THE ICON
HAMILTON

Project

DA - ESD REPORT

WENTWORTH EQUITIES PTY LTD

Client

EMF GRIFFITHS

Sustainability Consultants

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EXECUTIVE SUMMARY

The proposed development, The Icon, at 19 Hercules Street, Hamilton comprises four buildings that rise from a retail Plaza level.

EMF Griffiths are the project's building services and sustainability consultants. This report outlines the project's commitment to superior design outcomes with respect to ESD.

The key achievements are outlined as follows:

Precinct integration	A four tower, mixed use development that brings together a diversity of uses and functions. Community infrastructure such as a residential, hotel, child care centre, public spaces and retail contributes to the ongoing vitality of the precinct.
Façade amenity	A very high performance integrated façade that incorporates extensive private balconies that provide passive shading and shelter from wind and intense sunlight.
Passive design	The buildings incorporate significant passive design initiatives that result in a 50% reduction in annual cooling demand when compared to a standard deemed to satisfy outcome. 89% of apartments score 6 stars and above; 77% of apartments score 7 stars and above; and 31% of apartments score 8 stars and above.
Efficient building services	Centralised high efficiency chilled water plant results in much higher levels of energy efficiency than a conventional approach. The proposed system allows for reduced infrastructure sizing by taking diversity into account. This reduces the upstream infrastructure and the demands on the supply authority's network. In addition, provision of thermal storage allows for an additional degree of peak demand management.
Energy management	The proposed systems provide the opportunity to inform the residents on their real-time use of electricity, potable water, gas and water. This technology will be deployed in selected apartments.
Water	Stormwater is to be harvested to meet the site's irrigation demands and water feature top up. High efficiency hydraulic fixtures will be used throughout.
Transport	The development features over 600 secure bicycle parking spaces provided in the common areas. The parking areas will include charging bays for electric cars, car pool/car share and bikes. Parcel receiving facilities will be incorporated in order to reduce trips across Kingsford Smith drive to pick up from the post office.
Waste and materials	Materials shall be selected on the basis of recycled content, low toxicity and minimisation of resource depletion.
Habitats and biodiversity	Landscaping design will be low water use and largely native. The quality of water draining from urban development has been protected and associated drainage infrastructure costs have been minimised. Light pollution will be minimised by efficient lighting design with targeted rather than general illumination.

SECTION 1.0 INTRODUCTION

EMF Griffiths have been engaged by Wentworth Equities Pty Ltd to report on the sustainability credentials of the proposed development at "The Icon", 19 Hercules Street, Hamilton described as Lot 3 on SP172658.

To facilitate the creation of sustainable urban communities, the project focuses on the following key principles:

1. Promoting and maintaining liveable communities
2. Providing economic benefit
3. Protecting ecological values and optimising resource use
4. Promoting planning and design excellence.

This report will demonstrate how the proposed development protects, manages and enhances natural systems and promotes the efficient use of materials, water and energy to minimise impacts on the environment. It will illustrate the project's compliance with the criteria noted and will focus on the specific measures that contribute to a sustainable development.

1.1 BUILDING DESCRIPTION

The development proposal comprises four buildings that rise from a retail Plaza. The proposed scheme contains a diverse mix of building heights, apartment types and uses that activate the frontages.

The site masterplan comprises four buildings:

Tower 1:	33 storey mixed use hotel and residential tower
Tower 2:	28 storey residential tower
Tower 3:	8 storey residential tower
Tower 4:	15 storey residential tower

Car parking is provided in a seven level basement with spaces for residents, retail tenants, hotel guests and visitors.

The proposed mix is as follows:

Studio apartments:	74
1 bed apartments:	279
2 bed apartments:	176
3 bed apartments:	31
Total apartments:	560 units
Hotel Suites:	227
Retail GFA:	4,734m²
Residential GFA:	41,504m²
Hotel GFA:	13,099m²
Total GFA:	59,337m²

Figure 1 below illustrates the proposed site plan and the associated building numbers.

