CUNDALL

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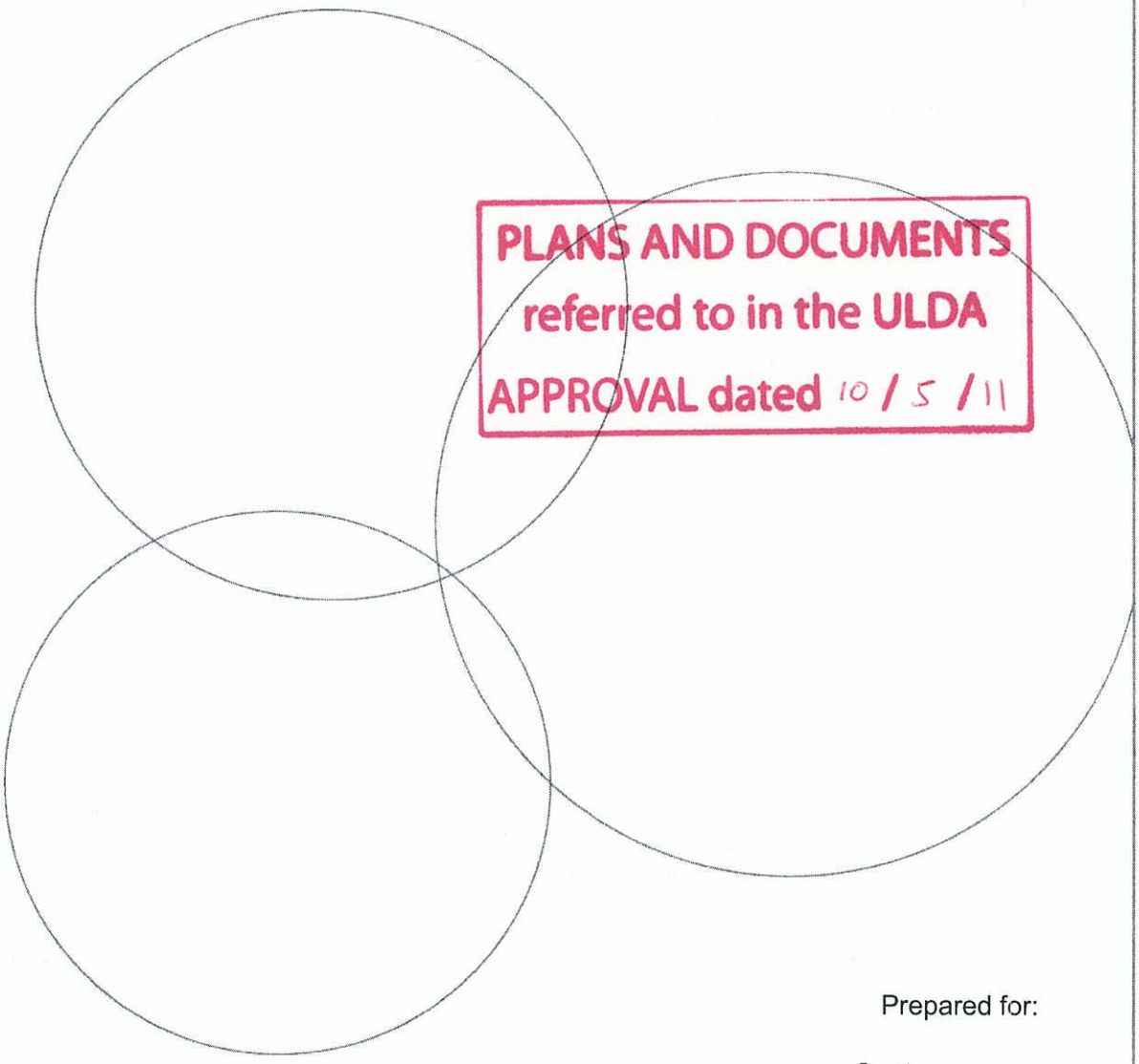
ULDA Superior Design Report

1003218 5 and 9 Hercules St Hamilton



PLANS AND DOCUMENTS
referred to in the ULDA
APPROVAL dated 10/5/11

Prepared for:

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A	Preliminary issue	24/1/11
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The success and realisation of the proposed initiatives will be dependent upon the commitment of the design team, the development of the initiatives through the life of the design and also the implementation into the operation of the building. Without this undertaking the proposed targets may not be achieved.

Contents

1 Introduction

This report highlights the Superior Design outcomes for the multiunit residential development at 5 and 9 Hercules St Hamilton. This report is to be read in conjunction with the "ULDA Sustainable Design" report which addresses all of the ULDA criteria.

There are several features of this building that have been designed to reduce the environmental impact of this building when compared to a standard building of this class. The combination of these features has resulted in a superior building that will add to the local community whilst minimising the impact to the environment. The main features that improve the environmental performance of this building are summarised below.

2 Water Efficient Fittings and Fixtures

Water efficient fittings and fixtures not only reduce the consumption of potable water supplies but they also reduce the energy required to heat water and the quantity of sewerage that needs to be treated in the municipal waste water plants. This means that water efficient fittings and fixtures provide a triple benefit to society – saving potable water supplies, reducing CO_2 emissions associated with water heating and reducing the infrastructure costs and energy used for waste water treatment.

The Water Efficiency Labelling Scheme (WELS) provides a simple method of comparing the water consumption of fittings and fixtures. This development will install 3 Star showers, 5 Star taps and 4 Star toilets as a minimum in all of the apartments. The water savings achieved by installing these rather than a standard fitting is outlined in the following tables. This is a superior design outcome when compared to a standard development.

