



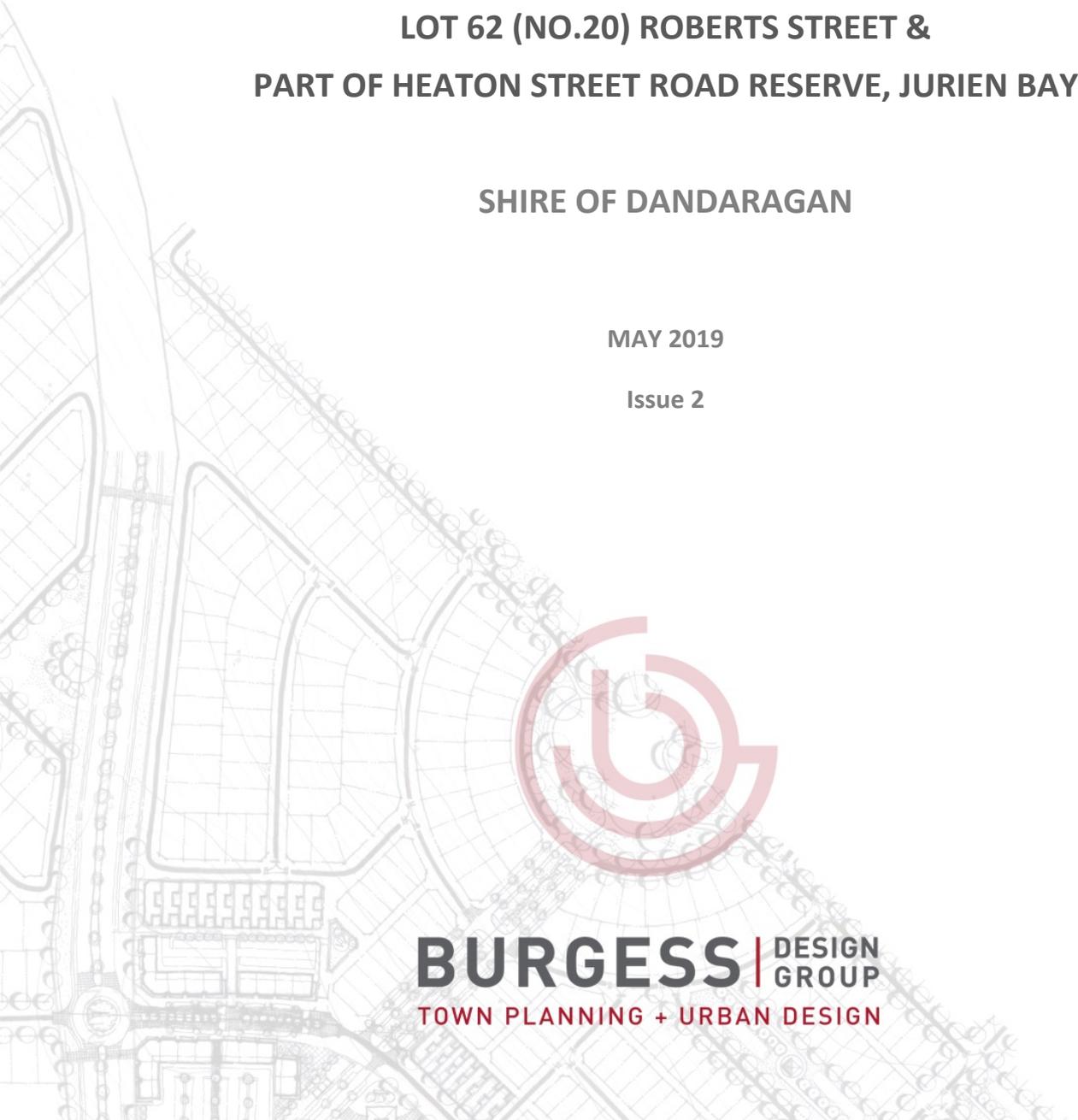
PROPOSED MIXED-USE TOURISM DEVELOPMENT

LOT 62 (NO.20) ROBERTS STREET &
PART OF HEATON STREET ROAD RESERVE, JURIE BAY

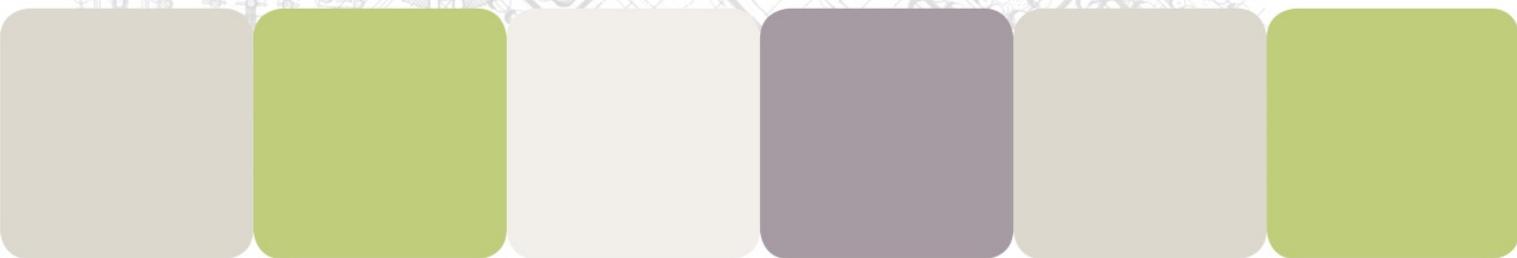
SHIRE OF DANDARAGAN

MAY 2019

Issue 2



BURGESS | DESIGN
GROUP
TOWN PLANNING + URBAN DESIGN



**Lot 62 (No.20) Roberts Street &
Part of Heaton Street Road Reserve, Jurien Bay**

Shire of Dandaragan

PROPOSED MIXED-USE TOURISM DEVELOPMENT

Issue 2: May 2019

Prepared for: Aliceville Holdings Pty Ltd

Prepared by: Burgess Design Group
101 Edward Street, Perth, 6000
PO Box 8779, Perth Business Centre, W.A., 6849
Telephone: (08) 9328 6411
Facsimile: (08) 9328 4062
Website: www.burgessdesigngroup.com.au
Email: reception@burgessdesigngroup.com.au

Project Planner: Mark Szabo
Job code: ALO JUR
File reference: 190510RLGA_Development Application v2
Revision No: 1

Quality Assurance

Issue/Version:	Date:	Author:	Reviewer:
1	20/07/17	Zarina MacDonald	Mark Szabo
2	8/05/19	Zarina MacDonald	Mark Szabo

TABLE OF CONTENTS

1.	INTRODUCTION	5
1.1	ABBREVIATIONS	5
2.	SITE DESCRIPTION/DETAILS.....	6
2.1	LEGAL DESCRIPTION, RESTRICTIONS AND ENCUMBRANCES	6
2.2	LOCATION	6
2.3	EXISTING AND HISTORICAL USE AND DEVELOPMENT	6
2.3.1	Previous planning approvals.....	6
2.4	SURROUNDING LAND USE AND DEVELOPMENT.....	6
3.	SITE ANALYSIS	9
3.1	TOPOGRAPHY	9
3.2	GEOTECHNICAL	9
3.2.1	Soil contamination.....	9
3.3	HYDROLOGY.....	9
3.3.1	Groundwater	9
3.3.2	Groundwater contamination.....	9
3.3.3	Surface water.....	9
3.4	BUSHFIRE PRONE AREA	10
4.	PLANNING FRAMEWORK	10
4.1	STRATEGIC FRAMEWORK.....	10
4.1.1	Shire of Dandaragan Jurien Bay Town Centre Strategy (2012).....	10
4.2	STATUTORY FRAMEWORK	10
4.2.1	Shire of Dandaragan Local Planning Scheme No.7	10
4.3	LOCAL DEVELOPMENT PLAN FOR LOT 62 ROBERTS STREET, JURIEN BAY	11
4.4	WAPC GUIDING POLICIES.....	13
4.4.1	WAPC State Planning Policy No.2.6 State Coastal Planning Policy	13
4.4.2	WAPC Planning for Tourism - Planning Bulletin 83-2013	14
4.4.3	Residential Design Codes (R-codes).....	14
5.	PROPOSED DEVELOPMENT	15
5.1	LAND USE	15
5.1.1	Land use permissibility	15
5.2	SITE AND BUILDING LAYOUT	16
5.2.1	Short stay and permanent units	17
5.3	BUILDING HEIGHT.....	18
5.4	SETBACKS.....	18
5.5	BUILDING FORM, COLOURS AND MATERIALS	19
5.5.1	Colours and materials.....	19
5.5.2	Overlooking and visual privacy	19
5.5.3	Environmentally sensitive design	19
5.6	COASTAL HAZARD RISK MANAGEMENT & ADAPTATION PLAN	19
5.7	LANDSCAPING	20
5.8	CAR PARKING	20
	Commercial car parking	20
	Short term residential parking	22
6.	TRAFFIC AND TRANSPORT.....	23
6.1	FUTURE ROAD NETWORK	23
6.2	PUBLIC TRANSPORT NETWORK	23
6.3	SCHEDULE 4 - SPECIAL USE ZONES	24
7.	TERM OF DEVELOPMENT APPROVAL.....	28
8.	CONCLUSION	29

LIST OF PLANS

DA01	Location Plan	DA18	Block E Plans
DA02	Level B Carpark	DA19	Block F Plans
DA03	Level G Carpark	DA20	Block G Plans
DA04	Rev A Level 1	DA21	Block G Plans
DA05	Level Roof	DA22	Block G Plans
DA06	Block A Plans	DA23A	Block H Plans
DA07	Block A Plans	DA3B	Block H Plans
DA08	Block A Plans	DA24	Site Section AA
DA09	Block A Plans	DA25	Site Section BB
DA10	Block A Plans	DA26	Site Elevation
DA11	Block B Plans	DA27	Site Elevation
DA12	Block B Plans	DA28	Site Elevation
DA13	Block B Plans	DA29	Site Elevation
DA14	Block B Plans	DA30	Context Plan
DA15	Block C Plans	DA31	Context Elevations
DA16	Block C Plans	DA32	Sight Line Study 1
DA17	Block D Plans	DA33	Sight Line Study 1

LIST OF FIGURES

Figure 1	Location Plan
Figure 2	Aerial Photograph
Figure 3	Local Planning Scheme No.7 Map

LIST OF TABLES

Table 1	R-codes car parking standards
Table 2	Building Height
Table 3	Setbacks
Table 4	Plot ratio
Table 5	Commercial car parking
Table 6	Residential car parking
Table 7	Long term (permanent) residential parking
Table 8	Short term residential parking
Table 9	Bicycle Racks/Bus Bays
Table 10	Schedule 4 - Special Use Zones

LIST OF APPENDICES

Appendix 1	Certificate of Title and Survey Plans
Appendix 2	Landscape Concept Report
Appendix 3	Environmental Sensitive Design Review
Appendix 4	Coastal Hazard Risk Management and Adaptation Plan

1. INTRODUCTION

Burgess Design Group has been appointed by Aliceville Holdings Pty Ltd, the registered landowners of Lot 62 (No.20) Roberts Street, Jurien Bay, for the provision of town planning consultancy services associated with the preparation of a Development Application and the coordination of statutory approvals for the proposed mixed-use tourism development at Lot 62 (No.20) Roberts Street, Jurien Bay and the adjoining south west portion (910m²) of Heaton Street Road Reserve (subject 'land' or 'site').

The enclosed Development Application has been prepared by Burgess Design Group, in collaboration with specialist consultants, who have provided technical input in relation to matters as follows:

Scanlan Architects	Architectural Plans
AECOM	Landscape Concept Report & ESD Review

The application proposes the development of a mixed-use tourism development, comprising commercial and hospitality as well as short stay and permanent accommodation. The following report provides an overview of the site characteristics, the local and regional context, findings of preliminary technical investigations and explains the rationale of the Development Application design and the statutory framework that will guide its implementation.

1.1 ABBREVIATIONS

Abbreviations used in this report are summarised below for ease of reference:

JDAP	Joint Development Assessment Panel
LDP	Local Development Plan
LPP 8.7	Local Planning Policy 8.7 – Car Parking
LPS7	Shire of Dandaragan Local Planning Scheme No.7
SPP 2.6	State Planning Policy No.2.6
SU4	Special Use No.4
WAPC	Western Australian Planning Commission

2. SITE DESCRIPTION/DETAILS

2.1 LEGAL DESCRIPTION, RESTRICTIONS AND ENCUMBRANCES

The subject site incorporates Lot 62 Roberts Street, Jurien Bay, and adjoining south west (910m²) portion of the Heaton Street Road Reserve. The realignment of Heaton Street will require land swap negotiations to be entered into with a road closure process to be initiated by the Shire.

Lot 62 is registered in the ownership of Aliceville Holdings Pty Ltd.

The site is formally described as:

- Lot 62 on Deposited Plan 207149, Volume 1499, Folio 123.

There is one (1) restrictions and/or encumbrances registered on the Title. Refer to **Appendix 1 – Certificate of Title and Survey Plans**.

The total area of the subject site is approximately 2.199ha.

2.2 LOCATION

The subject site is located within the central Jurien Bay town site, approximately 200km north west of Perth (refer **Figure 1 – Location Plan**). The site is bounded by Roberts Street to the south west, Heaton Street to the north west, Sandpiper Street to the south east and Lot 63 Heaton Street to the north east (refer **Figure 2 – Aerial Photograph**).

The subject site is located less than 2km from Jurien Bay airport, and within 250m of Indian Ocean Drive, being the main road to Perth. The site has a good aspect and outlook, situated within the Jurien Bay Commercial Centre and immediately adjacent to the Jurien Bay Foreshore. **Figure 1 – Location Plan** depicts the location of the site.

2.3 EXISTING AND HISTORICAL USE AND DEVELOPMENT

The subject site is predominantly vacant with limited existing vegetation. There are currently two buildings on site that are degraded and not currently in use. These buildings will be demolished/removed.

2.3.1 Previous planning approvals

The Shire of Dandaragan has previously granted planning approval for a proposed mixed-use tourism development on 20 January 2012. This planning approval was not enacted due to various conditions of approval, including the requirement for a scheme amendment to be prepared and adopted by Council prior to issue of a building licence. In this regard, the approval has since lapsed and a new approval is required for development to proceed.

2.4 SURROUNDING LAND USE AND DEVELOPMENT

Surrounding land uses are predominantly tourist and commercial activities, including:

- Jurien Bay Commercial Town Centre located immediately east of subject site;
- Jurien Bay Foreshore and small café located immediately west of the site; and,
- Jurien Bay Tourist Park located directly to the southwest of the site.



FIGURE 1

**LOCATION PLAN
 LOT 62 ROBERTS STREET &
 PART OF HEATON STREET ROAD RESERVE
 JURIEN BAY**



NORTH



SCALE 1:10,000 (A4)



FIGURE 2



NORTH



SCALE 1:2000 (A4)

**AERIAL PHOTO
LOT 62 ROBERTS STREET &
PART OF HEATON STREET ROAD RESERVE
JURIEN BAY**

3. SITE ANALYSIS

3.1 TOPOGRAPHY

The topography of the site is generally flat with an elevation to approximately 2.5m Australian Height datum (AHD) (refer **DA01 – Location Plan/Existing Site Survey**).

3.2 GEOTECHNICAL

3.2.1 Soil contamination

The subject site has been classified as ‘contaminated - remediation required’ under the Contaminated Sites Act 2003. A detailed site investigation in March 2004 identified hydrocarbons and heavy metals in soil at concentrations exceeding Ecological Investigation Levels (EILs). The hydrocarbon concentrations also exceeded Health Investigation Levels for residential uses as well as commercial/industrial land uses.

Action required

The Basic Summary of Record specifies that:

‘Groundwater investigations are required to fully delineate the lateral extent of groundwater contamination beneath the site and off-site beneath the Dobbyn Park to west of the site. The off-site investigation should be completed no later than 30 November 2012.

As remediation of the site is required, remedial options must be assessed and a remediation action plan developed for the site.

Investigations are required to determine the nature and extent of asbestos impacts at the site. Investigations should be carried out in accordance with the ‘Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia’ (Department of Health, May 2009).’

3.3 HYDROLOGY

3.3.1 Groundwater

Groundwater has been measured at between 1.5 - 2.2m below ground level (BGL).

3.3.2 Groundwater contamination

The site has a history of activities and land uses which have generated contamination in groundwater.

3.3.3 Surface water

There are no natural surface water bodies or drains on or marginal to the site. A constructed drain basin is located on the beach side of the Café at the caravan park.

3.4 Bushfire prone area

The subject site is not a designated Bushfire Prone Area.

4. PLANNING FRAMEWORK

Outlined below is a summary of the relevant strategic and statutory documents that guide the use and development of the site and/or support the development of the land for urban purposes.

4.1 STRATEGIC FRAMEWORK

4.1.1 Shire of Dandaragan Jurien Bay Town Centre Strategy (2012)

This strategy aims to provide a clear direction for future development and management within the Jurien Bay Town Centre.

The relevant aims of the strategy are:

“A vision (and possible theme) for the town centre of Jurien Bay looking forward 10-15 years.

Where future commercial, tourist, medium density residential and mixed use development should occur based on physical, social and environmental considerations.

Appropriate scale and density of development (residential, commercial, tourist) to achieve a sustainable economic benefit, whilst enhancing the quality of wellbeing lifestyle and services for the broader community.

Consolidation of land use and establish a framework to deliver a more integrated, sustainable, and functional town centre environment.”

4.2 STATUTORY FRAMEWORK

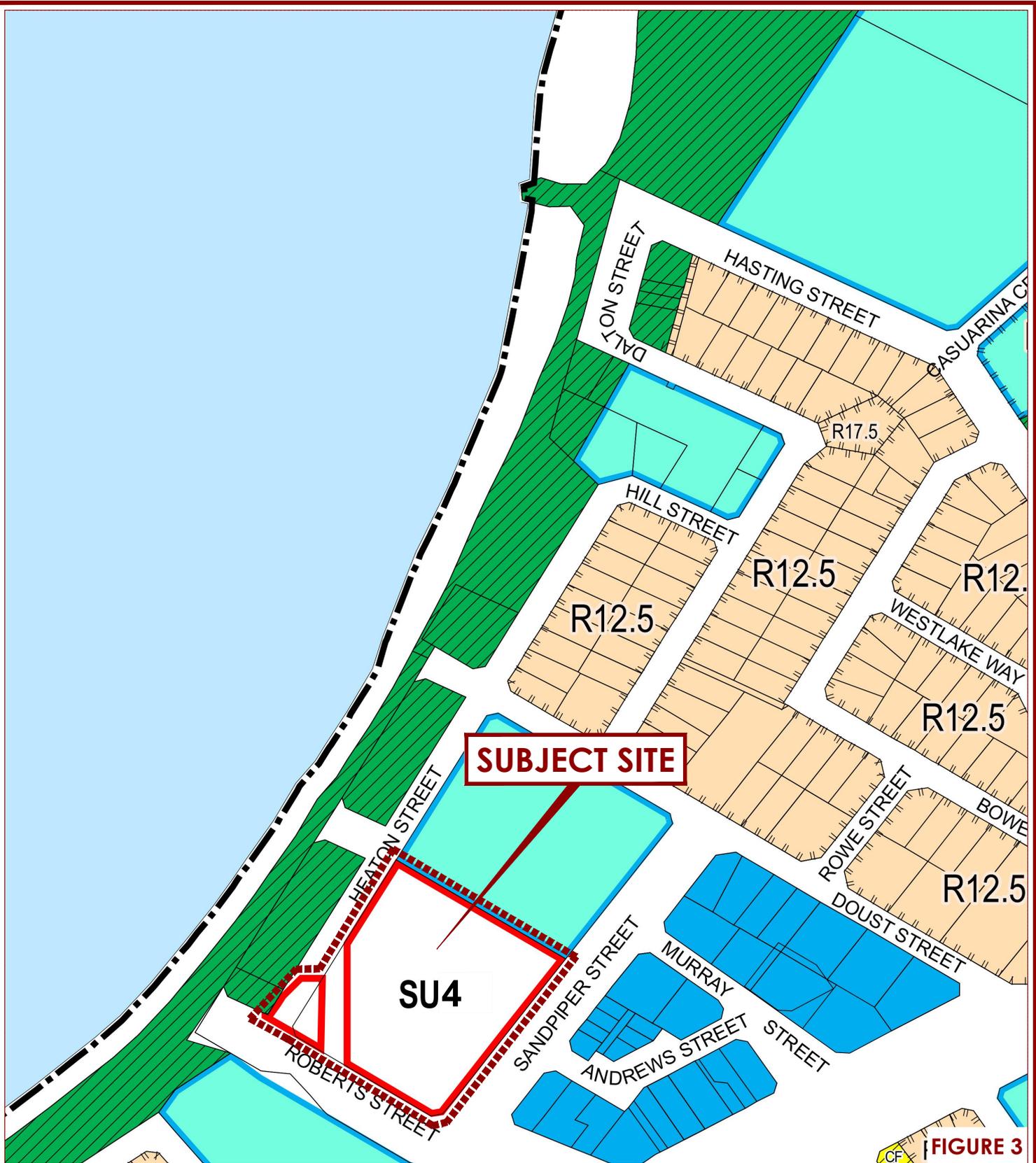
4.2.1 Shire of Dandaragan Local Planning Scheme No.7

The majority of the site is zoned ‘Special Use No.4 – Tourist Resort’ under the Shire of Dandaragan Local Planning Scheme No.7 (LPS7), with a portion of Lot 62 Roberts Street reserved as ‘Local Road’ (refer **Figure 3 – LPS7 Map**).

Pursuant to clause 3.7.2 ‘a person must not use any land, or any structure or buildings on land, in a special use zone except for the purpose set out against that land in Schedule 4 and subject to compliance with any conditions set out in Schedule 4 with respect to that land.’

4.3 LOCAL DEVELOPMENT PLAN FOR LOT 62 ROBERTS STREET, JURIEN BAY

The Local Development Plan (LDP) has been approved by the Shire of Dandaragan. As such, the proposed development must comply with the development standards specified in the LDP. An assessment against the LDP is provided in Section 5 of this report.



CF | **FIGURE 3**

LEGEND

Subject Land

LOCAL SCHEME RESERVES

Commercial

Tourist

Parks & Recreation

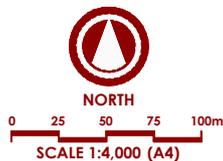
OTHER

Scheme Boundary

Local Government Boundary

Special Use

Townsite - Land Act



**LOCAL PLANNING SCHEME NO.7
LOT 62 ROBERTS STREET &
PART OF HEATON STREET ROAD RESERVE
JURIEN BAY**

Planner: MS
Client: Carl Aloi

Date: 15.06.18
Plan No: ALO JUR 7-02-03

SHIRE OF DANDARAGAN

4.4 WAPC GUIDING POLICIES

4.4.1 WAPC State Planning Policy No.2.6 State Coastal Planning Policy

State Planning Policy No.2.6 (SPP 2.6) provides guidance for land use and development decision-making within the coastal zone including managing development and land use change; establishment of coastal foreshore reserves; and to protect, conserve and enhance coastal values.

SPP 2.6 has specific measures that relate to tourism development as follows;

5.1 General Measures

(i) Local and regional planning strategies, structure plans, schemes, subdivisions, strata subdivision, development applications, coastal planning strategies and foreshore management plans, as well as other planning decisions and instruments relating to the coast should comply with the policy measures.

5.2 Development and Settlement

(iii) Ensure that when identifying areas suitable for development, consideration is given to strategic sites for coastal access and commercial development that is demonstrably dependent on a foreshore location including ports, boat harbours and regional boat ramps.

(iv) Ensure that use of the coast, including the marine environment, for recreation, conservation, tourism, commerce, industry, housing, ocean access and other appropriate activities, is sustainable and located in suitable areas.

(v) Ensure that land use and development, including roads, adjacent to the coast is sited and designed to complement and enhance the coastal environment in terms of its visual, amenity, social and ecological values.

5.4 Building Height Limits

Maximum height limits should be specified as part of controls outlined in a local planning scheme and/or structure plan, in order to achieve outcomes which respond to the desired character, built form and amenity of the locality.

5.10 Coastal Strategies and Management Plans

Any structure plan, zoning, subdivision, strata subdivision or development proposal for public purposes, residential, industrial, commercial, tourist, special rural and similar uses on the coast is only approved based on or in conjunction with a current detailed coastal planning strategy or foreshore management plan (whichever is appropriate for the stage and scale of development).

4.4.2 WAPC Planning for Tourism - Planning Bulletin 83-2013

WAPC Planning for Tourism - Planning Bulletin 83-2013 guides decision making by the WAPC and local government for subdivision, development and scheme amendment proposals for tourism purposes.

The objectives of the policy are as follows:

- Highlight the importance of strategic planning for tourism.
- Recognise local and regional variations in tourism demand and development pressures; and their impacts on the viability of tourism development, in assessing and determining tourism proposals.
- Provide guidance to local government in planning for tourism development to be undertaken as part of the local planning strategy process.
- Provide guidance on the development of non-tourism uses on tourism sites.
- Provide for flexibility in the design and assessment of tourism and mixed use development.

The policy seeks to identify tourism precincts, localities of tourism value or amenity that incorporate the 5 A's into tourism development (these being attractions, accommodation, access, amenities, and activities).

4.4.3 Residential Design Codes (R-codes)

The Residential Design Codes apply to the residential component of the proposed development. The R-codes stipulate that residential elements of mixed-use development within non R-Coded land is to be assessed against R-AC3 provisions, unless varied in the Scheme or Local Development Plan.

Car parking standards

The R-codes specify the following minimum number of on-site car parking spaces is to be provided for dwelling comprising the following number of bedrooms:

Table 1: R-codes car parking standards	
Type of dwelling	Car parking spaces
1 bedroom dwelling	1
2 + bedroom dwelling	2

5. PROPOSED DEVELOPMENT

This application seeks the approval of a mixed-use tourism development comprising; a hotel, motel, retail and other commercial activities, 171 short stay units (inclusive of hotel and motel units) and 122 permanent residential units, and car parking.

The proposed development as indicated on the submitted plans will comprise:

Building A

Tavern, restaurant, function facility, and 79 short stay and permanent residences

Building B

Retail shops, day spa, amenities, and 45 short stay and permanent residences

Building C

Retail shops, offices, health club, cinema and 8 short stay and permanent residences

Building D

Retail shops and motel (36 motel rooms)

Building E

Reception, sales and 9 short stay residences

Building F

4 x permanent (terrace style) residences

Building G

Retail shops and 19 permanent residences

Building H

Hotel (consisting of 93 rooms, lobby and reception, restaurant and bar/terrace)

5.1 LAND USE

5.1.1 Land use permissibility

The proposed development includes the following uses:

- Hotel - 'P' permitted;
- Tourist resort - 'P' permitted;
- Motel - 'P' permitted;
- Serviced apartment - 'P' permitted;
- Restaurant - 'P' permitted;
- Cinema/theatre - 'P' permitted;
- Grouped Dwelling - 'P' permitted;

- Multiple Dwelling- 'P' permitted;
- Office - 'P' permitted;
- Reception Centre - 'D' discretionary land use.

All proposed uses can be considered and approved by Council under LPS7 Schedule 4 – Special Use Zone No.4.

5.2 SITE AND BUILDING LAYOUT

Building A

Building A is located in the centre of the site, with frontage to Roberts Street and the realigned Heaton Street.

Building A is 11 storeys in height and is comprised of a total of 79 residential units, 13 of which are for short stay accommodation on Levels 1 and 2. Above this are the remaining 66 permanent residential units. Level 1 of Building A also contains a lobby, three (3) function rooms, and restaurant (refer **DA06 - DA10**).

Building B

Building B is sited between Building A and Building F and fronts the adjacent Seafront Estate development.

Building B is 7 storeys high and accommodates a total of 45 residential units, comprising 16 short stay residential dwellings on Ground Level, and Levels 1 and 2, and a further 29 permanent dwellings above (refer **DA11 - DA14**).

Level 1 Building B will comprise a day spa with therapy rooms, associated change facilities and small private gardens and pools. The spa is accessed from Level 1 and will be available for use by the public as well as hotel patrons and residents.

Building C

Building C is located in the southern corner of the site with frontage to both Roberts Street and Sandpiper Street.

Building C is 4 storeys high and contains 8 retail tenancies and a ticket office at Ground Level, and 5 office tenancies and a health club at Level 1.

Levels 2 and 3 comprise a total of 8 residential units (4 short stay dwellings and 4 permanent) (refer **DA15 & DA16**).

Building D

Building D sited on the eastern boundary with frontage to Sandpiper Street. Building D is 4 storeys high and comprises 36 motel rooms (classified as short stay units) and 1 retail space (refer **DA17**).

Building E

Building E is located near the north eastern corner of the site and is the reception and administration/housekeeping centre for short stay tenancies and the resort. Building E is 4 storeys high and comprises a 2 office tenancies and staff room at Ground Level.

Levels 1-3 of Building E comprise 9 short stay residential units (refer **DA18**).

Building F

Building F is located near the northern site boundary and fronts the adjacent Seafront Estate. Building F is 2 storeys high and comprises 4 permanent town house dwellings each with ground level courtyards and terraces fronting the pedestrian access way (refer **DA19**).

Building G

Building G is located near the north western site boundary with frontage to Heaton Street. Building G has a building height of 5 storeys.

Ground level comprises 11 retail tenancies, and 2 permanent residential dwellings, each with private courtyards. Levels 1-4 comprise a total of 17 permanent dwellings (refer **DA20 - DA22**).

Building H

Building H is located on the portion of the site divided by the realignment of Heaton Street (the western portion).

Building H is a 6 storey hotel development and comprises 93 hotel rooms (classified as short stay).

A restaurant and lounge/bar are proposed at Ground Level fronting Jurien Bay.

At the roof level, recreation facilities including a small gym and pool will be provided for exclusive use of hotel patrons (refer **DA23A - DA23B**).

5.2.1 Short stay and permanent units

LPS7 Schedule 4 – SU4 Condition 8 stipulates:

‘Any proposed ‘Hotel’ or ‘Motel’ on the land shall provide 100% short-stay accommodation. For all accommodation units proposed on the land, the maximum proportion of permanent residential units relative to the total number of short stay units on the site shall be equal to or less than 45%.’

This application proposes a total of 293 accommodation units, comprising; 122 permanent units, 42 short stay residential units, 36 motel rooms, and 93 hotel rooms.

The majority of the short stay units are located on levels 1 and 2 and permanent residential units above.

The proposed motel (Building D) and hotel rooms (Building H) are 100% short stay accommodation. The overall proportion of permanent residential units is 41.64%, and 58.36% short stay units. In this regard, the proposed percentage of permanent residential dwelling is consistent with the LPS7 condition and LDP provision.