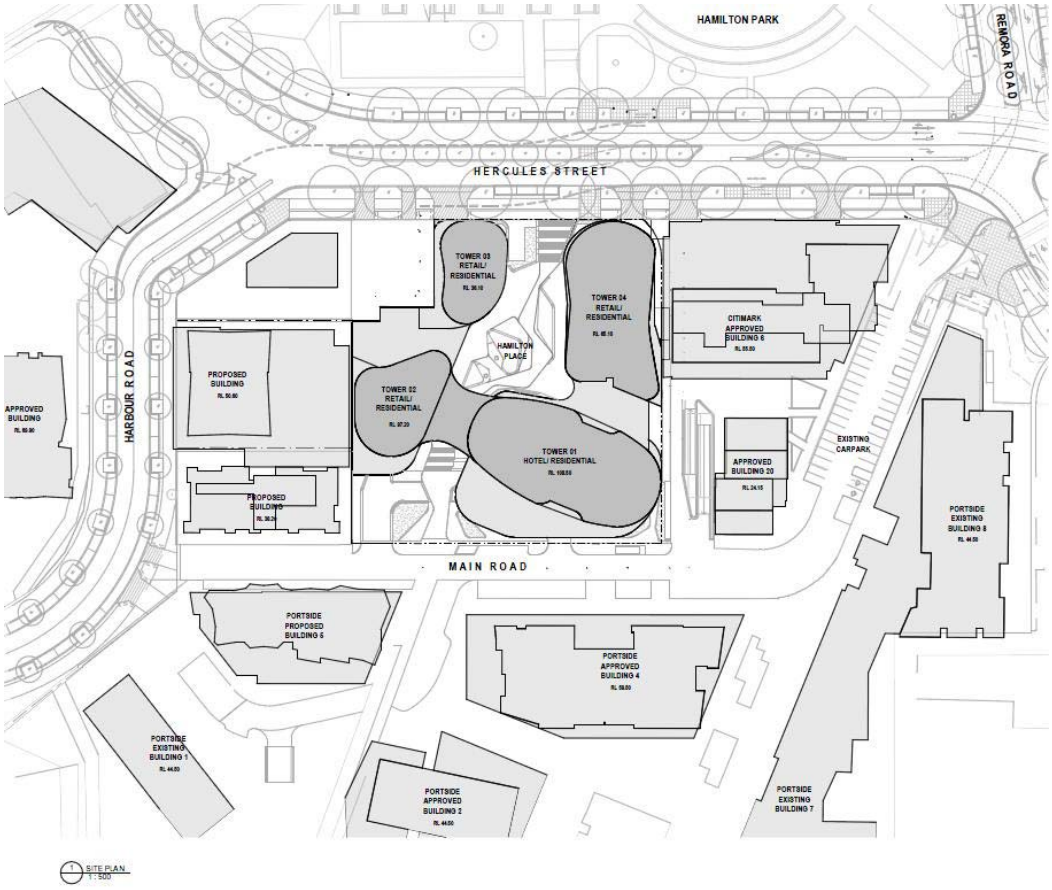


Figure 1: Site Plan

SECTION 2.0 SUPERIOR DESIGN OUTCOMES

Significant measures have been undertaken to ensure that this develop responsibly impacts upon the local environment and addresses environmental, social and economic sustainability aspects for the buildings' occupants, users and the wider community.

The buildings have been designed to create a "destination", drawing in a diversity of people from the surrounding areas. The mix of residences, hotel and commercial spaces together with supporting infrastructure such as the child care centre provides a diversity that ensures there is continual activity.

The environmental vision, principles, goals and strategies for The Icon are described as follows:

Vision	***To create a sustainable urban community***			
Principles	**Promoting and maintaining a livable community**	**Providing economic benefit**	**Protecting ecological values and optimising resource use**	**Promoting planning and design excellence**
Goals	**A community** that is diverse, safe and healthy, has access to services, jobs and learning, that fosters active local participation and is a pleasant place to live, work and visit while integrating with and enhancing the value of existing neighbourhoods.	**Economic benefit** is maximised by facilitating the release of urban land, incorporating lifecycle costs including operational savings, long term employment opportunities, and creating partnering opportunities and long term value.	**Protect**, manage and enhance natural systems, habitats and biodiversity, and promote the innovative and efficient use and management of materials, water and energy to minimise impacts on the climate.	**Develop** a modern resilient and adaptable urban form that promotes connectivity, safety and accessibility whilst recognising existing local values and aspirations
Strategies	• Housing affordability • High quality of life • High levels of community participation • Healthy and safe communities • Respect existing communities	• Public benefit • Lifecycle costs • Land supply • Partnerships • Sustainability champion	• Climate impact • Water • Energy and transport • Materials and waste • Habitats and biodiversity • Pollution	• Community and place • Responsive urban form • Quality public realm • Infrastructure • Connectivity, safety and accessibility • Engagement and Partnerships

