Port Douglas Wave Park
Preliminary Electrical Review

The following advice has been prepared in response to preliminary information supplied by Hunt Design for the proposed Wave Park to be developed at Mowbrey River, Far North Queensland.

The aim of this preliminary advice is to identify the likely electrical infrastructure required, consider potential sustainability initiatives which may prove feasible and consider the likely impact on the supply authority network.

Estimated Electrical Demand

The proposed configuration of the complete development estimated peak demand for the development is in the order of 3 – 3.5 MVA made up as follows:

Element	kW (peak)
Wave Park	1,333
Water Treatment	166
Hotel	1,000
Housing lots & Villas	750
	3,216

Table 1.0 : Estimated Peak Demand

The wave park element of the site demand represents a high degree of variability from a peak of 1300kW in the mornings and evenings to around 450kW for the majority of the day.

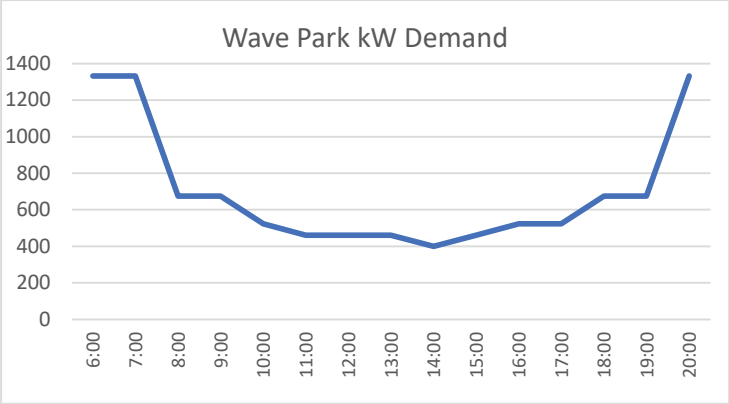

Figure 1.0 : Wave Park Typical Daily Load Profile

This variability in daily demand incentivises the use of demand management at the site as a means of stabilising the demand to achieve an optimum level in order to exploit the available electricity tariffs.

PV Power Generation

The development will include a 300-space covered carpark with approximately 5,500m² roof area available for rooftop PV, able to yield in the order of 820kW at an average density of say 150W/m².

In addition, the proposed hotel roof area of approximately 7000m^2 has the potential to yield up to a further 1MW.

The combined demand profile of the Wave Park and Water Treatment demand, together with the offset included for PV (conservatively based on 1MW of the available 1.8MW of PV), the resultant demand profile could potentially be as follows:

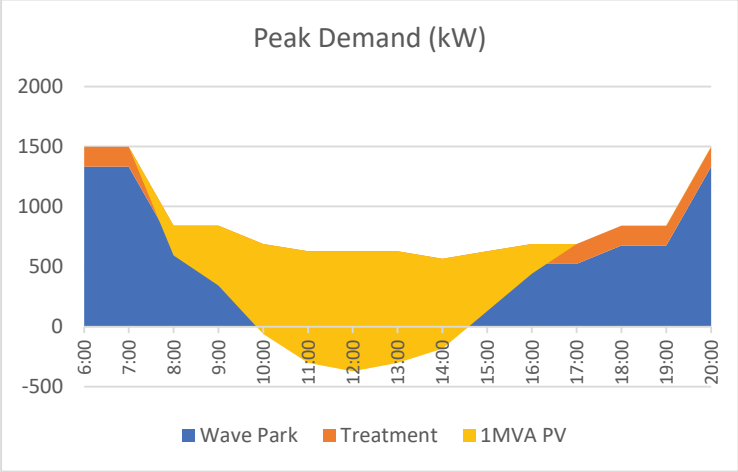

Figure 2.0 : Wave Park Typical Daily Load Profile (including water filtration & PV offset)

Hotel Demand Management

The variability of the combined Wave Park demand and contribution from a 1MW PV array results in an overall demand profile varying form 1.5MVA at mornings and evenings to -350MVA at midday.

This provides the opportunity to manipulate the hotel daily demand profile to compliment the overall site demand to flatten the daily demand to best suit the applicable energy tariff.

The use of Thermal Energy Storage (TES) through the introduction of a large scale thermal tank, would enable the hotel to restrict central conditioning plant chillers to daytime operation to produce the chilled water necessary to provide continuous cooling through the day and night.

The incorporation of a large-scale TES tank would enable the use of fixed speed high efficiency water cooled chillers which achieve optimum energy efficiency. The buffer capacity provided by the storage tank permits the chillers to be run at maximum efficiency at fixed speed as they are decoupled from the actual demand profile. The use of energy metering to track instantaneous demand, ensure the chillers are operated only at periods of low load, thereby ensuring the daily demand remains below the threshold required to fully exploit the most advantageous demand tariff.

Ergon Infrastructure

Preliminary discussions with Ergon Energy indicate the site locality can be serviced without the need for any significant headworks due to its proximity to the substation at Cargile. Whilst Ergon do not anticipate any supply issues, they have requested details of the number, rating and method of starting for electric motors to determine if there is a risk of mains disturbances being induced to their network (i.e. flicker).

High Voltage Network

As the development will require a minimum of four (4) off 22kV/400V distribution transformers throughout the site, the most likely scenario would be for the customer to take supply at 22kV via a HV metering point at the boundary, with the internal HV network owned and operated by the customer.

This would allow the customer the benefit from lower energy costs and avoid the need for internal infrastructure to be located within registered easements and subject to Ergons standards.