Dwelling density

Dwelling density is calculated based on permanent residential dwellings only. The application proposes 122 permanent dwellings over a site area of 2.1979 hectares. This equates to a site area per dwelling of 180m², or an R-Code of approximately R50/R60.

5.3 BUILDING HEIGHT

The LDP specifies a range of possible building heights from 2 to 5 storeys adjacent to Roberts and Sandpiper Streets, and Seafront Estate; and 5 to 11 storeys in the centre of the site and towards Heaton Street.

No structure shall exceed 40 metres in height measured from natural ground level, unless it forms part of any telecommunications infrastructure.

All proposed building heights are consistent with the Local Development Plan (LDP) – Building Height Plan.

Table 2: Building height

Building	Height (storey)
A	11
B	7 (above podium level)
C	4
D	4
E	4
F	2
G	5
H	7

5.4 SETBACKS

Table 3: Setbacks

Boundary	Setback
Roberts Street	Nil
Heaton Street; North of Building A	Nil
Realigned road reserve	Nil
Class A reserve	Nil
Sandpiper Street	Nil
North East boundary	4.5 (public access way)

LPS7 and the LDP do not prescribe setbacks for the site. As such, Council has discretion to approve the development as proposed.

5.5 BUILDING FORM, COLOURS AND MATERIALS

The proposed buildings display modern and attractive architecture, comprising a contemporary character and mix of building materials and colours which combine to form an interesting and significant local presence.

The proposed development has been designed with an appropriate level of articulation to reduce the building bulk. Taller buildings are located towards the centre of the site to reduce their scale and maintain the pedestrian scale of the surrounding streets.

5.5.1 Colours and materials

The colours and materials are reflective of the sites local context and climate, and influenced by similar international coastal developments. Materials include; concrete, jarrah and timber, stone, limewash renders, and large format pavers. Colours include; whites, greens, limes (refer **Appendix 2 –Landscape Concept Report**). A more detailed schedule of external materials and colour schemes shall be submitted to the Shire of Dandaragan, prior to the approval of a building permit application.

5.5.2 Overlooking and visual privacy

The proposed development is compliant with the LDP and R-codes, with the bulk of the development overlooking internal public spaces and external streets. Active retail and other commercial frontages are incorporated into the development to ensure a suitable level of passive surveillance of the public domain, and all buildings are designed with windows or balconies facing the street.

Building F is the nearest and only building that overlooks adjoining private property. The proposed development does not directly impact the adjacent private property as there is a proposed public accessway that provides adequate separation between the proposed building and the adjacent development. Balconies on Building F overlook the public accessway for passive surveillance and provide visual relief to the building. The setback to the boundary level varies between 4.5m and 7.5m. Buildings are angled to ensure there is no direct sight line into the adjoining private spaces. Proposed balconies are not expected to be the primary outdoor space area, with ground level courtyards providing this amenity. As such, the proposed development is compliant with the R-code design principles.

5.5.3 Environmentally sensitive design

The proposed development design is environmentally sensitive. Buildings are oriented between 18° east of north to promote morning winter solar gain, and have a longer north-south façade and short east-west façade. (Refer **Appendix 3 – Environmental Sensitive Design Report**).

5.6 COASTAL HAZARD RISK MANAGEMENT & ADAPTATION PLAN

LPS7 Condition 6 of Special Use Zone 4 states the following:

‘Prior to approval of development on the site, a Coastal Hazard Risk Management and Adaptation Plan (CHRMAP) is to be prepared in accordance with State Planning Policy 2.6: State Coastal Planning Policy and approved by the local government. The CHRMAP

should include but not be limited to consideration of inundation, erosion, finished floor levels, setbacks and drainage. Recommended management and adaptation actions are to be implemented at timings indicated within the approved implementation plan.'

A CHRMAP has been prepared by M P Rogers and Associates in accordance with the above condition. At an Ordinary Council Meeting held on 28 February 2019 Council granted final approval to the Coastal Hazard Risk Management and Adaptation Plan (Doc Id: 128533) (Refer **Appendix 4 – CHRMAP**). In this regard, the proposed development complies with this condition.

5.7 LANDSCAPING

A Landscape Concept Report has been prepared by AECOM (Refer **Appendix 2 –Landscape Concept Report**). This report establishes a landscape design appropriate to the site.

5.8 CAR PARKING

LPS7 and Local Planning Policy 8.7 – Car Parking (LPP 8.7) specify parking requirements for various non-residential land uses. The following table is an assessment of car parking at the rates required under LPS7 and LPP 8.7.

Notwithstanding the requirements of LPS7 and LPP 8.7, this application proposes a reduced provision of overall car bays based on reciprocal parking arrangements.

Commercial car parking

Table 5: Commercial car parking

Land Use	LPS7/LPP 8.7 Requirement	Required – Non-Adjusted	Proposed
Office	1 for every 20m ² NLA <i>Area: 505.77m²</i>	25	194
Health Club	1 bay for 45m ² GFA (including swimming pools) <i>Area: 313.21m²</i>	7	
Retail (Shop)	1 for every 20m ² of gross lettable area <i>Area: 2,358.8m²</i>	118	
Restaurant	1 for every 10m ² of gross lettable area or 1 for every 4 seats provided, whichever is the greater <i>Area: 1,292m²</i>	129	
Cinema/Theatre	1 bay per every 4 seats plus 1 bay for each employee	Internal fit-out TBC	

Hotel/Tavern	1 bay for every bedroom plus 2 bays for 25m ² of bar and public area plus 1 bay for 2 every employees	93	50
Motel	1 bay for each unit plus 3 bays for 25m ² of service area	36	25
Total		408	269

There is a shortfall of 139 commercial car parking bays. This calculation, however, does not consider reciprocal car parking, on-site usage, and the site's proximity to the town centre that substantially reduces the amount of commercial parking required.

A reciprocal parking arrangement is proposed based on generally accepted occupancy rates of hotels that operate around 65% (yearly averages) and based on the acceptance that a number of guests arrive by coach or other means generally in the order of 30-40%. It is anticipated that 15% to 20% of permanent residents within the complex will use the facilities on a daily basis, representing approximately 20% to 50% of the potential patronage of the various premises. Furthermore, a significant number of patrons frequenting the retail outlets, restaurant and bar facilities, will be either on-site apartment owners or short term tenants, who will not require an additional commercial car bay. In this regard, the proposed 269 car bays on site are considered sufficient to cater for the commercial uses and that there is no shortage of vehicle parking.

Residential car parking

LPS7 stipulates car parking for multiple dwellings is to be provided in accordance with the Residential Design Codes (R-codes).

Total number of residential car bays required by the R-codes is as follows:

Table 6: Residential car parking

Type of dwelling	R-codes/ LPP 8.7 Ratio	No. of units	Required	Proposed
Permanent residential (2 + bedroom dwelling)	2 bays per apartment/ dwelling	122	244	
Short stay residential (Tourist Accommodation)	1 bay for each accommodation unit	42 (excludes motel and hotel units)	42	
Total		164	286	235

There is a shortfall 51 car bays. However, the R-Codes are intended for single and multiple residential developments located in largely residential areas. The R-codes state that consideration may be given to a reduction in the minimum number of on-site car parking spaces provided that available street parking in the vicinity is controlled by the local government. Given that the proposed residential dwellings will be located within the tourism complex, in close proximity to the existing town centre, and additional parking is available off-site, the need for private vehicle parking is reduced. Moreover, two (2) car bays will not be required for every one and two bed apartments as it is expected that the majority of apartment owners and occupants will only utilise one (1) car whilst in Jurien Bay (holiday homes/weekenders). In this regard, the proposed residential parking allocation is considered to comply with the R-codes performance criteria.

A revised car parking calculation is provided in Table 7 below that allocates one (1) car bay for 1 or 2 bed apartments, and two (2) car bays for every 3 bedroom, 4 bedroom and penthouse apartment.

Table 7: Permanent residential parking

No. of Apartments	Ratio	Proposed
86 x 1 & 2 bedroom apartments	1 bay per apartment	86
36 x 3 bedrooms or more apartments (includes penthouse apartments)	2 bays per apartment	72
Total: 122 permanent units		158

Short term residential parking

A revised car parking calculation is provided in Table 8 below:

Table 8: Short stay residential parking

No. of Apartments	Ratio	Proposed
7 x 1 bedroom apartments	1 bay per apartment	7
31 x 2 bedroom apartments	1 bay per apartment	31
3 x 3 bedroom apartments	2 bays per apartment	6
1 x penthouse apartments	2 bays per apartment	2
Total: 42 short stay units		46

Based on the revised car parking calculations above the total number of residential car bays required is 204 car bays. Given that the proposal provides 235 residential car bays, 31 of the one and two bedroom apartments can be allocated 2 bays instead of 1 bay.

Therefore the long term residential car parking based on the proposal reflects:

- 100% of the 3 bed/4 bed/penthouses have two (2) car bays each
- 75% of all 1 and 2 bed room apartments have one (1) car bays each
- 25% of all 1 and 2 bed room apartments have two (2) car bays each

6. TRAFFIC AND TRANSPORT

6.1 FUTURE ROAD NETWORK

The surrounding road network is proposed to be modified in accordance with the Jurien Bay Foreshore Redevelopment Master Plan. Modifications and upgrades that will be undertaken based on recommendations of this document will include:

- Realignment of Heaton Street with an increase in the provision of on street parking;
- Improvement of bicycle and pedestrian access and facilities.

The subject site is proposed to be connected to the local network by a number of new access points on Sandpiper Street and Heaton Street; the location of the access points is considered suitable and will not result in unacceptable impacts. The site layout is shown in **DA03 - Site Plan**.

6.2 PUBLIC TRANSPORT NETWORK

No public transport service operates within the Jurien Bay town site as such provisions for bus routes through the development are not considered necessary. However, 2 bus bays have been provided for tour buses.

Table 9: Bicycle Racks/Bus Bays

Land Use	Bicycle racks ratio	Required	Bus bays ratio	Required
Office/Health Club	1 rack for 200m ² GFA	1,030m ² /5=5.15	-	-
Retail (Shop)	1 rack for 200m ² GFA	2,358.8m ² =11.794	-	-
Restaurant	Nil	-	-	-
Hotel	1 rack for 75 m ² of bar and public area		1 bay for every 75 beds	1
Motel	Nil	-	1 bay for every 100 beds	Nil
Permanent Residential	R-codes C3.2 'one bicycle space to each three dwellings for residents; and one bicycle space to each ten dwellings for visitors, designed in accordance with AS2890.3 (as amended).'	121/3=40.33 121/10=12.1 Total =52.43	-	-
Short stay residential (Tourist Accommodation)	2 racks at reception area	2	-	-
TOTAL		71		1

6.3 SCHEDULE 4 - SPECIAL USE ZONES

An assessment of the proposal against LPS7 Schedule 4, SU4 conditions is provided in the table below.

Table 10: Schedule 4 - Special Use Zones

NO	DESCRIPTION OF LAND	CONDITIONS	COMMENT
4.	Lot 62 (No.20) Roberts Street and a portion of the Heaton Street road reserve, Jurien Bay as designated on the Scheme Map.	1. Prior to the submission of an application for development approval, a Local Development Plan (LDP) for the land is to be prepared and approved by the local government.	The Shire of Dandaragan approved an LDP in 2018.
		2. Development of the land shall be in accordance with a LDP adopted by the local government.	The proposed development is consistent with the provisions of the LDP.
		3. All development on the land (including change of use) shall be subject to an application to the local government for approval to commence development unless specifically exempted in an approved LDP.	This application seeks planning approval from the JDAP and the Shire of Dandaragan.
		4. All development on the land shall be connected to a reticulated water supply and sewerage system.	The proposed development will be connected to reticulated water supply and sewerage system. Details can be provided at building permit stage.
		5. Prior to the commencement of development the site is to be remediated to the extent required for its intended use.	The site will be remediated for the proposed use prior to the commencement of development.
		6. Prior to approval of development on the site, a Coastal Hazard Risk Management and Adaptation Plan (CHRMAP) is to be prepared in accordance with <i>State Planning Policy 2.6: State Coastal Planning Policy</i> and approved by the local government.	A CHRMAP has been prepared and supported by the Shire of Dandaragan. Refer to Appendix 4 for complete report.
		7. The only permitted land use on the portion of the site divided by the realignment of Heaton Street (the western portion) is a 'Hotel' and associated ancillary uses.	The proposal complies with this condition.
		8. Any proposed 'Hotel' or 'Motel' on the land shall provide 100% short-stay accommodation. For all accommodation units proposed on the land, the maximum proportion of permanent residential units relative to the total number of short	The proposed development complies with this condition. Refer to Section 5.2.1.

	<p>stay units on the site shall be equal to or less than 45%.</p>	
	<p>9. Any residential unit for use for permanent occupation must:</p> <ul style="list-style-type: none"> (i) form part of a mixed use development proposal; (ii) form an integrated component of the tourist complex in terms of the type, style and character and the landscaping of the building; (iii) shall be in a concentrated area located to provide a transition between tourism development and surrounding residential uses; (iv) be provided with recreation and amenity facilities; and (v) shall be designed to enable management and use on an integrated basis with the overall tourist resort. 	<p>The proposed permanent residential units are integrated into the mixed use development. There are permanent units in various buildings.</p>
	<p>10. Prior to the commencement of the hotel development the closure, realignment and land transfers of a portion of the Heaton Street road reserve must be finalised to the satisfaction of the local government.</p>	<p>The landowner agrees to the closure, realignment and land transfers of a portion of the Heaton Street reserve as a condition of planning approval.</p>
	<p>11. Prior to the commencement of development, the ceding of a minimum 11 metre wide street along the north east boundary of the land, providing a connection between Heaton and Sandpiper Streets, is to be completed to the satisfaction of the local government.</p>	<p>The landowner agrees to the ceding of a minimum 11 metre wide street along the north east boundary of the land.</p>
	<p>12. No structure shall exceed 40 metres in height measured from natural ground level, unless it forms part of the telecommunications infrastructure, and the height of individual structures will be in accordance with an approved LDP.</p>	
	<p>13. Subdivision of the land will be limited to built or survey strata subdivision.</p>	<p>No subdivision is proposed as part of this application.</p>
	<p>14. A notification to the following effect is to be placed on the certificate(s) of title of any proposed lot(s) identified in the Coastal Hazard Risk Management and Adaptation Plan that may be affected by coastal hazards: <i>Vulnerable coastal</i></p>	<p>The landowner will place notifications on certificates of title following subdivision approval.</p>

		<p><i>area – This lot is located in an area likely to be subject to coastal erosion/inundation over the next 100 years.</i></p>	
		<p>15. For all short-stay accommodation a register of guests showing periods of occupancy is to be kept and made available to the local government on request in order to ensure compliance with the requirement to limit occupation to a maximum of three months in any 12-month period.</p>	<p>The landowner agrees to provide the Shire occupancy details on request.</p>
		<p>16. In accordance with Section 5C of the <i>Strata Titles Act (1985)</i> (as amended) a condition of any future built strata subdivision of tourist accommodation shall include the preparation and submission of a management statement and associated agreements for the local governments approval, that includes:</p> <ul style="list-style-type: none"> ▪ the establishment of a Schedule 1 by-law that requires, as a minimum, a unit management agreement, lease or alternative arrangement between each owner of a strata unit and the common facility manager/operator to provide for common management of all such units for a minimum period of 25 years as a tourist facility; ▪ the ability for a Strata Company to terminate a contract with the facility manager/operator at the end of a 5 year contract or lesser period based on performance criteria as determined by the Strata Company; ▪ the management agreement, lease or alternative shall cover but not be limited to letting agent (manager) arrangements, resort reception, access, security, maintenance, caretaking, refurbishment, marketing and other services reasonably required for the development to operate as a tourism facility; and ▪ any other additions the local government considers appropriate to ensure the 	<p>Noted.</p>

		ongoing sustainability of the proposal for tourism purposes	
<i>Note: The conditions in the table are summarized. Please refer to LPS7 for the exact conditions.</i>			

7. TERM OF DEVELOPMENT APPROVAL

The applicant is also seeking Council and JDAP support for a development approval period of 4 years. If the subject development is not substantially commenced within the 4 year period, the approval shall lapse and be of no further effect. Given the scale of the proposed development and time required to prepare all of the detailed building and engineering plans along with the extensive earthworks that will be required there is a concern that the proponent will not achieve substantial commencement within the standard 2 year development approval timeframe. As such, this application seeks an extended approval of 4 years to ensure that the approval will not lapse during the construction period.

8. CONCLUSION

Burgess Design Group, on behalf of the registered owners of Lot 62 Roberts Street, Jurien Bay, have prepared the preceding Development Application report to guide the development of a mixed-use tourism development and associated car parking.

The proposed development is generally consistent with Shire's Local Planning Scheme No.7, policy requirements and the Local Development Plan.

We hereby respectfully request the support of Shire's Planning Services in preparing a responsible authority report to the Joint Development Assessment Panel (JDAP).

APPENDIX 1:
Certificate of Title
and Survey Plans



REGISTER NUMBER 62/DP207149	
DUPLICATE EDITION 2	DATE DUPLICATE ISSUED 14/7/2004

RECORD OF CERTIFICATE OF TITLE
UNDER THE TRANSFER OF LAND ACT 1893

VOLUME **1499** FOLIO **123**

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.



REGISTRAR OF TITLES

LAND DESCRIPTION:

LOT 62 ON DEPOSITED PLAN 207149

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

ALICEVILLE PTY LTD OF 47 THE CRESCENT, MIDLAND

(TP 1925472) REGISTERED 21/6/2004

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:
(SECOND SCHEDULE)

- 1. *K969981 MEMORIAL. CONTAMINATED SITES ACT 2003 (CONTAMINATED SITE - REMEDIATION REQUIRED) REGISTERED 11/6/2009.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required.
* Any entries preceded by an asterisk may not appear on the current edition of the duplicate certificate of title.
Lot as described in the land description may be a lot or location.

-----END OF CERTIFICATE OF TITLE-----

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND: 1499-123 (62/DP207149)
 PREVIOUS TITLE: 1499-123
 PROPERTY STREET ADDRESS: 20 ROBERTS ST, JURIEN BAY.
 LOCAL GOVERNMENT AUTHORITY: SHIRE OF DANDARAGAN

NOTE 1: A000001A LAND PARCEL IDENTIFIER OF JURIEN BAY TOWN LOT/LOT 62 (OR THE PART THEREOF) ON SUPERSEDED PAPER CERTIFICATE OF TITLE CHANGED TO LOT 62 ON DEPOSITED PLAN 207149 ON 09-APR-02 TO ENABLE ISSUE OF A DIGITAL CERTIFICATE OF TITLE.

NOTE 2: THE ABOVE NOTE MAY NOT BE SHOWN ON THE SUPERSEDED PAPER CERTIFICATE OF TITLE OR ON THE CURRENT EDITION OF DUPLICATE CERTIFICATE OF TITLE.

(M)

LANDS	L.T.O.
Entered	Land
	Permit
	Lease
	Name



WESTERN AUSTRALIA



Crown Grant

1499 123 (S)

Page 1 (of 2 pages) 1499 123

Superseded - Copy for Sketch Only

Elizabeth the Second, by the Grace of God, Queen of Australia and Her other Realms and Territories, Head of the Commonwealth. To all to whom these Presents shall come, GREETING: Know ye that We, of Our especial Grace, certain knowledge, and mere motion, have given and granted, and We do by these Presents, for Us, Our heirs and successors, in consideration of the payment of the sum of \$25 000.00 and the fulfilment of the prescribed conditions to the satisfaction of Our Governor of Our State of Western Australia. Give and Grant unto

Fremantle Fishermens Co-operative Society Limited of care of Post Office Box 384 Fremantle

(hereinafter called the Grantee), the natural surface and so much of the land as is below the natural surface to a depth of 12.15 metres of ALL THAT Piece or Parcel of Land situate and being in the Town of Jurien in Our said State, containing 2.1979 hectares or less, and marked and distinguished in the Maps and Books of the Department of Lands and Surveys of Our said State as Jurien Tot 62

and as the same is delineated and coloured green in the plan drawn in the first schedule: TOGETHER with all Appurtenances thereunto belonging or in anywise appertaining: TO HAVE AND TO HOLD the said Piece or Parcel of Land to the depth aforesaid, and all and singular the Premises hereby granted, with their appurtenances, unto the Grantee, in fee simple: Yielding and Paying for the same to Us, Our heirs and successors, one peppercorn of yearly rent on the twenty-fifth day of March in each year, or so soon thereafter as the same shall be lawfully demanded: PROVIDED NEVERTHELESS that subject to section 141 of the Land Act, 1933, shall (at any time within twenty-one years from the date of these Presents) be lawful for Us, Our heirs and successors, or for any person or persons acting in that behalf by Our or their authority, to resume and enter upon possession of any part of the said Piece or Parcel of Land, which it may at any time by Us, Our heirs and successors, be deemed necessary to resume for roads, tramways, railways, and railway stations, canals, bridges, towing paths, harbour or river improvement works, drainage or irrigation works, quarries, and generally for any other works or purposes of public use, utility or convenience, and for the purpose of exercising the power to search for minerals hereinafter reserved, and such Land so resumed to hold to Us, Our heirs and successors as of Our or their former estate without making to the Grantee, or any person claiming under him, any compensation in respect thereof; so, nevertheless, that no such resumption be made without compensation of any part of the said Piece or Parcel of Land upon which any expenditure or improvements shall have been made by the said Grantee, or any person claiming under him; and We do hereby save and reserve to Us, Our heirs and successors, all Mines of Gold, Silver, Copper, Tin, or other Metals, Ore and Minerals, or other substances containing Metals, and all Gems or Precious Stones and Coal or Mineral Oil, and all Phosphatic Substances in or under the said Piece or Parcel of land hereby granted, with full liberty at all times to search and dig for and carry away the same; and for that purpose to enter upon the said Piece or Parcel of land or any part thereof; and we do hereby save and reserve to Us, Our heirs and successors all petroleum (as defined in the Petroleum Act, 1967 and all amendments thereof for the time being in force) on or below the surface of the said Land with the right reserved to Us, Our heirs and successors and persons authorised by Us, Our heirs and successors to have access to the said land for the purpose of searching for and for the operations of obtaining petroleum in any part of the said land subject to and in accordance with the provisions contained in the Petroleum Act, 1967, and all the amendments thereof for the time being in force.

IN WITNESS whereof We have caused Our trusty and well-beloved HIS EXCELLENCY AIR CHIEF MARSHAL SIR WALLACE KYLE, Knight Grand Cross of the Most Honourable Order of the Bath, Knight Commander of the Royal Victorian Order, Commander of the Most Excellent Order of the British Empire, Companion of the Distinguished Service Order, Distinguished Flying Cross, Knight of Grace of the Most Venerable Order of the Hospital of St. John of Jerusalem, Governor in and over the State of Western Australia and its Dependencies in the Commonwealth of Australia, to affix to these Presents the Public Seal of the said State.

Sealed this 4th day of April, One thousand nine hundred and eighty eight

Grant under the Land Act, 1933 as amended

Wallace Kyle
Governor

Jane Craig
Minister for Lands.

CERTIFICATE OF TITLE UNDER THE "TRANSFER OF LAND ACT, 1893" AS AMENDED

The abovenamed Grantee is now the registered proprietor of an estate in fee simple in all the land described in this Grant subject to the easements and encumbrances shown in the Second Schedule hereto.

DATED THE 27th DAY OF April 1978

Lundborough
REGISTRAR OF TITLES



The correct address of the registered proprietor is now 8 Ahoy Road, Spearwood.
By E225329. Registered 2nd November, 1989 at 9.40 hrs.



The correct address of the registered proprietor is now 8 Ahoy Road, Coogee.
By E943543. Dated 23rd July, 1992 at 10.06 hrs.



FOR FURTHER ENTRIES SEE PAGE 3 OF 4 PAGES

FOR ENCUMBRANCES AND OTHER MATTERS AFFECTING THE LAND SEE SECOND SCHEDULE

PERSONS ARE CAUTIONED AGAINST ALTERING OR ADDING TO THIS CERTIFICATE OR ANY NOTIFICATION HEREON

FIRST SCHEDULE

Superseded - Copy for Sketch Only

Area and measurements on the Plan hereon are more or less, and a peg has been placed at each corner of the lot.

All measurements in Metric Units

Scale: 1 : 2000

Survey: O.P. 7149

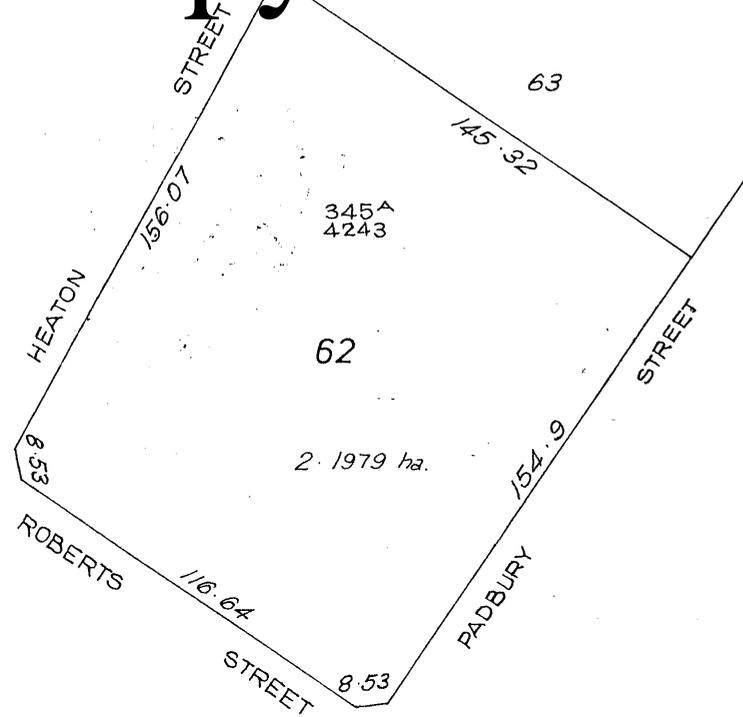
Surveyed: by R. B. Hawking

Corr: 390/57

Drawn: A. L. W.

Examined: *[Signature]*

John Morgan
SURVEYOR GENERAL.



SECOND SCHEDULE

NOTE: RULING THROUGH AND SEALING WITH THE OFFICE SEAL INDICATES THAT AN ENTRY NO LONGER HAS EFFECT. ENTRIES NOT RULED THROUGH MAY BE AFFECTED BY SUBSEQUENT ENDORSEMENTS.

INSTRUMENT		PARTICULARS	REGISTERED	TIME	SEAL	INITIALS	CANCELLATION	NUMBER	REGISTERED OR LODGED	SEAL	INITIALS
NATURE	NUMBER										
Mortgage	B524374	to The Commercial Bank of Australia Limited.	17.5.78	10.12	[Seal]	RS	Discharged	D342909	16.10.86	[Seal]	[Initials]
Mortgage	E225329	to Bank of America Australia Ltd.	2.11.89	9.40	[Seal]	W	Discharged	E943541	23.7.92	[Seal]	[Initials]
Caveat	E482017	Lodged 6.11.90 at 9.29 hrs.			[Seal]	[Initials]	Withdrawn	E943538	23.7.92	[Seal]	[Initials]
Mortgage	E943543	to Standard Chartered Bank Australia Ltd.	23.7.92	10.06	[Seal]	[Initials]				[Seal]	
Caveat	H610744	by HSBC Bank Australia Ltd. Lodged 30.11.00 at 15.59 hrs.			[Seal]	[Initials]	Withdrawn	H620633	12.12.00	[Seal]	[Initials]
Transfer	H620634	of Mortgage E943543 to HSBC Bank Australia Ltd.	12.12.00	15.20	[Seal]	[Initials]				[Seal]	
Mortgage	H620638	to HSBC Bank of Australia Ltd. <i>As per Register of Titles 8-1-01</i>	12.12.00	15.20	[Seal]	[Initials]				[Seal]	

CERTIFICATE OF TITLE VOL. 1499 - 123

FIRST SCHEDULE (continued)		NOTE: RULING THROUGH AND SEALING WITH THE OFFICE SEAL INDICATES THAT AN ENTRY NO LONGER HAS EFFECT. ENTRIES NOT RULED THROUGH MAY BE AFFECTED BY SUBSEQUENT ENDORSEMENTS.											
REGISTERED PROPRIETOR	INSTRUMENT NUMBER	REGISTERED TIME	SEAL	INITIALS									
The correct address of the registered proprietor is now <u>3 Norfolk Street, Fremantle.</u>	By	H620638	12.12.00	15.20									

SECOND SCHEDULE (continued)

NOTE: RULING THROUGH AND SEALING WITH THE OFFICE SEAL INDICATES THAT AN ENTRY NO LONGER HAS EFFECT. ENTRIES NOT RULED THROUGH MAY BE AFFECTED BY SUBSEQUENT ENDORSEMENTS.

INSTRUMENT		PARTICULARS	REGISTERED	TIME	SEAL	INITIALS	CANCELLATION	NUMBER	REGISTERED OR LODGED	SEAL	INITIALS
NATURE	NUMBER										

CERTIFICATE OF TITLE VOL. 1499 FOL. 123

FIRST SCHEDULE (continued)

NOTE: RULING THROUGH AND SEALING WITH THE OFFICE SEAL INDICATES THAT AN ENTRY NO LONGER HAS EFFECT. ENTRIES NOT RULED THROUGH MAY BE AFFECTED BY SUBSEQUENT ENDORSEMENTS.

Superseded - Copy for Sketch Only

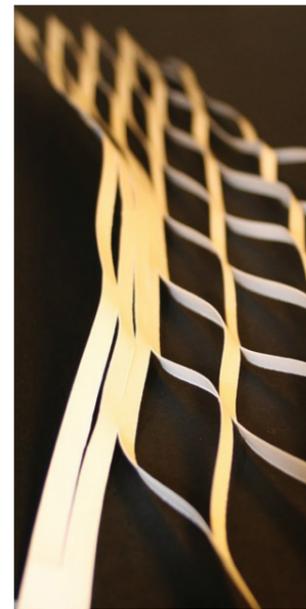
REGISTERED PROPRIETOR	INSTRUMENT NATURE	INSTRUMENT NUMBER	REGISTERED	TIME	SEAL	INITIALS

SECOND SCHEDULE (continued)

NOTE: RULING THROUGH AND SEALING WITH THE OFFICE SEAL INDICATES THAT AN ENTRY NO LONGER HAS EFFECT. ENTRIES NOT RULED THROUGH MAY BE AFFECTED BY SUBSEQUENT ENDORSEMENTS.

