming below 1.5°C above pre-industrial levels.

**Commonwealth policy** | The advancement of the City Performance Indicators under the smart cities plan.

**Transport for NSW** | The site is an important place in the metro strategy for Future Transport 2056 Strategy; including future mobility and the principles of movement and place.

**NSW Environmental Protection Agency** | The site can be an urban exemplar of the Circular Economy, giving effect to the NSW Circular Economy Policy Statement.

**Greater Sydney Commission and NSW Department of Planning, Industry and Environment** | The site will be a benchmark project for the Sydney Metro and Eastern District Plans.

**NSW Office of Environment and Heritage** | The site will give effect to the NSW climate change framework with the ambition for net zero emissions by 2050 and adaptation to a changing climate.

**NSW Aboriginal Procurement in Construction** | Supporting and advancing the opportunities for Aboriginal and Torres Strait Islander Australians through the procurement and design approaches to the site.

**North Sydney Community Strategic Plan** | In addition to Commonwealth and State policy, the site will give effect to the sustainability ambitions of the North Sydney Community Strategic Plan.

**Resilient Sydney** | the site will help build resilience for the broader city, supporting the strategic directions of the strategy for city resilience: People centred city; Live with our climate; Connect for strength; Get ready and One city.

## SUSTAINABLE DEVELOPMENT GOALS



# SUSTAINABILITY PLANNING PRIORITIES AND OBJECTIVES

The North District Plan identifies planning priorities and objectives for sustainability. Our proposal for 45 McLaren St directly addresses these priorities and objectives.

**Planning Priority N4:**

- Objective 7 | Communities are healthy, resilient and socially connected.
- Objective 8 | Greater Sydney's communities are culturally rich with diverse neighbourhoods.

**Planning Priority N15:**

- Objective 25 | The coast and waterways are protected and healthier.

**Planning Priority N16:**

- Objective 27 | Biodiversity is protected, urban bushland and remnant vegetation is enhanced

**Planning Priority N17:**

- Objective 28 | Scenic and cultural landscapes are protected.

**Planning Priority N18:**

- Objective 29 | Environmental, social and economic values in rural areas are protected and enhanced.

**Planning Priority N19:**

- Objective 30 | Urban tree canopy cover is increased.
- Objective 32 | The Green Grid links parks, open spaces, bushland and walking and cycling paths.

**Planning Priority N20:**

- Objective 31 | Public open space is accessible, protected and enhanced.

**Planning Priority N21:**

- Objective 33 | A low-carbon city contributes to net-zero emissions by 2050 and mitigates climate change.
- Objective 34 | Energy and water flows are captured, used and re-used.
- Objective 35 | More waste is re-used and recycled to support the development of a circular economy.

**Planning Priority N22:**

- Objective 36 | People and places adapt to climate change and future shocks and stresses.
- Objective 37 | Exposure to natural and urban hazards is reduced.
- Objective 38 | Heatwaves and extreme heat are managed.

## Directions for sustainability



### A city in its landscape

**Planning Priority N15**

Protecting and improving the health and enjoyment of Sydney Harbour and the District's waterways

**Planning Priority N16**

Protecting and enhancing bushland and biodiversity

**Planning Priority N17**

Protecting and enhancing scenic and cultural landscapes

**Planning Priority N18**

Better managing rural areas

**Planning Priority N19**

Increasing urban tree canopy cover and delivering Green Grid connections

**Planning Priority N20**

Delivering high quality open space



### An efficient city

**Planning Priority N21**

Reducing carbon emissions and managing energy, water and waste efficiently



### A resilient city

**Planning Priority N22**

Adapting to the impacts of urban and natural hazards and climate change.

*North District Plan Sustainability Priorities*

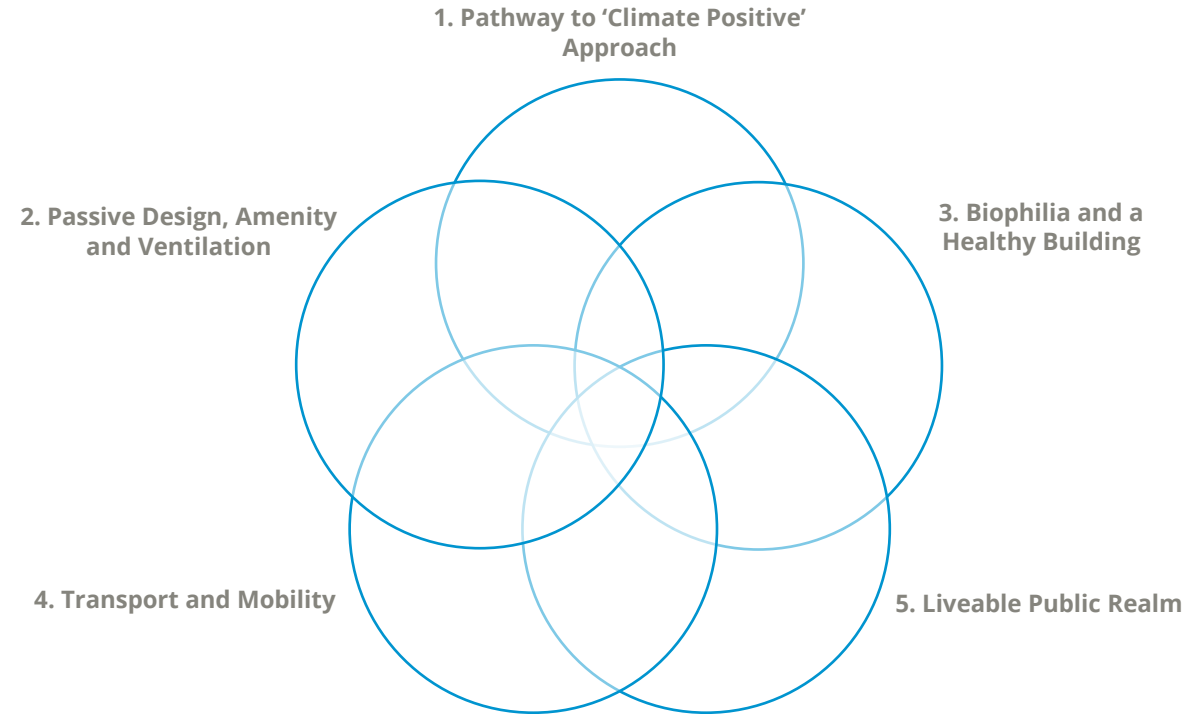
# OUR OBJECTIVES

In pursuit of a planning proposal that expands the horizons of sustainability performance in the built environment, several strategic initiatives that support ambitious sustainability objectives have been identified for consideration in the planning proposal.

