

SJB Architects



# Crystalbrook Superyacht Marina Development

Port Douglas

Development Application

---

Prepared for  
Ghassan Aboud Group

---

Issued  
21/12/2017



# We create amazing places



SJB is passionate about the possibilities  
of architecture, interiors, urban design  
and planning.

Let's collaborate.

Version: 01  
Prepared by: AC  
Checked by: KB

Contact Details:

SJB Architects  
Level 5, 18 Oliver Lane  
Melbourne VIC 3000  
Australia

T. 61 3 9699 6688  
architects@sjb.com.au  
sjb.com.au

SJB Architecture Pty Ltd  
ABN 68 065 207 490  
ACN 065 207 490

# Contents



<b>1</b>	<b>Site &amp; Context</b>	<b>8</b>			
1.1	Location	9	4.3	Hotel Arrival	35
1.2	Site and Context	10	4.4	Plaza, Pavilion & Duck Pond Villas	36
1.3	Urban Design Response	11	4.5	Plaza, Pavilion & Duck Pond Villas	37
1.4	Existing Site & Surrounding Area	12	4.6	Marina Boardwalk	38
<b>2</b>	<b>Design Response</b>	<b>14</b>	4.7	Marina Boardwalk	39
2.1	Concept & Vision	15	4.8	Hotel Frontage	40
2.2	Character	16	4.9	Hotel Frontage	41
2.3	Character	17	4.10	Marina Pavilion	42
2.4	Authentically Local Design	18	4.11	Marina Pavilion	43
2.5	Form & Massing	19	4.12	Marina Interface	44
2.6	Site Conditions	20	4.13	Marina Interface	45
2.7	Site Plan	21	4.14	Residential Accommodation	46
<b>3</b>	<b>Localised Sustainability</b>	<b>22</b>	4.15	Residential Accommodation	47
3.1	Integrated Greenery and Landscaping	23	4.16	Hotel Crown	48
3.2	Shading Strategies	24	4.17	Hotel Crown	49
3.3	Shading Strategies	25	4.18	Precedents	50
3.4	Ventilation	26	4.19	Materiality	51
3.5	Ventilation	27	4.20	Development Summary	52
3.6	Cooling Strategies	28	4.21	Development Summary	53
3.7	Energy Use and Generation	29	<b>5</b>	<b>Documentation</b>	<b>54</b>
3.8	Water Initiatives	30	5.1	Architectural Drawings	55
3.9	Paddock to Plate	31			
<b>4</b>	<b>Study Areas</b>	<b>32</b>			
4.1	Key Diagram	33			
4.2	Hotel Arrival	34			

# Architects Statement



The Crystalbrook Marina redevelopment seeks to reinvigorate and revitalise the Port Douglas waterfront and create a vibrant new ecosystem within the Douglas Shine context. It will provide a world-class hotel and residential offering attracting local and international guests.

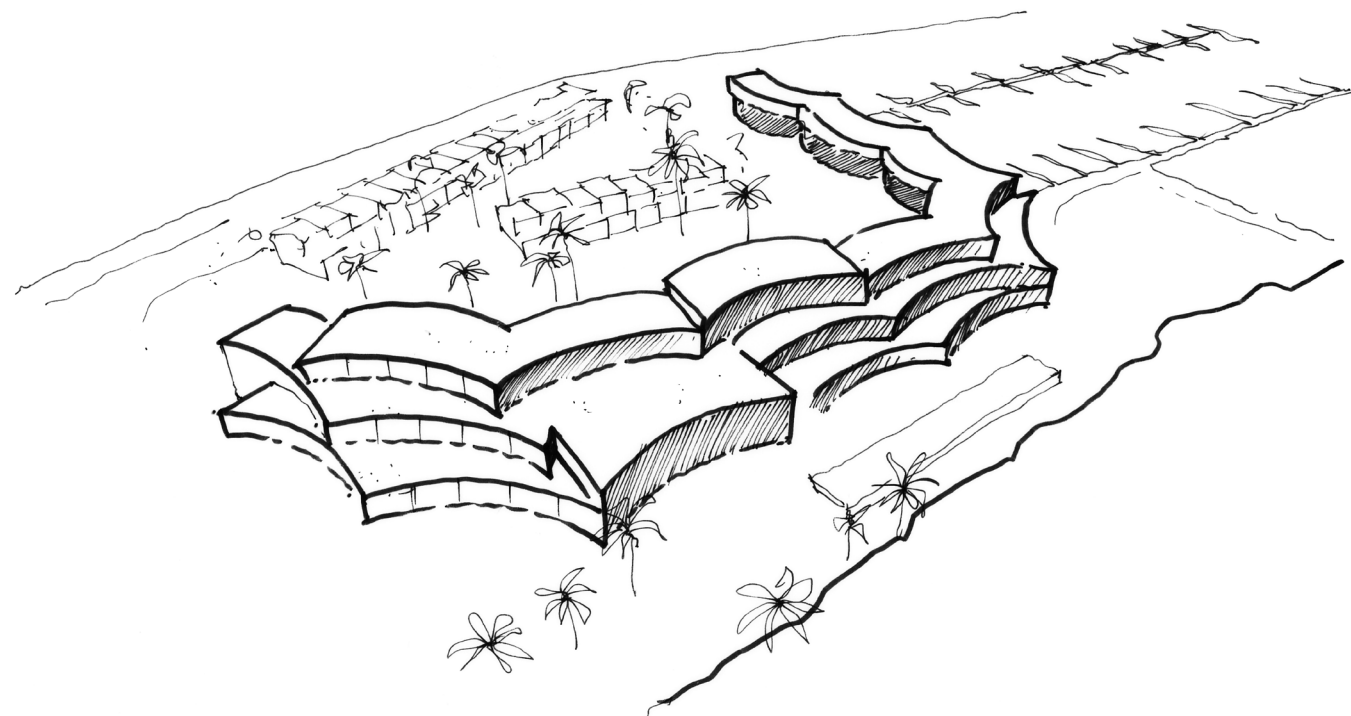
A 5-star hotel anchors the site, with a design language inspired by the nearby reef's structure and ecology. This language permeates throughout the residential, retail, hospitality and amenity buildings, with the dynamic, layered terracing creating an internationally recognisable architectural landmark.

Instantly identifiable, with the highest level of accommodation and amenity, the hotel will be clearly distinctive but also heavily connected to the environment and immediate context. Sustainability, in terms of building longevity as well as environmental response, is a key element of the design. The ethos of the development is 'responsible luxury' – a philosophy which affects everything from the performance of the building, to the energy efficiency, the sourcing of materials, and even the dining experience within the signature restaurant.

The site has been re-imagined as a car-free ground plane, with all parking placed underground – in stark contrast to the existing condition. A completely pedestrianised and walkable environment has been established. Extensive gardens infill all areas of the site with boardwalks and tree-lined paths creating permeability in and around the marina, hotel and villas.

New food and beverage premises both at the 'gateway' to the site – the northeast corner – and along the marina waterfront, will provide a vibrant offering for guests and residents of the development, as well as day-trippers going out to the reef.

A cocktail bar has been located in the southwest corner of the site, fronting directly onto the marina and Dickson Inlet. This too will provide another striking piece of architecture for the area, and a place to meet, relax, watch the sunset and take in the stunning natural surrounds of Port Douglas.









# Executive Summary



34,000

m<sup>2</sup>

Land Area (approx)

---

130

No.

Hotel Rooms

---

10

No.

Hotel Villas

---

35

No.

Private Villas

---

9

No.

Private Apartments

---

4,076

m<sup>2</sup>

Retail and Dining

---

277

No.