INSTRUMENT		PARTICULARS	REGISTERED	TIME	SEAL	INITIALS	CANCELLATION	NUMBER	REGISTERED OR LODGED	SEAL	INITIALS
NATURE	NUMBER										

APPENDIX 2:
Landscape Concept Report



Jurien Bay Resort Landscape Concept Report

PREPARED FOR LAWRENCE SCANLAN AND
ASSOCIATES ARCHITECTS
PROJECT NO. 0954.1089
FEBRUARY 2010

AECOM

Contents

- Introduction 2
- Precedent Studies 3
- Site Context 6
- Site Analysis:
 - Wind Analysis 8
 - Solar Analysis 10
 - Views 11
 - Circulation 12
 - Landscape Rooms 13
- Conceptual Thoughts 14
- Preliminary Concepts:
 - Canopy Grauation 15
 - Protection from the elements 16
 - Wind Concept 17
 - Grid Concept 18
 - Water Concepts 19
- Landscape Concept Masterplan 20
- Character Zones 22
- Character and Material Types 23

Introduction

This report outlines the conceptual framework and approach to landscape design for the Jurien Bay Resort. It has been prepared in consultation with Lawrence Scanlan and Associates Architects, AECOM Buildings Group and the UDLA studio (responsible for neighbouring works).

This landscape strategy report and master plan is provided as supporting material to the development application.

Objectives

The main design objectives of the document are:

- to establish a landscape design appropriate to the site context and location
- create a superb and luxurious resort landscape setting
- establish quality streetscape interfaces with the resort and hotel
- work in and compliment plans for the foreshore and main street connection by the UDLA
- identify environmental constraints and opportunities that may influence design decisions in the Master Plan; eg mitigation of heat/wind effects
- establish an appropriate suite of plant species fit for purpose and location
- establish and integrate into the site wide water quality management system where by reed-bed filtration ponds become feature water elements in the landscape



Jurien Bay Town Foreshore Concept Plan as designed in coordination with UDLA, the Shire of Dandaragan and the Jurien Bay Foreshore community / stakeholder reference group.



Existing site photos



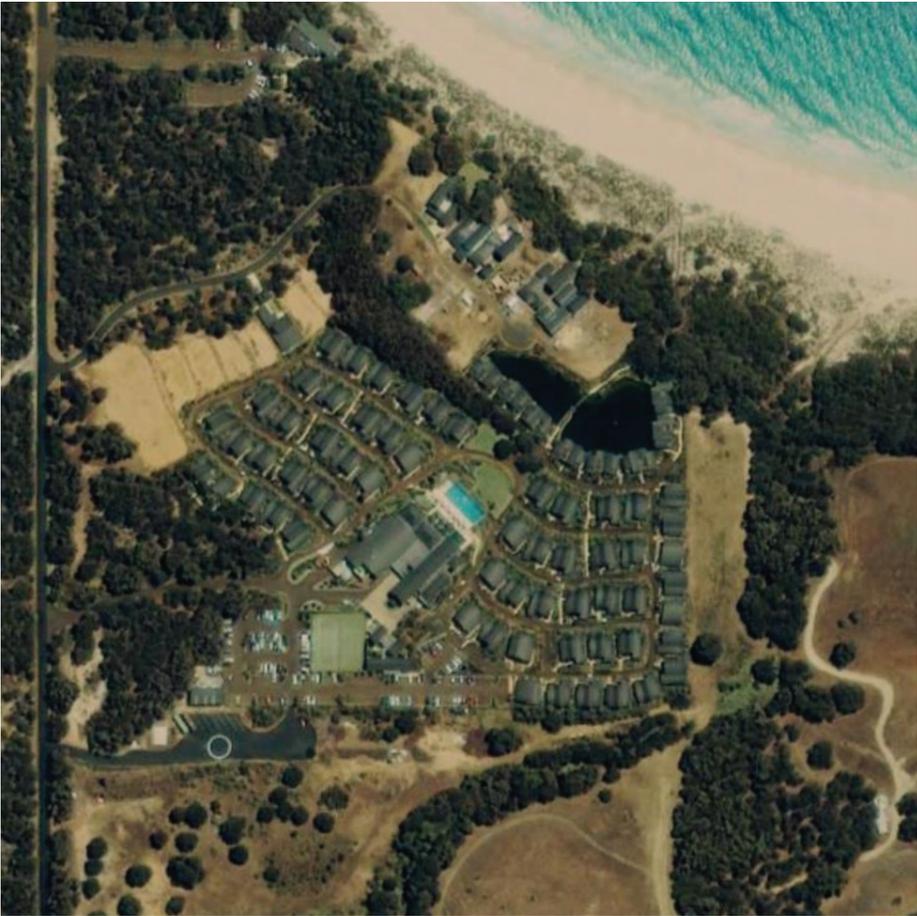
Precedent sites

Injidup Spa and Retreat, Margaret River



Precedent sites

Bunker Bay Resort, Dunsborough



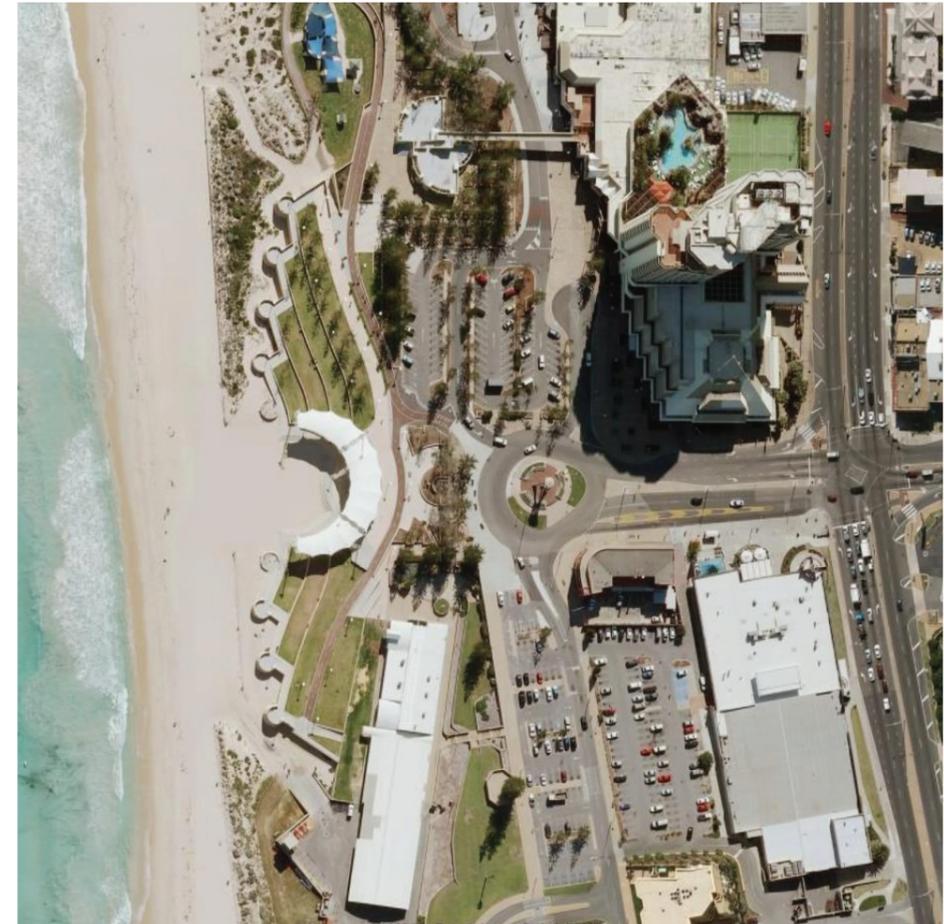
Smiths Beach Resort, Yalingup



Club Capricorn, Yanchep



Scarborough Beach



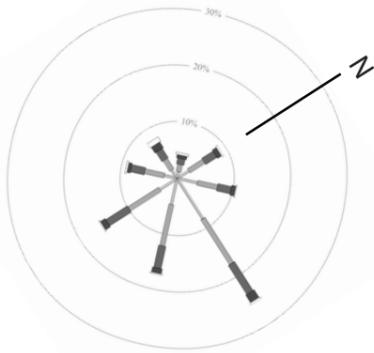
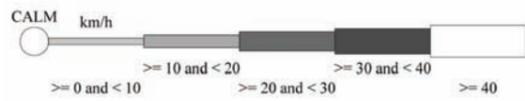
Site context - broad





Wind analysis- morning easterly

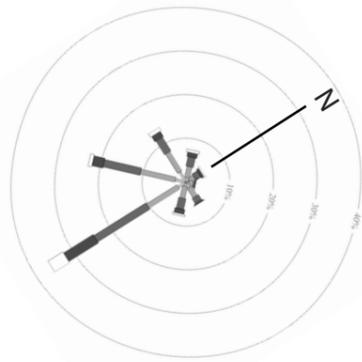
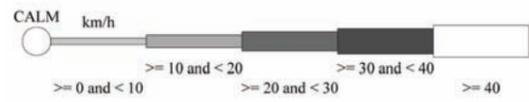
legend



- wind shadow (morning easterly)
- wind exposed (morning easterly)



legend



- wind shadow (afternoon south westerly)
- wind exposed (afternoon south westerly)

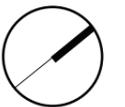


Solar analysis



legend

- all day shade
- morning sun
- midday sun
- afternoon sun
- all day sun





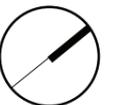
legend

-  major views
-  key views
-  minor views

Circulation analysis

legend

-  1st floor main entry point
-  ground floor entry point
-  1st floor entry point
-  first floor main circulation
-  first floor minor circulation
-  ground floor main circulation
-  ground floor minor circulation
-  beach access



- 1 beach arrival / boulevard
- 2 formal entry
- 3 cafe / bar
- 4 restuarant (2 floors)
- 5 beachfront park
- 6 beachside streetscape
- 7 sunken courtyards
- 8 passive pool side
- 9 trajectory - water view
- 10 beach swale park
- 11 reflection pond: resort lobby
- 12 internal junction
- 13 function courtyard
- 14 tickets and entry to theatre
- 15 outdoor theatre lobby
- 16 theatre
- 17 active poolside
- 18 intimate viewing platform
- 19 garden path
- 20 active sport
- 21 walk through
- 22 external arrival junction
- 23 kids play (non water)
- 24 formal city-side arrival & sales
- 25 city-side streetscape
- 26 carpark entry
- 27 cross site link / beach track / boulevard



Conceptual thoughts -
mapping the concept



Precedent project showing 'lamina flow' or wind contours



Preliminary concepts



Concept - Canopy gradation

Dunal landscapes are characterised by an increase in vegetation structure the further back one moves from the beach.

Tree canopy is difficult to establish in front row windy conditions and limited species are appropriate.

Consequently the strategy is to build up canopy density further back into the resort where built form provides more wind protection.

This brings about a cool, protected and shady respite to the eastern portion versus the exposed and harsh beach front.

These dualities are helpful in constructing a range of microclimates that allow guests



Melaleuca lanceolata



Pink Frangipani



Olive species



Tabebuia rosea



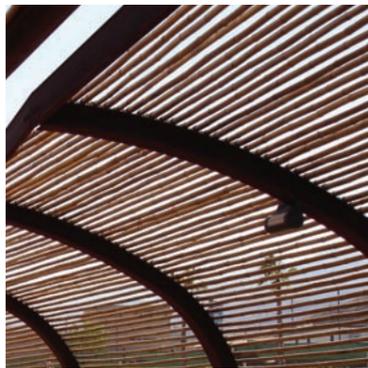
Washingtonia robusta



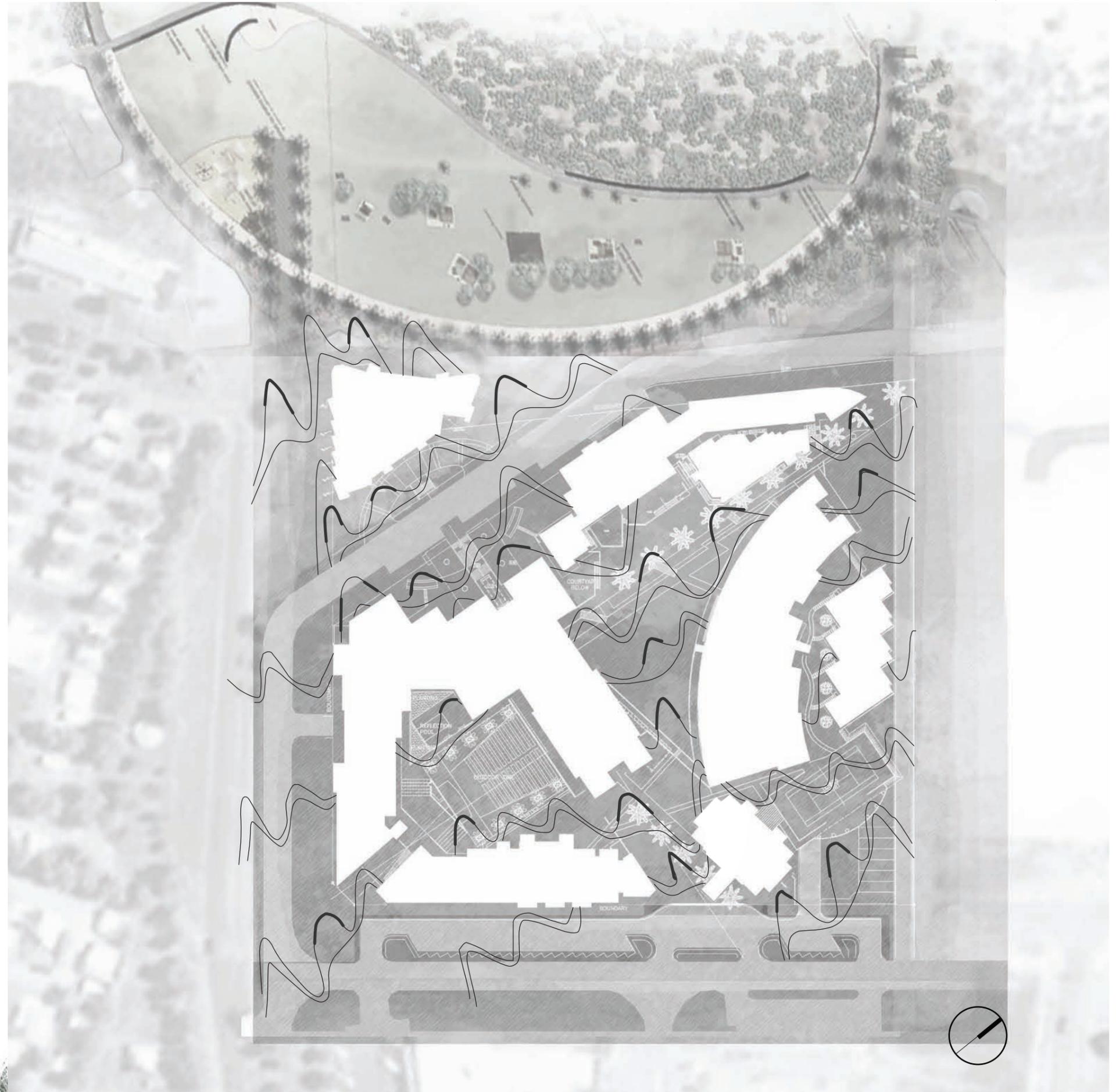
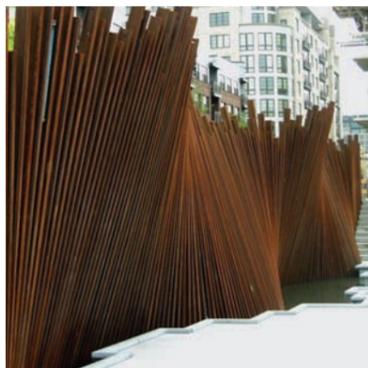
Auracaria heterophylla



Coastal vegetation has adapted to the changing and often harsh weather conditions associated with dunal areas. Vegetation, such as Spinifex, is salt tolerant and has the ability to trap wind-blown sand, thereby assisting with dune formation.



Vegetation plays an important role in the establishment and longevity of dune systems. They act as a windbreak, trap sand particles and have the ability to grow up through the sand and continually produce new stems and roots as more sand is trapped and the dune grows.



Preliminary concepts

Prevailing wind interacts with the proposed built form to establish a patterning and surface structure in the public domain.

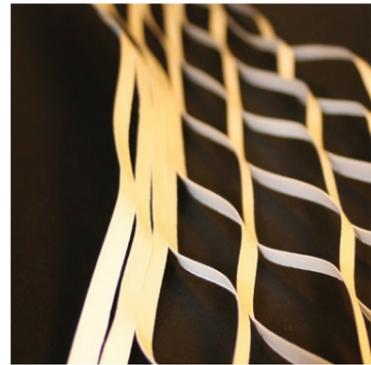
This base structure to the landscape design serves to unify the various spaces into a continuous theme, setting or carpet.

The lamina flow or wind contours generate sweeping gestures that are massaged to create planter beds, pools, decks, bridges and paving patterns.

A sensuous and rythmical outcome is achieved

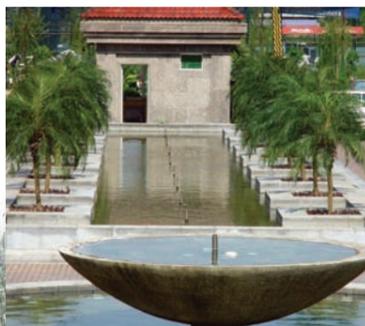
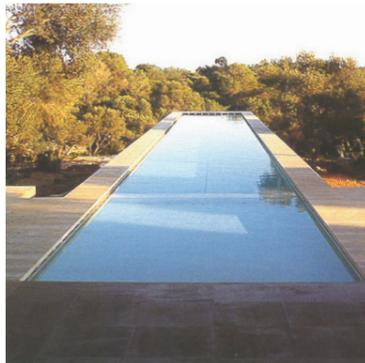
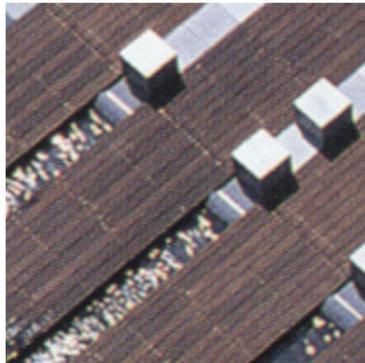


Wind concept



Grid concept

18



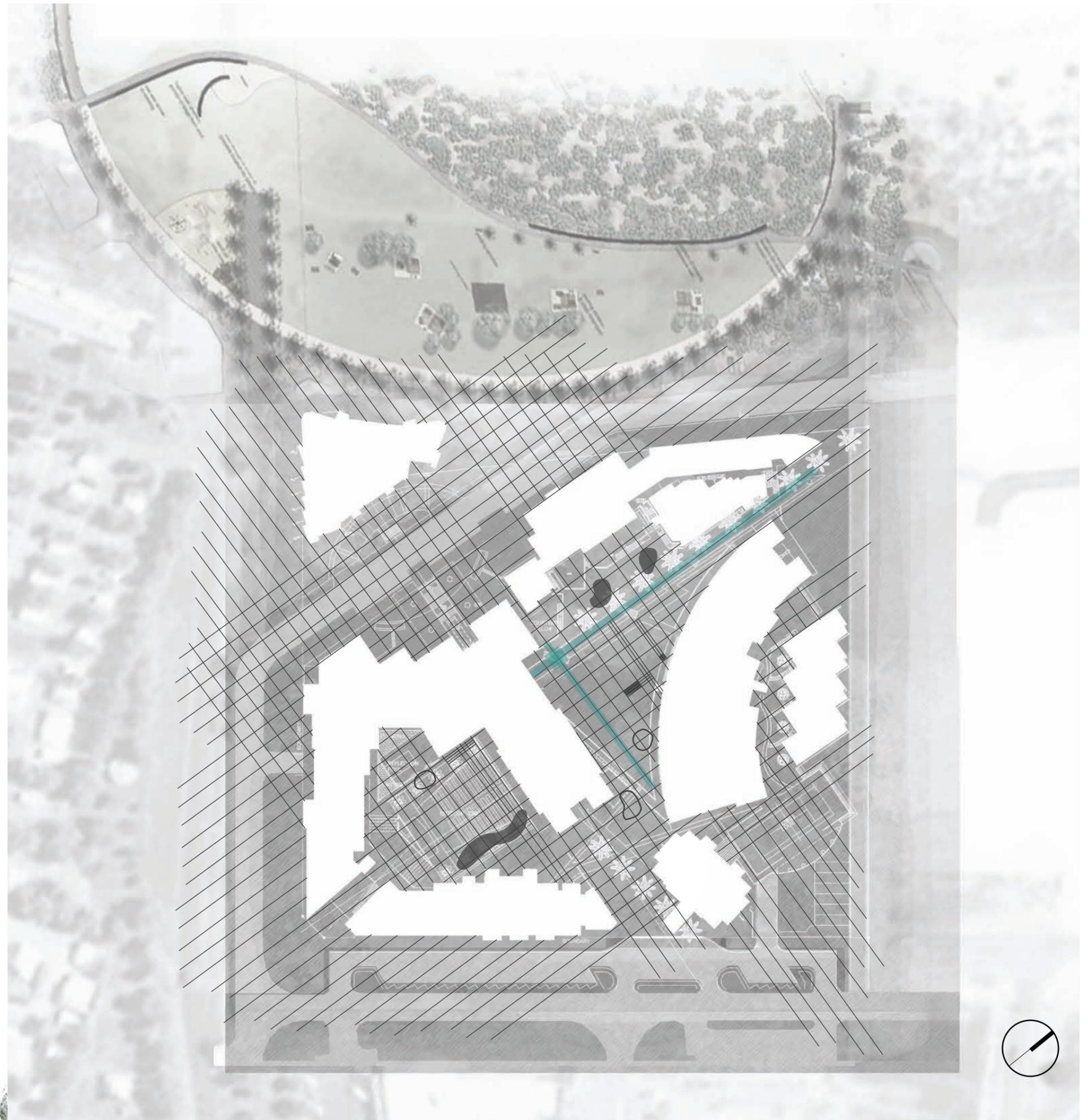
The built form is set out on two major axes. In an east-west orientation the first axis organises the architectural elements of hotel, lobby, central tower and eastern entry. In a north-south orientation the axis forms a long reflection pond that aligns with Favourite Island off the coast. They intersect in a central lobby area.

On the whole the Master Plan has been developed using the wind contour concept rather than the grid structure, however on the north-south axis, along the reflective pond, the wind contours meet and conform to the grid.

This creates a moment of formality and symmetry when viewing north out from the central lobby area.

The pool area is a synthesis of both the grid and wind structures. As a hybrid it adopts both formality and informal aspects.

The resulting design is a fusion of both concepts.



Water concepts

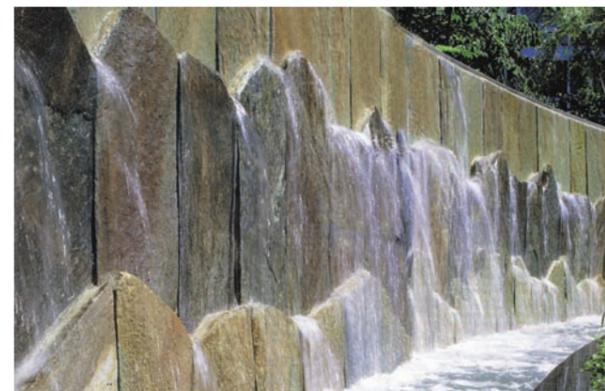
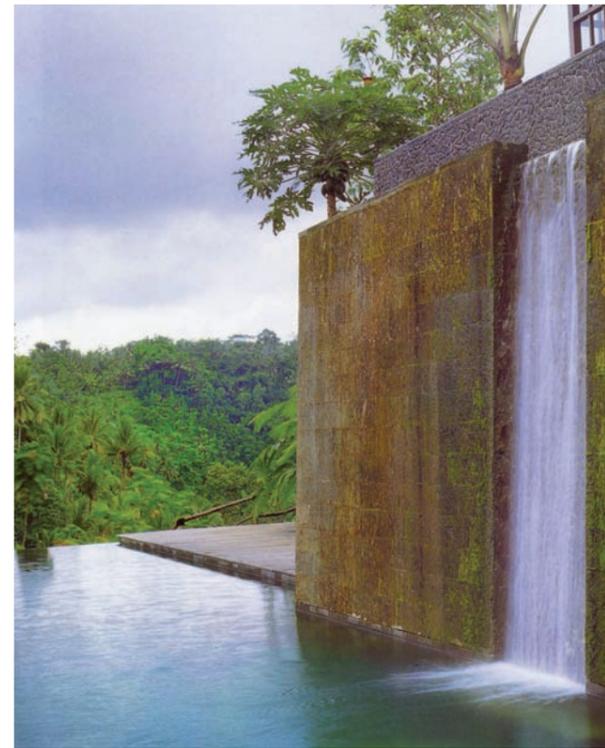
1. Reflection/Still Water Pools



2. Swimming Pool



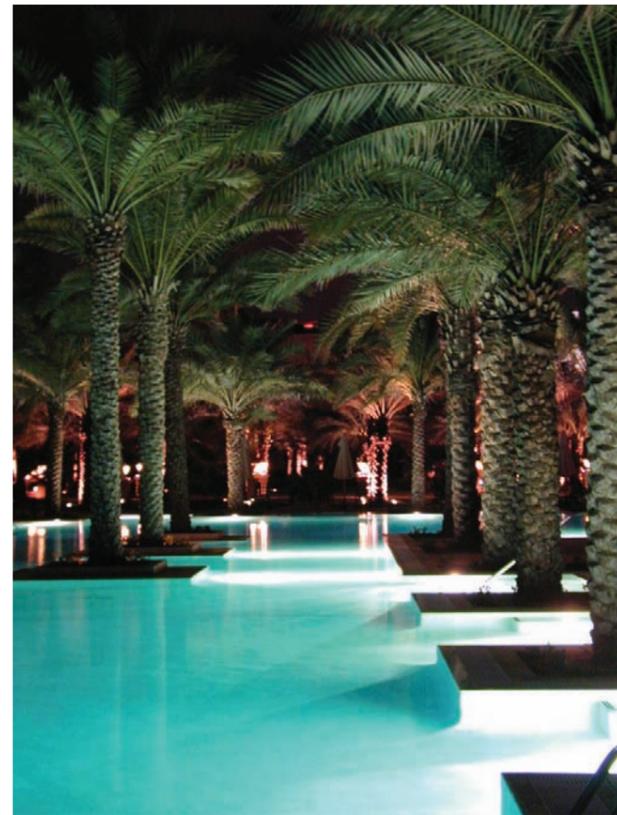
5. Falling Water (cont)



6. Fountains/ bubblers

There are five types of water proposed to bring about a multi-layered and ever-changing sense of water on site. Critically the water management and recycling strategy is integrated to support the celebration and expression of water.