2.1 PRECINCT INTEGRATION

The design includes an extensive activated ground level plane with a large public open space. The long term maintenance of this area has been future proofed by including Hamilton Place in the Hotel Stratum ensuring it is maintained to a 5 star quality level.

The development has embedded precinct integration and contributes additional facilities, including a child care centre, to the Hamilton Portside hub so potential car use is minimised. By maximising trip reduction and provision of end of trip facilities, reduced demands are made on local infrastructure. The traffic management design has separated primary space uses to allow for independent operation of the residential/retail and hotel uses.

2.2 FAÇADE AMENITY

The building facades comprise a unique external curtain wall cladding that encloses extensive balconies around the full building perimeter. Central cores maximise the potential for daylighting, providing an outlook to views on all orientations.

Whereas this configuration would typically result in problems associated with extensive west glazing, our enclosed deep set balconies work to heavily shade the inner skin to the occupied spaces.

The amenity of the balconies had been addressed through selective façade treatment that varies with height in the buildings. In order to strike a balance between sheltered, enclosed spaces whilst encouraging natural ventilation and passive cooling, the upper most storeys are provide with operable louvres for approximately 50% of the façade area. Balconies can be manually enclosed and comfortably occupied when wind speeds are excessive, and opened to provide ventilation and passive cooling at other times.

This provides a dynamic interest to the façade that will have an ever changing appearance as occupants open and close the louvres.

Mid rise storeys are not exposed to the same magnitude of wind speed, so their balconies have large permanent openings. These opening areas have been sized to ensure that the balconies remain shaded and protected.

The façade openings are maximised on the lower storeys where there is a natural overshadowing and greater protection from high winds. The larger openings on these floors ensure adequate natural ventilation under these more sheltered conditions. Where required, apartments are provided with privacy screens to separate storeys from adjacent neighbouring buildings.

Vision properties of the glazing selected for the inner skin and outer curtain glazing will be selected to ensure a high degree of transparency to maintain good daylighting in the apartments. The shading from the deep balconies means that the building can be less reliant on the thermal properties of the inner glazing than would otherwise be required, with the result that the glass can be clearer than would otherwise be required.

The external glazing combined with the deep balcony projections has the additional benefit of shading the balcony slabs. This inhibits the radiant heating effect between balconies, further contributing the high levels of balcony amenity.

2.3 QUANTIFIED PASSIVE DESIGN BENEFITS

The characteristics described above are all contributors to the passive design outcome for the buildings. Enhanced shading, provision of natural ventilation and selection of the building materials all result in reducing the peak cooling loads, allowing for smaller air-conditioning units to be installed, a reduction in the times that air-conditioning units are likely to be used, and a reduced overall energy consumption of the building. This directly relates to a reduction in greenhouse gas emissions and a reduction in resource depletion.

The design process for the buildings has seen several iterations, and throughout this process we have been able to quantify the predicted energy outcome and use these results to influence the evolution of design.

The result of this process is a building that significantly exceeds the minimum performance requirements of the BCA and QDC. These results are described in detail in Section 4, the environmental benefits are summarised as follows:

Apartment	Repetitions	Base case (without shading)		Refined passive thermal design	
		Cooling (MJ/m².annum)	Cooling (MJ/annum)	Cooling (MJ/m².annum)	Cooling (MJ/annum)
T1 L17-L32 1	64	27.4	84,173	14.5	44,544
T1 L17-L32 9	80	27.8	106,752	13.9	53,376
T1 L17-L32 14	18	53.2	73,419	22.8	31,465
T2 L2-L31 1	30	23.8	33,130	18.8	26,170
T2 L2-L31 3	30	27.6	58,059	13.0	27,347
T2 L2-L31 4	30	31.8	40,822	22.6	29,012
T2 L2-L31 5	30	27.1	39,024	14.7	21,168
T3 L2-L9 1	8	49.8	22,589	17.0	7,711
T3 L2-L9 2	8	36.0	12,603	11.4	3,991