Car spaces (on site)

---













1.1 Location

The land is currently an existing property of approximately 34,000m2 which includes existing retail areas, a slipway, car park and marina.

--- Site extent







1.2 Site and Context

Natural Features



- [---] Site
- Open Spaces
- Parks and Recreation
- Topography
- Marina
- Prevailing Breezes
- Beach
- Publicly Accessible Waterfront
- Obstructed Waterfront
- Wharf

Vehicular Access and Movement



- [---] Site
- Major Car Parking
- Bus/Shuttle Parking
- Primary Vehicular Movement
- Secondary Vehicular Movement
- Township Gateway

Pedestrian Movement



- [---] Site
- Primary Pedestrian Movement
- Secondary Pedestrian Movement
- Recreational Pedestrian Movement

Key View Corridors



- [---] Site
- Primary View to Site
- Secondary View
- Viewline Termination

Manifesto

An understanding of place, landscape and history is fundamental to this design project.

It is no longer acceptable to simply impose old ways of thinking on fragile and unique landscapes. This design process respects and engages with the land in a harmonious and sustainable way. The proposal reflects a balanced, holistic design and careful insertion of urban form into the (re-established) natural setting. It also encompasses a flexible, adaptable outcome, responsive to Port Douglas' re-emerging urban.





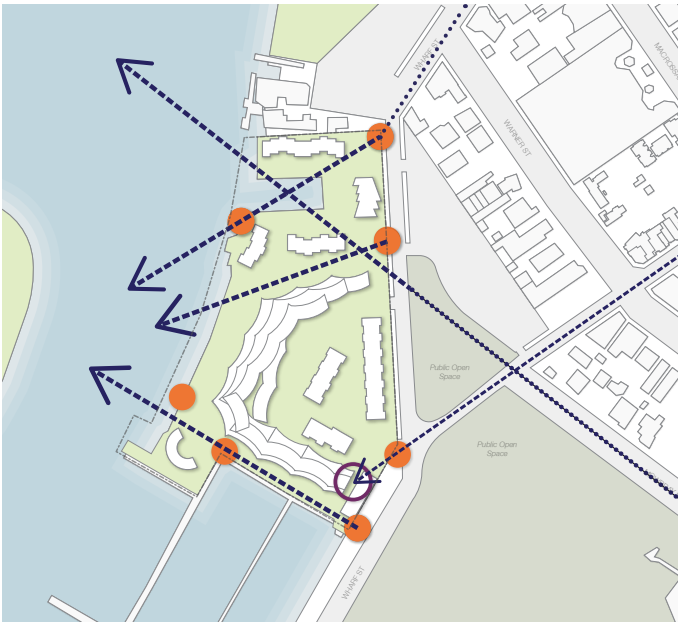
1.3 Urban Design Response

Increase Pedestrian Permeability / Improve Access to Waterfront



- [---] Site
- Primary Pedestrian Movement
- - - Secondary Pedestrian Movement
- Arrival Node/Wayfinding

Define and Establish View lines to Waterfront



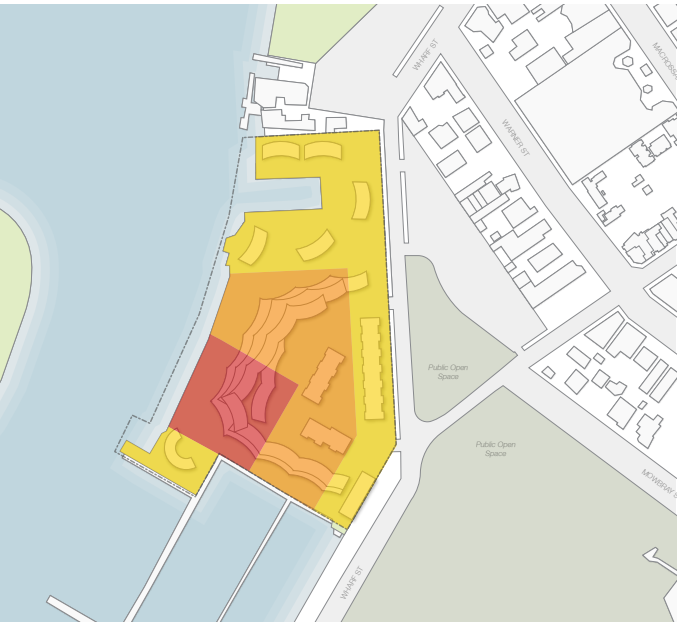
- [---] Site
- Primary Viewline
- - - Secondary Viewline
- ... Potential Future Viewline
- Viewline Termination
- Arrival Node/Wayfinding

Consolidate Access, Increase Vegetation and Decrease Vehicular Presence within the Site



- [---] Site
- Primary Vehicular Movement
- - - Secondary Vehicular Movement
- Services/Loading Zone
- Reinstated Tropical Vegetation
- Driveway

Building Height Gradient to Maintain Street Character and Protect Surrounding Amenities



- [---] Site
- 2 Storeys
- 4 Storeys
- 5 Storeys

Key Themes

A cohesive piece of urban fabric, creating a new sense of arrival to Port Douglas

A new urban structure for the site will integrate with the surrounding local fabric, whilst aligning new spaces and connections with existing streets and arrival points, supporting legibility and accessibility. The site boundaries will be highly permeable, open and welcoming, while also providing a new definition to existing street edges.

A new open space network.

Quality public and private spaces that proliferate and enliven the urban form, and reconnect the City. A series of linked space that create a unified identity.

A dynamic ground plane

The new spaces and connections will be abuzz with people and movement, with activity types and levels changing throughout the day and evening.


A focus on tropical living

Tropical living will integrate the landscape and design elements into the built environment to deliver: shelter from sun and rain; a contrast of light and shade; sufficient spaces around and between buildings; minimisation of radiant heat and heat island effects with green roofs and vertical landscapes; high quality responsive landscaping; and passive design that responds to the tropical climate, such as street canopies as an architectural expression of the rainforest canopy.