The sustainability objectives for the 45 McLaren St planning proposal are:

1. To reduce GHG emissions, with the goal of Net Zero Emissions (Priority N21);
2. To support the health and wellbeing of building occupants, visitors and the community (Priority N4);
3. To dramatically reduce the use of non-renewable resources and advance the circular economy (Priority N21);
4. To support the physical resilience of assets, and the resilience of the community, to manage shocks and stresses from climate change (Priority N22);
5. To contribute new green space to the city, supporting local habitat, connectivity for mobile species, water management, urban heat and local amenity (Priorities 15, 16 and 19);
6. To enable movement to and from the site with non-vehicular transport; connecting to Sydney Metro, supporting better mobility options in the neighbourhood and supporting the adoption of emerging mobility options that supports sustainable outcomes;
7. To mitigate the consumption of potable water resources, seek more sustainable infrastructure solutions and provide best practice water quality leaving the site (Priority N21);
8. To embed Indigenous knowledge into the design and development process in support of our cultural heritage and recognition of the sustainability insight from Indigenous communities (Priority N17).

*This paper presents five sustainability aspirations for consideration in giving effect to these objectives.*





# SUSTAINABILITY ASPIRATION | 1. Pathway to Climate Positive Approach

Climate change is among the most urgent challenges of our times, with deep emissions cuts required by 2030 and net zero emissions by 2050 required to keep temperature rise below 1.5° C.

The Green Building Council of Australia has defined 'climate positive' in preference to 'net zero' and breaks this down in the following way (see right);

- Fossil fuel free
- Highly efficient
- Powered by renewable energy
- Built with low carbon materials
- Offset with nature

45 McLaren St will investigate a suite of initiatives to target a climate positive approach over the life of the project. The objectives to achieve net zero emissions are aligned with industry best practice:

- Electrification of all normally-operating systems;
- Best in class energy efficiency (7 star NatHERS, 5.5 star NABERS benchmark);
- An innovative hybrid timber structure to reduce embodied emissions (provisional target of 40% below BAU);
- Enabling procurement of 100% renewable energy (on-site and off-site) via an embedded network;
- Offset all residual emissions (scope 1, 2 and nominated scope 3) from construction and operation with nature-based solutions, supporting regional carbon projects.



Green Star definition of Net Zero

*"One of the biggest barriers to deep emissions reduction in construction is our reliance on high emissions-intensity materials. Deep embodied emissions reduction is the next frontier for zero emissions cities."*



# SUSTAINABILITY ASPIRATION | 2. Passive Design, Amenity and Ventilation

There are a range of passive opportunities to reduce the resource consumption of the dwellings, provide healthy and comfortable homes for occupants and enable high-efficiency systems.

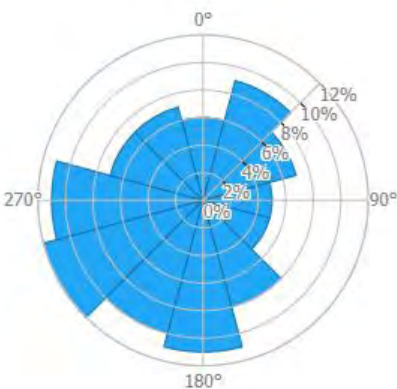
**Natural ventilation** – The Sydney climate provides an ideal environment for effective natural ventilation and making use of prevailing wind patterns should form part of design development. Ceiling fans. Night-time flushing to reduce cooling loads. Daytime natural ventilation to reduce HVAC loads and increase thermal comfort + amenity.

**Building Fabric** – High performance building fabric is critical to low energy and comfortable buildings. This includes the minimisation of the thermal bridges in construction. Best practice benchmarks: *Rt3.2 walls, Rt5-6 roof, double-glazing, low-E glass* and *thermally broken framing*.

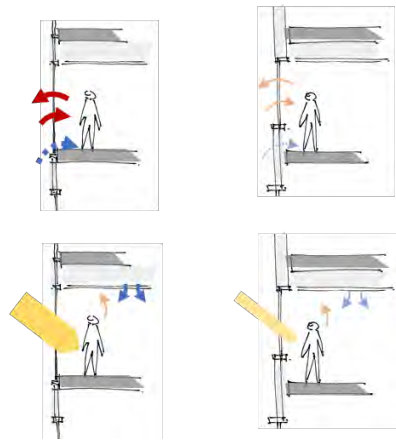
**Solar access** – Buildings should aim to exceed the minimum solar access requirements for winter-time solar access at mid-day. Building geometry has been carefully considered to maximise solar access in the context of the site. Good daylight access to improve dwelling amenity.

**Shading** – Shading or window screening as an integral part of building design for thermal comfort and cooling load reduction. Horizontal shading to the north and vertical shading to the east and west are most effective.

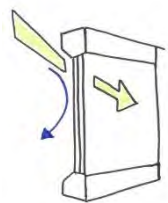
The goal is to create a high performance, passive building that makes optimal use of its climate and supports high efficiency building systems.