- 1. Reflection Ponds
- 2. Swimming Pools
- 3. Spa Pools
- 4. Children's/Paddle Pool
- 5. Falling Water
- 6. Fountains/bubblers
- 7. Water Filtration through reed and filter medium (see diagram below)



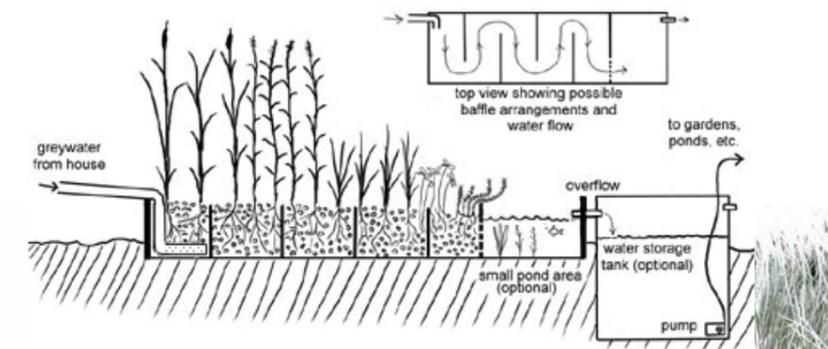
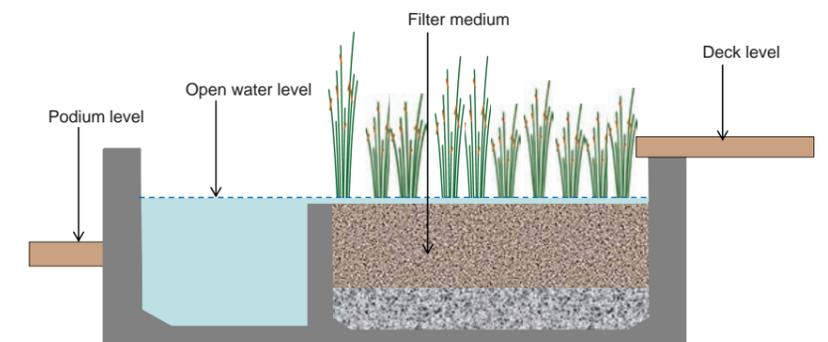
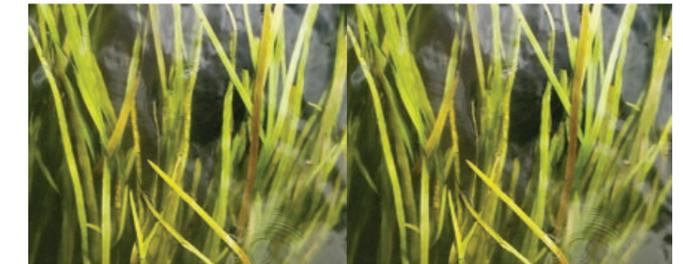
3. Spa Pools



5. Falling Water



7 Water Filtration - Reed bed and filter medium



The Landscape Concept Master Plan



Pool Area Detail



Landscape Master Plan

Indicative Section

LEGEND

- ① Main pool
- ② Timber slatted shade deck
- ③ Childrens pool
- ④ Spa
- ⑤ Toilet with water fall and roof garden over
- ⑥ Ampitheatre
- ⑦ Potential childrens play area
- ⑧ Tropical walk
- ⑨ Eastern entry stair and deck with water falls
- ⑩ Western formal entry
- ⑪ Entry to Ampitheatre
- ⑫ Extention of water axis into water fall and pool



Indicative section

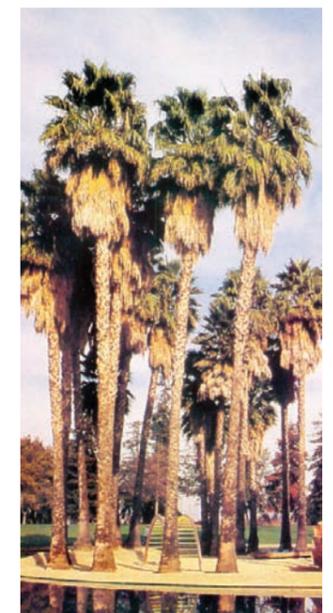
Character zones
Location map



- 1 main and coastal streetscape axis
- 2 entrance axis (both western and eastern)
- 3 amphitheatre
- 4 central pool area
- 5 sport and access areas
- 6 town-side streetscape and eastern entry



Character and material types
Main and coastal streetscapes

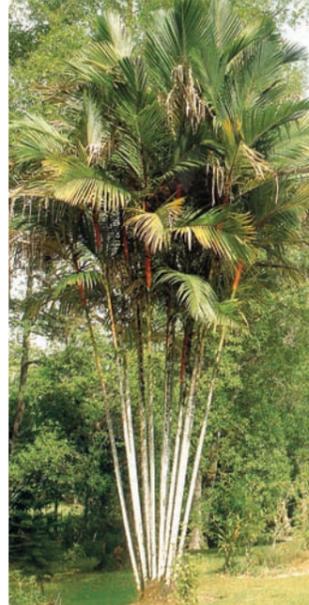
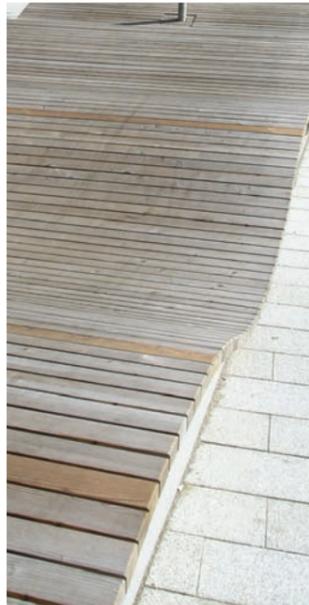
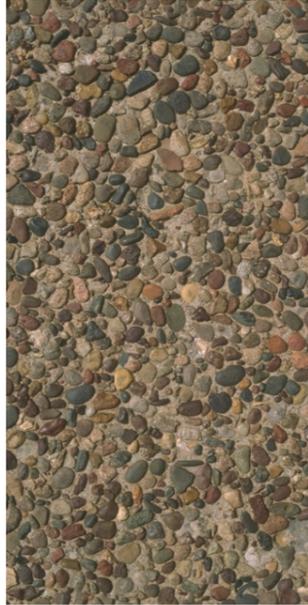


Character and material types

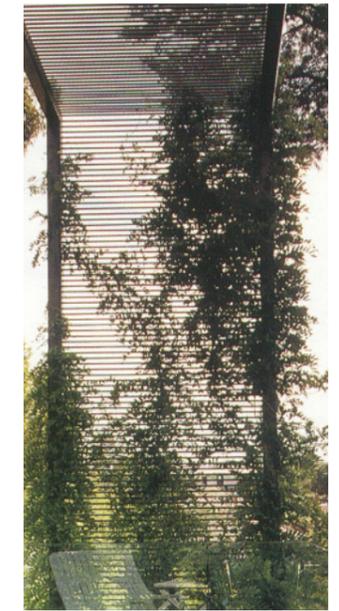
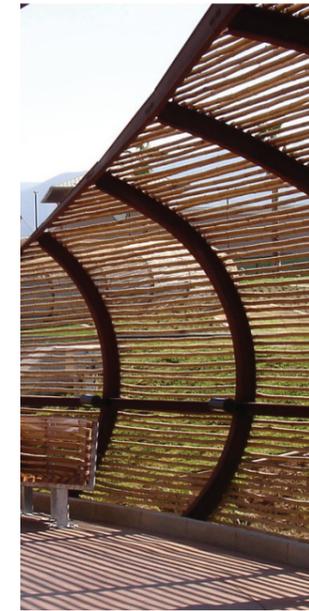
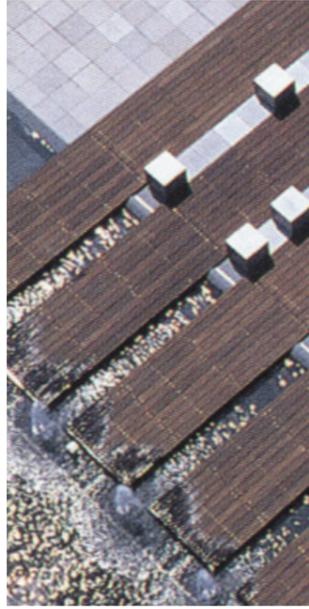
Entrance axis

Character and material types

Amplitheatre



Character and material types
Central Pool Area



Character and material types
Central Pool Area (continued)





APPENDIX 3:
Environmental Sensitive Design

Jurien Bay - An ESD Review



Jurien Bay - An ESD Review

Prepared for
Lawrence Scanlan and Associates

Prepared by

AECOM Australia Pty Ltd
3 Forrest Place, Perth WA 6000, GPO Box B59, Perth WA 6849, Australia
T +61 8 6430 2000 F +61 8 6430 2999 www.aecom.com
ABN 20 093 846 925

15 February 2010

60140270

© AECOM Australia Pty Ltd 2010

The information contained in this document produced by AECOM Australia Pty Ltd is solely for the use of the Client identified on the cover sheet for the purpose for which it has been prepared and AECOM Australia Pty Ltd undertakes no duty to or accepts any responsibility to any third party who may rely upon this document.

All rights reserved. No section or element of this document may be removed from this document, reproduced, electronically stored or transmitted in any form without the written permission of AECOM Australia Pty Ltd.

Quality Information

Document Jurien Bay - An ESD Review

Ref 60140270

Date 15 February 2010

Prepared by Ashley Barnett

Reviewed by Graham Agar

Revision History

Revision	Revision Date	Details	Authorised	
			Name/Position	Signature
1	09-Feb-2010	Appendices - DA	Ashley Barnett Associate Director	
2	14-Feb-2010	Appendices - DA	Ashley Barnett Associate Director	

Table of Contents

1.0	Introduction	1
1.1	Specific Considerations	1
2.0	Building Form	1
2.1	General	1
2.2	Orientation	1
2.3	Building Shape	1
2.4	Placement of Mass	1
2.5	Solar Penetration and Shading	1
2.6	Prevailing Breeze Study	2
3.0	Building Envelope	3
3.1	Thermal Mass	3
3.1.1	Internal thermal mass	3
3.2	Thermal Efficiency of Facade	3
3.2.1	Insulation	3
3.2.2	Radiant Barrier	3
3.2.3	Roof and façade colour	3
3.3	Glazing	3
3.3.1	Extent of the glazing	3
3.3.2	High performance glazing	3
3.3.3	Low e glazing	3
4.0	Mechanical Services	4
4.1	Thermal comfort levels	4
4.2	Fan Energy Reduction Techniques	4
4.2.1	Demand controlled ventilation	4
4.3	Heating Considerations	4
4.3.1	Rooftop / Wall / Facade Solar Air Heaters	4
4.4	Geothermal Heat exchange	4
4.4.1	Closed loop ground source heat pump	4
4.5	Thermal Storage	5
4.6	Air to Air Heat Recovery	5
4.7	Night Cooling	5
4.8	Natural Ventilation	6
4.9	Mixed Mode Ventilation	6
5.0	Electrical Services	7
5.1	Integrated daylight / artificial daylight control	7
5.2	Occupancy sensors	7
5.3	Lighting control system	7
5.4	Carpark lighting	7
5.5	Exterior lighting	7
5.6	Light shelves and prisms	7
6.0	Hydraulics	8
6.1	Grey water and Rain Water recycling	8
6.2	Site Wide Water Conservation Strategy	8
6.3	Solar hot water	9
7.0	Power Generation	10
7.1	Photovoltaic (pv cells)	10
7.2	Façade integrated PV cells	10
7.3	Wind power	10
8.0	Materials	11
8.1	Natural and Renewable Resources	11
8.2	Embodied energy	11
8.3	Toxicity	11
8.4	Use of industrial by-products	11
8.5	Durability	11
8.6	Deconstruction	11
9.0	Waste	12
9.1	Maximise off-site prefabrication	12
9.2	Recycle construction waste	12

9.3	Recycling space	12
10.0	Site Considerations	13
10.1	Maintain or improve site ecology	13
10.2	Landscaping and Microclimates	13
10.3	Bioswales and roof gardens	13
10.4	Design approach to smart water design	14

1.0 Introduction

AECOM's commission on the Jurien Bay resort is to review the existing design and suggest additional initiatives to assist the design team to ensure that the facility achieves the lowest possible energy usage, whilst maintaining acceptable occupant comfort and not compromising the aesthetics or usability of the space.

The report highlights areas which have been reviewed now and those for further consideration as the design progresses. The project is already significantly developed using proven ESD principles and, as such, macro issues; such as whether natural ventilation or natural lighting strategies will be incorporated are already largely decided. In the future, computer modelling of the resort will assist in quantifying the magnitude of any benefits which can be obtained and the suitability of currently suggested ESD initiatives.

The report reviews issues associated with the site such as landscaping and micro climates, passive building measures such as building form and shading as well as active measures involving air conditioning and lighting services.

The level to which the client responds to the ESD challenge will be subject to the available capital available for the project and the perceived benefits the client expects from each initiative. The benefits from implementing ESD initiatives generally fall into three categories and often encompass more than one. These categories include:

- Direct economic benefits through the reduction in outgoings from incorporating energy efficient equipment. The acceptable simple payback period for many property developers is around three years.
- Improved comfort conditions through incorporating individual occupant control, improved lighting and air conditioning design, higher levels of outdoor air and opportunities to incorporate natural ventilation and natural lighting.
- Increased opportunities for Client to demonstrate environmental credentials to environmentally aware public.

Each strategy in this report will be developed to determine the direct economic benefits of strategies as the design progresses.

1.1 Specific Considerations

It is noted that, for the Jurien Bay project, validation of ESD initiatives on purely economic benefits alone would be likely to result in adoption of a minimum number of initiatives.

The usage profile of the building, coupled with its low energy load profile, suggests that more holistic criteria, beyond pure economic objectives, would need to be configured into the decision making process.

It is also suggested that the usage profiles and building loads at the Jurien Bay spa resort would result in greater viability for systems that are more simplistic and intuitive in nature favouring solar passive design principles and low embodied energy principles, as opposed to extensive building services type systems.

The design approach for an eco sensitive design is to actively incorporate synergy between the Architecture, Building Engineering and the Landscape design. Between AECOM and Lawrence Scanlan Architects this realisation has been for filled. This section of the report is to be read in harmony with the built form description and the landscape theme. We draw particular attention to the innovative water sensitive design approach of this project.

2.0 Building Form

2.1 General

The various building forms of the Jurien Bay resort has, in the majority, been predetermined by site, functional and planning considerations.

Site planning considerations have been defined by the project architects, Lawrence Scanlan, and the following solar passive design considerations will be embraced wherever possible:

2.2 Orientation

The building orientations have been arranged to take advantage of free solar heating during the winter months and minimise solar gain to the east and west façade when the sun is low over the horizon in the summer months. On this basis conventional wisdom recommends that the facility be orientated between 18° east of north to promote morning winter solar gain.

2.3 Building Shape

With a view to minimise the east west solar penetration, the building form should, and does, express a longer north south façade and short east west façade. Generally a length to width ratio of 1.6:1 provides the optimum floor plan to profit from the volume to façade ratio for a temperate climate. The resort buildings A to F are all significantly longer than this, however, with a relatively narrow aspect it will allow it to have improved natural ventilation and natural lighting performance.

2.4 Placement of Mass

To further promote solar gain in winter the peripheral areas such as the building core, stairwells, toilet areas and lift shafts are strategically located. This provides a buffer zone reducing heat gain from the east and west to the occupied space in summer and promotes free solar heating during the winter.

2.5 Solar Penetration and Shading

There are a number of solar penetration and shading issues that influence the design. These are mapped below by the landscape team.

The northern façades contains the area in the resort that is used as typical apartments. Part of maintaining a pleasant and attractive environment is to allow natural lighting and long distance views as much as practicable, whilst maintaining the designs integrity as far as external heat loads.

Conventional wisdom suggests that horizontal shading devices above the windows provide the best results for northern facades. This occurs throughout the resort.

The western façade has views on to the ocean. Western facades are treated with shade louvres in the vertical plane.



2.6 Prevailing Breeze Study

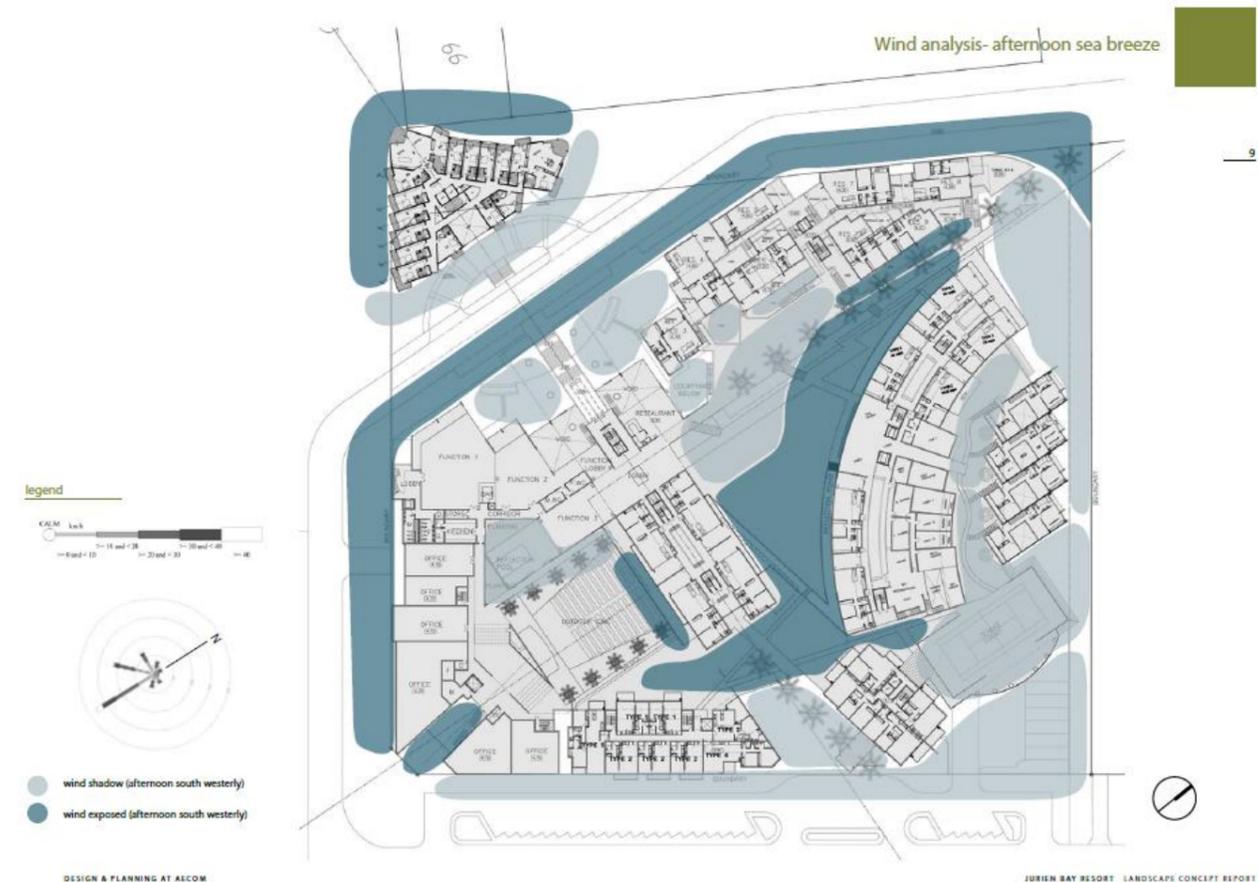
The Jurien Bay climate is dominated by strong breezes, particularly in the mid to late afternoon in the summer months. By locating ventilation openings to take advantage of these breezes it will be possible to obtain significantly improved thermal performance for the spaces.

The naturally ventilated and mixed mode spaces will have louvres on both the north and south facades to encourage cross ventilation and make use of the prevailing winds at the site.

Of note, the combination of the loggia and atrium in building type A and B are designed to take advantage of this free ventilation. The prevailing winds change direction in the afternoon, coming off the ocean. The buildings and landscape combined provide a self protection from the sea breeze.

A site wide wind study, detailed by the landscape design team is shown below. In terms of building design, the areas exposed to morning easterly winds will be closed off. Thus allowing the warm easterly winds to be deflected. All the buildings, with building A and B in particular have been designed with easterly wind protection. This principle is simple yet validates the intent of the ESD approach.

Conversely, In terms of building design, the areas exposed to afternoon south westerly winds will be opened up. Thus allowing the cool south westerly winds to flow through the building. All the buildings, with building A and B in particular have been designed to use the south westerly wind. This principle is simple yet validates the intent of the ESD approach. The benefits are increased natural ventilation, ability to introduce heat transfer from the thermal mass of the building into the natural air exchange. This directional flow will also be used for night cooling.



3.0 Building Envelope

3.1 Thermal Mass

3.1.1 Internal thermal mass

Thermal mass can be used to stabilize the internal temperature of the occupied spaces. In temperate zones where night-time temperatures fall below the daytime maximum and room comfort temperatures, the thermal mass of a naturally ventilated building can be effectively employed as a method to stabilise the internal comfort temperatures. This is effectively achieved through a process known as night cooling.

The Jurien Bay climate provides a high diurnal temperature variation in the order of 15°C. This high range can be used in conjunction with mixed mode and natural ventilation to minimise the air conditioning requirements of the space.

Home » Climate » Jurien Bay Climate

Jurien Bay Long-term Averages													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Mean Max (°C)	29.8	30.7	29.3	26.2	23.1	20.5	19.4	19.8	21.1	23.1	25.7	28.0	24.7
Mean Min (°C)	17.0	17.8	16.5	14.0	11.9	10.3	9.5	9.4	9.9	11.1	13.5	15.5	13.0
Mean Rain (mm)	6.6	15.4	13.5	30.8	80.8	110.8	113.6	80.6	45.0	26.2	17.4	6.5	545.1
Median Rain (mm)	1.0	3.6	7.6	24.8	78.2	106.4	112.0	82.0	43.4	24.0	13.1	2.5	555.0
Mean Rain Days	1.8	2.7	3.4	6.8	11.7	14.8	17.0	14.9	11.9	8.0	5.4	2.9	100.8

Jurien Bay Daily Records													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
High Max (°C)	45.2	44.7	44.0	37.3	32.1	27.8	26.2	26.9	32.8	38.2	40.5	44.7	45.2
Low Max (°C)	21.2	21.5	18.8	17.4	14.6	13.2	14.0	13.2	12.9	15.0	15.8	20.0	12.9
High Min (°C)	26.5	27.9	27.0	24.4	22.4	19.3	17.3	18.8	18.3	23.5	23.9	27.6	27.9
Low Min (°C)	8.0	8.8	5.6	1.7	2.7	-1.0	0.6	1.3	1.3	2.7	4.0	6.6	-1.0
High Rain (mm)	77.4	98.2	50.4	125.2	76.8	83.0	95.8	54.6	34.4	25.0	37.8	24.4	125.2

Jurien Bay Monthly Records													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
High Mn. Max (°C)	33.3	34.8	32.0	28.7	25.4	22.2	20.9	21.2	23.3	25.0	28.2	30.5	34.8
Low Mn. Max (°C)	26.9	27.8	27.0	24.0	21.5	18.5	17.9	18.2	19.2	21.0	22.6	24.1	17.9
High Mn. Min (°C)	18.8	21.1	19.0	16.6	14.8	12.6	12.0	11.8	11.8	12.8	16.6	17.9	21.1
Low Mn. Min (°C)	15.2	15.6	14.0	11.2	10.0	6.5	7.5	7.0	7.1	9.1	10.9	13.0	6.5
High Rain (mm)	91.6	164.4	85.0	127.8	255.8	300.2	217.0	178.8	81.0	66.6	63.6	41.9	300.2
Low Rain (mm)	0.0	0.0	0.0	1.0	14.8	25.8	33.3	16.4	8.8	0.5	0.0	0.0	0.0

Buildings A and B have a significant volume and, as such, can make use of cooler night time temperatures to purge any heat that has been trapped within the space. Whilst there is little thermal mass within the space it is believed that night purge of the space, especially during summer, will be of benefit. The natural airflow path is through the louvred façade of the loggia. Combining with the central void atrium, the full use of thermal mass transferring energy to the air can be utilised.

Internal finishes should comprise as much exposed thermal mass as possible. By exposing thermal mass and night purging the space it will be possible to delay the amount of time where air conditioning is required and reduce the peak cooling load when it is.

3.2 Thermal Efficiency of Facade

3.2.1 Insulation

For all air conditioned and heated areas it is recommended that thermal insulation be provided to walls and ceilings. The thermal insulation assists in reducing the convective and conductive losses from the air conditioned and heated spaces.

In the Jurien Bay climate the internal heat source should be prevented from escaping and reclaimed to provide free heating in the winter and night-time operation of mid-season.

It is noted that the new edition of the BCA requires certain levels of insulation for compliance with part J. Compliance with Part J should be taken as a minimum starting point.

3.2.2 Radiant Barrier

For all air conditioned areas it is recommended that radiant barriers be provided to walls and ceiling. The radiant barrier assists in reducing the radiant temperature and thus the comfort temperature within the occupied space. The western elements of Building A and B provide this by means of self shading.

3.2.3 Roof and façade colour

Selection of light coloured roofs and walls will reduce the absorption of solar heat in summer. Conversely, the selection of dark coloured walls and roofs will promote heating in winter. As such, colour choices will be made based on the expected usage profile of the different buildings.

3.3 Glazing

3.3.1 Extent of the glazing

Reduced glazing will reduce the level of heat load in summer and heat loss in winter thereby reducing air conditioning and heating energy costs and plant size. However reduced window sizes will also reduce day lighting decreasing comfort levels and increasing the reliance on electric lighting.

A detailed analysis of the glazing type and shading scheme will be carried out for the western façade in particular. It should be noted that direct solar radiation on glass will be avoided wherever possible and, if the exposed glass is in close proximity to occupants, internal operable shading will be provided to reduce radiant heat and coolth and to reduce the impact of glare.

3.3.2 High performance glazing

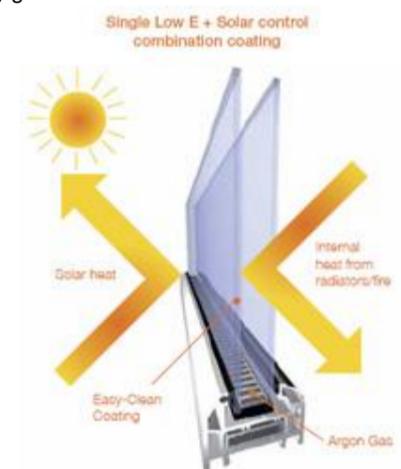
High performance glazing should be provided, especially if occupants are located close to glass.

The main effect on the internal conditions from the glazing will be radiation of heat or cold from the window. Consideration should be given to installing low 'e' (radiation emission) glass.

3.3.3 Low e glazing

Low 'e' glazing incorporating coating or laminate is ideal for temperate climates where radiant heat loss from windows is to be reduced. Low 'e' glass is most effective for reducing radiant heat loss to outside so its application is ideal in colder climates when heat loss from the occupied space to outside is the significant issue.

The benefits include reduced operating costs, improved comfort and reduced air conditioning and heating plant size.



4.0 Mechanical Services

4.1 Thermal comfort levels

Design temperatures can be challenged within each of the air conditioned zones. Relaxation of internal temperature and humidity levels will have significant effects on the reduction of energy consumption and plant capacity levels.

Designing the system to maintain elevated internal temperatures during the summer and reduced internal temperatures during the winter can improve occupant comfort levels significantly. This design strategy is based on occupant clothing standards during the varying seasons.

Consideration will be given to increasing comfort temperatures to 25°C in summer and reducing comfort temperatures to 19°C in winter.

4.2 Fan Energy Reduction Techniques

4.2.1 Demand controlled ventilation

As the outdoor air component of the buildings heating and cooling load is of such significance, all attempts should be made at reducing the external ventilation gains.

As the outdoor air volume flow rate is a function of occupancy, the volume flow rate can be varied depending on the number of occupants within the conditioned space. This can be achieved through the use of carbon dioxide monitoring to sense the level of carbon dioxide in the room air and vary the outdoor air according to the population.

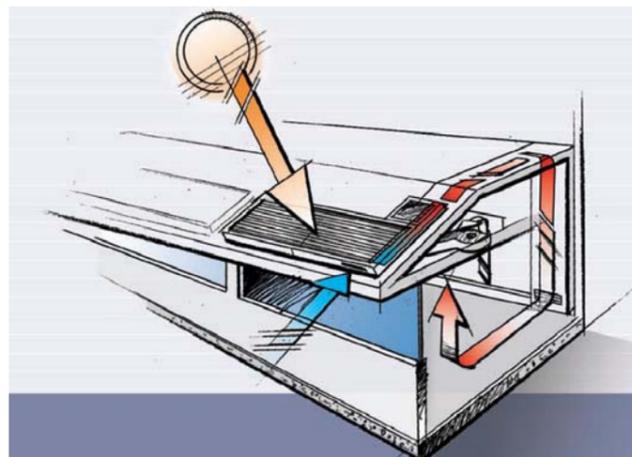
On this basis, it is recommended that CO₂ monitoring and outdoor air control be considered for this project, especially for communal areas.

4.3 Heating Considerations

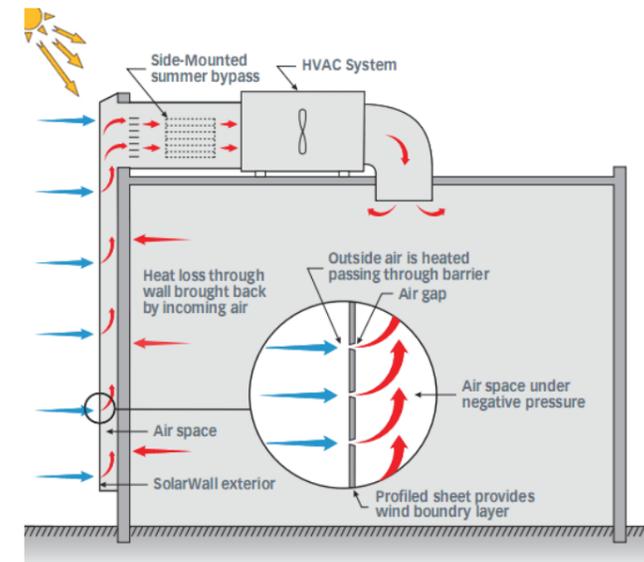
4.3.1 Rooftop / Wall / Façade Solar Air Heaters

These options involve pre-heating outside air streams via solar heat collectors. Such devices can be easily incorporated into the design of all the buildings the roof, the building's walls / floor, or both, and are generally constructed from dark coloured, highly conductive materials such as metals. The external surface heats up in the presence of direct solar radiation, and convectively transfers heat to the air stream moving below the surface.

The external element of this system relies on being orientated to receive the sun's rays during winter. As such, it also needs to be supplemented with the central heating system to provide the room with heat during days (or evenings) when the sun's power cannot be guaranteed to provide heating. i.e. overcast days.



Façade Solar Air Heaters



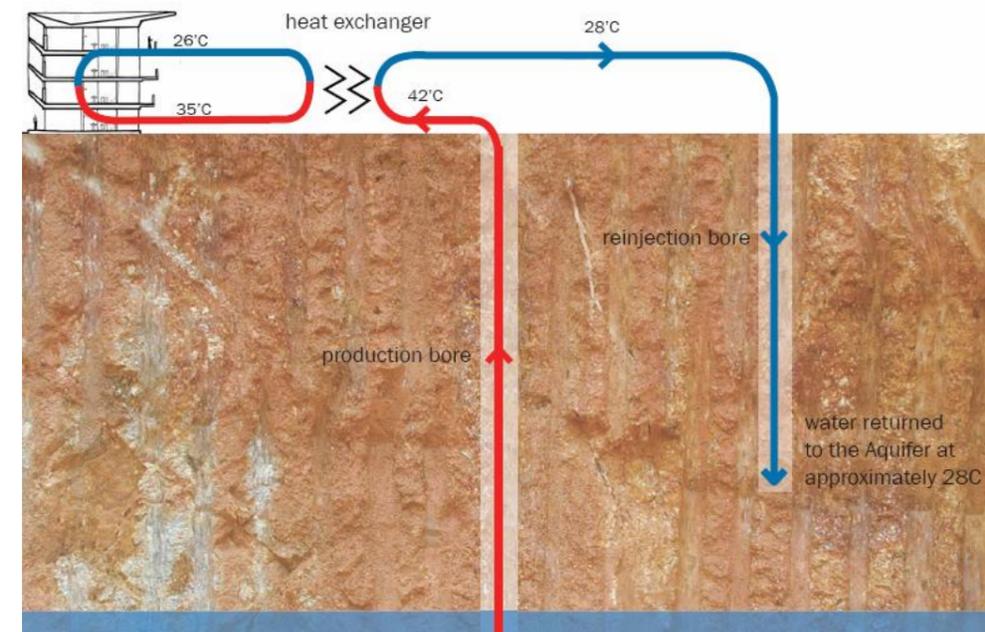
4.4 Geothermal Heat exchange

4.4.1 Closed loop ground source heat pump

Closed loop ground source heat pump systems use the ground to store heat or 'coolth' from an air conditioning condenser water system. This heat or 'coolth' which is stored in the ground is then extracted when needed and used to cool or heat the building through the use of a refrigeration circuit.

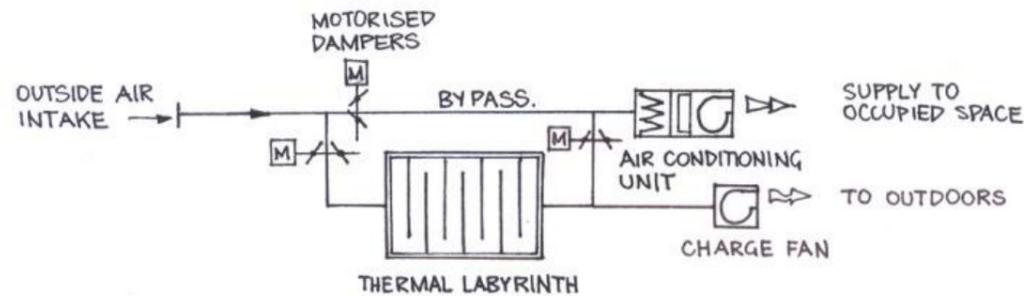
Closed loop ground source heat pumps require an annual balanced heating and cooling energy load to ensure that the net ground temperature does not continuously rise or fall. Ground source heat pump systems incur high capital costs and require site area for the location of bore holes.

Based on the heating and cooling energy consumption over a year, we will investigate the feasibility of a closed loop ground source heat pump.



4.5 Thermal Storage

Thermal storage in the form of chilled water, ice storage or a rock bed thermal labyrinth can provide significant cost savings in the operation of chiller plant. Operating standby chillers at night to generate chilled water for storage can take advantage of off-peak electricity rates and reduce energy consumption through operating at a depressed wet-bulb temperature. The stored chilled water can then be used to peak-lop during the peak chiller load of the following day.