1.4 Existing Site & Surrounding Area


Existing Site Plan




1 Wharf Street




2 Existing building on site




3 Marina




4 Existing building on site




5 Balley Hooley train track




6 Existing Duck Pond




7 Existing landscape on site



8 Balley Hooley



9 Existing Duck Pond





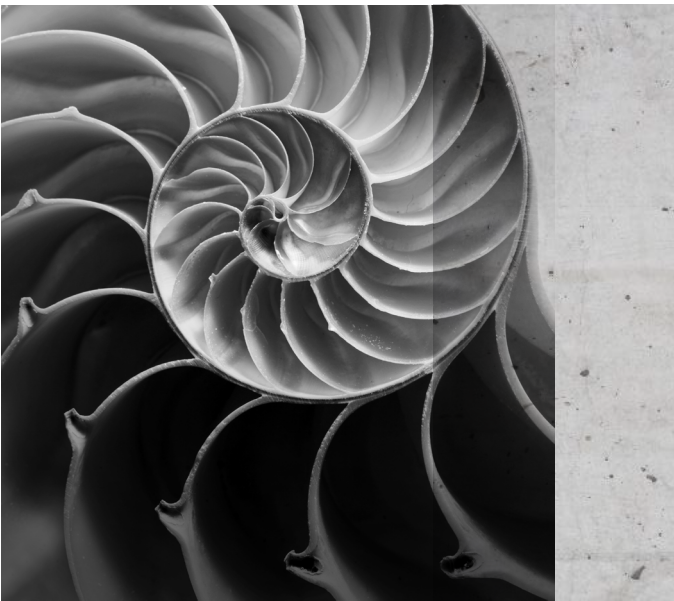
**This page intentionally left blank**







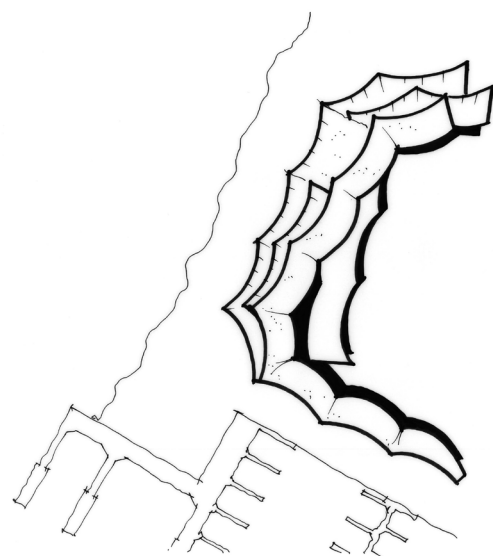
2.1 Concept & Vision



**ARCHITECTURAL CONCEPT**

Architecturally and conceptually, the building form of the hotel references organic forms found within a reef ecosystem. Scalloped modules, consisting of typically 5 hotel suites, are stacked and stepped to create a dynamic and instantly identifiable building form – like a tidal movement of peaks and troughs the scalloped form also reflects the endless energetic movement of the ocean.

A kind of Fibonacci sequence of repeating segments (found in the nautilus shell, the sea horse, etc) is also evident. This theme of repeating geometries and modulation affects all building forms across the site.

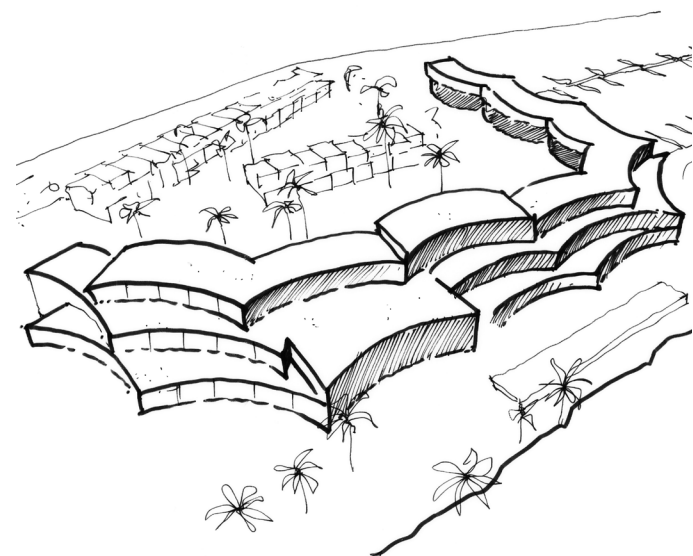


**AUSTRALIA’S GREATEST RESORT MARINA. THE EPITOME OF LUXURY CASUAL.**

This project will revitalise the port Douglas Marina precinct, a truly world-class site that demands design thinking of the highest calibre.

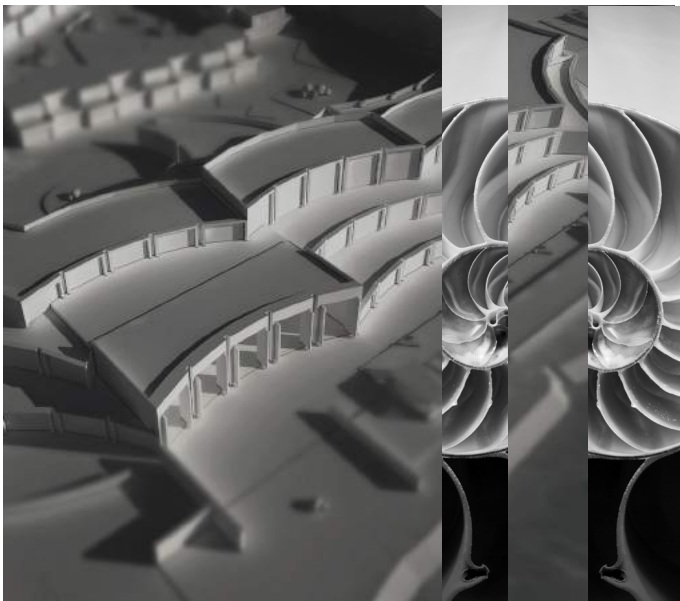
A 5 star hotel anchors the site, setting a design language inspired by the reef’s ecosystem, which permeates throughout the residential, retail, hospitality and amenity buildings. An exciting new identity for the precinct that will garner international attention for its design nous, sustainable luxury as well as its abundant natural beauty.

The hotels dynamic, layered terracing animates the form creating an internationally recognisable architectural landmark.



**STACKING LAYERED CONCRETE FORMS WITH TROPICAL OVERGROWTH**

Stacking forms allow for layered landscaping, spacious terraces and elevated private gardens, while reinforcing the biomimicry of the building form.



**BIOMIMICRY**

An approach that seeks sustainable solutions to human challenges by emulating nature’s time-tested patterns and strategies.



2.2 Character

DESIGN CUES FROM PORT DOUGLAS HERITAGE



DAINTREE RAINFOREST  
COCKTAIL LOUNGE

Local, tropical planting and a canopy like atmosphere seamlessly uniting inside and outside space. Inspired by the world renowned Daintree rainforest.



GREAT BARRIER REEF  
ARCHITECTURE & SCULPTURE

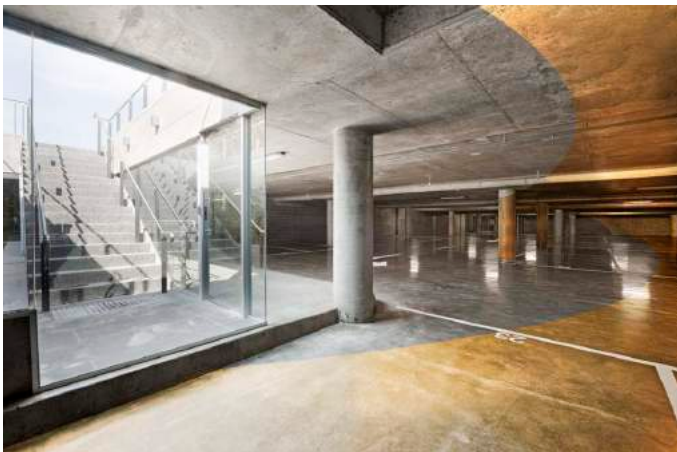
The biggest draw card for Port Douglas tourism, the reef inspired the natural materiality and modular ‘ecosystem’ of the architecture.

Custom made sculpture by Jamie North combines eroded concrete forms with various plant life, mimicking the diverse ecosystem of the reef.



SUGAR CANE  
ARRIVAL

Sugar Cane is celebrated, planted with intelligent up-lighting, framing views through the lobby space and adding some lush greenery on the backdrop of concrete and timber.



GOLD MINING  
BASEMENT SUPER-GRAPHIC

The gold super-graphic car park is a nod to the mining heritage of Port Douglas, that saw its population rise to its highest ever level of 12,000 in 1880. The measure of restraint in keeping the gold scheme to the underground keeps the hotel itself free of flashy, ‘traditionally luxurious’ finishes.