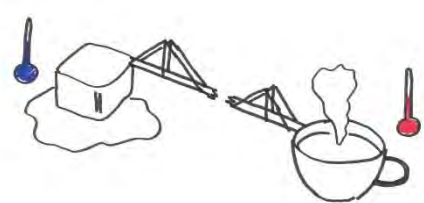
Annual wind rose (frequency) of location



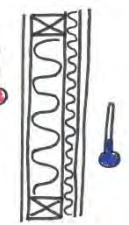
Design priorities - managing Winter heat loss and summer solar gain



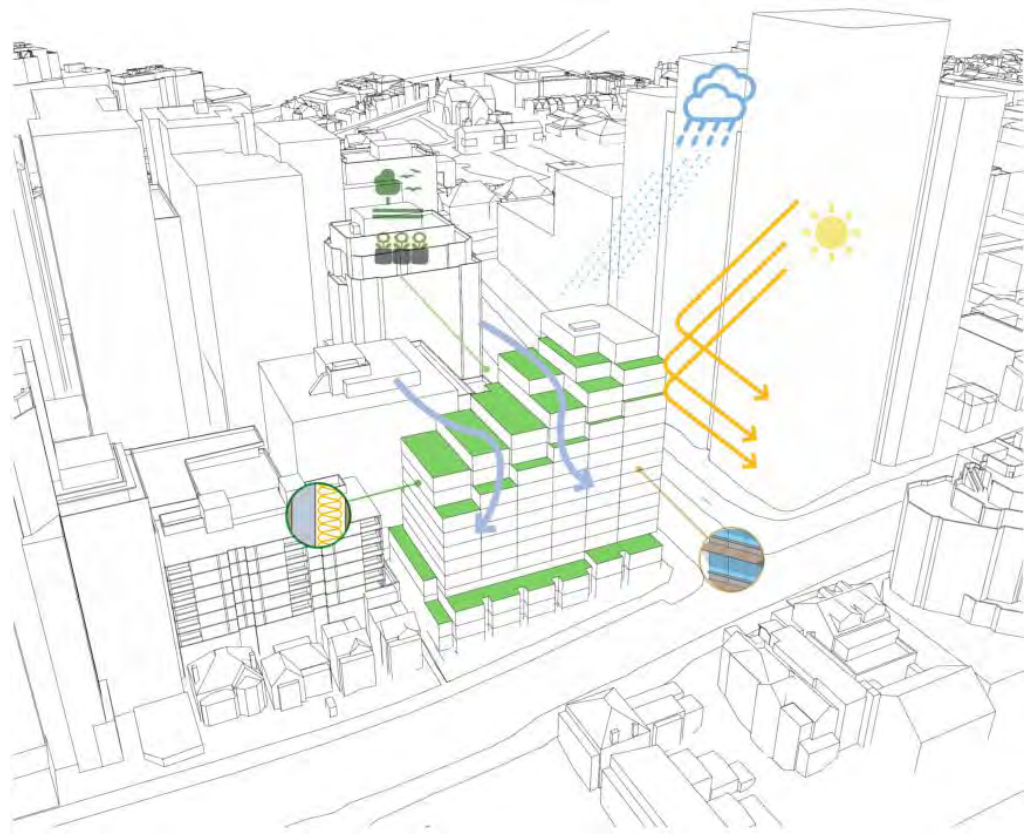
High Performance Glazing



Reduced Thermal Bridges



High Level of Insulation





# SUSTAINABILITY ASPIRATION | 3. Biophilia and a Healthy Building

Biophilia is the innate affiliation that people have for the natural world.

Biophilic design is an approach to the built environment that can reduce stress, improve cognitive function and creativity and improve well-being.

For urban renewal in a growing city centre, and particularly in a post-COVID world, these qualities are increasingly important.

The buildings at 45 McLaren St will embed biophilic design principles throughout the proposal:

- Rooftops – wind-sheltered garden roof terraces;
- Façade – green walls and biomorphic forms in façade;
- Podium – integration of green terraces into podium levels improves green connectivity to the park tree canopy.

Opportunities for community urban agriculture aligned to organic waste management and integrated water cycle management will also be explored.

The building will also include initiatives to support broader health and wellbeing: air, water, nourishment, movement, comfort, sound, materials, mindfulness and community.

The design will give explicit consideration to infection control in pandemic situations such as COVID-19, including: hand-hygiene, contactless systems, ventilation, UV filtration and advanced cleaning regimes in commercial areas.



WELL rating categories



Connection natural systems, presence of water and biomorphic forms



Biophilia through form, finish and contact with nature

### 14 Patterns of Biophilic Design

**Nature in the Space Patterns**

1. Visual Connection with Nature
2. Non-Visual Connection with Nature
3. Non-Rhythmic Sensory Stimuli
4. Thermal & Airflow Variability
5. Presence of Water
6. Dynamic & Diffuse Light
7. Connection with Natural Systems

**Natural Analogues Patterns**

8. Biomorphic Forms & Patterns
9. Material Connection with Nature
10. Complexity & Order

**Nature of the Space Patterns**

11. Prospect
12. Refuge
13. Mystery
14. Risk/Peril

Principles for biophilic design (Terrapin Bright green)