Apartment	Repetitions	Base case (without shading)		Refined passive thermal design	
		Cooling (MJ/m².annum)	Cooling (MJ/annum)	Cooling (MJ/m².annum)	Cooling (MJ/annum)
T3 L2-L9 5	8	35.6	11,096	18.8	5,860
T4 L2-14 2	13	36.7	22,901	18.7	11,669
T4 L2-14 3	13	64.2	42,114	20.2	13,251
T4 L2-14 6	13	95.2	74,912	23.7	18,649
T4 L1-14 9	54	34.9	90,461	15.5	40,176
T4 L4-L9 12	6	22.0	8,927	17.3	7,020
Total annual cooling energy:			**720,981**		**341,408**

The base case is the building without the deep balconies and without performance glazing, but still with a level of performance that meets the BCA/QDC minimum requirements. The result of having refined the building's passive thermal design is over a 50% reduction in the annual cooling energy.

These sample calculations represent 70% of the total number of apartments in the development so are therefore a very good representation.

As outlined in Section 4, all apartments perform better than the minimum 5 star QDC requirement:

- 89% of apartments score 6 stars and above;
- 77% of apartments score 7 stars and above; and
- 31% of apartments score 8 stars and above.

2.4 EFFICIENT BUILDING SERVICES

The conventional approach to air-conditioning a development such as this would be individual split systems, typically with condensers on the balconies. This limits efficiency in a number of ways. The efficiency of these systems is inherently fairly low. Condensers are often located in enclosed spaces, which has a limiting effect on efficiency. In addition, all these systems work independently in isolation. This results in extensive infrastructure that cannot capitalise on the diversity of demands across the buildings.

At The Icon, we will be adopting a centralised chilled water approach to cooling. This comprises multiple magnetic bearing chillers that satisfy the entire development's cooling demands. This chiller configuration is highly efficient, with Integrated Part Load Values (IPLV) of up to 8. This means the system delivers 8kW of cooling for every 1kW of electrical input – over double that associated with split systems.

Being a centralised system, the plant is sized to take into account diversity. For example, the east and west orientations do not experience simultaneous peak loads which means the system can be sized for the diversified *coincident* peak. With split systems, much more cooling capacity is required to deal with the undiversified peak. Our approach has the upstream benefits of reduced electrical infrastructure and reduced peak demand from the site.

In addition, provision of a thermal storage facility provides the opportunity for the chilled water system to be optimised to run under its most efficient conditions and store chilled water to meet peak demands. This has the effect of further reducing the installed capacity and its impact on the supply authority's infrastructure.

The chillers and cooling towers are to be located in close proximity to each other, which reduces the parasitic losses associated with pumping condenser water.

2.5 ENERGY MANAGEMENT

The proposed systems provide the opportunity to inform the residents on their real-time use of electricity, potable water, gas and water.

Making this information available provides a significant incentive to modifying behaviour in order to reduce consumption. Making people aware of the consequences of their actions is a powerful means of reducing the development's overall environmental impact.

Select apartments will be identified as a testbed for this technology. In addition, certain apartments will be provided with comprehensive home energy and management systems allowing the occupants to gain a smart level of control over their environments.

2.6 WATER

The development is consistent with current best practice Water Sensitive Urban Design (WSUD) principles for Queensland. WSUD has been achieved by:

- Collecting rainwater runoff for irrigation and water feature top up.
- Impacts on existing natural features and ecological processes have been minimised
- Increase social amenity through multi-purpose green space, landscaping to enhance visual, social, cultural and ecological values
- Improved waterway health through responsible flood management and pollution prevention
- It is proposed to install a GPT in the basement area for treatment of stormwater prior to discharge. This will allows trapping of oils and grease. This would also provide treatment to the stormwater runoff from the podium areas.

4 star WELS rated fixtures and fittings will be used in all apartments.

2.7 TRANSPORT

The development features over 600 secure bicycle parking spaces provided in the common areas.