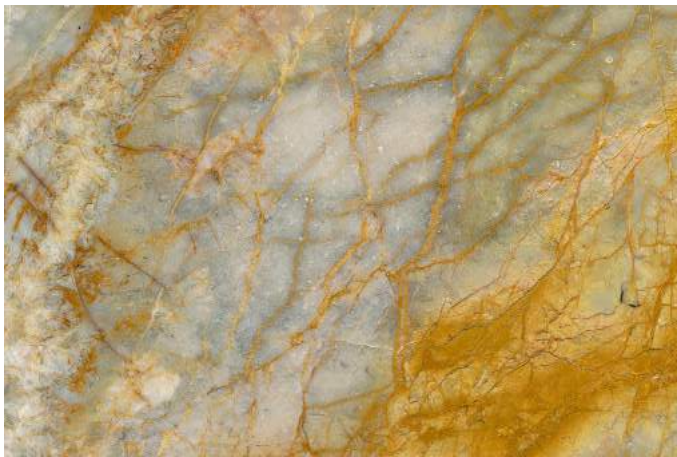
2.3 Character

DESIGN CUES FROM THE PORT DOUGLAS CONTEXT



SUSTAINABLE MATERIALS

Bagasse is a 100% sustainable material, the husky by-product of sugar extraction from cane. The material has found popularity in interior design of late for its natural aesthetic and sustainable credentials, in the case of this hotel development it helps share story of a key local industry, strengthened by the end of the Bally Hooley line at the Marina.



LOCAL STONE

Local stone from local manufacturers allow for an authentic Port Douglas design. As an example, the marble shown above is from Chillagoe Quarry, located in North Queensland. A gold touch within the stone is also reminiscent of the local mining heritage.



LOCAL TIMBER

North Queensland is home to a variety of local timbers, including Forest Red Gum, Blackbutt, Gympie Messmate, Spotted Gum and White Mahogany. Timber is a sustainable, light-weight building material suitable for particularly warm climates such as Port Douglas.



GREEN ROOFS

Open breathable space, responsive facades and lush landscaped areas. Landscaped roofs assist to passively cool the buildings and blend the architecture into the landscape.