## SUSTAINABILITY ASPIRATION | 4. Transport and Mobility

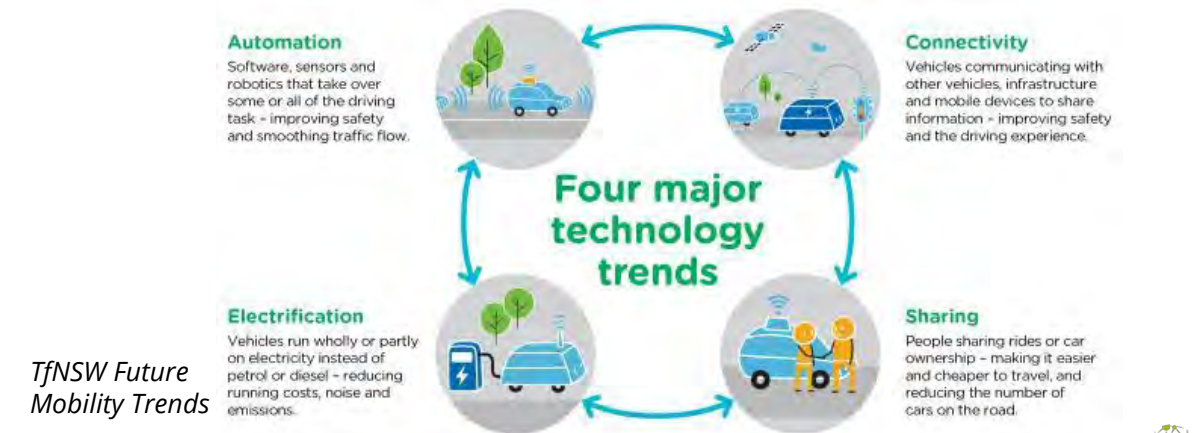
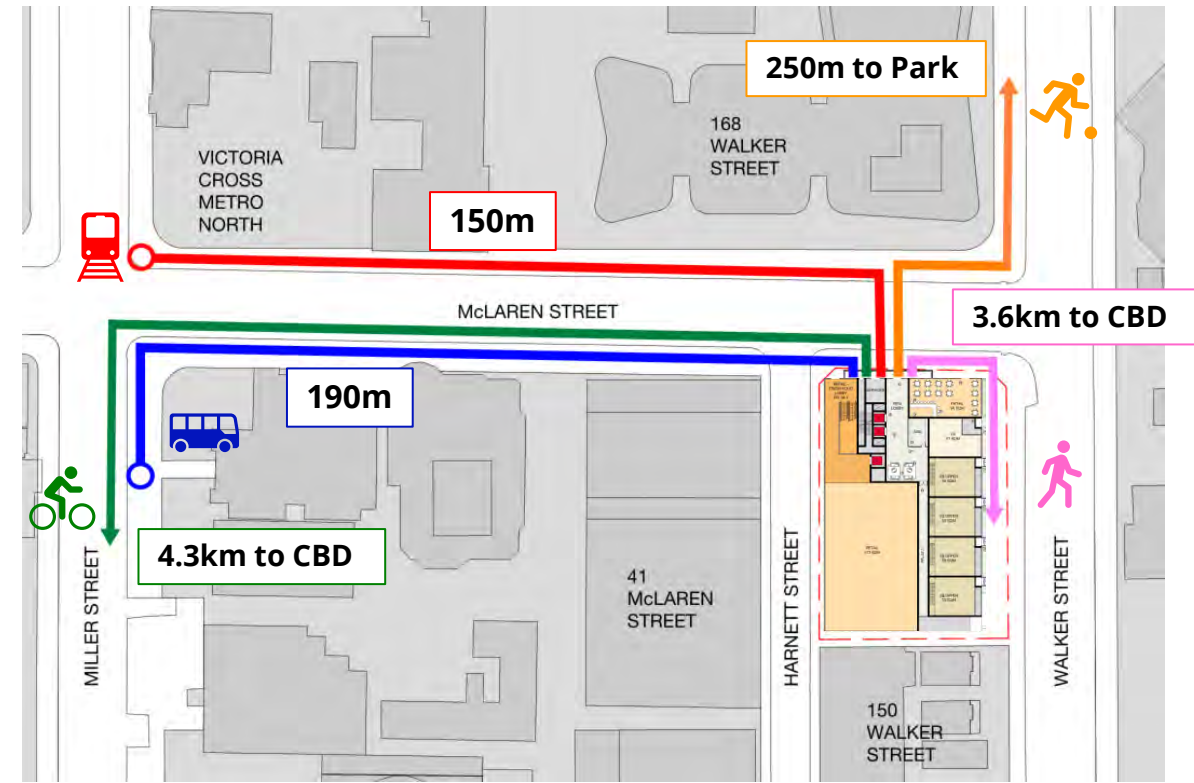
The future of Greater Sydney will be shaped by the relationship between land use and mobility. As the mobility sector changes – through public investment in projects like Sydney Metro and technology changes allowing for electric vehicles or connected and autonomous vehicles - the relationship between projects and mobility must change too.

The design should consider the relationship of movement priority and place priority for the project. The place-making should enable and encourage mobility options along a hierarchy of sustainability:

- Active mobility
- Public transport
- Future mobility – shared, autonomous & electric
- Private mobility

The sustainability mobility implementation approach should seek to embed key sustainability objectives in the project and possibly engage with future mobility providers. Opportunities to be pursued in the project include:

- Promotion of pedestrian amenity – walkable neighbourhoods and immediate public transport access
- Active transport: End of trip facilities and secure bicycle storage
- Electric mobility: EV charging infrastructure and parking incentives
- Shared mobility: car sharing and ride-sharing providers;
- Connected and Autonomous Mobility: ride share, tech company or vehicle manufacturer providers;
- Flexible Parking: Designing for a future where any existing parking must be able to be re-used for higher and better uses (e.g. considering separate strata titling for parking and units).



TfNSW Future  
Mobility Trends

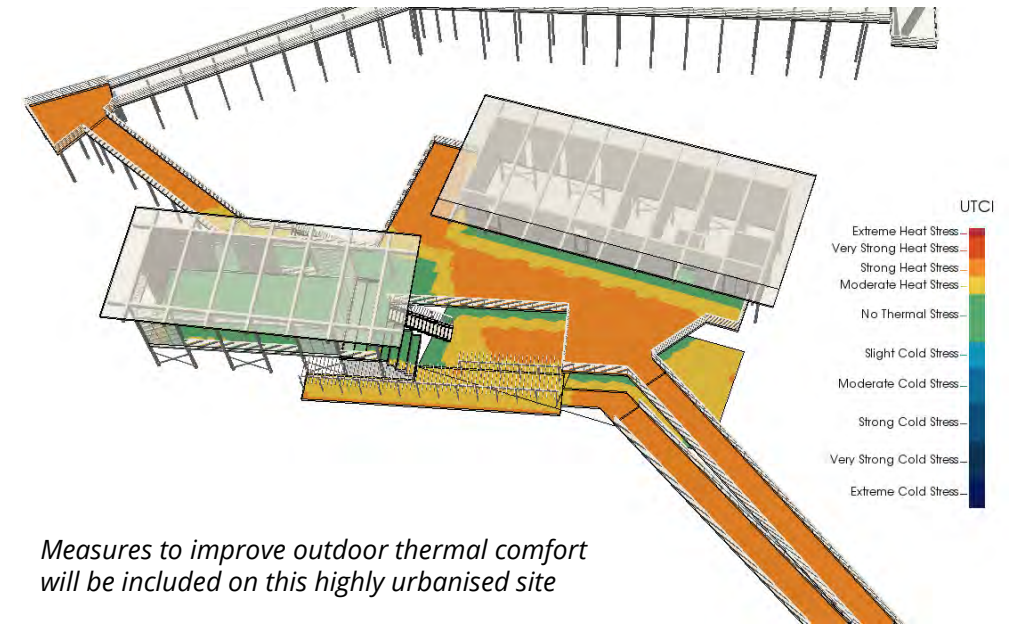


# SUSTAINABILITY ASPIRATION | 5. Liveable Public Realm

The design for a liveable public realm is at the heart of supporting a new urban place that is active, healthy and resilient.