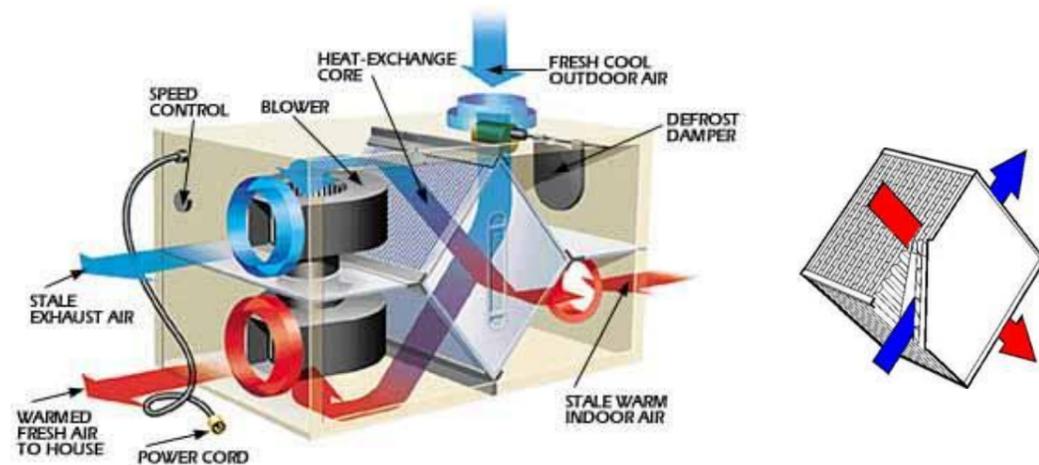


Thermal labyrinths are effective in climates with high diurnal temperature climates such as Jurien Bay. In Jurien Bay, the average diurnal range is 15 degrees, making thermal storage systems quite effective in reducing peak cooling load requirements.

4.6 Air to Air Heat Recovery

Air-to-air heat recovery through the use of plate heat exchangers can recover up to 70% of exhaust air from a building.

Air-to-air heat recovery installations need to be carefully designed to minimise the extent of additional ductwork and all of the additional material required to complete an installation.



Air-to-air heat exchange through the use of run-a-round coils can provide heat recovery with up to 50% efficiency. Run-a-round coils use conventional air conditioning unit coils to transfer heat from the exhaust air into a water circuit. The heated water is then reticulated to another coil. This second coil releases the stored

heat into the air stream providing heat reclaim. The run-a-round coil system is more flexible than the plate heat exchanger system as the heat exchanger coils can be located easily anywhere in ductwork however it provides a lower efficiency and requires higher fan and pumping energy consumption.

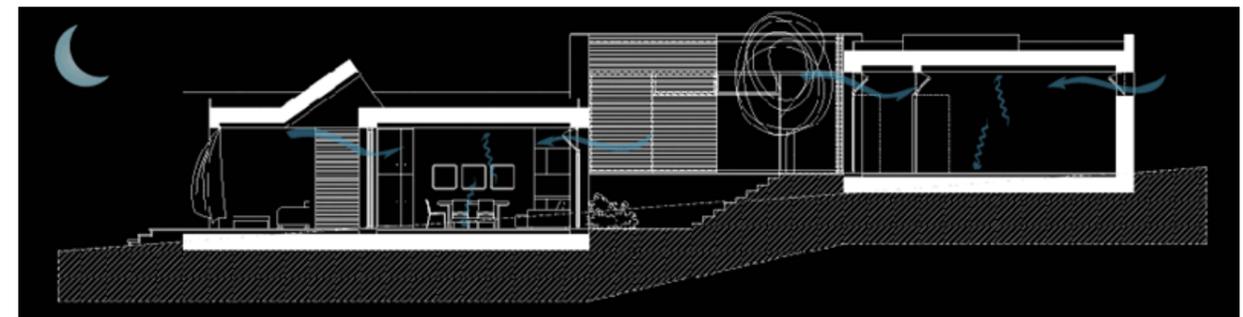
Cost benefit analyses for various systems will be provided to maximise the level of air-to-air heat recovery systems.

4.7 Night Cooling

Passive heating and cooling operates on the principle that an isolated system will always try to reach thermal equilibrium by transferring heat from the warmer body to the cooler body. For a system such as a building, this means that the wall and internal air temperatures will constantly converge in an attempt to reach equilibrium. The rate at which the building achieves thermal equilibrium is dependent upon the construction of the building and the desired comfort conditions within the internal spaces.

During the heat of the day a building absorbs heat from the warm outside air and direct solar radiation incident upon the walls and roof. During the night when the surrounding environment is cooler this heat is transferred back to the environment, cooling the thermal mass of the building.

During the summer months when the temperatures of the internal space is high due to the heat gain of the day, ventilation strategies will be put in place to maximise the benefits of the building mass. By opening the windows fully during the night, the cooler night air can flow through the building allowing the heat to be convected out of the structure. In this instance the openings of the loggia will provide this. The building slowly cools down during the night so that throughout the following day it can absorb more heat before the internal temperature starts to rise. Maximising the thermal mass of the structure increases the amount of heat that the building can absorb before it heats up to a level above a comfortable temperature.



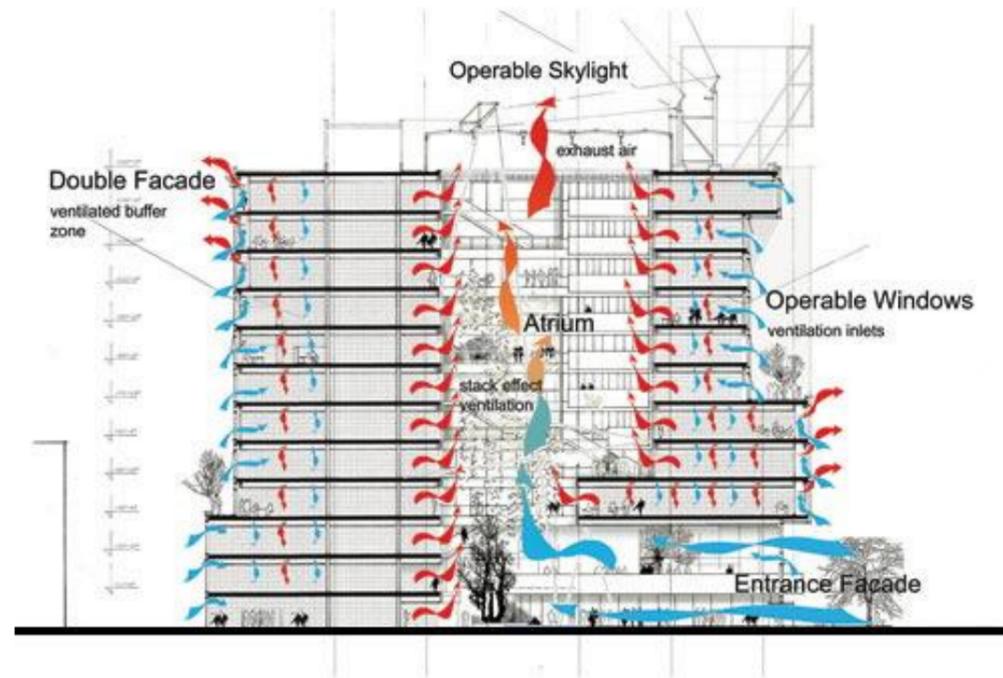
Where natural ventilation is incorporating, night cooling is a very effective means to provide comfort conditions within a space. The coastal Jurien Bay climate is ideal for incorporating night cooling in the mid-seasons and summer.

Night cooling techniques operate most effectively in occupied spaces with exposed thermal mass on ceilings and walls. Night cooling will be considered for building A and B in particular. The strategy can be site wide. Therefore all buildings will have as much exposed thermal mass as possible.

4.8 Natural Ventilation

The coastal Jurien Bay climate is ideal for providing natural ventilation in the mid-seasons and winter. The cool night temperatures and the mild mid-seasons could allow acceptable conditions to be maintained in the resort without the need for air conditioning system operation.

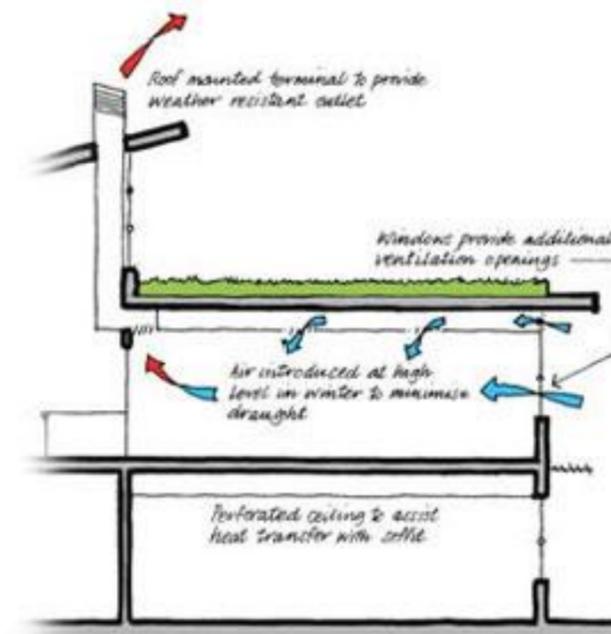
The benefits of a natural ventilation solution to the resort includes significantly reduced energy consumption levels, savings in plant capital cost and improved comfort levels for occupants for most of the year.



4.9 Mixed Mode Ventilation

Mixed mode ventilation systems involve hybrid systems incorporating natural ventilation and air conditioning. Natural ventilation is provided when the ambient conditions are suitable through the use of operable windows or façade vents. When the ambient conditions become unacceptably high or low, the natural ventilation systems are disabled and the air conditioning or heating system is activated to maintain comfort conditions.

The benefits of mixed mode ventilation systems include reduced operating costs and improved occupant comfort levels.



5.0 Electrical Services

5.1 Integrated daylight / artificial daylight control

Where natural lighting is promoted at the building facades additional energy saving features can be employed through the use of photo electric sensors. These controls operate the lighting at the facade through dimming or shutting off lights when the ambient light levels are adequate.

Dimming of lights is preferred to turning lights on and off as the abrupt change in lighting level caused with the latter method of control can cause distractions to the occupants.

5.2 Occupancy sensors

Infrared motion detectors will be employed in rooms which are infrequently inhabited, such as private offices, to shut off lighting and or air conditioning. This method of control is useful in automatically disabling light and/or air conditioning when the rooms are not occupied. These systems are effective however they are more expensive than manual control and are dependent on constant occupant movement and line-of-site to all corners of the room.

Infrared motion detectors are usually employed when occupants cannot be disciplined to manually turn on or off lighting or air conditioning systems.

5.3 Lighting control system

A fully integrated lighting control system which turns lights on and off in accordance with a time schedule can provide both running cost and energy savings. The integrated lighting control system can be linked to occupancy and day lighting controllers to assist in optimising the building lighting system operation.

5.4 Carpark lighting

Carpark lighting energy consumption can be reduced significantly through a number of initiatives to assist in improving the average lux levels and optimising the lighting design.

Provision of low energy light fittings throughout carparks in addition to controlling lights through infrared motion detectors or timers can provide energy reductions.

Opportunities for using integrated PV powered lighting systems for carparking will be considered.

5.5 Exterior lighting

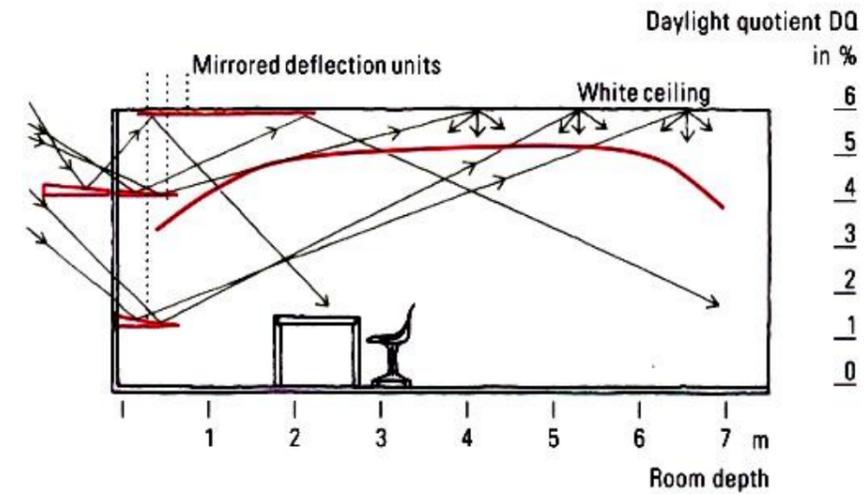
Exterior lighting energy consumption could be reduced through optimum lighting design and use of low energy fittings such as plasma, high pressure sodium or LED fittings. Exterior lighting controls using photoelectric cells will reduce the occurrence of exterior lights operating when not required.

To prevent light pollution all external lighting will be aimed to fall incident upon a building façade.

5.6 Light shelves and prisms

Natural lighting by using light shelf or prism technology can be effective for up to 7m into the room from the façade.

Light shelves provide the glass with direct shading of the window from the sun and they also reflect the visible spectrum deep into the occupied space. Laser cut prisms can refract diffuse light from the sky and direct it deep into the occupied space to reduce the reliance on electric lighting.



Effective natural lighting techniques can reduce not only the annual lighting energy consumption significantly but also assist in reducing the air conditioning load.



6.0 Hydraulics

6.1 Grey water and Rain Water recycling

Due to the usage of the site, it is considered that hydraulics is one area where excellent sustainability initiatives exist and will be explored further for viability within the scope of the cost plan.

As a holiday and permanent residence, it is likely that reasonable quantities of grey water will be generated. In addition, the adjoining athletics stadium is also likely to generate grey water and rainwater. Initial calculations indicate a diversified grey water volume of 70,000 litres per day. This could be as high as 100,000 litres at peak load conditions.

A tourism development like this will be water intensive. The patrons of holiday resorts place high demands on the water infrastructure. At AECOM we see an opportunity to apply a water sensitive design strategy. In harmony with a landscape design that utilises spent water from the site for irrigation, all building water use can be re-used.

By approaching the water design as a closed loop system, we are able to control the input and output of water use. Apart from the obvious environmental benefits, the client saves a considerable amount of money per annum.

In brief we would recommend studies on the following -

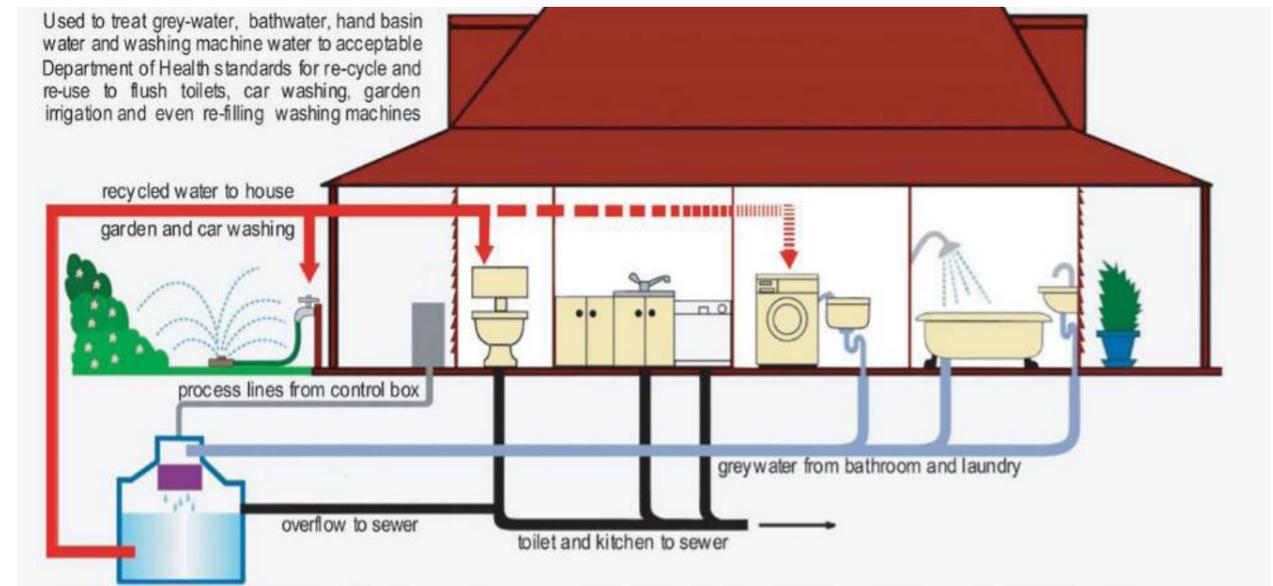
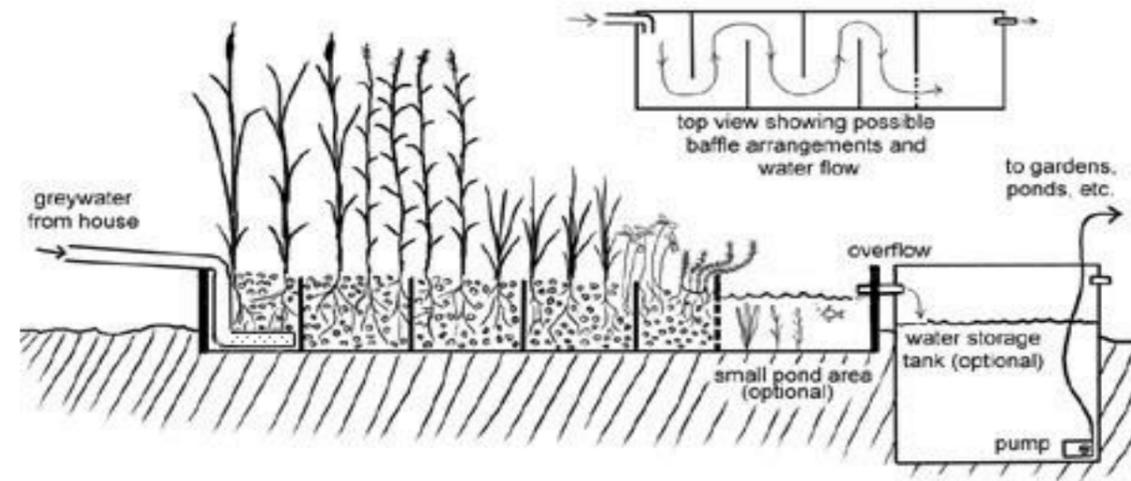
6.2 Site Wide Water Conservation Strategy

Cost of Water

The typical cost for water in remote locations can be \$5.20 per kilo litre (kl). The cost of potable clean water at Jurien Bay will be excessive compared to Perth where a kl of water costs 0.43c. Our site wide water conservation strategy will offer significant potable water consumption savings, and the associated economic benefits.

Grey water treatment and recycling alone reduces demand on the potable water supply by 50%.

The plant material (reeds and sedges) proposed for within the grey water treatment systems are emergent Macrophytes. These Macrophyte plants break down the impurities and polish the grey water passing through the grave bed. The grey water treatment systems operate under oxygenated conditions and produce no odour.

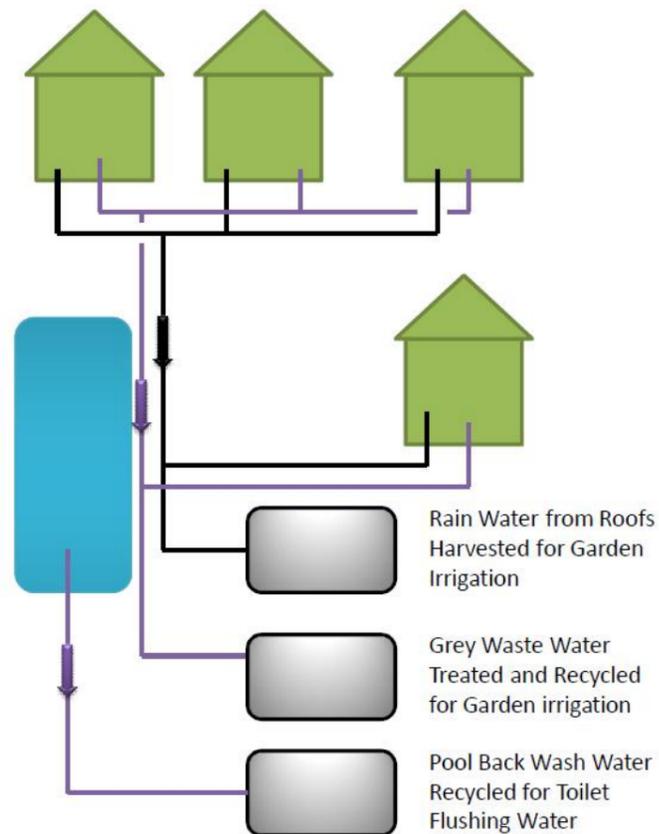


Water ways with Reed Beds for Grey Water Treatment

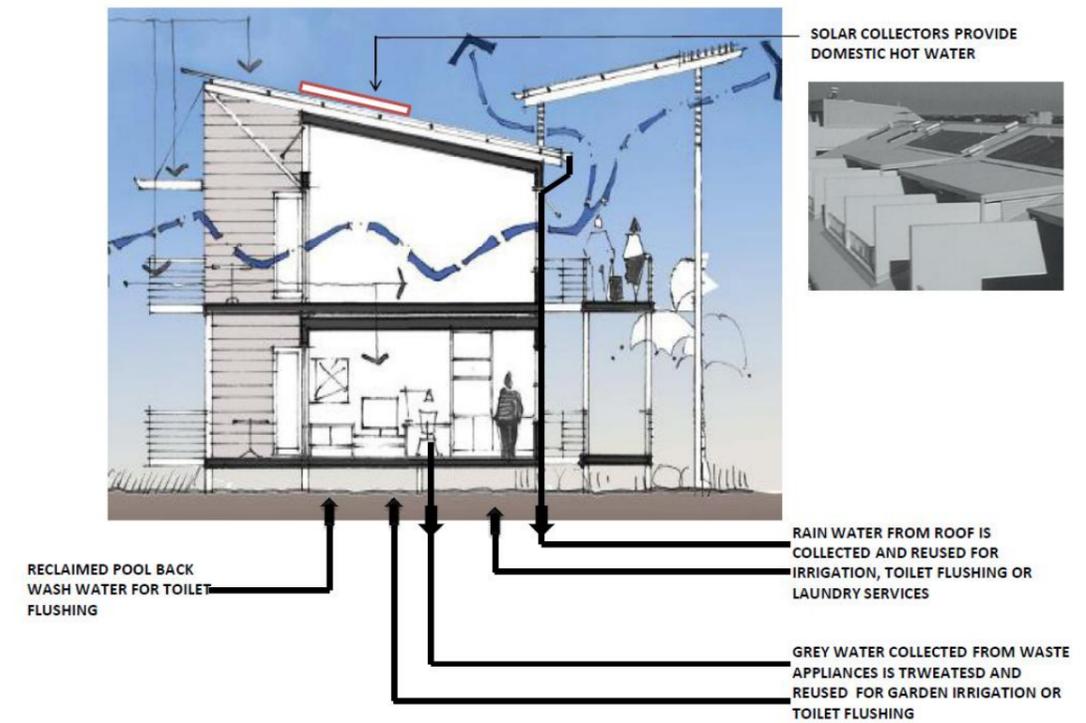
The Hydraulic Services design will be a water sensitive design, interactive with the Landscaping and built environments. The system will minimise offsite foul water and stormwater discharge, and reuse the treated water in specific situations.

The Hydraulic Services system design will incorporate:

- **Reduced flow tap ware** and water efficient sanitary appliances. This will provide significant reductions in the domestic water demand and in the volume of waste water produced.
- **Rain water** from roofed areas will be collected and reused onsite. By capturing and reusing rain water we can reduce the reliance and demand on the water supply infrastructure.
- **Grey Water recycling** treatment system will collect waste water from basins, showers and laundry areas. The grey water is treatment by a grey water treatment package unit. Secondary treatment is provided by interactive landscape water ways and reed beds, designed in conjunction with the landscape architects.
- **Pool filter back wash water** is passed through a back wash sand filter and stored for later reuse. The initial back wash water will be purged and discharged to the stormwater system, the remaining back wash water is collected



A typical water conservation strategy is depicted below.



6.3 Solar hot water

Solar hot water panels are another method of using solar energy directly to reduce the energy consumption. Locating flat panel solar hot water collectors on the roof of the all the buildings could significantly contribute to the supply of domestic hot water demand for the resort.

Hot water generation by solar collectors could also be used to provide heating to the facility or pre-heating of outdoor air.

For space heating, it is envisaged that the solar collectors could heat water which could then pass through either the floor slab or perimeter fin tube convectors.

7.0 Power Generation

The issue of whether the client is prepared to embark on power generation is one that needs to be considered. Generally, the end user of these buildings will not have power generation as part of their core business plan. However, installing green power generation to offset that used by the site may be a viable option.

7.1 Photovoltaic (pv cells)

Photovoltaics generate electricity directly from sunlight using layers of silicon compounds. There are generally four types of photovoltaic types including:

- Monocrystalline Silicon Cells
- Polycrystalline Silicon Cells
- Amorphous solar cells
- Semi transparent

The efficiencies of photovoltaic cells range from 4% to approximately 20%, however the return on investment is still difficult to justify in most cases.

Consideration will be given to installing photovoltaic cells on the roof area of block A and B. There is the potential to install over 100kW capacity with photovoltaics.

The current payback period for photovoltaics is between 8 to 10 years and the embodied energy required to manufacture them is significant questioning their viability for this project.

This notwithstanding, block A and B has significant roof area which could be utilised for mounting of solar panels. Alternately, translucent cells could be integrated within the façade to provide some natural lighting as well as generating electricity.

Similarly, PV powered lighting for paths and roads within the facility may have a reduced payback due to reduced cabling and infrastructure requirements.

7.2 Façade integrated PV cells

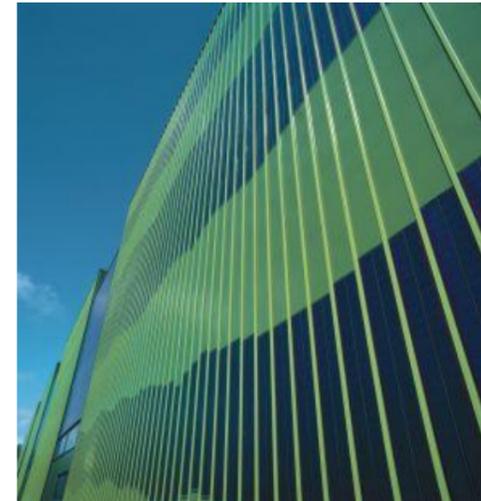
Façade integrated PV cells provide all of the benefits and disadvantages of the previous clause. However façade integrated PV cells provide slightly better returns as they can be offset against the façade material.

As mentioned previously, integrating translucent cells within the roof of selected roof areas could provide some natural lighting, as well as electricity generation.

7.3 Wind power

Wind power could be employed to generate electricity on site through the use of wind mills mounted at high level above the height of any neighbouring buildings or other obstructions.

Nominated locations around the entire site may be acceptable for mounting the turbines.



8.0 Materials

8.1 Natural and Renewable Resources

Where ever possible natural and renewable materials will be specified for use in the construction of the resort. Natural and renewable products lower the impact of the development on the local environmental. Old growth forests will be avoided and preference will be given to plantation timber preferably from local sources.

8.2 Embodied energy

Embodied energy can account for up to 30% of a building's total energy consumption. The facility will be constructed from low embodied energy materials. Embodied energy includes the energy used in extracting the raw material, energy in processing and manufacturing the material or product and transport energy costs. This means preference will be given to using materials which are quarried or harvested locally, have minimal processing required to create the finished products, are easily installed with little wastage and are easily disposed of or recycled.

Various amounts of sometimes conflicting data exist on embodied energy. Consideration will be given to adopting a principle of construction without full auditable material selection guidelines.

8.3 Toxicity

Materials will be selected with minimal toxicity effects. Materials such as paint finishes, adhesives, carpets or wall cladding and with Volatile Organic Compounds (VOC) will be avoided or minimised. PCB's (Polychlorinated Biphenyls) will be avoided and the use of PVC's (Poly Vinyl Chloride's) will be reduced. The benefits of reducing these products include improved occupant health with the potential for reduced sick building syndrome and a reduced impact on the environment through toxic chemical dilution.

8.4 Use of industrial by-products

The use of industrial by-products in lieu of non-renewable resources will be considered. Flyash is a product of industrial process which can be used in cement to provide fill and improve insulation qualities. Consideration will be given by the structural engineer for use of flyash concretes in relation to suitability of concrete strength.

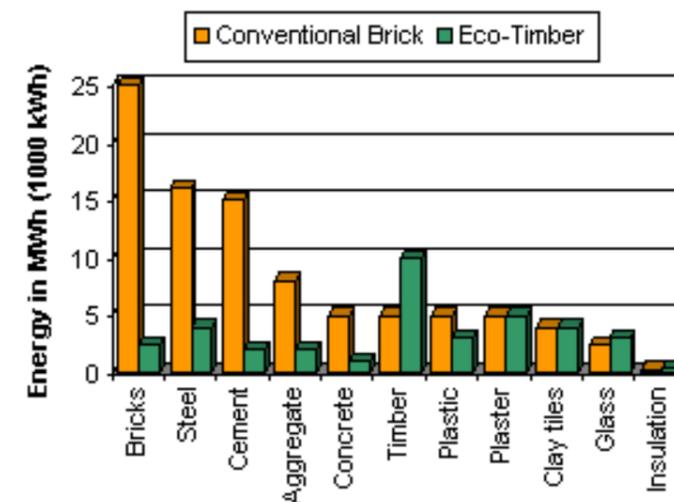
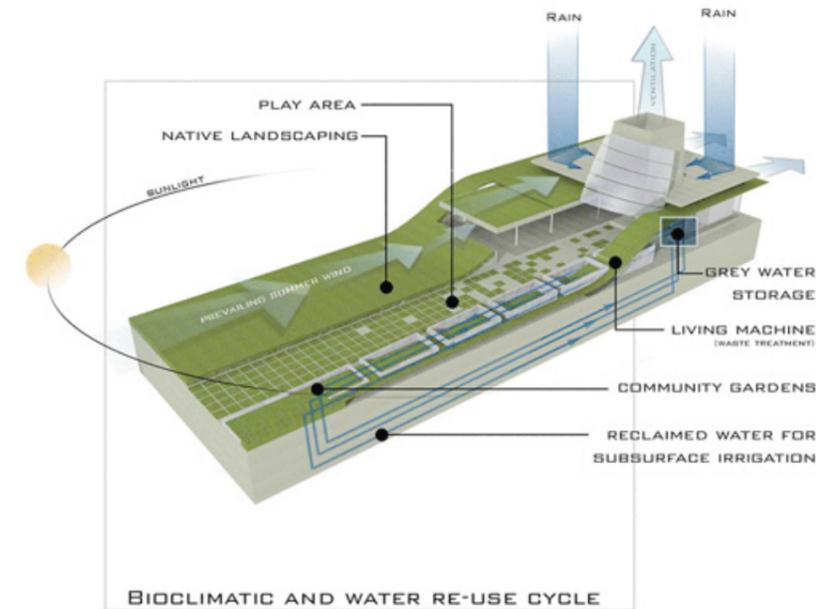
8.5 Durability

Good quality materials which have long lasting qualities will benefit the project and provide lower energy costs over the duration of the buildings. The necessity to replace materials such as carpet or wall materials before the economic life of the building will cost more and incur greater energy through maintenance and material embodied energy.