2.4 Authentically Local Design

ARCHITECTURAL VISION



FRAMED VIEWS



TROPICAL WELLNESS SANCTUARY



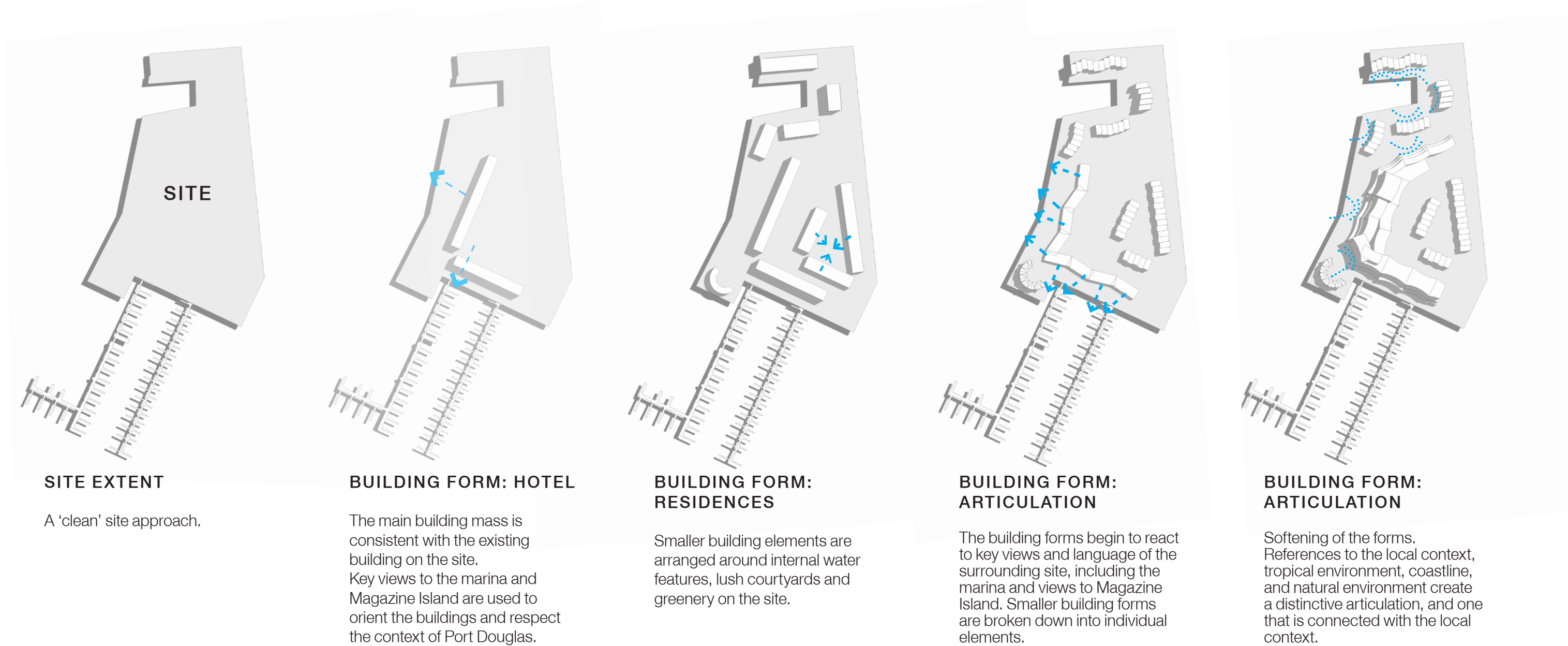
SEAMLESS TRANSITION IN > OUTSIDE



NATURAL MATERIALITY, REFINED  
DETAILING



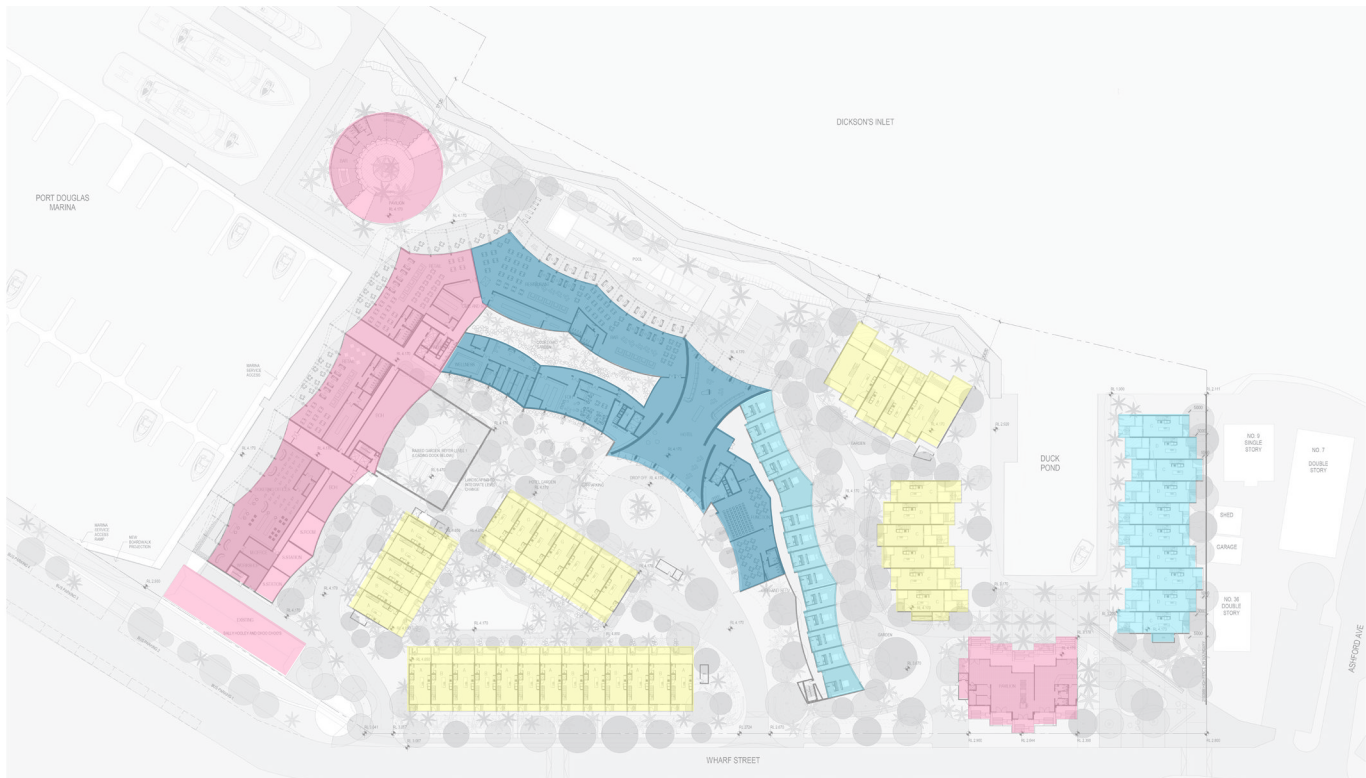
2.5 Form & Massing





Design Response

2.6 Site Conditions



Site Uses

- Hotel Public Areas
- Hotel Rooms
- Retail / Food & Beverage
- Residential



Site Circulation - Pedestrian Linkages & Way-finding

- Major Public Circulation
- Minor Pedestrian Circulation
- Public Point of Interest



2.7 Site Plan









Localised Sustainability

3.1 Integrated Greenery and Landscaping



Passive Design

The existing site is extensively covered with hard surfaces (car parking, pavement, and industrial service yards). The proposed development integrates extensive landscaping into and around the site, over and between built form.

Greenery serves to provide shading and a cooling effect to the overall development. Landscaped roofs (a combination of vegetated and permeable gravel treatments) provide both insulation and usable rooftop spaces.

Site Permeability

Removal of extensive car parks and hard surfaces from the existing site and integration of extensive landscaping around new buildings.

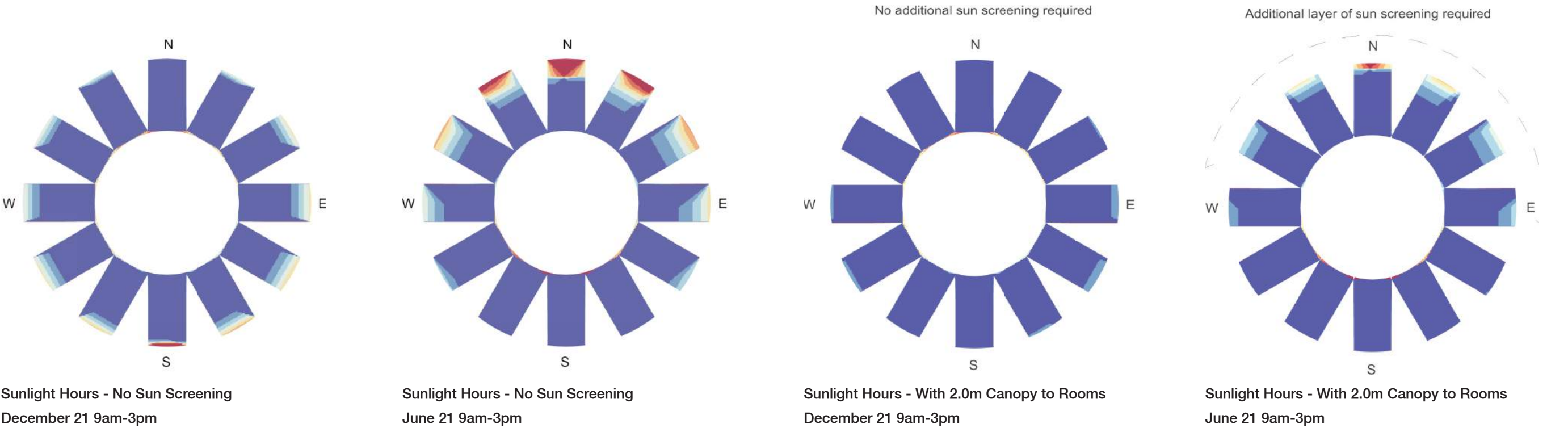


Landscaped Roofs



3.2 Shading Strategies

Solar Analysis



Sunlight Penetration and Shading

Energy modelling of the proposed building form, occupancy and climate is used to determine appropriate thermal envelope responses. The fundamental considerations are shading (avoidance of excessive passive solar gains, direct and diffuse) and airtightness.

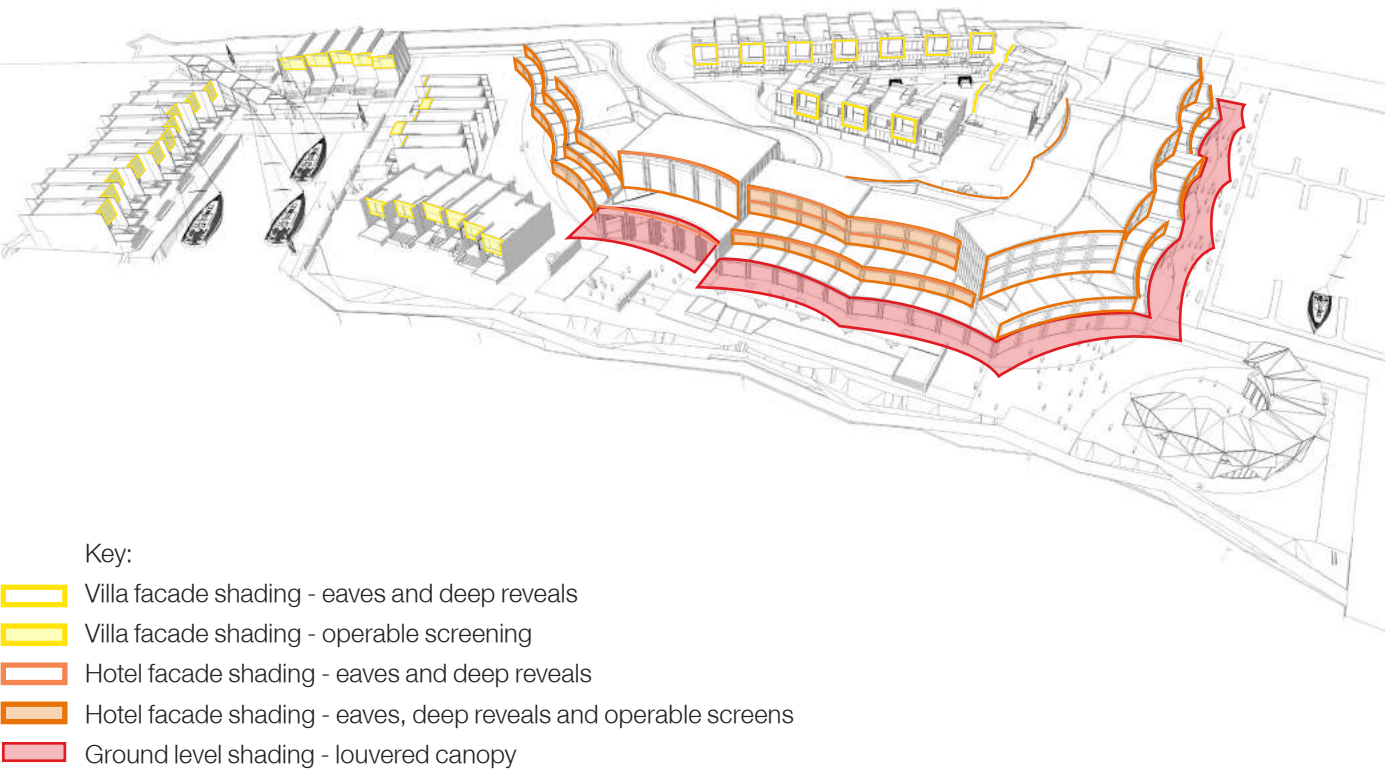
The diagrams above illustrate the effects of the no sun screens versus the proposed shading devices on an individual hotel room at various orientations. Each rectangular segment of the 'fan' represents a room, the colouration represents the number of hours of sunlight penetrating into the room