	Standard Shower	3 WELS Star Shower
Flow Rate	15 l/min	9 l/min
Average Daily Usage per apartment	16 min	16 min
Number of apartments	226	226
Annual water consumption	54,240 l	32,544 l
Annual Water Savings	21,696 l/year	

	Standard Taps	5 WELS Star Taps
Flow Rate	15 l/min	6 l/min
Average Daily Usage per apartment	10 min	10 min
Number of apartments	226	226
Annual water consumption	33,900 l	13,560 l
Annual Water Savings	20,340 l/year	

	Standard 9/4.5 Dual flush toilet	4 WELS Star 4.5/3 Dual flush toilet
Average flush	5.4 l	3.3 l
Flushes per apartment per day	10	10
Number of apartments	226	226
Annual water consumption	12,204 l	7,458 l
Annual Water Savings	4,746 l/year	

By installing these water efficient fittings and fixtures, this development will reduce the consumption of potable water and the emissions to the sewerage by approximately **46,782 l/year.**

3 Energy Efficient Appliances

Of the 226 apartments, 88 of them will be developed as serviced apartments. Before they can be operated as serviced apartments, they will need to be fully furnished which will include a fridge, a dishwasher and a television. By ensuring these appliances are energy efficient, the consumption of electricity and the associated CO_2 emissions will be reduced. This development will select 3.5 Star dishwashers, 3 Star refrigerators and 5 Star televisions as a minimum[1].

The following tables show the energy and CO_2 that will be saved by installing these energy efficient appliances in the serviced apartments. This will result in a superior design outcome when compared to a standard development.

	Standard television	5 Star television
Energy Consumption per apartment[2]	700 kWh/yr	350 kWh/yr
Number of apartments	88	88
Total Energy Consumption	61.6 MWh/yr	30.8 MWh/yr
Annual Energy Savings	30.8 MWh/yr	
Annual CO_2 savings[3]	31,416 kg CO_2-e	

	Standard refrigerator	3 Star refrigerator
Energy Consumption per apartment[1]	275 kWh/yr	180 kWh/yr
Number of apartments	88	88
Total Energy Consumption	24.2 MWh/yr	15.8 MWh/yr
Annual Energy Savings	8.4 MWh/yr	
Annual CO_2 savings[2]	8,568 kg CO_2-e	

[1] Energy Efficiency Ratings were revised in 2009. Appliances will achieve a lower star rating under the new system than under the old system. All star ratings quoted refer to the new Energy Efficiency Rating system.
[2] The annual energy consumption figures are taken from the energy labels. Please see www.energyrating.gov.au for the assumptions used for these calculations.
[3] Assume 1.02 kg CO_2-e/kWh based on national-greenhouse-factors-july-2010-pdf.pdf accessed from www.climatechange.gov.au on 17/1/11

	Standard dishwasher	3.5 Star dishwasher
Energy Consumption per apartment[1]	400 kWh/yr	275 kWh/yr
Number of apartments	88	88
Total Energy Consumption	35.2 MWh/yr	24.2 MWh/yr
Annual Energy Savings	11 MWh/yr	
Annual CO_2 savings[2]	11,220 kg CO_2-e	

Additionally, this development will install 3.5 Star dishwashers in the 138 non-serviced apartments. The energy savings achieved by this is shown in the following table.

	Standard dishwasher	3.5 Star dishwasher
Energy Consumption per apartment[1]	400 kWh/yr	275 kWh/yr
Number of apartments	138	138
Total Energy Consumption	55.2 MWh/yr	37.9 MWh/yr
Annual Energy Savings	17.3 MWh/yr	
Annual CO_2 savings[2]	17,646 kg CO_2-e	

By installing these energy efficient appliances in the serviced apartments, this development will save approximately **67.5 MWh/yr** of electricity and reduce the greenhouse gas emissions by **68.6 T CO_2-e/yr** when compared to the same development using standard appliances.

4 Increase minimum NatHERS Star rating

The 2010 version of the Building Code of Australia requires all apartments in a residential development in Queensland to have a minimum NatHERS rating of 4 Stars. However, this development is seeking a superior design outcome by ensuring that the minimum NatHERS rating for all apartments is 5 Stars.

In the Brisbane climate, a 4 Star apartment will consume a maximum of **71 MJ/m^2** whilst a 5 Star apartment will consume a maximum of **55 MJ/m^2**. By committing to achieve a 5 Star rating on all apartments, the maximum energy consumption of these apartments will be reduced by **23%** on the minimum standards.

Thermal modelling using the BERS software has been performed on the worst performing apartments in the development. Initially, a portion of these only achieved 4 Stars, however, by replacing the standard glazing on the western side of these apartments with a high performance low-e glazing, the minimum performance was improved to 5 Stars. This will significantly reduce the energy consumption of these apartments whilst increasing the comfort of the occupants.

5 Naturally ventilated corridors

The corridors in the development will be naturally ventilated. This removes the need to provide artificial air-conditioning to these areas. As the HVAC load for these areas would ordinarily be in the order of 50 kWh/m^2/year, this will save approximately **65 MWh/yr** of electricity and reduce the greenhouse gas emissions by **66.3 T CO_2-e/yr** when compared to a standard building with air-conditioned corridors.

6 Conclusion

This development has demonstrated a superior design outcome through a combination of the water efficient fittings and fixtures, energy efficient appliances in the apartments, increasing the minimum NatHERS star rating from 4 Stars to 5 Stars and by naturally ventilating the corridors. These features will result in a reduction in the electricity and water consumed by this development compared to a standard development. This reduces the consumption of scarce natural resources, reduces pressure on the local infrastructure and reduces the amount of pollution released into the atmosphere.