8.6 Deconstruction

An item not commonly considered as part of sustainability is the deconstruction and refurbishment aspects of a project. At the time of deconstruction, demolition techniques oftentimes render the original building product as unusable.

Building techniques that allow building elements to be readily reused will be considered.



9.0 Waste

9.1 Maximise off-site prefabrication

Maximising off-site prefabrication will contribute to significant savings in construction energy and land fill waste. Off-site pre-fabrication can also improve construction programme thereby improving the overall construction efficiency.

9.2 Recycle construction waste

Separate bins will be located on site during the construction period to encourage construction waste recycling. The benefits will be in reducing landfill and transport energy however training of construction workers will need to be carried out.

9.3 Recycling space

The new buildings will be provided with facilities and space for recycling of waste such as plastics, paper and cardboards and for glass. This will involve providing local deposit locations and bins.

The benefits include a reduction in wastes to landfill however it does rely on staff attitude and management practices.



10.0 Site Considerations

10.1 Maintain or improve site ecology

Many projects are built on sites which once incorporated indigenous flora and fauna. To minimise the impact of this development on the environment, the existing natural surroundings will be maintained as much as possible. This means retaining natural contours, bird life, etc where possible.

Where excavation is required, the extent of excavation will be minimised and the landscaping will only use indigenous species which are indigenous to the immediate local area. This reduces the environmental impact of the development on the sites flora and fauna.

10.2 Landscaping and Microclimates

Landscaping will provide more desirable microclimates around the buildings can improve the comfort for occupants in transit and reduce the climatic effect on the building façade. Microclimates can be achieved through the use of effective landscaping and shading. The form of the landscape, the use of vegetation around buildings and the arrangement of buildings can reduce the occurrence of suntraps and promote comfortable microclimates. Prevent wind tunnel effect around buildings. Open spaces between buildings can promote wind distribution and reduce wind restrictions.

Consideration will be given for designing wind paths around buildings and using landscaping to improve comfort conditions in microclimates surrounding the buildings. This will provide improved comfort conditions for occupants outside the buildings.

The use of trees to provide shading from low angle sun in both the summer and winter will also be considered. Refer to the landscape masterplan for a more detailed description.

10.3 Bioswales and roof gardens

Bioswales and roof gardens can be used to collect and absorb water into the ground in lieu of discharging into the stormwater system. Consideration will be given to incorporating bioswales into the landscape design to collect and absorb stormwater from the hard standing areas and building footprint.

The majority of rainwater and grey water from the site is to be harvested and reused in the facility, however, any other runoff, including from remote road ways and the like, will be directed to recharge the local aquifer.



APPENDIX 4:
**Coastal Hazard Risk Management &
Adaptation Plan**

R1132 Rev 0

February 2019

Aliceville Pty Ltd

**Lot 62 Roberts St, Jurien Bay
Coastal Hazard Risk Management & Adaptation Plan**

marinas

boat harbours

canals

breakwaters

jetties

seawalls

dredging

reclamation

climate change

waves

currents

tides

flood levels

water quality

siltation

erosion

rivers

beaches

estuaries

www.coastsandports.com.au

m p rogers & associates pl

creating better coasts and ports

Suite 1, 128 Main Street, Osborne Park, WA 6017

p: +618 9254 6600

e: admin@coastsandports.com.au

w: www.coastsandports.com.au

K1571, Report R1132 Rev 0

Record of Document Revisions

Rev	Purpose of Document	Prepared	Reviewed	Approved	Date
A	Draft for MRA & Client Review	A Clapin	C Doak	C Doak	5/12/2018
A	Updated & Issued for Client Use	A Clapin	C Doak	C Doak	12/02/2019

Form 035 18/06/2013

Limitations of this Document

This document has been prepared for use by the Client in accordance with the agreement between the Client and M P Rogers & Associates Pty Ltd. This agreement includes constraints on the scope, budget and time available for the services. The consulting services and this document have been completed with the degree of skill, care and diligence normally exercised by members of the engineering profession performing services of a similar nature. No other warranty, expressed or implied, is made as to the accuracy of the data and professional advice included. This document has not been prepared for use by parties other than the Client and its consulting advisers. It may not contain sufficient information for the purposes of other parties or for other uses.

M P Rogers & Associates takes no responsibility for the completeness or form of any subsequent copies of this document. Copying this document without the permission of the Client or M P Rogers & Associates Pty Ltd is not permitted.

Table of Contents

1.	Introduction	6
1.1	Coastal Hazard Assessment Requirements	9
2.	Context	12
2.1	Purpose	12
2.2	Objectives	12
2.3	Scope	12
2.4	The Site	14
2.5	Stakeholder Engagement	16
2.6	Existing Planning Controls	17
2.7	Key Assets	21
2.8	Success Criteria	23
3.	Coastal Hazard Identification	24
3.1	Coastal Erosion Hazard Allowances	24
3.2	Coastal Inundation Hazard Allowance	27
4.	Coastal Vulnerability	29
5.	Risk Analysis	30
5.1	Likelihood	30
5.2	Consequence	34
6.	Risk Evaluation	38
6.1	Risk Evaluation Matrix	38
6.2	Risk Assessment	38
7.	Risk Adaptation & Mitigation Strategies	41
7.1	Coastal Adaptation Approach	41
8.	Implementation Plan	46
8.1	Planning & Initial Construction	46
8.2	Operation Over the Infrastructure Service Life	46
8.3	Asset Replacement	47
8.4	Monitoring & Review	48

9. Conclusions	50
10. References	51

Table of Figures

Figure 1.1	Lot 62 Roberts St, Jurien Bay Location	6
Figure 1.2	Hotel & Residential Resort Basement (Left) & First Level (Right)	8
Figure 1.3	Hotel & Residential Resort Ground Level	8
Figure 2.1	Risk Management & Adaptation Process Flowchart (WAPC 2014)	13
Figure 2.2	Extract from Local Nautical Chart (WA 947)	15
Figure 2.3	Coastal Sediment Cell (Stul et al 2014)	16
Figure 2.4	Local Planning Scheme No.7 Extract	18
Figure 3.1	Coastal Erosion Hazard Lines (Cardno 2018)	26
Figure 3.2	Storm Surge Components	27
Figure 3.3	Recommended Allowance for Sea Level Rise (DoT 2010)	28
Figure 7.1	Risk Management & Adaptation Hierarchy	41
Figure 7.2	Conceptual Shoreline Model (MRA 2009)	44

Table of Tables

Table 1.1	Alignment of the Proposed Development with SPP2.6 Objectives	10
Table 2.1	Key Assets within the Proposed Hotel & Residential Resort	22
Table 3.1	Total Recommended Erosion Hazard Allowances (GHD 2015)	24
Table 3.2	S4 Inundation Levels	28
Table 5.1	Scale of Likelihood	30
Table 5.2	Assessment of Likelihood of Coastal Erosion Impact	32
Table 5.3	Assessment of Likelihood of Coastal Inundation Impact	33
Table 5.4	Scale of Consequence	34
Table 5.5	Assessment of Consequence of Coastal Erosion Impact	36
Table 5.6	Assessment of Consequence of Coastal Inundation Impact	37
Table 6.1	Risk Matrix	38
Table 6.2	Risk Tolerance Scale	38
Table 6.3	Assessment of Risk of Coastal Erosion Impact	39
Table 6.4	Assessment of Risk of Coastal Inundation Impact	40
Table 8.1	Implementation Plan – Planning & Initial Construction Stage	46
Table 8.2	Implementation Plan – Operation Over Infrastructure Service Life	47
Table 8.3	Implementation Plan – Asset Replacement	48
Table 8.4	Implementation Plan – Monitoring & Review	49

1. Introduction

Lot 62 Roberts St (Lot 62) is located on the Western Australia coastline in Jurien Bay, approximately 200 km north of Perth, and within the Shire of Dandaragan (Shire).

Lot 62 is situated immediately landward of Heaton St and Dobbyn Park, a popular area of the Jurien Bay foreshore. The locality of Lot 62 is shown in Figure 1.1.



Figure 1.1 Lot 62 Roberts St, Jurien Bay Location

Current development at Lot 62 is limited to two buildings and a shed, which are relatively degraded and not currently in use. The site is approximately 2.2 ha and is predominantly vacant, with some trees adjacent to the existing buildings.

Aliceville Pty Ltd own Lot 62 and are developing plans to create an exciting new Hotel and Residential Resort. Aliceville recognise the demand for a tourism development within the area and plan to address this by providing world class facilities that are accessible to a wide range of visitors. If economically feasible, the delivery of the Hotel and Residential Resort will result in a much needed approximately \$22.5 million investment into the local community, with corresponding increases in tourist patronage to the region.

The vision for the development is to create an iconic and memorable destination that protects and enhances the existing natural and social values and character of the coastal site. The current plans for the Hotel and Residential Resort feature a hotel at the western corner, a range of other accommodation types, a fitness centre, a bar, two restaurants, swimming pools, an outdoor cinema and a tennis court.

Furthermore, it is intended that the Hotel and Residential Resort will:

- interpret the high standard of marine and terrestrial activities in the region to encourage length of stay;
- provide a range of accommodation types for families and domestic and international visitors;
- provide large landscaped areas and open spaces for guests to relax and play; and
- be capable of satisfying high end escorted coach travellers, fly-in guests and weddings/functions.

The above outcomes will help to increase the level of tourist patronage in the region, which will have a direct benefit to the local economy. The concept plans for the Hotel and Residential Resort can be summarised by the Lawrence Scanlan & Associates Pty Ltd (2011) site plans shown in Figures 1.2 and 1.3.

The basement and first level site plan layouts are shown in Figure 1.2 (left) and 1.2 (right) respectively. The main focus of this assessment, the ground level, is shown by the site layout plan in Figure 1.3.

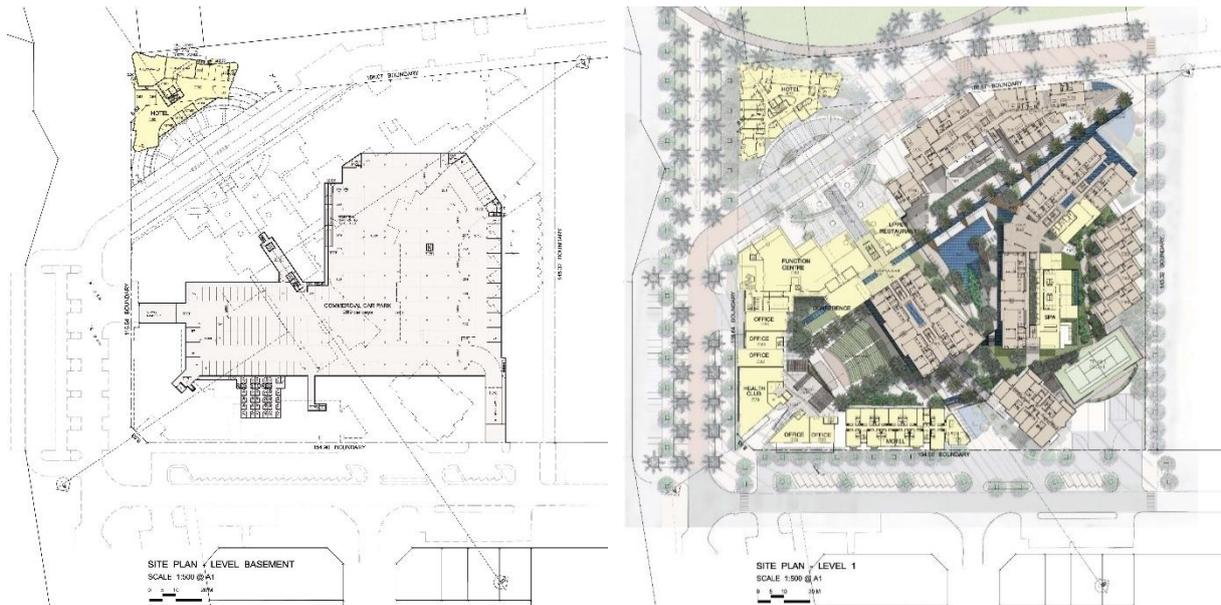


Figure 1.2 Hotel & Residential Resort Basement (Left) & First Level (Right)

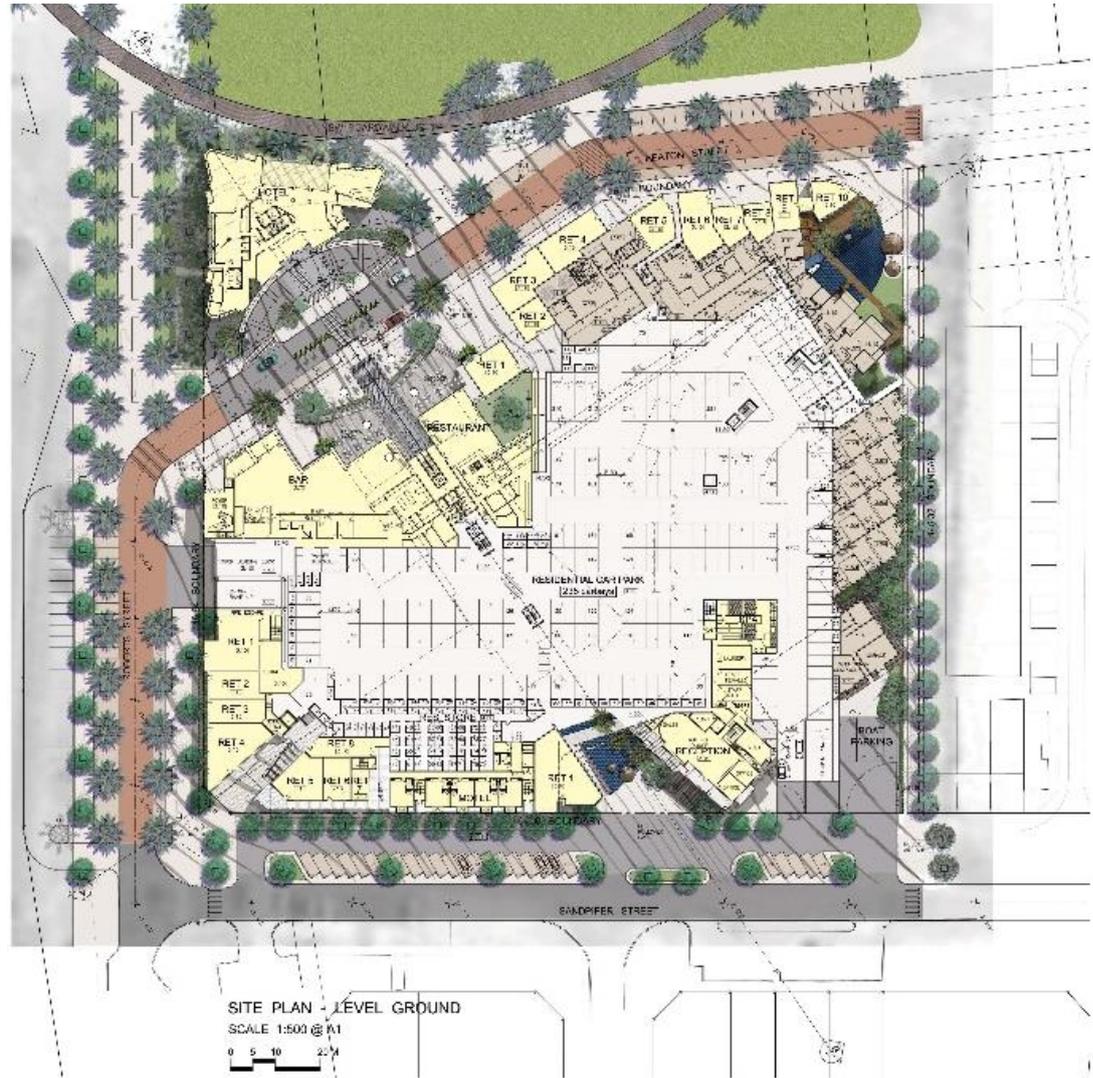


Figure 1.3 Hotel & Residential Resort Ground Level

m p rogers & associates pl

As the proposed Hotel and Residential Resort has a coastal frontage (refer to Figure 1.1), the risks posed to the site from coastal hazards need to be considered both now and into the future. Notwithstanding the potential risks, Aliceville is committed to pursuing the development of the Hotel and Residential Resort if it is economically feasible. Development at this location will provide a world class destination with accommodation and amenities suitable for a diverse range of tourists and visitors, which will help boost the Western Australian tourism industry.

1.1 Coastal Hazard Assessment Requirements

Within Western Australia, State Planning Policy 2.6: State Coastal Planning Policy (SPP2.6; WAPC 2013) provides guidance on the assessment of coastal hazard risks for assets or infrastructure located near to the coast. The objectives of SPP2.6 are wide ranging, however a key component of SPP2.6 is to provide focused areas of the coast for use by the public to access and enjoy the coastal amenity that is inherent to the Western Australian lifestyle. This includes allowing for tourism developments at appropriate locations through provision of access to the foreshore reserve in these areas. Table 1.1 provides further details of how the proposed Hotel and Residential Resort is consistent with the stated objectives of SPP2.6.

Table 1.1 Alignment of the Proposed Development with SPP2.6 Objectives

SPP2.6 Policy Objective	Details of Proposed Hotel & Residential Resort Development
<p>1. Ensure that development and the location of coastal facilities takes into account coastal processes, landform stability, coastal hazards, climate change and biophysical criteria.</p>	<p>The Coastal Hazard Assessment (GHD 2015), discussed in Section 3 of this report, assessed the coastal processes for the relevant Jurien Bay shoreline surrounding the proposed Hotel and Residential Resort development.</p> <p>The concept designs for the Hotel and Residential Resort produced by Lawrence Scanlan & Associates have considered the Coastal Hazard Assessment completed for Jurien Bay and adopted preliminary recommendations made as part of this CHRMAP process. This has included, for example, assigning finished floor levels based on the potential inundation levels over relevant planning timeframes.</p>
<p>2. Ensure the identification of appropriate areas for the sustainable use of the coast for housing, tourism, recreation, ocean access, maritime industry, commercial and other activities.</p>	<p>The proposed Hotel and Residential Resort is located within the Experience Perth tourism brand reach. It is connected with Australia’s Coral Coast to its north (from Cervantes to Ningaloo) via Indian Ocean Drive and the Brand Highway.</p> <p>Jurien Bay and it’s surrounds currently lacks the significant high end tourism development for national and international visitors, which is available throughout the southwest region.</p> <p>In 2011, Jurien Bay was selected as one of nine inaugural ‘SuperTowns’ under the Royalties for Regions Regional Centres Development Plan (SuperTowns) initiative. Under this plan, Jurien Bay is identified as having the potential to develop into a Regional City with a population of over 20,000. To enable growth in Jurien Bay, tourism developments such as the proposed Hotel and Residential Resort are required for the local economy.</p> <p>Tourism Western Australia (2013) have also recognised and registered the proposed Hotel and Residential Resort as a “Significant Tourist Accommodation Development” within Australia’s Coral Coast.</p> <p>With the sustained growth of the northwest Perth Metropolitan region and limited high end tourism facilities available surrounding Jurien Bay, Aliceville recognise the opportunities and plan to deliver a world class destination. Preliminary investigations and consultation have been met with strong support.</p>
<p>3. Provide for public coastal foreshore reserves and access to them on the coast.</p>	<p>The concept plans for the Hotel and Residential Resort development include public parking along Heaton and Roberts St as well as formal access to the foreshore reserve and Dobbyn Park.</p>
<p>4. Protect, conserve and enhance coastal zone values, particularly in areas of landscape, biodiversity and ecosystem integrity, indigenous and cultural significance.</p>	<p>The concept design recognises the strong support for retaining public access to the beaches and foreshore reserve as well as preserving coastal dunes and vegetation for future generations. These coastal values were identified by the wider Shire CHRMAP (Cardno 2018) as discussed further in Section 2.5 of this report.</p>

The guidance on the assessment of coastal hazard risk is provided within SPP2.6 in the form of a methodology to assess the potential extent of coastal hazard impacts, as well as for the development of a Coastal Hazard Risk Management and Adaptation Plan (CHRMAP). Further details in this regard are also provided in the CHRMAP Guidelines (WAPC 2014).

The key requirement of a CHRMAP is to develop a risk based adaptation framework for assets or infrastructure that could be at risk of impact from coastal hazards over the relevant planning timeframe. Importantly, the balance of these risks needs to be considered with reference to the expected lifetime of the assets or infrastructure.

To provide guidance regarding the risks posed by coastal hazards, Aliceville engaged specialist coastal and port engineers, M P Rogers & Associates Pty Ltd (MRA), to complete a CHRMAP for the proposed Hotel and Residential Resort development. This CHRMAP covers the following key items:

- Establishment of context.
- Coastal hazard identification and vulnerability.
- Risk analysis and evaluation.
- Risk management and adaptation planning.
- Implementation planning.

Details regarding each of these items will be provided in this report.

2. Context

2.1 Purpose

The potential vulnerability of the coastline and the subsequent risks to the community, economy and environment needs to be considered for any coastal development.

SPP2.6 requires that the responsible management authority or development proponent prepares a CHRMAP where an existing or proposed development may be at risk from coastal hazards over the planning timeframe. The main purpose of the CHRMAP is to define areas of the coastline which could be vulnerable to coastal hazards and to outline the preferred approach for the monitoring and management of these hazards where required.

A CHRMAP can be a powerful planning tool to help provide clarity to existing and future developers, users, managers or custodians of the coastline. This is done by defining levels of risk exposure, management practices and adaptation techniques that the development proponent, with agreement from the appropriate management authority, considers acceptable in response to the present and future risks posed by coastal hazards.

Specifically, the purpose of this CHRMAP is as follows:

- Confirm the specific extent of coastal hazards in relation to the proposed Hotel and Residential Resort development assets.
- Outline the coastal hazard risks associated with the Hotel and Residential Resort development and how these risks may change over time.
- Establish the basis for present and future risk management and adaptation, which will be used to inform the proposed Hotel and Residential Resort development.
- Provide guidance on appropriate future management and adaptation planning for the proposed Hotel and Residential Resort, including monitoring.

2.2 Objectives

The key objectives of this plan are as follows:

- Inform the Hotel and Residential Resort design development by providing appropriate guidance to the proponents and key stakeholders with respect to the management of coastal hazards.
- Ensure the proponent and key stakeholders understand the potential likelihood, consequence and subsequent risks to assets within the proposed development being impacted by coastal hazards over each planning horizon.
- Outline the required coastal adaptation approach in a project specific Implementation Plan for the proponent and that is acceptable to key stakeholders.

2.3 Scope

The *CHRMAP Guidelines* (WAPC 2014) provide a specific framework for the preparation of a CHRMAP. This is outlined in the flowchart presented in Figure 2.1, which shows the risk management and adaptation process.

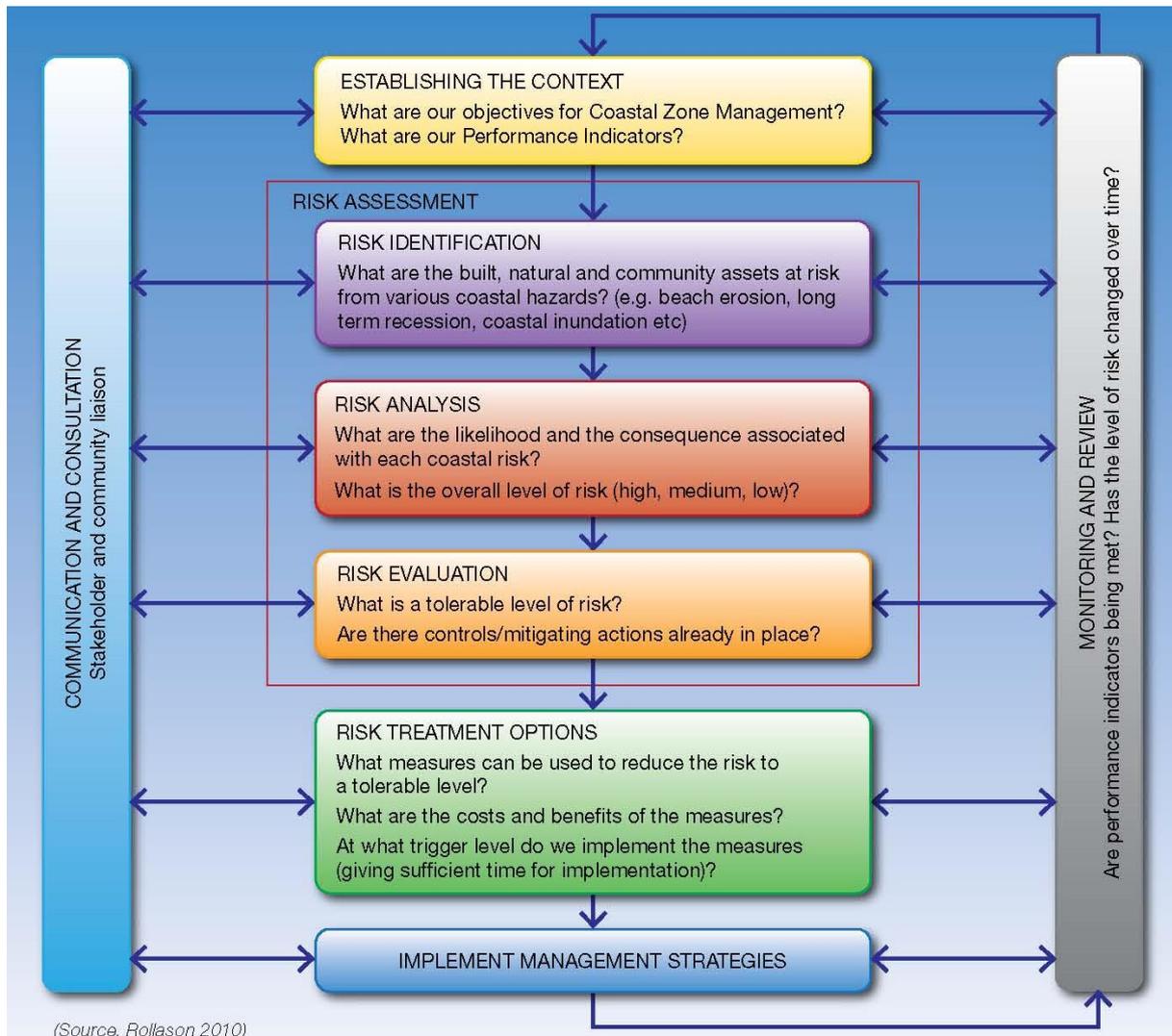


Figure 2.1 Risk Management & Adaptation Process Flowchart (WAPC 2014)

As presented in the flowchart, the process for the development of a meaningful CHRMAP requires a number of fundamental inputs. These inputs enable the assessment and analysis of risk, which should ultimately be informed by input received from key stakeholders, to help shape the subsequent adaptation strategies.

The management of coastal hazard risk associated with the proposed Hotel and Residential Resort development will be required to present a proposed adaptation plan that is acceptable to the stakeholders. As a result, the approach that has been taken for this plan is to develop a management methodology that allows for flexibility into the future.

The development of the adaptation plan will be informed by the assessment of the coastal erosion and inundation hazards at the site. The identification of the coastal erosion and inundation hazards at the proposed Hotel and Residential Resort is presented within Section 3 of this report.

This CHRMAP will consider the potential risks posed by coastal hazards over a range of horizons covering the 100 year planning timeframe, as required by SPP2.6 for development on the coast.

Intermediate planning horizons will also be considered in order to assess how risk profiles may change in the future and to inform the requirement for adaptation strategies. This is particularly significant where these intermediate planning horizons more closely align to the expected service lives of the proposed development assets. The intermediate planning horizons that will be considered in this CHRMAP are based on the available erosion hazard line horizons, discussed in Section 3.1, and are listed below.

- Present day.
- 2030.
- 2070.
- 2110.

Based on the results of the risk assessment, risk mitigation strategies will be developed, where required, in order to provide a framework for future management. However, it is important to realise that the risk assessment will be based on the outcomes of the coastal vulnerability assessment, which by their nature, are justifiably conservative. This is due to the uncertainty around coastal dynamics when predicting impacts over long timeframes. As a result, the framework for future risk management strategies should be considered to be a guide of future requirements.

The actual requirement for implementation of these management actions should ultimately be informed by a coastal monitoring regime. The purpose of this coastal monitoring regime is to identify actual changes in the shoreline or sea level that could alter, either positively or negatively, the risk exposure of the proposed assets and infrastructure. A recommended coastal monitoring regime is included within the Implementation Plan, presented within Section 8.4 of this report.

2.4 The Site

The proposed Hotel and Residential Resort is located on the Jurien Bay coastline, approximately 200 km north of Perth and within the Shire. Situated between Cervantes to the south and Green Head to the north, Jurien Bay is connected with Australia's Coral Coast via Indian Ocean Drive and the Brand Highway. Jurien Bay has a relatively small permanent population of almost 2,000 people (ABS 2016), however is a popular tourist destination with a range of activities on offer including swimming, fishing, snorkelling, surfing, walking, kitesurfing, skydiving and sightseeing.

The shoreline fronting the Jurien Bay townsite is relatively well protected by the adjacent fringing reef and groups of offshore islands. The beach receives waves averaging less than 0.5 m, which combined with the fine beach sand, maintain a wide low gradient beach and inshore area (Short 2006). The extent of the reef, islands and shallow nearshore area surrounding the site is best illustrated on the local nautical chart, an extract from which is provided in Figure 2.2.



Figure 2.2 Extract from Local Nautical Chart (WA 947)

The long-term stability of the geomorphic landform at Island Point, south of Lot 62 (refer to Figure 2.2) is dependent on the ongoing supply of sand that originates in the lee of the offshore island chain (GHD 2015).

The Jurien Bay townsite, encompassing the proposed Hotel and Residential Resort, is located within Secondary Sediment Cell 6 - Grey to Middle Head, as identified in Stul et al (2014) and presented in Figure 2.3. The coastal hazard assessment and adaptation strategies presented by this CHRMAP consider this entire sediment cell, as recommended in SPP2.6.