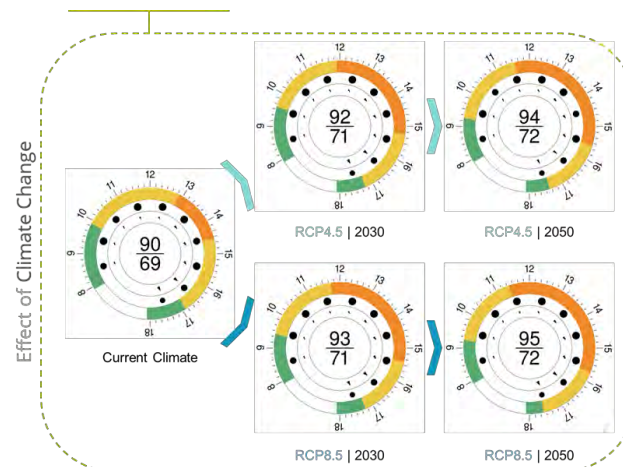
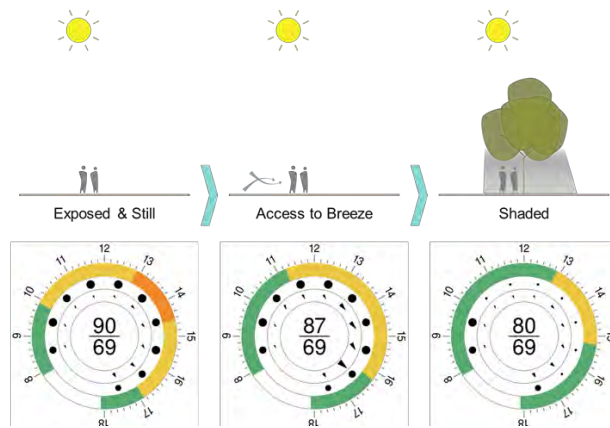
The attributes of the public realm that can deliver on this ambitious vision are:

- Balancing solar access in winter, shading in summer, wind impacts and the longer term urban heat island effect;
- Exploring green infrastructure opportunities on the site that support urban water management as well as habitat for resident avifauna and other native mobile species;
- Stormwater management system on site that captures surface water for re-use in irrigation and heat rejection (commercial areas);
- Biodiversity considerations, such as nesting boxes, bee hives and other habitat provisions;
- Surface finishes with high SRI values to reflect solar radiation back into the atmosphere and mitigate urban heat risk;
- Biophilic design and connection to place aligned to health and wellbeing.



*Measures to improve outdoor thermal comfort will be included on this highly urbanised site*

Effect of Design Interventions



*"Comfort Clock" concept for the current and future climate scenarios.*



*Water management is a planning priority for sustainability.*

# OUR COMMITMENTS | VPA STRATEGY

The following certification commitment will form part of the VPA in support of the planning proposal:

The following certification commitments are proposed:

- 5 star Green Star Design and As-built v1.3 baseline
- WELL v2 Silver (Core)



Aligned with the our objectives and the above certification commitment, the following initiatives are central to the proposals sustainability ambitions and will be implemented into the project.

- Electrification of all building services coupled with on-site renewable energy generation (PV) and embedded network for distribution
- Minimum average 7 star NatHERS ratings for residential dwellings
- Biophilic design measures such as green roofs and green walls
- Electric vehicle (EV) charging
- End of Trip facilities



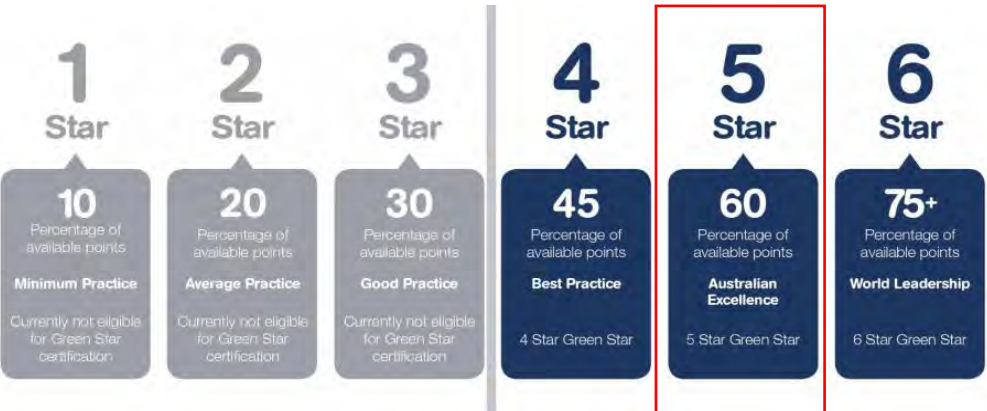


# PATHWAY TO GREEN STAR

This report documents two certification pathways for Green Star:

- Design and As-built v1.3 6 star (83 points)
- Design and As-built v1.3 5 star (67 points)

The baseline of 5 star Green Star pathway sets the floor for our strategy.



Weighted points generated	Credit	Points Available	Points Targeted
66	MANAGEMENT	14	13
	1Green Star Accredited Professional	1	1
	2Commissioning and Tuning	4	4
	3Adaptation and Resilience	2	2
	4Building Information	1	1
	5Commitment to Performance	2	1
	6Metering and Monitoring	1	1
	7Responsible Construction Practices	2	2
	8Operational Waste	1	1

INDOOR ENVIROMENTAL QUALITY	17	15
9Indoor Air Quality	4	4
10Acoustic Comfort	3	3
11Lighting Comfort	3	3
12Visual Comfort	3	2
13Indoor Pollutants	2	2
14Thermal Comfort	2	1
ENERGY	22	12
15Green House Gas Emissions	20	10
16Peak Electricity Demand Reduction	1	1
TRANSPORT	10	6
17Sustainable Transport	7	6
WATER	12	6
18Potable Water	12	4
MATERIALS	14	4
19Life Cycle Impacts	7	1
20Responsible Building Materials	3	3
21Sustainable Products	3	0
22Construction and Demolition Waste	1	1
LAND USE & ECOLOGY	6	2
23Ecological Value	3	0
24Sustainable Sites	2	1
25Heat Island Effect	1	1
EMISSIONS	5	4
26Stormwater	2	1
27Light Pollution	1	1
28Microbial Control	1	1
29Refrigerant Impacts	1	0
INNOVATION	10	6
30Innovation	10	6
TOTAL	110	66