All apartments are located within 500m of the existing bus route on Kingsford Smith Drive and within 800m of existing City Cat ferry services

This development achieves a Walk Score of 87% (see Appendix C for further details).

The parking areas will include charging bays for electric cars and bikes. At the next stage 5 parking bay have been identified as charging bays for electric cars, and 1 parking bay has been nominated for car pool/ car share.

Parcel receiving facilities will be incorporated in order to reduce trips across Kingsford Smith drive to pick up from the post office.

2.8 WASTE AND MATERIALS

The site is completely hard stand in its current form. The proposed development will implement a sediment and erosion control plan.

The development will use recycled and reused materials in construction and landscaping, such as fly ash in concrete, where practical.

The development will incorporate materials from sustainable and renewable resources where practical.

The project will, where appropriate, source their manufactured materials from suppliers with ISO14001 certification and EMPs in place.

Non-toxic and low emission materials will be used as standard.

The development will use materials sourced locally where practical.

The development will adopt a waste management plan during demolition and construction.

2.9 HABITATS AND BIODIVERSITY

Landscaping design will be low water use and largely native.

Stormwater will be used for landscape irrigation.

Light pollution will be minimised by efficient lighting design with targeted rather than general illumination.

SECTION 3.0 COMPLIANCE WITH QDC MANDATORY PART 4.1

The Queensland Development Code Mandatory Part 4.1 ensures;

- Class 1 and Class 2 buildings are energy and water efficient;
- The electricity supplied to each meterable premises is able to be measured appropriately; and
- End of trip facilities are provided in major developments located in designated local government areas.

Under Section 14 of the Building Act 1975, compliance with this part can be achieved only by:

a) Complying with the relevant acceptable solution for the performance criterion; or
b) Formulating an alternative solution that complies with the performance criteria or is shown to be at least equal to the relevant criteria; or
c) A combination of (a) and (b).

Compliance with these criteria for The Icon is described as follows:

Strategy	Criteria	Compliance
Part 1: Building Design and Facilities		
5-star multi-unit residential buildings	*P2* *The thermal performance of sole occupancy units in class 2 buildings complies with performance requirement JP1 of the BCA 2009 (Volume 1).*	Each sole occupancy unit has software rating of not less than 4 stars and the average software rating of all sole occupancy units is not less than 5 star.
Part 2: Fixtures, Fittings and Appliances		
Energy Efficient Lighting	*P4* *In sole occupancy units of class 2 buildings fixed artificial lighting must be energy efficient.*	Each sole occupancy unit has energy efficient lighting for a minimum of 80 per cent of total fixed artificial lighting.
Water Conservation	*P6* *In class 1 and class 2 buildings, in areas serviced by a water service provider, shower roses must facilitate the efficient use of water.*	All shower roses have a minimum 3-star Water Efficiency Labelling and Standards rating (4.5 to 9 litres per minute).
	P7 *In class 1 and class 2 buildings, in areas serviced by a water service provider, toilet cisterns and bowls must facilitate the efficient use of water.*	All toilet cisterns have a dual flush function and have a minimum 4-star Water Efficiency Labelling and Standards rating (4.5 litres per flush full flush and 3 litres per flush half flush), and are compatible with the size of the toilet bowl to allow for proper functioning of the toilet.
	P8 *In class 1 and class 2 buildings, in areas serviced by a water service provider, tap ware must facilitate the efficient use of water.*	All tap ware have a minimum 4-star Water Efficiency Labelling and Standards rating (6.5 to 7.5 litres per minute).
Electricity Sub-metering	*P9* *The electricity supplied to each meterable premises is able to be measured.*	Each meterable premises has an electricity sub-meter installed which measures only the electricity supplied to that meterable premises.
	P10 *An electricity meter must be located so it is easy and safe to read and maintain at any reasonable time.*	The electricity sub-meter is installed in a common area and free of hindrance or obstruction to a person authorised to read and/or maintain the electricity sub-meter.
	P11 *The electricity meter for each meterable premises must be labelled to indicate which meterable premises it is associated with.*	A meter label identifying which meterable premises it is associated with is affixed or located adjacent to the electricity sub-meter for each meterable premises.