Localised Sustainability

3.3 Shading Strategies

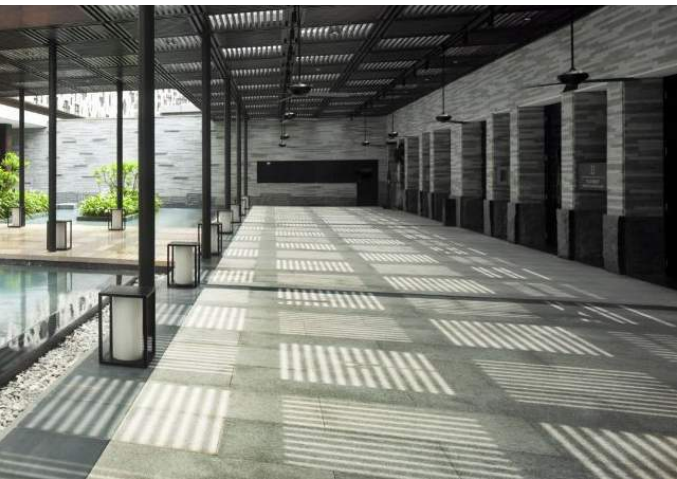
Response to Climatic Conditions



Shading Devices

Based on analysis of sunlight penetration, various shading devices are proposed for different conditions. As illustrated diagrammatically above, for the hotel eaves and deep reveals are proposed to all orientations, and additional operable (and perforated) screens are proposed in north, east and west orientations which require additional sun screening. For the villas, eaves and deep reveals, as well as operable screen are integrated into the designs.

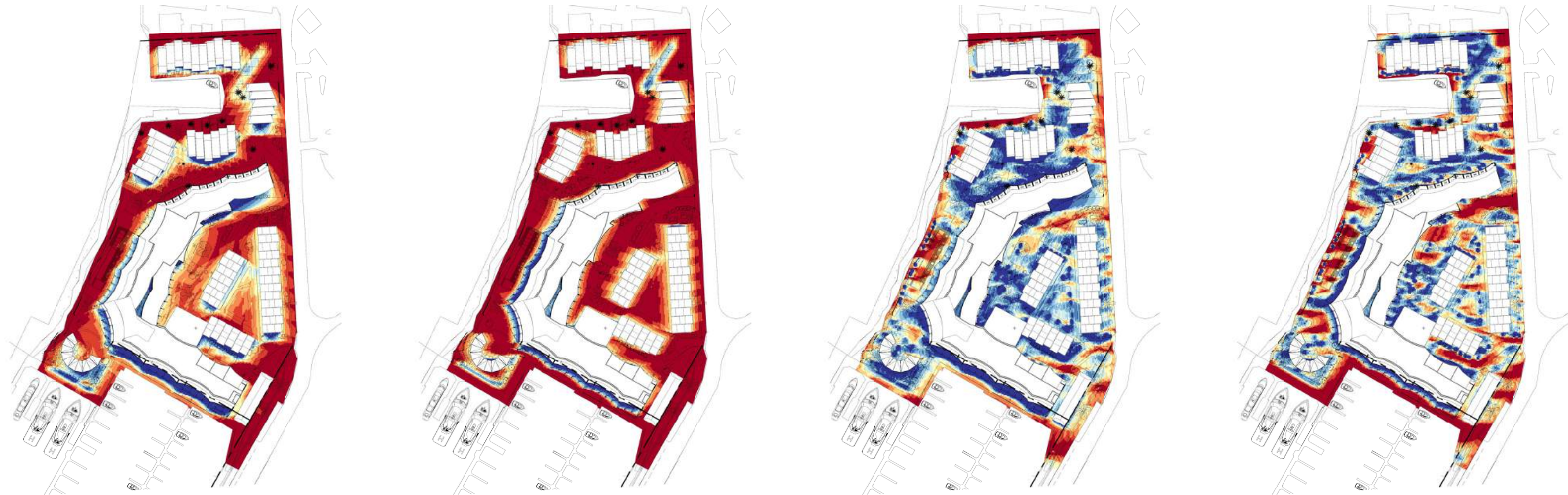
Extensive ground level canopies are also proposed outside food, beverage and retail areas to provide solar (and weather) protection to internal and external spaces.





3.4 Ventilation

Heat Mapping



Sunlight Hours - Buildings and Canopies Only  
June 21 8am-4pm

Sunlight Hours - Buildings and Canopies Only  
December 21 8am-4pm

Sunlight Hours - Buildings, Canopies and Vegetation  
June 21 8am-4pm

Sunlight Hours - Buildings, Canopies and Vegetation  
December 21 8am-4pm

Site Analysis

The diagrams above illustrates the effects of the proposed canopies and extensive vegetation. Vegetation modelled is based on the landscaping plan prepared for the application. Colouring on the diagrams represents the number of hours of direct sunlight on the ground plane.

The 2 diagrams for 'building and canopies only' illustrate the effects of the proposed ground floor canopy over public spaces - therefore providing a cool zone to these areas.

The diagrams illustrating the effects of 'buildings', canopies and vegetation' show the combined effect of the proposed canopies and landscaping strategy.



Localised Sustainability

3.5 Ventilation

Vegetation as a Cooling Device



Key:  
Integrated balcony landscaping  
Ventilation flow

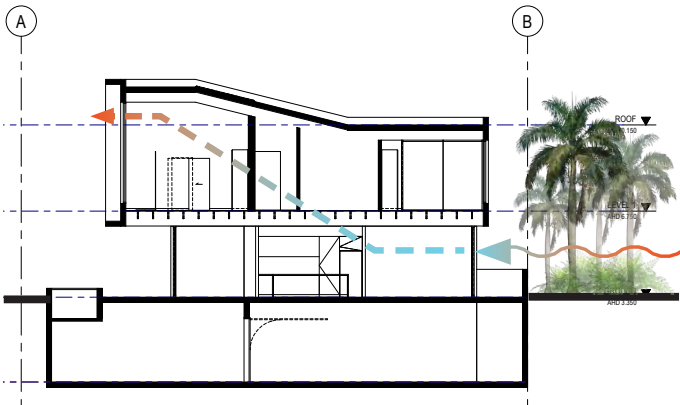
Passive Design

The climate of Port Douglas presents both challenges and opportunities. High temperature and humidity for large portions of the year are such that cooling is the dominant energy demand with no heating required.