# PATHWAY TO GREEN STAR | 6 STAR

The 6 star pathway is based on a mechanism for procuring 100% renewable energy for apartment owners/residents (15.B.2.10) for 5 points, the 5 star pathway does not. This would require an innovative model either for an embedded network with a PPA agreement, or an off-site capital investment in renewable energy capacity;

The 6-star pathway includes 1 point for water and aggregate reduction in concrete (19B.1.2 and 19B.2), the 5 star pathway does not. These are potentially a procurement challenge due to complexity in mix design, and represent a challenge for some contractors;

The 6-star pathway includes 3 points for Structural Timber – Reduced Embodied Impacts (19B.4), the 5 star pathway does not. This would likely require a CLT or other structured timber approach to the buildings;

The 6 star pathway includes 3 points for Product Transparency and Sustainability (21.1), the 5 star pathway does not. This would require 9% of the capital budget to be spent on products that meet a selection of sustainability criteria, which would certainly be a challenge;

The 6 star pathway includes 10 innovation points, the 5 star pathway includes 6. We will need to review the full range of options for innovation points in the course of design. Innovation points would not typically attract a substantial budget, but could reflect organisational or operational considerations that are outside of the scope of normal Green Star credits.

Weighted points generated	Credit	Points Available	Points Targeted
82	<b>MANAGEMENT</b>	<b>14</b>	<b>13</b>
	1Green Star Accredited Professional	1	1
	2Commissioning and Tuning	4	4
	3Adaptation and Resilience	2	2
	4Building Information	1	1
	5Commitment to Performance	2	1
	6Metering and Monitoring	1	1
	7Responsible Construction Practices	1	1
	8Operational Waste	1	1

<b>INDOOR ENVIROMENTAL QUALITY</b>	<b>17</b>	<b>15</b>
9Indoor Air Quality	4	4
10Acoustic Comfort	3	3
11Lighting Comfort	3	3
12Visual Comfort	3	2
13Indoor Pollutants	2	2
14Thermal Comfort	2	1
<b>ENERGY</b>	<b>22</b>	<b>16</b>
15Green House Gas Emissions	20	15
16Peak Electricity Demand Reduction	1	1
<b>TRANSPORT</b>	<b>10</b>	<b>6</b>
17Sustainable Transport	7	6
<b>WATER</b>	<b>12</b>	<b>4</b>
18Potable Water	12	4
<b>MATERIALS</b>	<b>14</b>	<b>12</b>
19Life Cycle Impacts	7	5
20Responsible Building Materials	3	3
21Sustainable Products	3	3
22Construction and Demolition Waste	1	1
<b>LAND USE &amp; ECOLOGY</b>	<b>6</b>	<b>2</b>
23Ecological Value	3	0
24Sustainable Sites	2	1
25Heat Island Effect	1	1
<b>EMISSIONS</b>	<b>5</b>	<b>4</b>
26Stormwater	2	2
27Light Pollution	1	1
28Microbial Control	1	1
29Refrigerant Impacts	1	0
<b>INNOVATION</b>	<b>10</b>	<b>10</b>
30Innovation	10	10
<b>TOTAL</b>	<b>110</b>	<b>82</b>



# PATHWAY TO WELL FOR RESIDENTIAL

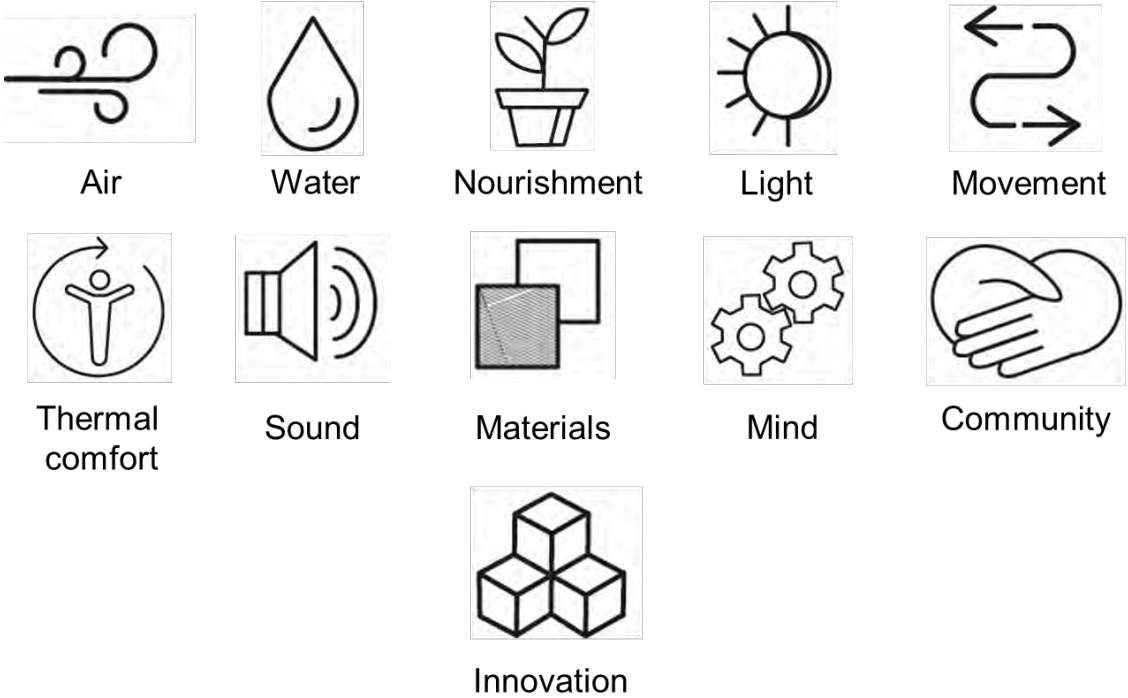
As described by the International Well Building Institute “*The WELL Building Standard™ version 2 (WELL v2™) is a vehicle for buildings and organizations to deliver more thoughtful and intentional spaces that enhance human health and well-being. WELL v2 includes a set of strategies—backed by the latest scientific research—that aim to advance human health through design interventions and operational protocols and policies and foster a culture of health and wellness. Built upon the pioneering foundation of the first version of the WELL Building Standard (WELL v1), WELL v2 draws expertise from a diverse community of WELL users, practitioners, public health professionals and building scientists around the world.*”

WELL v1 was created for commercial projects exclusively. However WELL v2 can now be applied to a variety of sectors, including the residential sector. WELL v2 is comprised of 108 features within the ten key concepts shown to the right + an innovation category. There are three available ratings and similar to Green Star there are also certain pre-conditions that must be met. It should also be understood that for a number of credits post completion on site testing is required to validate certain points.