SECTION 4.0 ENERGY COMPLIANCE MODELLING

4.1 BCA 2014

The Queensland Development Code supersedes Section J of the 2014 BCA for projects in Queensland and refers to BCA 2009. The latest release of the QDC (MP 4.1 January 15th 2013 Version 1.12) specifies the following requirements:

The compliance requirement for sole occupancy units in a Class 2 building is outlined in the BCA (2009) Section J Clause J0.2 which requires that each unit must

i) Collectively achieve an average energy rating of not less than 5 stars and
ii) Individually achieve an energy rating of not less than 4 stars using a calculation method that complies with the ABCB Protocol for House Energy Rating Software. EMF Griffiths use BERS Pro software, which meets this requirement.

4.2 RESULTS

There are a total of 560 apartments in The Icon, with 15 basic plan forms, with additional variations arising from orientation, vertical position in the building (which affects wind loading), outside rather than party walls and location at roof level.

We have simulated a sufficient number of apartments to represent 70% of all apartments within the building. The modelled apartments are highlighted in Appendix B. The assessed apartments were chosen as a mix of worst and typical performing apartments. Based on this methodology, it is expected that once the remaining apartments are assessed and included in the assessment, the energy rating will improve further than these preliminary findings.

The assessed apartments were selected according to the following criteria;

- Orientation
- Apartment layout
- Window to wall ratio
- Balcony extent shading
- Facade to floor area ratio
- Apartment depth

Since the buildings are undergoing further design development, assumptions were made on the following items. The details of these assumptions can be found in Appendix A.

- Material selection (colour and thermal properties)
- Window operability
- Electrical equipment (downlights and exhaust fans)

In order to comply with and exceed the Queensland Development Code Mandatory Part 4.1 criteria, we have modelled and outlined two scenarios to understand the energy impact of;

- Compliance with BCA 2014 Sole Occupancy Unit i.e. to collectively achieve a 5 star average energy rating and no individual unit can achieve less than 4 stars; and
- The best possible improvement over the minimum requirements through optimising the passive thermal design.

The following sustainable strategies have been incorporated:

In order to achieve compliance with BCA 2014 Sole Occupancy Unit;

- Aluminium frame with high performance low-e double glazing
- Full height glazing provides occupants with a visual connection to the external environment.
- Window operability improves the well being of occupants by providing ample amounts of outside air and cross ventilation to counteract build-up of indoor pollutants. Natural ventilation also provides cooling within a dwelling free of greenhouse gas emissions and financial costs associated with mechanical ventilation.
- Access to private external spaces improves the well being of occupants by providing a place to connect with the natural environment.
- Weather protection and sun shading is incorporated into facades and roof forms to reduce direct solar heat and provide rain protection appropriate to each facade orientation.

Based on preliminary modelling, the simulated typical apartments collectively achieve a 7.3 average star rating.

Apartment	Conditioned Area (m^2)	Unconditioned Area (m^2)	Adjusted Cooling (MJ/m^2)	Adjusted Heating (MJ/m^2)	Star Rating	Compliance
T1 L17-L32 1	48.00	7.80	14.50	3.90	8.5	✓
T1 L17-L32 9	48.00	7.80	13.90	14.50	7.5	✓
T1 L17-L32 14	76.67	5.13	22.80	23.70	5.5	✓
T2 L2-L31 1	46.40	4.42	18.80	10.70	7.5	✓
T2 L2-L31 3	70.12	4.08	13.00	12.00	8.0	✓
T2 L2-L31 4	42.79	3.77	22.60	25.30	5.5	✓
T2 L2-L31 5	48.00	7.80	14.70	6.90	8.0	✓
T3 L2-L9 1	56.70	5.20	17.00	11.80	7.5	✓
T3 L2-L9 2	43.76	4.71	11.40	25.40	6.5	✓
T3 L2-L9 5	38.96	5.76	18.80	15.80	6.5	✓
T4 L2-14 2	48.00	7.80	18.70	11.20	7.5	✓
T4 L2-14 3	50.46	7.44	20.20	17.30	6.5	✓
T4 L2-14 6	60.53	6.96	23.70	15.70	6.0	✓
T4 L1-14 9	48.00	7.80	15.50	9.60	7.5	✓
T4 L4-L9 12	67.63	4.16	17.30	22.80	6.0	✓
				Average Energy Rating	**7.3**	✓

These results demonstrate a Superior Design Outcome:

- All apartments perform better than the minimum 5 star requirement;
- 89% of apartments score 6 stars and above;
- 77% of apartments score 7 stars and above; and
- 31% of apartments score 8 stars and above.