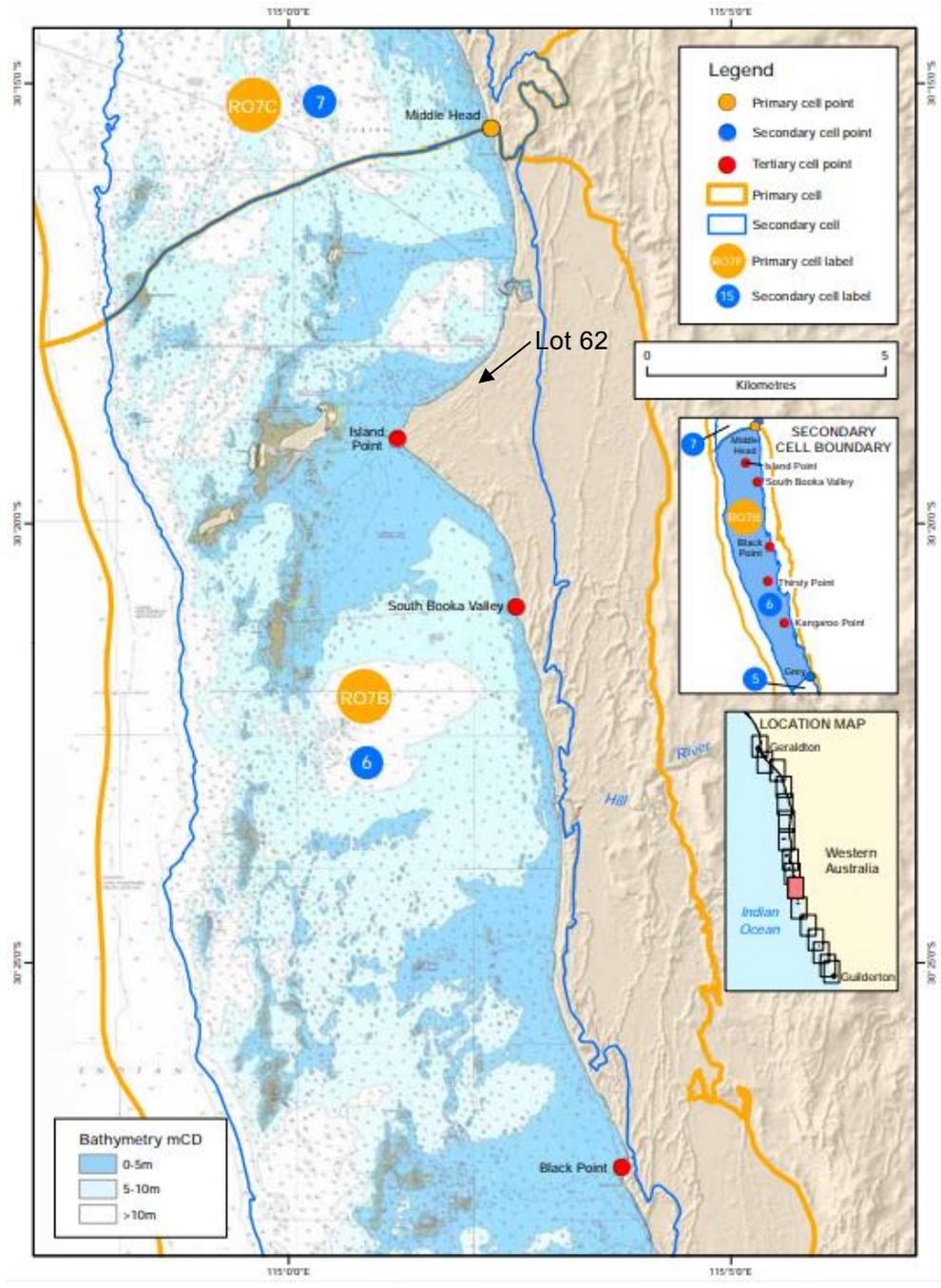


Figure 2.3 Coastal Sediment Cell (Stul et al 2014)

2.5 Stakeholder Engagement

In 2018, Cardno completed a CHRMAP for the entire Shire, which encompasses Jurien Bay and the proposed Hotel and Residential Resort development area. As part of this wider CHRMAP, stakeholder and community engagement was completed. This engagement was completed to capture the coastal values of the community, inform the public about coastal hazards and the CHRMAP process and gauge attitudes towards the various adaptation options available. A community engagement session was facilitated by the Shire in Jurien Bay on 27 May 2017 and followed by an online survey in June 2017.

The key outcomes of the CHRMAP community engagement are summarised below.

- The community strongly support the ongoing provision of the foreshore reserve for current and future generations.
- The community strongly agreed that private landholders should be informed about the risk of erosion when purchasing or developing in hazard areas and that development should be limited in these areas.
- There was strong community disagreement for protecting private property from erosion when this results in the loss of the public foreshore reserve and beach access.
- The community moderately support allowing private land owners to protect their property when they have demonstrated there will be no impact on the adjoining coast.
- The community moderately support relocating assets away from the coast and letting natural processes take their course.

The wider CHRMAP completed for the Shire doesn't address Lot 62 or the proposed Hotel and Residential development specifically. Nonetheless, the key community engagement and CHRMAP outcomes will be considered in this assessment and used to help determine appropriate risk adaptation and mitigation strategies.

This is considered to be the key stakeholder input required for the preparation of this CHRMAP, in addition to the Shire, since the development of Lot 62 is in accordance with the relevant planning requirements and schemes (refer to Section 2.6). There has been ongoing consultation with the Shire during the development application process, which will continue throughout the planning phase of this project.

2.6 Existing Planning Controls

The proposed Hotel and Residential Resort has regard for a number of planning requirements and considerations. Details of these are provided within the following section.

2.6.1 Land Tenure & Ongoing Management

The proposed Hotel and Residential Resort development site is legally described as:

Lot 62 on Deposited Plan 207149, Volume 1499, Folio 123.

Aliceville purchased Lot 62 in June 2004 and is committed to the ongoing management of coastal risk and the acceptance of this risk as part of the proposed development. Aliceville has acknowledged and accepted the coastal hazard risks presented by this CHRMAP document.

The risk management and adaptation requirements for Lot 62 will be determined in the next phase of this CHRMAP process, however construction of coastal protection works to protect the development is not something that would be contemplated by Aliceville, unless the wider Shire's CHRMAP (Cardno 2018) was updated to identify this as the preferred adaptation strategy for the broader region.

2.6.2 Shire Local Planning Scheme No.7

The Jurien Bay townsite, inclusive of Lot 62, Roberts Rd, is governed by Local Planning Scheme No.7 (LPS7). The majority of Lot 62, Roberts Rd was rezoned 'Special Use No.4 - Tourist Resort'

under Scheme Amendment No.21 (2015) of LPS7, with a portion of the site reserved as 'Local Road.' This is shown in the following extract of LPS7.

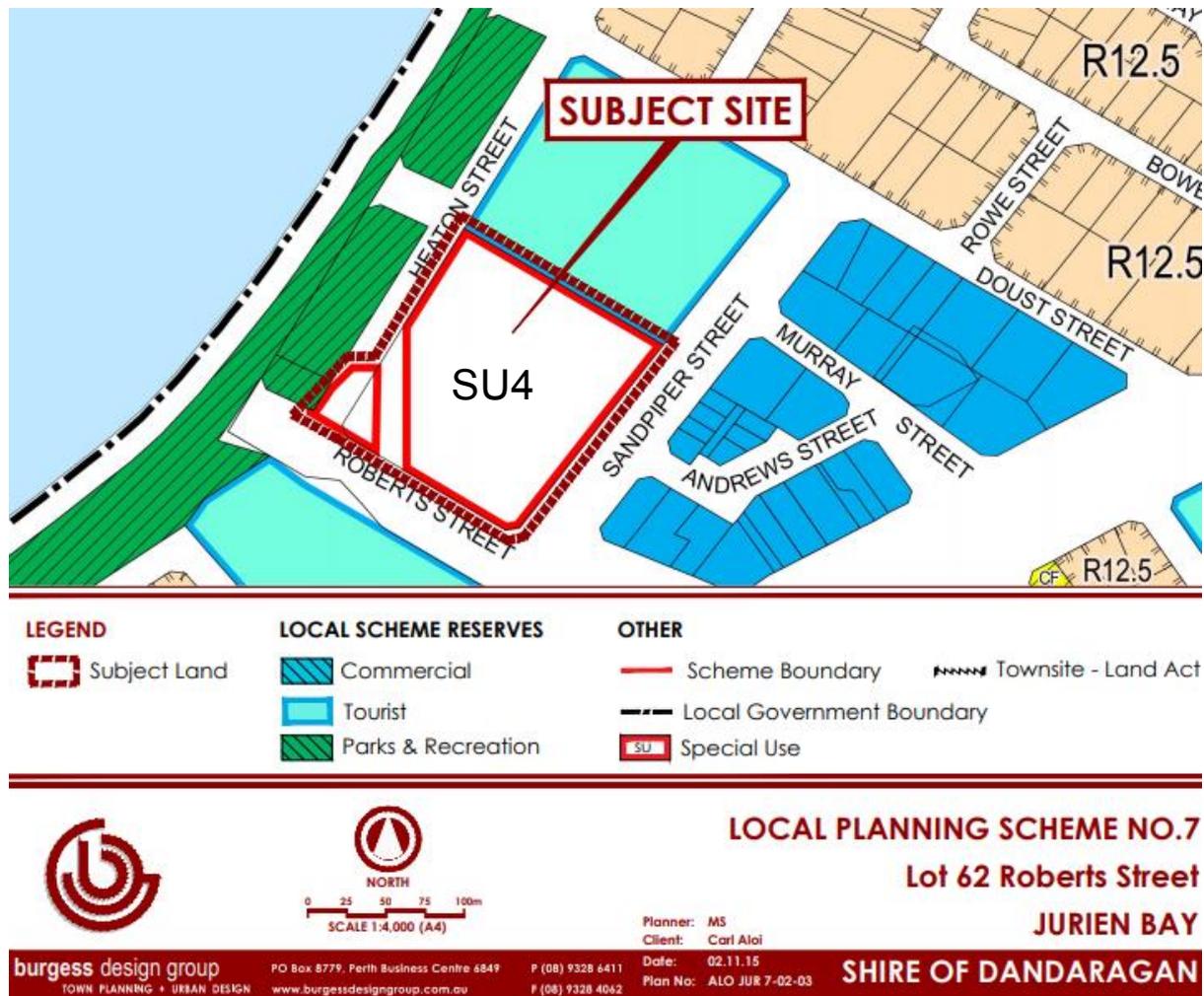


Figure 2.4 Local Planning Scheme No.7 Extract

The proposed Hotel and Residential Resort concept plans are compliant with this zoning, which permits a range of tourism, recreation, residential and commercial activities. Two clauses of the Lot 62 special use zone (SU4) that specifically reference coastal hazards are given below:

Condition 6: Prior to the approval of development on the site a CHRMAP is to be prepared in accordance with SPP2.6 and approved by the local government. The CHRMAP should include but not be limited to consideration of inundation, erosion, finished floor levels, setbacks and drainage. Relevant adaptation measures are to be implemented at the time of development.

*Condition 14: A notification to the following effect is to be placed on the certificate(s) of title of any proposed lot(s) identified in the CHRMAP that may be affected by coastal hazards:
 Vulnerable coastal area – This lot is located in an area likely to be subject to coastal erosion/inundation over the next 100 years.*

The completion of this CHRMAP report aims to address Condition 6 of the LPS7 Scheme Amendment No.21. Furthermore, the adaptation and mitigation strategies and Implementation

Plan discussed in Sections 7 and 8 respectively will discuss the notification of title required by Condition 14 of the LSP7 Scheme Amendment No.21.

2.6.3 Jurien Bay Regional Centre Growth Plan

In 2011, Jurien Bay was selected as one of nine inaugural 'SuperTowns' under the Royalties for Regions Regional Centres Development Plan SuperTowns initiative (Regional Development Council). Under this plan, Jurien Bay is identified as having the potential to develop into a Regional City with a population of over 20,000.

The Jurien Bay Regional Centre Growth Plan was subsequently completed in 2012(a) (Eaton et al) and recognizes tourism development within the area as a key economic driver to support this sustainable growth. Furthermore, the Plan recognises that Jurien Bay has the potential to develop a strong value proposition as a higher end 2-3 day destination for national and international guests, leveraging on the nearby beautiful local natural environment.

The Jurien Bay Regional Centre Growth Plan states that the development of an Interpretative Centre and associated café at Dobbyn Park in conjunction with the proposed development at Lot 62 'would "bookend" and frame the view looking to the coast along Roberts St and abut the pedestrian link from Roberts St to the foreshore and jetty' providing a major public activation opportunity.

2.6.4 Jurien Bay Town Centre Strategy (2012)

Eaton et al (2012b) have prepared a Draft Jurien Bay Town Centre Strategy that aims to provide a clear direction for future development and management within the Jurien Bay Town Centre. The relevant aims of the strategy are:

- A vision (and possible theme) for the town centre of Jurien Bay looking forward 10-15 years.
- Where future commercial, tourist, medium density residential and mixed use development should occur based on physical, social and environmental considerations.
- Appropriate scale and density of development (residential, commercial, tourist) to achieve a sustainable economic benefit, whilst enhancing the quality of wellbeing, lifestyle and services for the broader community.
- Consolidation of land use and establish a framework to deliver a more integrated, sustainable, and functional town centre environment.

Aliceville intend to achieve the above Town Centre Strategy aims by providing the following in the delivery of the proposed Hotel and Residential Resort development:

- Long term economic benefit to the town centre.
- Jobs for the local community.
- A central tourist core for Jurien Bay into the future.
- A bookend development to Roberts St.
- An active pedestrian link along Roberts St to the Jurien Bay Foreshore.

2.6.5 Shire Local Tourism Planning Strategy

The Shire Local Tourism Planning Strategy (Tourism Western Australia 2012) is the current guiding strategic document for tourism planning within the Shire.

The Strategy has been formed through the analysis of the existing State, regional and local framework and the development of a tourism profile. It recognises the proposed development at Lot 62 as 'presenting a number of opportunities to facilitate the creation of a tourism precinct between the town centre and the foreshore.'

2.6.6 Shire Local Planning Strategy

A Draft Local Planning Strategy (LPS; 2016) is currently being considered for the entire Shire to outline a 10-15 year planning direction in the context of State and regional planning policies. It will also provide a rationale for land use zoning and planning provisions for amendments to the existing LPS7. Once approved, the current Jurien Bay Town Centre Strategy will be retained as a separate document to guide ongoing development in the city centre. However, the LPS will incorporate the information of and succeed a number of exiting documents discussed above.

The Draft LPS discusses coastal processes and the wider Shire CHRMAP process being undertaken during the time of writing. The document acknowledges that appropriate coastal setbacks are important, and that engineering solutions to protect coastal infrastructure or residential/tourist development may be required.

The Draft LPS includes the following strategic directions for Jurien Bay that are relevant to the proposed development at Lot 62:

- Recognise Jurien Bay as the regional centre providing services and facilities to serve the wider regional community.
- Provide a diversity of housing in response to demographic trends.
- Increase employment opportunities based on the competitive opportunities identified for the Shire, particularly in the tourism sector.
- Consolidate urban areas and support mixed use sites.

Other strategies relating to coastal hazards in Jurien Bay, given in the Draft LPS include the following:

- New development and coastal facilities to be within areas that can be protected from coastal processes and hazards as per SPP2.6.
- Identify areas in which a detailed CHRMAP needs to be undertaken before rezoning, subdivision or development occur, such as areas that may be subject to coastal inundation and long-term erosion over the planning timeframe.
- Undertake coastal adaptation planning to identify assets, including infrastructure that may be at risk from coastal processes over the planning timeframe, and develop strategies to mitigate or manage risks where appropriate.

The Draft LPS is expected to be updated and adopted by the Shire in the coming years.

2.6.7 Local Development Plan

A Local Development Plan (LDP) for Lot 62 Roberts Rd, Jurien Bay has been prepared by Burgess Design Group (2016). This was completed in accordance with the LSP7 Scheme Amendment No.21 and endorsed by the Western Australian Planning Commission (WAPC) in September 2015.

The LDP discusses in detail the existing planning framework relevant to Lot 62 and how the proposed Hotel and Residential Resort development plans to address them.

2.7 Key Assets

The proposed Hotel and Residential Resort development is being prepared with the specific requirement to not negatively impact the social and environmental values of the area, as to do so would be an unacceptable outcome to the key stakeholders and would detract from the tourism potential for the site. As a result, the preservation of social and environmental values is considered to be inherent in the development of the relevant plans for the Hotel and Residential Resort.

It has therefore been identified that a coastal adaptation strategy will need to be prepared to ensure that there is no negative impact on the social and environmental values of the area. This will require a coastal adaptation strategy that, incorporating the results of the coastal hazard assessment (GHD 2015), ensures the development assets are appropriately designed for and managed to safeguard against any adverse impacts. This is further discussed by the adaptation options presented in Section 7 of this CHRMAP.

This assessment will be completed with regard for the expected economic life of the built assets that will be constructed for the proposed Hotel and Residential Resort development. For instance, it is envisaged that the design life of the structures within the proposed development will be limited to 50 years. Beyond this period, it is expected that the condition of these assets would be such that they would need to be replaced, as is common for structures immediately adjacent to the coastline given the corrosive nature of the environment.

The key assets proposed within the Hotel and Residential Resort development are shown on the concept plans previously provided in Figure 1.2 and 1.3 and have been summarised in Table 2.1. The risk assessment will focus on these assets in order to identify their vulnerability and consequently the requirements for risk management.

The beach and Dobbyn Park located immediately landward of Lot 62, are also considered to be key assets, however have been previously assessed by the wider Shire CHRMAP (Cardno 2018). They will be discussed in Section 7 in relation to the proposed adaptation strategies.

It is also noted that the existing built assets on the site, the two buildings and shed, will be demolished to enable the construction of the Hotel and Residential Resort.

Table 2.1 Key Assets within the Proposed Hotel & Residential Resort

Key Assets	Finished Floor Level (mAHD) (Development Level)
Environment	
Beach	N/A
Social	
Dobbyn Park	~ 3.0
Hotel	5.1 (Ground)
Bar	4.6 (Ground)
Restaurant	4.6 (Ground)
Spa	5.4 (Ground)
Staff Accommodation	5.4 (Ground)
Residences	> 4.0 (Ground)
Motel	5.4 (Ground)
Boardwalk	> 3.0 (Ground)
Economic	
Residential Carpark	5.4 (Ground)
Commercial Carpark	1.7 (Basement) and 3.35 (Ground entrance point)
Roberts St Road/Carparking	3.35 (Ground)
Heaton St Road/Carparking	3.8 (Ground)
Reception	3.6 (Ground)

Notes: 1. Finished floor levels are based on the lowest proposed development ground level for each asset group.

2. Assets on the first level are located above approximately 7.8 mAHD and will be addressed in this CHRMAP by the assessment of the ground level assets that they are located above.

2.8 Success Criteria

The success criteria for the CHRMAP will ultimately be as follows:

- Demonstrated understanding by the proponent and key stakeholders regarding the likelihoods, consequences and subsequent risks of coastal hazards impacting identified assets over each planning horizon.
- Evidence of the stakeholder engagement outcomes being incorporated throughout the development of risk management and adaptation measures.
- Acceptance of a risk management and adaptation plan for the 100 year planning timeframe by the proponent and key stakeholders.
- Adoption of the Implementation Plan (refer to Section 8) by the proponent throughout the development and operation of the Hotel and Residential Resort.

The outcomes of the success criteria listed above are presented in the following sections of this report.

3. Coastal Hazard Identification

An understanding of the coastal hazards and potential risks is critical for the assessment and determination of management and adaptation actions. Appropriate coastal erosion and inundation hazard allowances have been determined in accordance with SPP2.6 and are presented in the following sections.

3.1 Coastal Erosion Hazard Allowances

A Coastal Hazard Assessment was previously completed by GHD (2015), which was reviewed and accepted for adaptation planning purposes by DoT. It was completed in accordance with SPP2.6 and included the calculation of coastal erosion hazard lines for the present day (2016), 2030, 2070 and 2110 year planning horizons. These coastal erosion hazard lines were subsequently adopted for use by the wider Shire CHRMAP completed by Cardno (2018).

SPP2.6 provides the methodology for completing an assessment of the potential impacts from erosion on coastal development in Western Australia. For sandy coasts, relevant for the shoreline fronting the proposed Hotel and Residential Resort, this methodology requires consideration of the following coastal erosion hazard allowances:

- Allowance for the current risk of storm erosion (termed the S1 allowance).
- Allowance for historic shoreline movement trends (termed the S2 allowance).
- Allowance for erosion caused by future sea level rise (termed the S3 allowance).
- Allowance for uncertainty.

The calculation of the above allowances (S1, S2 and S3) is outlined in the Coastal Hazard Assessment (GHD 2015) and determined the following total erosion hazard allowances for the relevant shoreline fronting the proposed Hotel and Residential Resort. The distances are given from the Horizontal Shoreline Datum (HSD).

Table 3.1 Total Recommended Erosion Hazard Allowances (GHD 2015)

Planning Horizon	S1 (m)	S2 (m)	S3 + Uncertainty(m)	Total Erosion Hazard Allowance(m)
Present Day (2016)	49	0	0	49
2030	49	0	10	59
2070	49	0	51	100
2110	49	0	109	158

It is important to understand that these coastal erosion hazard allowances are not intended to be predictions of the future shoreline location, but rather to provide conservative estimates of possible future shoreline retreat that are appropriate for consideration in coastal planning. Nevertheless, the coastal erosion hazard lines will be used for this CHRMAP to inform the potential future risk associated with the proposed Hotel and Residential Resort development.

The coastal erosion hazard lines for the relevant shoreline fronting Lot 62, the proposed Hotel and Residential Resort are shown in Figure 3.1. As shown by the figure, Lot 62 is located landward of the present day (2016), 2030 and 2070 hazard lines. However, the 100 year planning timeframe (2110) coastal erosion hazard line overlaps a relatively small western portion of the site, necessitating the completion of this CHRMAP.

The proposed development must also include consideration of a number of other factors such as public access, recreation, cultural and ecological requirements. In some cases, the required setback from the HSD may therefore be greater than the recommended erosion hazard allowances outlined in Table 3.1.



Figure 3.1 Coastal Erosion Hazard Lines (Cardno 2018)

3.2 Coastal Inundation Hazard Allowance

SPP2.6 requires that the allowance for inundation (termed the S4 allowance) be taken as the maximum extent of inundation experienced during a water level event with a 0.2% Annual Exceedance Probability (AEP) (500 year Average Recurrence Interval (ARI)) plus the appropriate allowance for sea level rise. This is the critical aspect when considering public safety and significant assets, however for tourist based assets where public safety is managed, consideration of less severe inundation events could be appropriate.

Assessment of the inundation levels requires consideration of peak storm surge, including wave setup. A storm surge occurs when a storm with high winds and low pressures approaches the coastline (refer Figure 3.2). The strong, onshore winds and large waves push water against the coastline (wind and wave setup) and the barometric pressure difference creates a region of high water level. These factors acting in concert create the storm surge. The size of the storm surge is influenced by the following factors:

- Wind strength and direction.
- Pressure gradient.
- Seafloor bathymetry.
- Coastal topography.

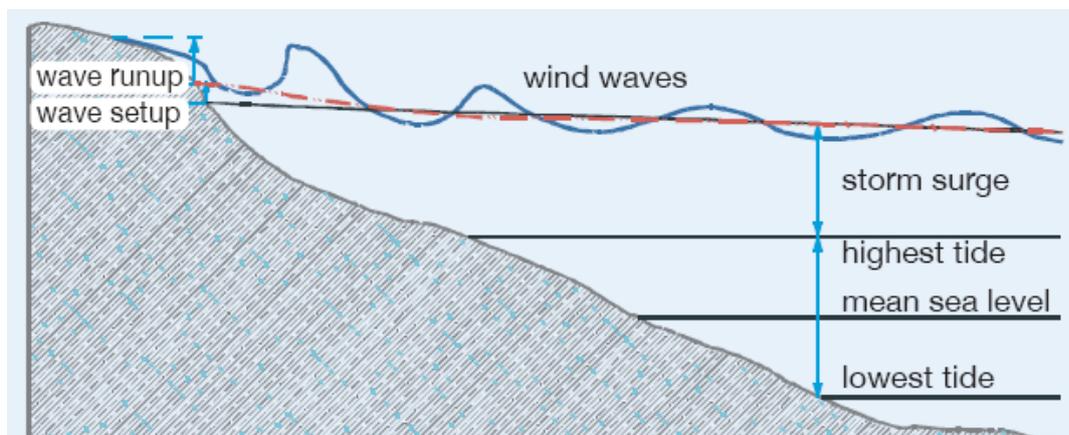


Figure 3.2 Storm Surge Components

The proposed Hotel and Residential Resort is located within Area 3 of SPP2.6 (Figure 1: Coastal Areas) and as such, the allowance for the current risk of inundation should be based on a tropical cyclone storm event.

Design Storms for Western Australia Coastal Planning - Tropical Cyclones (Seashore 2018) provides a preliminary set of estimated ARI inundation levels. This includes a 500 year ARI water level of 3.7 m AHD for Jurien Bay. Similarly, preliminary design water levels are given for 10, 20, 50, 100, 200 and 1000 year ARI events, which have also been used to assess inundation probability as discussed in Section 5.1.2.

As the projected water levels are given for the shoreline, they are assumed to include nearshore wind and wave set up during these events. It is also noted that in the absence of targeted and more detailed modelling, the levels presented by Seashore Engineering (2018) are deliberately conservative. It is also important to note that cyclones produce high waves and water levels for

relatively short periods of time compared to severe storms associated with the passage of cold fronts in the south-west region of Western Australia. These factors will be considered by the risk assessment and subsequent adaptation strategies discussed later in this report.

DoT (2010) completed an assessment of the potential increase in sea level that could be experienced on the Western Australian coast in the coming 100 years. This assessment extrapolated work by Hunter (2009) to provide sea level rise values based on the IPCC (2007) A1FI climate change scenario projections to the year 2110. The derived sea level rise scenario was subsequently adopted by the Western Australian Planning Commission (and SPP 2.6) for use in coastal planning along the Western Australian coast. This is the sea level rise scenario adopted for this assessment and is presented in Figure 3.3.

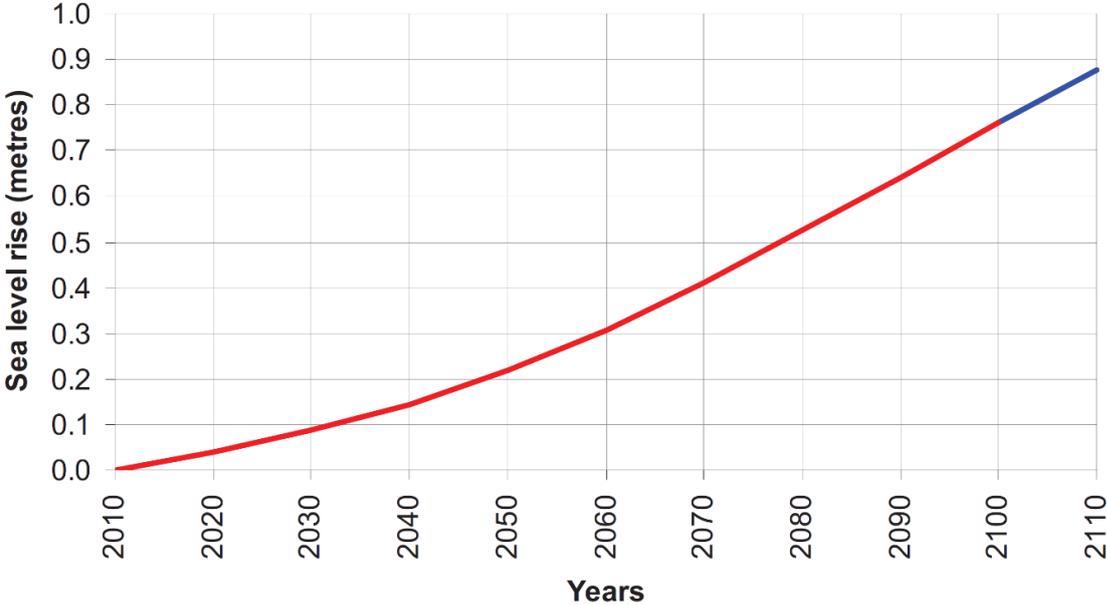


Figure 3.3 Recommended Allowance for Sea Level Rise (DoT 2010)

The total S4 storm surge inundation allowance for the Hotel and Residential Resort, considering the 500 year ARI storm surge water level (Seashore 2018) and the appropriate allowances for sea level rise (DoT 2010) are provided in Table 3.2 for each of the planning horizons.

Table 3.2 S4 Inundation Levels

Planning Horizon	Potential Sea Level Rise Allowance (m)	500 yr ARI Water Level (mAHD)	Inundation Level (mAHD)
Present Day (2016)	0	3.7	3.7
2030	0.06	3.7	3.76
2070	0.38	3.7	4.08
2110	0.9	3.7	4.6

These potential inundation levels will be considered as part of this CHRMAP to comply with the requirements of SPP2.6.

4. Coastal Vulnerability

The vulnerability of the existing and proposed assets identified previously (refer to Figures 1.2 and 1.3 and Table 2.1) is related to their level of exposure to coastal hazards, as well as their sensitivity to the impacts caused by these hazards and their ability to respond to them (termed adaptive capacity). With the exception of the environmental assets, which will essentially be left to naturally respond to the impacts of coastal hazards, the assets that are being considered are built form assets. Therefore, whilst they are being constructed in a way that will allow the assets to be migrated in the future in response to elevated coastal hazard risk, the level of vulnerability of the assets will ultimately be linked to their level of exposure. Further consideration of the risk and future management and adaptation requirements will therefore be needed for these assets. Details of this risk assessment and future management and adaptation requirements are presented in subsequent sections of this report.

5. Risk Analysis

In accordance with WAPC (2014), a risk based approach will be used to assess the hazards and required mitigation and adaptation options for the proposed Hotel and Residential Resort. As coastal hazards are the focus of this assessment, it is the likelihood and consequences of these coastal hazards that need to be considered. As stated previously, it is inherent in the proposal that there be no negative social or environmental impacts as a result of this development, with mitigation strategies already highlighted to address these issues.

5.1 Likelihood

Likelihood is defined as the chance of something happening (AS/NZS ISO 31000:2009). WAPC (2014) defines the likelihood as the chance of erosion or storm surge inundation occurring or how often they impact on existing and future assets and values. This requires consideration of the frequency and probability of the event occurring over a given planning timeframe.