Pre-conditions		
Silver	Gold	Platinum
50 points	60 points	80 points

To date there has not be a large up-take of the WELL building standard in the residential market. As such, the pursuit of WELL could be used as a mechanism to demonstrate beyond best practice for the project. The achievement of the WELL rating would clearly set this development apart from it's peers, particularly in the post COVID environment with an increased focus on health and well-being.

A pathway to WELL certification for this project would need to be carefully considered in order to achieve the right balance between an improved project outcome and the cost associated with achieving this. For this reason we would proposed the pursuit of the silver rating, with a view to consider gold as a stretch ambition, acknowledging that the achievement of any WELL rating for a largely residential development is already market leading.



# GLOBAL BEST PRACTICE

## BENCHMARKS FOR NORTH SYDNEY

Municipal governments are leading the global transition to sustainable cities. The local government response to sustainability challenges are being addressed through land use planning, urban renewal, alternative mobility infrastructure and support for public realm sustainability.

Increasingly, a high level of ambition for sustainability is a marker of competitiveness for city governments, providing a key attractor to knowledge workers and investment. Projects such as 45 McLaren St provide an opportunity for North Sydney to do similarly, and take advantage of the broader investment in new infrastructure such as Sydney Metro.

The North Sydney Community Strategic Plan identifies the principles for a sustainable and resilient city, which the proposal for 45 McLaren St supports: sustainable energy, water and waste management; conservation of non-renewable resources; supporting stewardship of natural systems and integration measures for adaptation to a changing climate.

There are many city governments, locally and abroad seeking to drive sustainability as a strategic priority:

- Cities of Parramatta and Sydney in NSW
- Greater London Authority, UK
- City of Vancouver, British Columbia, Canada.

## CITIES OF PARRAMATTA AND SYDNEY

Within the greater Sydney Metropolitan Region, the Cities of Parramatta and Sydney have set the benchmark for sustainability.

The City of Sydney has established a target of Net Zero Emissions by 2040, aligned with its renewed Community Strategic Plan: Sustainable Sydney 2050. One of the emerging themes of the Community Engagement is the need for an Environmentally Responsive City.

The City of Parramatta has a target of 60% emissions reduction and 50% renewable energy by 2038. Parramatta's goal for increasing urban canopy cover to 40% by 2050 is an ambitious goal for urban heat management that demonstrates leadership in Australia.



# GLOBAL BEST PRACTICE

## LONDON ENERGY TRANSFORMATION INITIATIVE

The London Energy Transformation Initiative (LETI) is a leading framework for addressing rapid decarbonisation of the built environment under the governance of the Greater London Authority. LETI was industry-led, in partnership with government in recognition that by 2030 100% of all new buildings will need to operate at Net Zero, which means that by 2025 100% of all buildings must be designed to Net Zero.

With a stated aim of 'supporting the capital's built environment to Net Zero Carbon, providing guidance that can be applied to the rest of the UK' LETI has achieved to date:

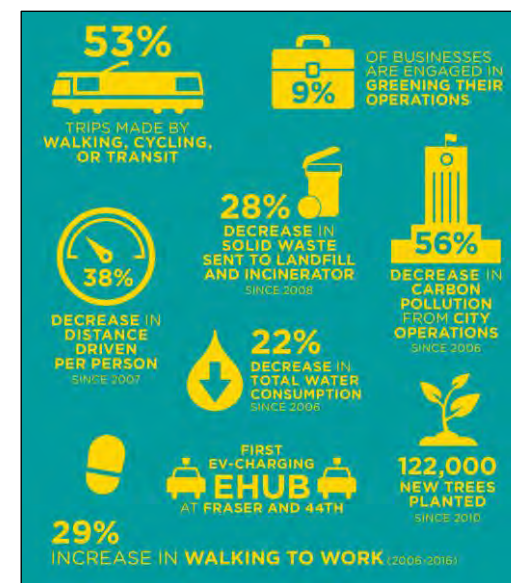
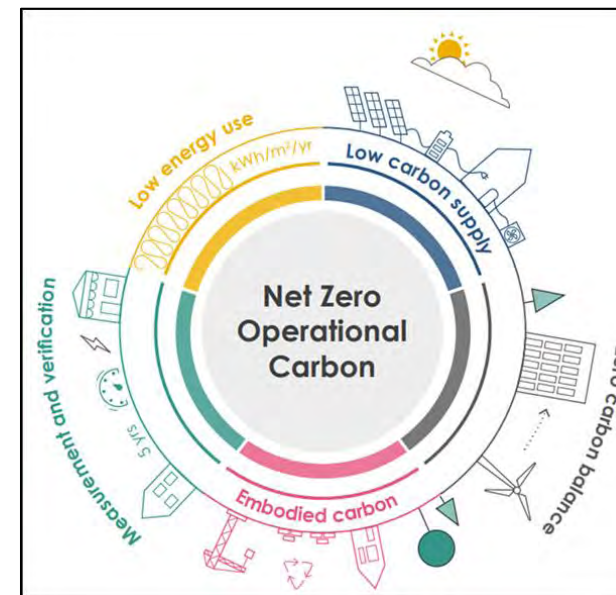
- Energy use disclosure to cement monitoring, verifying and reporting of energy use.
- Reduction in compliance calculations carbon factors reflecting the UK's decarbonising grid.
- All buildings and district heating systems must be future proofed to reach Net Zero carbon by 2050.
- Buildings must provide plans for demand side responses and investigations into energy storage are required.