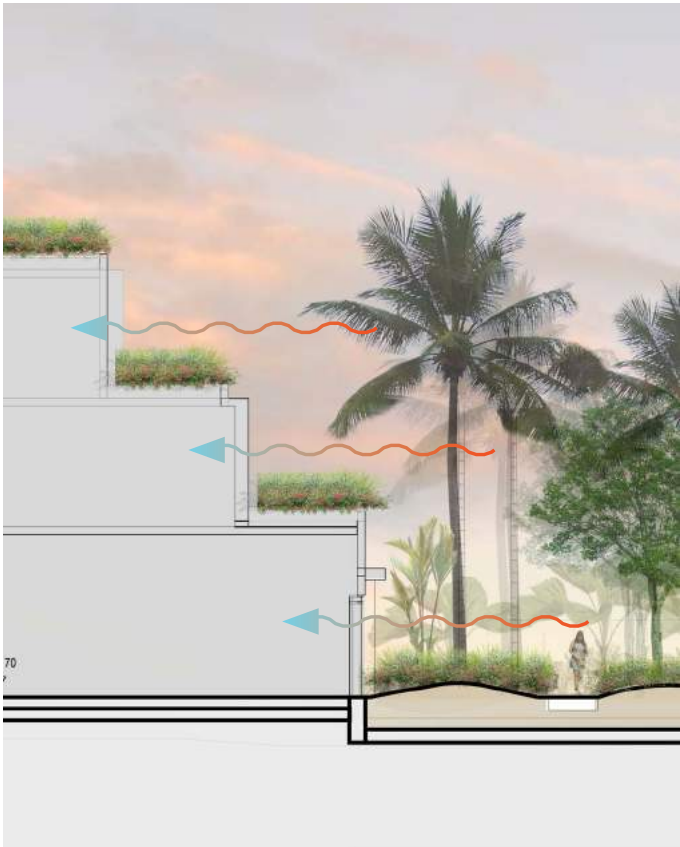
Building form and aperture arrangement are designed to allow bulk air movement such that natural ventilation can be used (with ceiling fans) in lieu of air conditioning during the cooler winter season, providing a 'mixed mode' solution.

As illustrated by heat mapping of the site, vegetation is strategically designed to create cool zones around the site. Ventilation flow (bulk air movement) through these cool zones provides cool air through the hotel spaces. In addition to extensive landscaping at ground, balcony planters or proposed to provide coolth (and mitigate heat) to upper floors of the building.

It is acknowledged that buildings in the tropics that switch between natural ventilation and mechanical AC need careful consideration of moisture transport/condensation. Significant energy and detrimental air quality issues (i.e. mould growth) could arise due to condensation occurring on internal finishes due to high moisture content in natural ventilation mode, then over-use of cooling when in mechanical AC mode. These issues could be mitigated through airtightness testing, vapour membranes and limits on cooling set-points.



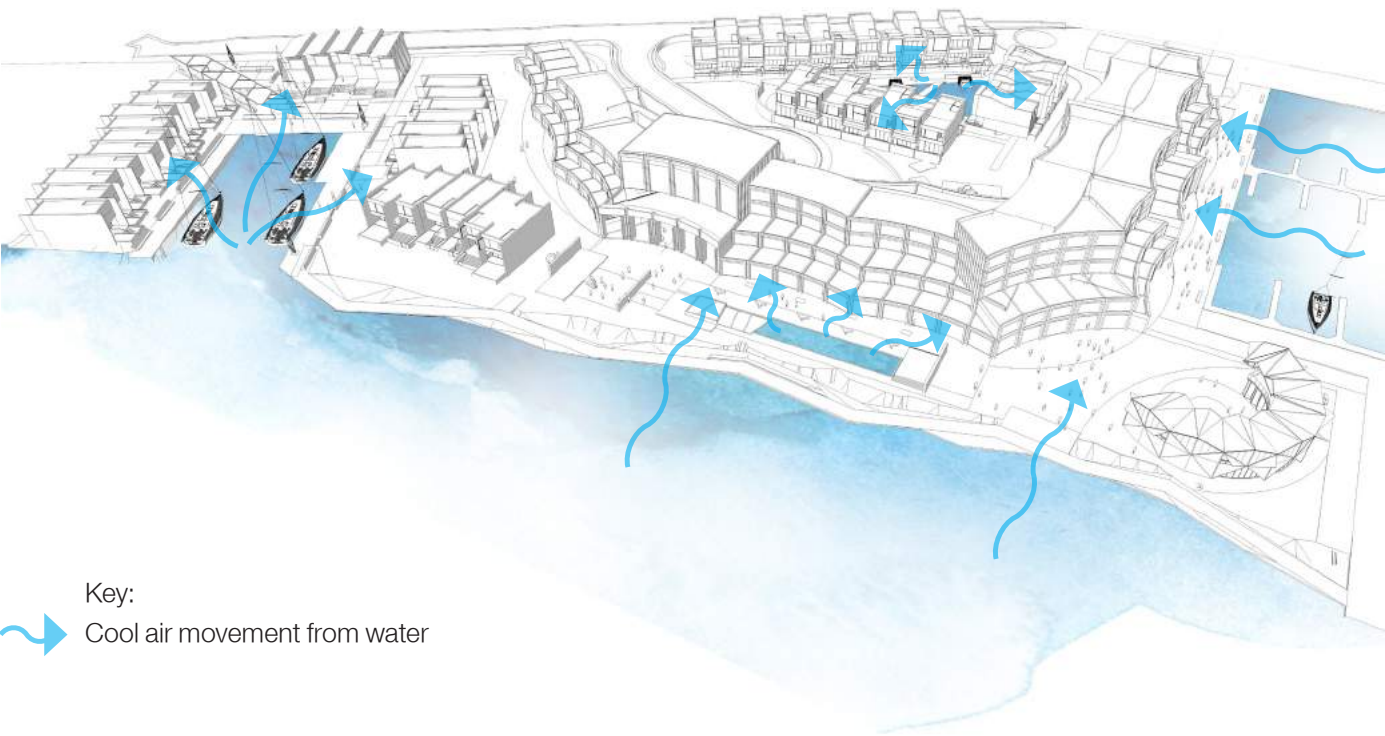
Villa Passive Ventilation Flow



Integrated Balcony Greenery



3.6 Cooling Strategies



Key:  
Cool air movement from water

Building Services

The adjacent waterfront and proposed pools provides passive cooling to surrounding spaces. Building are located to capture prevailing breezes as they pass over the surrounding water zones.

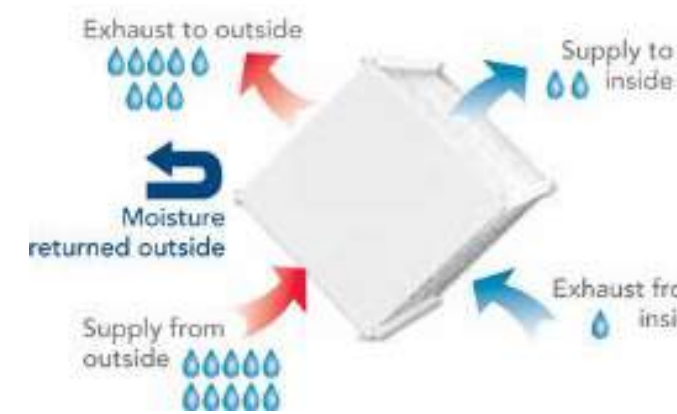
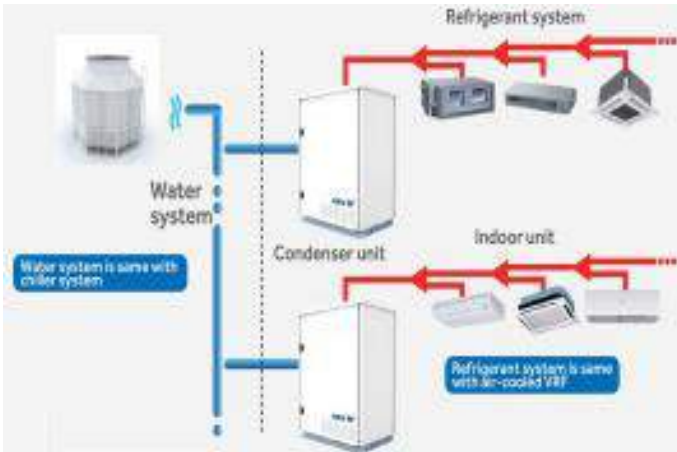
Supplementing passive strategies, and to provide for the predominant cooling demands it is likely that two separate approaches are required for the hotel/commercial spaces and the villas.