APPENDIX A HERS MODELLING INPUTS

***M*inimum Requirements**		
External walls	Precast concrete, plasterboard lined	
External wall insulation	R1.0 bulk insulation	
Internal walls	Cavity panel	
Floor to ceiling height	2550mm	
Windows properties	High performance low-e double glazing	
Window frame	Aluminum	
Window width	As per drawings	
Floor type	Concrete slab	
Under side floor insulation	Nil	
Floor covering	Bedrooms	carpet
	Kitchen/living	carpet
	Bathrooms	ceramic tiles
Insulation in ceiling	Nil	
Roof	Concrete slab	
Roof insulation	R2.0 bulk insulation	
Roof colour	Light	
Ceiling fans	No	
Downlights	Yes	
Exhaust fans	Yes	
Shading	Balconies as noted on the drawings	

APPENDIX B APARTMENT LAYOUTS

APPENDIX C WALKSCORE RESULTS

Type an Address: 19 Hercules Street Hamilton Go

Walk Score
87
Out of 100
Very Walkable
19 Hercules St Hamilton

Overview | More Amenities | Your Commute

Restaurants
SONO Japanese Resta 0.1km

Coffee
Mahjongg Cafe 0.1km

Groceries
Ascot Fruit Exchang 0.51km

Shopping
Vers Boutique 0.1km

Hospitals
Bloomworks Florist 0.08km

Parks
Hamilton Recreation 0.17km

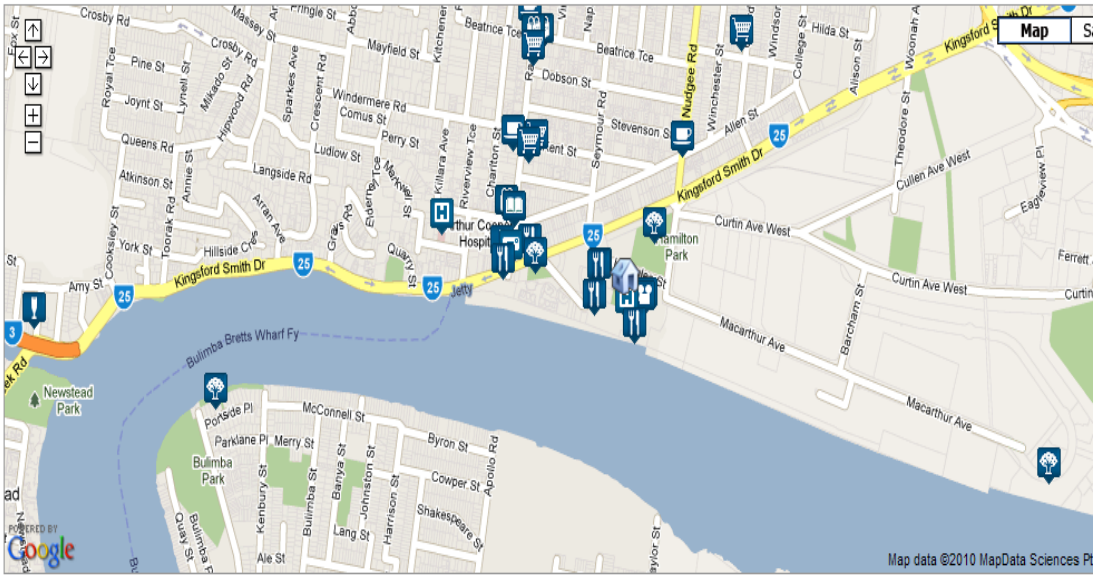
Books
Brisbane City Counc 0.46km

Pubs
Hamilton Hotel 0.48km

Entertainment
Dendy Cinemas Ports 0.1km

Post Offices
Australia Post - Ha 0.44km

View more amenities
Something missing?



Public Transportation

Why isn't public transit showing? About transit data

Compare Your Walk Score

Top 10% of scores: 92
Your score: 87
Average score: 49

9% of Walk Score users have a higher Score.