## VANCOUVER

British Columbia, and Vancouver in particular, is leading Canada's shift away from fossil fuels. The Zero Emissions Buildings plan is the overarching strategy for decarbonising the built environment in Vancouver. The plan sets increasingly stringent Greenhouse Gas (GHG) and energy targets over time, with new buildings achieving zero greenhouse gas emissions by 2030.

The four main strategies of the plan are:

1. Limits: establish GHG and thermal energy limits by building type and step these down over time to zero;
2. Leadership: require City-led building projects to demonstrate zero emission building approaches where viable;
3. Catalyse: develop tools to catalyse leading private builders and developers to demonstrate effective approaches to zero emission new buildings; and
4. Capacity Building: build industry capacity through information sharing tools and the development of a Centre of Excellence for Zero Emissions Building to facilitate the removal of barriers, the sharing of knowledge, and the development of the skills required to successfully achieve this goal.





# GLOBAL BEST PRACTICE | PRECEDENTS

*The following two projects have been provided as exemplars of what can be achieved when a project team partners with local government and both parties have a strong commitment to sustainability. Similar to the examples below, our aspiration for 45 McLaren Street is to work collaboratively with North Sydney Council to demonstrate excellence and drive wider ambition for the precinct.*

## TELUS GARDENS – VANCOUVER, BC, CANADA

This \$750 million redevelopment project involves the design and construction of a new 44-story residential tower and a 22-story office tower. The 450,000 sq. ft. office tower was completed in September 2015 and is the first LEED Platinum office building in Vancouver. It houses the company's new headquarters as well as other offices, a restaurant and a public plaza, while the 435,000 sq. ft. residential building will include market housing, retail units and underground parking.

Integral Group provided mechanical, electrical, energy modelling and LEED consulting engineering services to guide this project towards achieving its sustainable goals. With Integral Group's team approach the target was set at 35% below ASHRAE 90.1 2007 energy efficiency requirement (or base case). Through the integrated design approach the design and energy model came in at 3,296,171 kW hrs/yr and 43% below the energy efficiency standard.

At the most fundamental level, Telus Garden is a Smart Building that delivers useful building services—such as illumination, thermal comfort, and air quality—for its 2000 occupants to be productive and comfortable at the lowest cost and environmental impact over the life cycle of the building. Reaching this vision requires adding intelligence from the beginning of building's design through to the end of the building's useful life. To do this, Integral Group designed TELUS Garden to use information technology during operation to connect a variety of subsystems, which typically operate independently, so that these systems can share information to optimize total building performance.

This civic icon of sustainability features a central plant with high efficiency heat pumps and waste heat recovery from the TELUS Data Centre, radiant heating and cooling, demand-controlled ventilation and LED lighting. With over 10,000 sq. ft. of green roofs including two elevated roof forests, TELUS Garden is a stunning and true representation of British Columbia.



## APPOLD STREET, LONDON, UK

This project consists of a new build 45 storey mixed use tower in the heart of London. The tower will house approximately 10,000m<sup>2</sup> of office space, a 392 bedroom dual hotel partly aimed at business users and 260m<sup>2</sup> of ground floor retail space. Elementa (part of Integral Group) has been appointed as part of the client team due to our experience with the owner on other mixed use, hotel and commercial buildings. We are influencing and proposing design and specification decisions/briefings to maximize the buildings efficiency based on our knowledge of the area uses and client specifications.

The building is targeting a minimum BREEAM target of "excellent". Design features include a shared condenser water loop to VRF water cooled internal condensers, floor by floor ventilation across offices and hotel, thermal dump for peak lopping of cooling, high thermal performance facades and combined heat and power. The new development will be replacing the existing 10 storey building but despite the larger scale will operate more efficiently per m<sup>2</sup> due to its performance design.

Our input has led to reductions in plant capacity and therefore plant area. Our independent early input which is ongoing has reduced the clients risk in a number of design and design development areas. This has ensured a robust set of MEP client employer's requirements and design stage reports are complete to a high level of sustainability and performance based design.

We have displayed innovation by implementing design standards on performance based results rather than application of the 'standards'. As a mixed use building we looked to minimize plant requirements by recognising the different operational characteristics of the building as well as opening up the clients design team to sharing services where possible. We helped the team develop a workable distribution strategy in conjunction with a thermal heat dump in the form of the large sprinkler tanks to allow peak lopping of the cooling requirement suggested by the progressive client.





# OUR COMMITMENTS | VPA STRATEGY

The following certification commitment will form part of the VPA in support of the planning proposal:

The following certification commitments are proposed:

- 5 star Green Star Design and As-built v1.3 baseline
- WELL v2 Silver (Core)



Aligned with the our objectives and the above certification commitment, the following initiatives are central to the proposals sustainability ambitions and will be implemented into the project.

- Electrification of all building services coupled with on-site renewable energy generation (PV) and embedded network for distribution
- Minimum average 7 star NatHERS ratings for residential dwellings
- Biophilic design measures such as green roofs and green walls
- Electric vehicle (EV) charging
- End of Trip facilities



# CONCLUSIONS

The challenges of environmental sustainability in the built environment are material and projects such as 45 McLaren St have an opportunity to change trajectory with non-BAU innovation.

This proposal demonstrates three key areas of innovation that address pressing needs in our city;

- The need to decarbonize the City;
- The need to make better use of our favourable climate;
- The need to create places that are amenable and resilient in a changing climate.

The proposal also provides a foundational assurance framework that embeds leading sustainability ambition at its heart: deep emissions reduction, social and environmental sustainability and health and wellbeing.

This combination of ambition, innovation and assurance provides a strong basis for 45 McLaren St to be a leading renewal project for the broader North Sydney precinct.

Steps to 'Climate Positive' Approach	Captured as part of this proposal
Highly efficient building envelope and services	✓
Electrification	✓
On-site renewables	✓
Off-site renewable energy purchase	✓
Reduced embodied carbon	✓
Purchase offsets	✓





Australia  
Sydney

Level 7, 16 Spring Street  
Sydney NSW 2000  
+61 2 9053 6730

[australia@integralgroup.com](mailto:australia@integralgroup.com)  
[integralgroup.com](http://integralgroup.com)