Hotel/Commercial Spaces:

A central chilled water loop (central water-cooled chiller and cooling tower heat rejection) serving local FCUs and AHUs across the site. Heat rejection centralised to a consolidated cooling tower(s).

Private Villas:

One or two condenser water loops (each with cooling tower heat rejection) serving local water-sourced VRF units within each private villa and/or satellite buildings (e.g. pavilion). Water-sourced VRF systems are complementary to private villas where individual electricity metering is required.



Heat recovery

All HVAC systems should be provided with “enthalpy recovery”, transferring heat and moisture between outside air intake and exhaust air. Enthalpy recovery reduces cooling energy by pre-cooling and pre-drying outside air. Two types are anticipated to be provided; centralised Dedicated Outside Air System (DOAS) with enthalpy recovery for the hotel/commercial spaces, and unitary enthalpy recovery units for the private villas.



Localised Sustainability

3.7 Energy Use and Generation

Renewable Energy and Storage



Renewable Energy

Photovoltaic (PV) renewable energy technology has evolved to be the pinnacle on-site energy generation solution for the built environment given its compelling business case, technological maturity, minimal maintenance profile and emissions reduction benefit. This technology now provides building owners with the real ability to generate their own electricity to significantly reduce operating costs and GHG emissions. Similar to PV, advancements in battery energy storage are such that there are technically mature energy storage solutions to extend on-site PV generation systems. Benefits include providing peak demand/cost management, increased utilisation of on-site renewable generation and improved resilience to network failures or other events (e.g. cyclones). Combined with an embedded metering system and energy technology software, solar PV and energy storage is proposed to provide for a ‘micro-grid’ where all generation sources and loads are controlled within the site, providing cost and resiliency advantages.



Energy Storage



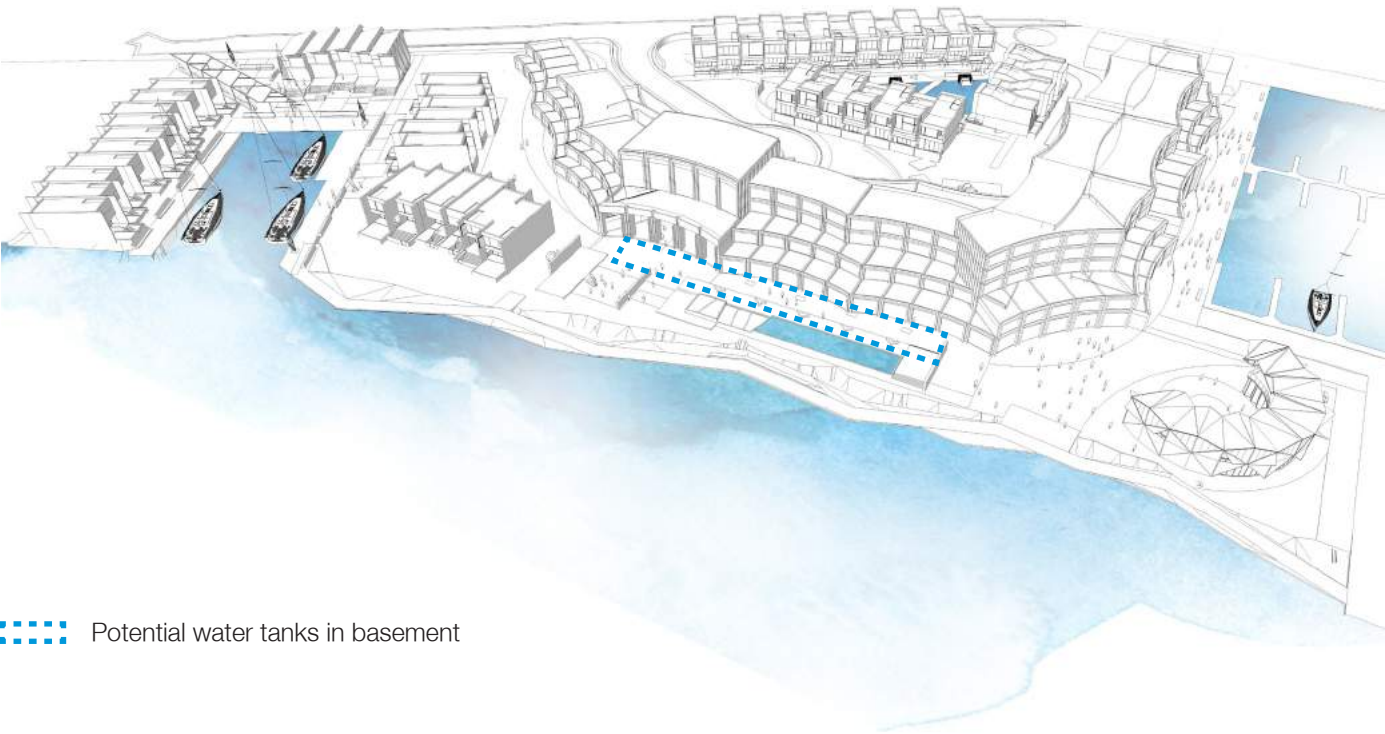
Photovoltaic



Localised Sustainability

3.8 Water Initiatives

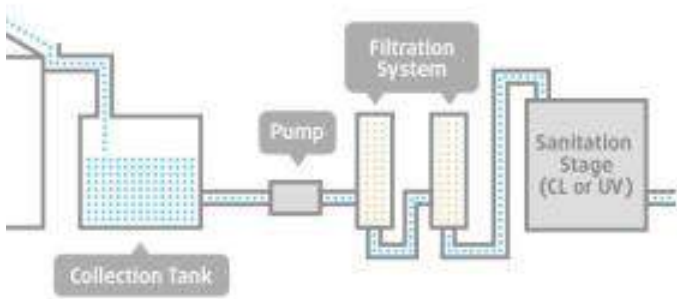
Catchment, Storage and Reuse



**Water Efficiency**

Although monthly rainfall varies significantly throughout the year, non-potable water harvest & reuse systems (rainwater & condensate) could be incorporated for suitable uses (toilet flushing, landscape irrigation, pool top-up and heat rejection). It's likely that guests would associate 'responsible luxury' with the broadly understood practice of rainwater harvesting. Rainwater storage volume is pending detailed site water balance analysis.

Water efficient fixtures and fittings would also be selected within context of 'responsible' luxury.



Water reuse



Localised Sustainability

3.9 Paddock to Plate



**Local produce, local farming, local Industry,**

‘Responsibly luxury’ is not just about buildings, the approach extends to a complete guest experience - dining, living and socialising.

Through the establishment of the hotel brand and with connections to local producers the impact of the project extends beyond the site itself. It is envisaged that produce farmed locally would be cut in the hotel kitchens, viewed prior to preparation and served in the restaurant to provide a complete paddock to plate dining experience.