The probability of an event occurring is often related to the AEP or the ARI. The use of the AEP to define impacts of coastal hazards over the planning timeframe assumes that events have the same probability of occurring each year. In the case of climate change and sea level rise, which has a large influence on the assessed coastal hazard risk, this is not true. In addition, there is insufficient data available to properly quantify the probability of occurrence. A scale of likelihood has therefore been developed, which follows the Australian Standard Risk Management Principles and Guidelines (AS/NZS ISO 31000:2009). This is presented in Table 5.1.

Table 5.1 Scale of Likelihood

Rating	Description/Frequency
Almost certain	There is a high possibility the event will occur as there is a history of frequent occurrence 90-100% probability of occurring over the timeframe.
Likely	It is likely the event will occur as there is a history of casual occurrence 60-90% probability of occurring over the timeframe.
Possible	The event may occur 40-60% probability of occurring over the timeframe.
Unlikely	There is a low possibility that the event will occur 10-40% probability of occurring over the timeframe.
Rare	It is highly unlikely that the event will occur, except in extreme/exceptional circumstances. 0-10% probability of occurring over the timeframe.

The likelihood and consequences of coastal hazards are different for erosion and inundation. As a result, the likelihood and consequence of erosion and inundation should be considered separately. The likelihood of the coastal hazard impacts is discussed in the following sections.

5.1.1 Coastal Erosion

The likelihood ratings given to the proposed development assets are based on the coastal erosion hazard lines (Figure 3.1) and the consideration of the probabilities of each of the allowances occurring within the respective planning horizons.

It is important to note that the hazard lines reaching a particular asset at the end of the planning horizon do not necessarily mean this will occur. This is due to the fact that it requires all of the following to occur:

- Erosion of 0.2 m/year (uncertainty allowance) in an area not identified as eroding.
- The upper estimate of erosion caused by sea level rise.
- The 100 year ARI severe storm event to be experienced at the end of the planning timeframe (ie when the other allowances have been realised).

Only if all of these occur will the erosion hazard lines be realised.

At the Hotel and Residential Resort, shoreline change above the HSD is predominantly driven by the 100 year ARI severe storm erosion event over the shorter term planning horizon to almost 2070. Without the 100 year erosion event being realised, coastal change will be limited to impacts to the beach and vegetation seaward of Dobbyn Park over the planning horizon to 2070.

This has been considered in the assessment of likelihood for the relevant assets over the 100 year planning horizon.

The assessment of the relative likelihood of each of the identified key assets (refer to Table 2.1), being impacted by erosion hazards over the 100 year planning timeframe, is presented in Table 5.2.

Table 5.2 Assessment of Likelihood of Coastal Erosion Impact

Key Assets	Present Day (2016)	2030	2070	2110
Hotel	Rare	Rare	Unlikely	Possible
Bar	Rare	Rare	Rare	Rare
Restaurant	Rare	Rare	Rare	Rare
Spa	Rare	Rare	Rare	Rare
Staff Accommodation	Rare	Rare	Rare	Rare
Residences	Rare	Rare	Unlikely	Possible
Motel	Rare	Rare	Rare	Rare
Boardwalk	Rare	Unlikely	Possible	Likely
Residential Carpark	Rare	Rare	Rare	Rare
Commercial Carpark	Rare	Rare	Rare	Rare
Roberts St Road/Carparking	Rare	Rare	Rare	Rare
Heaton St Road/Carparking	Rare	Rare	Unlikely	Possible
Reception	Rare	Rare	Rare	Rare

Notes: 1. Based on most exposed location of each asset group.

The assessment of likelihood of coastal erosion impact shows the following:

- Coastal erosion may impact several assets over the 100 year planning timeframe to 2110.
- All of the proposed Hotel and Residential Resort assets are assessed as either Rare or Unlikely for erosion hazard impact over the planning horizon to 2070, with the exception of the Boardwalk (rated Possible).
- The Hotel, Residences and Heaton St Road/Carparking are assessed as Possible for risk of erosion hazard impact over the 100 year planning timeframe to 2110.
- The Boardwalk is assessed as Likely for risk of erosion hazard impact over the 100 year planning timeframe to 2110.

5.1.2 Coastal Inundation

Assessment of the likelihood of coastal inundation is slightly different to that for coastal erosion. This is due to the fact that the potential for coastal inundation will change in the future as the sea level rises. This means that an area that would only be inundated during a very severe event in the present day could potentially be inundated by a much less severe event in the future.

Assessment of the probability of an area being inundated within a given planning horizon therefore needs to consider the changing probability of event occurrence throughout that planning timeframe.

As an example, based on the estimated inundation levels, an area with an elevation of around 3.7 mAHD would just be inundated by the 500 year ARI event in the present day. However, it may be inundated by the 375 and 200 year ARI events in 2070 and 2110 respectively. Cumulative probabilities of occurrence of inundation at each level for the proposed assets were combined on an annual basis. These probabilities have been used to determine the likelihood of each of the key assets being impacted by inundation for the respective planning horizons.

The results of the assessment of likelihood of coastal inundation for each of the key assets (refer to Figure 2.1) is presented in Table 5.3.

Table 5.3 Assessment of Likelihood of Coastal Inundation Impact

Key Assets	Finished Floor Levels	Present Day (2016)	2030	2070	2110
Hotel	5.1 (Ground)	Rare	Rare	Rare	Rare
Bar	4.6 (Ground)	Rare	Rare	Rare	Unlikely
Restaurant	4.6 (Ground)	Rare	Rare	Rare	Unlikely
Spa	5.4 (Ground)	Rare	Rare	Rare	Rare
Staff Accommodation	5.4 (Ground)	Rare	Rare	Rare	Rare
Residences	> 4.0 (Ground)	Rare	Rare	Rare	Unlikely
Motel	5.4 (Ground)	Rare	Rare	Rare	Rare
Boardwalk	> 3.0 (Ground)	Rare	Rare	Unlikely	Possible
Residential Carpark	5.4 (Ground)	Rare	Rare	Rare	Rare
Commercial Carpark	1.7 (Basement)	Rare	Rare	Unlikely	Possible
Roberts St Road/Carparking	3.35 (Ground)	Rare	Rare	Unlikely	Possible
Heaton St Road/Carparking	3.8 (Ground)	Rare	Rare	Unlikely	Unlikely
Reception	3.6 (Ground)	Rare	Rare	Unlikely	Unlikely

The assessment of likelihood of coastal inundation impact shows the following :

- Coastal inundation may impact several assets over the 100 year planning timeframe to 2110.
- All of the proposed Hotel and Residential Resort assets are assessed as either Rare or Unlikely for inundation hazard impact over the planning horizon to 2070.
- The Boardwalk, Commercial Carpark and Roberts St Road/Carparking is rated as Possible for inundation hazard impact over the 100 year planning horizon to 2110. It is noted the assessment of the Commercial Carpark is based on the 3.35 mAHD level, where the entrance ramp comes off Roberts St.

5.2 Consequence

The second part of the risk assessment is determining the consequence of the coastal hazards on the proposed Hotel and Residential Resort assets. A scale of consequence has been developed which provides a range of impacts and is generally consistent with the Australian Standard Risk Management Principles and Guidelines (ISO 31000:2009).

Table 5.4 Scale of Consequence

Rating	Social	Economic	Environment
Catastrophic	Loss of life or serious injury. Large long term or permanent loss of services, employment, finances or culture (75% of community affected), international loss	Damage to property, infrastructure or local economy > \$20M	Major widespread loss of environmental amenity and progressive irrecoverable environmental damage
Major	Serious injury. Medium term disruption to services, employment, finances or culture (<50% of community affected), national loss	Damage to property, infrastructure or local economy > \$5M to \$20M	Severe loss of environmental amenity and a danger of continuing environmental damage
Moderate	Minor injury. Major short or minor long term disruption to services, employment, finances or culture (<25% of community affected), regional loss	Damage to property, infrastructure or local economy > \$500K to \$5M	Isolated but significant instances of environmental damage that might be reversed with intensive efforts. Recovery may take several years.
Minor	Small to medium disruption to services, employment, finances or culture (<10% of community affected), local loss	Damage to property, infrastructure or local economy > \$50K to \$500K	Minor instances of environmental damage that could be reversed. Consistent with seasonal variability, recovery may take one year.
Insignificant	Minimal short-term inconveniences to services, employment, finances or culture (<5% of community affected), neighbourhood loss	Damage to property, infrastructure or local economy < \$50K	Minimal environmental damage, recovery may take less than 6 months.

Similar to the assessment of likelihood, the consequence rating has been completed separately for coastal erosion and coastal inundation. Typically for infrastructure and assets, the consequences associated with coastal erosion are more significant than those associated with coastal inundation. This arises due to the fact that coastal erosion is generally more permanent and more difficult to overcome than coastal inundation. For instance, if the foundations of a house were undermined by erosion it is likely that the house would fall. However, if a house was inundated, while there may be some damage, structural failure would be less likely.

The consequence ratings for coastal erosion and coastal inundation are outlined in the following sections. These consequence ratings are ultimately provided to inform Aliceville of the risks given their future management liabilities as outlined in Section 2.6.

Importantly, this assessment of the consequence of coastal erosion and inundation has been completed on the basis that the public safety risk is managed during severe coastal events. Given that these events are likely to be associated with the passage of severe storms or cyclones, management of public safety is something that will occur through an emergency management plan of the Hotel and Residential Resort and the emergency management procedures of DFES. This is discussed further in Sections 7 and 8 of this CHRMAP.

5.2.1 Coastal Erosion

The assessed consequences of coastal erosion for each of the planning horizons over the 100 year planning timeframe are outlined in Table 5.5.

Table 5.5 Assessment of Consequence of Coastal Erosion Impact

Key Assets	Present Day (2016)	2030	2070	2110
Hotel	Catastrophic	Catastrophic	Catastrophic	Catastrophic
Bar	Major	Major	Major	Major
Restaurant	Major	Major	Major	Major
Spa	Major	Major	Major	Major
Staff Accommodation	Major	Major	Major	Major
Residences	Major	Major	Catastrophic	Catastrophic
Motel	Major	Major	Major	Major
Boardwalk	Minor	Minor	Moderate	Moderate
Residential Carpark	Moderate	Moderate	Catastrophic	Catastrophic
Commercial Carpark	Major	Major	Major	Major
Roberts St Road/Carparking	Moderate	Moderate	Moderate	Moderate
Heaton St Road/Carparking	Moderate	Moderate	Moderate	Major
Reception	Major	Major	Major	Major

Notes: 1. Assumes structures are appropriately designed to withstand coastal forces expected during design events as discussed in following Sections.

The rationale behind the key consequence ratings for coastal erosion impact are provided below:

- As shown in the table, the consequences of erosion vary for some key assets over different timeframes due to the potential effects of increased erosion. For example, the Heaton St Road/Carparking has a Moderate consequence of erosion over the planning horizon to 2070 as the erosion hazard line extends only to the edge of the carparking. However, the 2110 erosion hazard line extends past the entire road and carparking, resulting in a higher quantity of potential erosion and therefore a Major consequence rating.
- The erosion impact consequence ratings assigned to each of the proposed ground level assets also takes into account the first level assets located above. For example, structural failure of the Bar on the ground level would subsequently result in the failure of the Function Centre on the first level.
- The consequence of erosion for assets with toilets or chemical storage was deemed to be more severe, given the potential environmental impact of the erosion of these assets. The erosion of a sewerage system during a cyclone event for example could lead to the contamination of the surrounding fragile environment.

5.2.2 Coastal Inundation

The assessed consequence of coastal inundation for each of the key assets and each of the planning horizons is presented in Table 5.6. Similar to erosion, the consequence of inundation changes over the planning horizons due to the likely increased consequence of a higher water level and potentially greater inundation extents as sea level rise is realised over time.

Table 5.6 Assessment of Consequence of Coastal Inundation Impact

Key Assets	Present Day (2016)	2030	2070	2110
Hotel	Moderate	Moderate	Major	Major
Bar	Moderate	Moderate	Major	Major
Restaurant	Moderate	Moderate	Major	Major
Spa	Moderate	Moderate	Moderate	Moderate
Staff Accommodation	Moderate	Moderate	Moderate	Moderate
Residences	Moderate	Moderate	Major	Major
Motel	Moderate	Moderate	Moderate	Moderate
Boardwalk	Minor	Minor	Minor	Moderate
Residential Carpark	Minor	Minor	Minor	Minor
Commercial Carpark	Moderate	Major	Major	Major
Roberts St Road/Carparking	Minor	Minor	Minor	Minor
Heaton St Road/Carparking	Minor	Minor	Minor	Minor
Reception	Minor	Minor	Minor	Minor

Notes: 1. Assumes structures are appropriately designed to withstand coastal forces expected during design events as discussed in following Sections.

The rationale behind the key consequence ratings for coastal inundation are provided below:

- The impacts of inundation are assessed to be Minor at present day for assets such as the Boardwalks, carparks and roads. This is due to the fact that the cost for the repair of each of these assets after a short duration inundation event, expected to be the case for a tropical cyclone (refer to Section 3) is expected to be minimal.
- The more significant assets, including the Hotel, Bar and Restaurant were assigned a consequence rating of Moderate and Major at present day and from 2070 onwards respectively. This is due to the higher expected costs to repair these assets after inundation, with the increased consequences from 2070 onwards explained by the potentially greater inundation depths as a result of sea level rise.

6. Risk Evaluation

6.1 Risk Evaluation Matrix

The risk rating from a risk assessment is defined as “likelihood” x “consequence.” A risk matrix defining the levels of risk from combinations of likelihood and consequence has therefore been developed for the coastal hazards. This risk matrix is generally consistent with WAPC (2014).

Table 6.1 Risk Matrix

RISK LEVELS		CONSEQUENCE				
		Insignificant	Minor	Moderate	Major	Catastrophic
LIKELIHOOD	Almost Certain	Low	Medium	High	Extreme	Extreme
	Likely	Low	Medium	Medium	High	Extreme
	Possible	Low	Medium	Medium	Medium	High
	Unlikely	Low	Low	Medium	Medium	Medium
	Rare	Low	Low	Low	Low	Low

A risk tolerance scale assists in determining which risks are acceptable, tolerable and unacceptable. The risk tolerance scale used for the assessment is presented in Table 6.2.

Table 6.2 Risk Tolerance Scale

Risk Level	Action Required	Tolerance
Extreme	Immediate action required to eliminate or reduce the risk to acceptable levels	Intolerable
High	Immediate to short term action required to eliminate or reduce risk to acceptable levels	Intolerable
Medium	Reduce the risk or accept the risk provided residual risk level is understood	Tolerable
Low	Accept the risk	Acceptable

The risk tolerance scale has been reviewed and accepted for use by the proponent. It shows that the extreme and high risks need to be managed.

6.2 Risk Assessment

The risk assessment for the study area will be completed in accordance with the recommendations of AS5334 (Standards Australia 2013), which requires a detailed risk analysis to include a vulnerability analysis to thoroughly examine how coastal hazards and climate change

may affect the assets. This includes consideration of the adaptive capacity and vulnerability of the relevant assets.

6.2.1 Coastal Erosion

Based on the results of the risk analysis completed previously, Table 6.3 presents the coastal erosion risk levels for each of the identified key assets. The order of the assessed risks in the table has been used to show the priority risk assets for each planning timeframe at the start of the table, with decreasing risk down the table.

Table 6.3 Assessment of Risk of Coastal Erosion Impact

Key Assets	Present Day (2016)	2030	2070	2110
Hotel	Low	Low	Medium	High
Residences	Low	Low	Medium	High
Boardwalk	Low	Low	Medium	Medium
Heaton St Road/Carparking	Low	Low	Low	Medium
Bar	Low	Low	Low	Low
Restaurant	Low	Low	Low	Low
Spa	Low	Low	Low	Low
Staff Accommodation	Low	Low	Low	Low
Motel	Low	Low	Low	Low
Residential Carpark	Low	Low	Low	Low
Commercial Carpark	Low	Low	Low	Low
Roberts St Road/Carparking	Low	Low	Low	Low
Reception	Low	Low	Low	Low

Notes: 1. Assumes structures are appropriately designed to withstand coastal forces expected during design events as

The results of the assessment show that all of the proposed development assets have a Low risk of being impacted by erosion over the planning horizon to 2030. Based on Table 6.2, these risks are low enough to warrant acceptance without further consideration.

Following this, four assets have a Medium or High risk of being impacted by erosion over longer planning horizons. This includes the Hotel, Residences, Heaton St Road/Carparking and Boardwalk. The High risk at 2110 for the Hotel and Residences is intolerable, as shown by Table 6.2, and action should be taken to eliminate or reduce this risk to an acceptable level.

Further consideration and discussion of the implications of these results are provided in the following section with regard to risk management.

6.2.2 Coastal Inundation

Based on the results of the risk analysis completed previously, Table 6.4 presents the coastal inundation risk levels for each of the identified key assets. The order of the assessed risks in the table has been used to show the priority risk areas for each planning timeframe at the start of the table, with decreasing risk down the table. Once again, this risk assessment is on the basis that public safety is effectively managed as discussed in Section 8.

Table 6.4 Assessment of Risk of Coastal Inundation Impact

Key Assets	Present Day (2016)	2030	2070	2110
Commercial Carpark	Low	Low	Medium	High
Bar	Low	Low	Low	Medium
Restaurant	Low	Low	Low	Medium
Residences	Low	Low	Low	Medium
Boardwalk	Low	Low	Low	Medium
Roberts St Road/Carparking	Low	Low	Low	Medium
Hotel	Low	Low	Low	Low
Spa	Low	Low	Low	Low
Staff Accommodation	Low	Low	Low	Low
Motel	Low	Low	Low	Low
Residential Carpark	Low	Low	Low	Low
Heaton St Road/Carparking	Low	Low	Low	Low
Reception	Low	Low	Low	Low

Notes: 1. Assumes structures are appropriately designed to withstand coastal forces expected during design events as

The results of the assessment show that all of the proposed development assets have a Low risk of being impacted by inundation up to 2070, with the exception of the Commercial Carpark.

The Commercial Carpark has a Medium risk of being impacted by inundation to 2070 and following, has a High risk to 2110. The High risk at 2110 is intolerable, as shown by Table 6.2, and action should be taken to eliminate or reduce this risk to an acceptable level.

Further consideration of the implications of these results are provided in the following section with regard to risk management.

7. Risk Adaptation & Mitigation Strategies

SPP2.6 outlines a hierarchy of risk adaptation and mitigation options, where options that allow for a wide range of future strategies are considered more favourably. This hierarchy of options is reproduced in Figure 7.1.



Figure 7.1 Risk Management & Adaptation Hierarchy

These options are generally outlined below:

- Avoid – avoid new development within the area impacted by coastal hazards.
- Retreat – the relocation or removal of assets within an area identified as likely to be subject to intolerable risk of damage from coastal hazards.
- Accommodation – measures which suitably address the identified risks.
- Protect – used to preserve the foreshore reserve, public access and public safety, property and infrastructure.

The assessment of options is generally done in a progressive manner, moving through the various options until an appropriate mitigation option is found.

7.1 Coastal Adaptation Approach

The potential future movement of the shoreline and the risks posed from coastal hazards necessitates the requirement for coastal adaptation and risk mitigation planning. The proposed approach for the Hotel and Residential Resort development is summarised below:

- The majority of assets within the proposed Hotel and Residential Resort development **avoid** the coastal hazard risks over the 100 year planning timeframe to 2110. As shown in Figure 1.2 and 1.3, the majority of the proposed built assets are located towards the eastern portion of the site, landward of the 100 year erosion hazard line and above the 500 year ARI inundation water level.
- The proposed development assets seaward of the 100 year erosion hazard line to 2110, therefore potentially at risk over the planning timeframe, include the Hotel and several of

the Residences. These assets were both shown in Table 6.3 to have a Low risk of erosion impact over planning horizon to 2030, which is considered to be tolerable. Following this, these assets were both assessed as having a Medium and High risk of erosion impact to 2070 and 2110 respectively. The Hotel and Residences would likely have a service life of around 50 years. As such, these assets could be utilised in their planned locations over the next 50 years and subsequently removed to **avoid** erosion hazard risk or **retreated** to a location further landward at the end of their service life. The location for **managed retreat** would be determined at the time based on an updated coastal hazard risk assessment. The potential for retreat of these assets would be dependent on suitable space being available elsewhere on Lot 62 as a result of a redesign at that time. If no space is available, these assets would be removed.

- The public assets seaward of the 100 year erosion hazard line, therefore potentially at risk, include the Boardwalk (Medium by 2070) and Heaton St Road/Carparking (Medium by 2110). These risks are considered to be tolerable, however an As Low As Reasonably Practical (ALARP) approach is proposed. Similar to the Hotel and Residences, these assets would have a service live of around 25 or 50 years. At the end of their service life, the Boardwalk and Heaton St Road/Carparking could be removed to **avoid** erosion hazard risk or **retreated** to a location further landward. The location for **managed retreat** would be determined at the time based on an updated coastal hazard risk assessment.
- It is important to consider the beach and Dobbyn Park located seaward of the proposed Hotel and Residential Resort. The beach was assessed by the wider Shire CHRMAP (Cardno 2018) as being at Low, Medium, Extreme and Extreme risk of being impacted by erosion in 2016, 2030, 2070 and 2110 respectively. Dobbyn Park was assessed by the wider Shire CHRMAP (Cardno 2018) as being at Medium, Medium, Medium and High risk of being impacted by erosion in 2016, 2030, 2070 and 2110 respectively. These assets are located within a popular section of the Jurien Bay foreshore and are considered to be extremely valuable. It is envisaged that the City would want to preserve these assets, should the monitoring (refer to the wider Shire CHRMAP Implementation Plan) indicate that there are risks from erosion impact. MRA (2009) outlines a conceptual shoreline model for Island Point and the shoreline to the north, including that fronting the proposed Hotel and Residential Resort. The shoreline model was based on an investigation (PWD 1984) of sediment dynamics at Jurien Bay to inform the construction of the boat harbour as well as updated shoreline movement plots and analysis (MRA 2009). The conceptual shoreline model is presented in Figure 7.2 and estimates that there is approximately 20,800 m³/year of net sediment transport to the north at the relevant section of shoreline fronting Lot 62. Options may be available to trap this sediment and preserve key sections of the foreshore, including that at Dobbyn Park. The above strategies for the proposed Hotel and Residential Resort don't rely on this possibility, however recognise that the erosion risks posed to the proposed development assets in later planning horizons would be reduced if this occurred.
- The Commercial Carpark has a proposed 3.35 mAHD entrance off Roberts Rd and a basement level of 1.7 mAHD. It was assessed as being at risk of being impacted by inundation over the 100 year planning timeframe (Medium to 2070 and High to 2110) and mitigation controls are required to reduce these risks. The following **accommodation** strategies are proposed for the Commercial Carpark:
 - Designing an appropriate storm surge barrier at the Heaton St entrance that can be closed during the passage of a severe cyclone event to restrict the carpark from being inundated.

- Designing the walls appropriately to minimise any groundwater seepage.
 - Minimising the services within the carpark and locating any required service infrastructure along the ceiling.
 - Incorporating systems that allow for the easy isolation of services in different areas, which can be shut off easily if required.
- The remaining assets within the proposed development were rated as being at Low or Medium risk of being impacted by inundation over the 100 year planning timeframe. This is considered to be tolerable, however should adopt an ALARP approach. The following **accommodation** strategies are proposed for the Hotel and Residential Resort development.
- Designing assets appropriately to the minimum prescriptive requirements of codes and standards typically considered mandatory for coastal built forms.
 - Locating service infrastructure as far landward and as high as possible to reduce the potential for inundation exposure. This should be above the 500 year ARI level of 3.7 mAHD plus the appropriate allowance for sea level rise over the relevant planning horizon.
 - Storing all hazardous materials as far landward and as high as possible to reduce the risk of environmental damage should inundation occur. This should be above the 500 year ARI level of 3.7 mAHD plus the appropriate allowance for sea level rise over the relevant planning horizon.
- The westernmost Residences, that are located within the erosion hazard extent identified by the Coastal Hazard Assessment (GHD 2015) or have a finished floor level of less than 4.6 mAHD, should have a notification placed on the Certificate(s) of Title. This shall be to the effect of “this Lot is located in an area likely to be subject to coastal erosion/inundation over the next 100 years”



Figure 7.2 Conceptual Shoreline Model (MRA 2009)

7.1.1 Public Safety

As outlined previously, the risk ratings that were determined for coastal hazards, namely inundation, and the risk mitigation strategies outlined above, are provided on the basis that public safety will be managed by both Aliceville and DFES. DFES’s management already occurs along the entire coastline of Western Australia in response to cyclone events, which are the key

contributor to inundation hazards at the proposed Hotel and Residential Resort development (refer to Section 3).

Essentially, to manage risks associated with cyclone inundation, DFES communicate with the Bureau of Meteorology to receive updates on the potential cyclone tracks, associated storm surge and potential areas of inundation. Evacuations are then completed as required in order to manage public safety prior to event impact.

It is also important to note that there would be some degree of self-management of these risks by patrons of the Hotel and Residential Resort at the time of such events, as many travellers would be aware of the risks and would likely leave the area before conditions became too severe. Nevertheless, despite the potential self-management by travellers and the management by DFES, it is recommended that Aliceville develop a specific inundation risk management plan for the Hotel and Residential Resort. This plan should outline steps that should be taken as severe events approach, as well as evacuation pathways and routes to identified safe areas. It is recommended that this plan be developed in consultation with DFES and the Shire.

As a result of the evacuation policies that are already in place, as well as any further development of these policies that may be required specifically for the Hotel and Residential Resort, the management of public safety due to coastal hazards is ensured.

8. Implementation Plan

The risk mitigation and adaptation strategies outlined in Section 7 set out the general proposed coastal management approach for the Hotel and Residential Resort development. Direct guidance on when, what, how and by who these processes will be completed is provided within this Implementation Plan. For ease of reference, these details have been broken down to outline the requirements for each stage of the project and/or asset life.

8.1 Planning & Initial Construction

Coastal planning for this development involves mitigating against coastal hazard risks from erosion and inundation. The sole responsibility for any coastal hazard risks at the site is something that has been acknowledged and accepted by the proponent.

As discussed in Section 2.6, this will be passed on to the relevant residential landholders by way of a notification placed on the Certificate(s) of Title.

The other element that is key during the planning and construction phases is to ensure that the designs of each of the individual assets that comprise the proposed development are appropriate for the expected loading, namely wind or water pressures.

A summary of the requirements of the planning and construction stage is presented in Table 8.1.

Table 8.1 Implementation Plan – Planning & Initial Construction Stage

Requirement	Timing	Responsibility
Acceptance of disclosed hazards/vulnerability	Planning Stage	Respective asset owners. It is noted that the proponent has completed this through the acknowledgement and acceptance of risks presented in this CHRMAP This is to be acknowledged by residential landholders by way of a notification placed on the Certificates of Title.
Appropriate design of Hotel and Residential Resort structural elements and levels to ensure that erosion and inundation risks are managed as best as possible	Planning & Construction Stage	Proponent (supported by engaged design team)

8.2 Operation Over the Infrastructure Service Life

Over the service lives of the proposed assets, there will be a requirement to monitor the shoreline to ascertain whether coastal risks to assets are increasing. Further details of the monitoring requirements are outlined in Section 8.4. This monitoring will be responsibility of the proponent.

If, at some stage during the service life of an asset, the risks from coastal hazards become intolerable, the relevant assets will be relocated in accordance with the managed retreat adaptation strategy. If this is not financially viable or aligned with the development requirements

at this time, the relevant assets will be abandoned and removed from the site. In this way, a foreshore area will always be maintained fronting the site.

A summary of the requirements during the operation of the assets over their service life is presented in Table 8.2.

Table 8.2 Implementation Plan – Operation Over Infrastructure Service Life

Requirement	Timing	Responsibility
Monitoring coastal hazard risk to assess if risks become intolerable and assets need to be retreated (Refer Section 8.4)	Operation over service life	Proponent
IF REQUIRED Asset relocation/retreat in accordance with the requirements outlined in Section 8.3 OR Abandon and remove infrastructure for that particular asset	If risks to Hotel and Residential Resort development assets are intolerable	Proponent

8.3 Asset Replacement

Replacement of assets after their service life requires that they be located in an area where the risk to that asset over its remaining service life is considered to be acceptable. To do this will require a revised coastal hazard risk assessment to be completed in accordance with the requirements at that time. The appropriate location for replacement assets can then be chosen based on tolerable risk levels. Alternatively, that particular asset could be removed and not replaced, essentially adopting an avoid approach. The responsibility for these actions would rest with the proponent.

A summary of the requirements during the replacement of assets is presented in Table 8.3.

Table 8.3 Implementation Plan – Asset Replacement

Requirement	Timing	Responsibility
Complete a revised coastal hazard risk assessment to quantify the risk level at that time	Planning for asset replacement	Proponent
Determine appropriate retreat location for replacement assets based on acceptable risk level OR Remove infrastructure and abandon for that particular asset	Planning for asset replacement	Proponent

8.4 Monitoring & Review

Coastal monitoring and review is essential in order to track changes to the shoreline over time. Whilst the results of the Coastal Hazard Assessment (GHD 2015) provide an indication of the potential changes to the shoreline (and incorporate a justifiable level of conservatism), the system is inherently complex and the actual shoreline response could be different to that presented. Monitoring should therefore be completed to track changes over time and indicate whether the timing for risk mitigation should be adjusted. Triggers for further assessment of the shoreline movement have previously been discussed. As a result, the following triggers will be used for the proposed Hotel and Residential Resort development:

- Retreat of the shoreline (defined in this instance as the HSD) to within 60 m (S1 allowance (approximately 50 m) plus 10 m) of the proposed development assets as a result of chronic erosion will prompt review by a specialist coastal engineer to commence planning for managed retreat of assets or removal.
- Retreat of the shoreline to within 20 m of the proposed development assets caused by chronic erosion will prompt immediate managed retreat or removal of assets.
- Retreat of the shoreline to within 20 m of the proposed development assets caused by acute erosion will prompt review by a specialist coastal engineer to ascertain the potential for recovery of the shoreline before managed retreat is implemented.

The shoreline monitoring should be completed using a combination of onsite measurements and photo-monitoring as well as review of aerial photography captured by Landgate. Given the relatively large buffer for erosion and minimal shoreline movement as outlined in the Coastal Hazard Assessment (GHD 2015), it is recommended that shoreline monitoring is completed and assessed at two yearly intervals.

If the rate of change in shoreline position observed during the monitoring is materially different from that allowed for with the Coastal Hazard Assessment, it would be recommended that the

Coastal Hazard Assessment and this CHRMAP be updated to quantify any changes to the risks posed by coastal hazards.

Likewise, should the State Government guidance for the determination of the required allowances change as a result of new information becoming available, the Coastal Hazard Assessment and this CHRMAP should also be updated. This is especially the case for information regarding climate change and projected sea level rise, however may also apply for the calculation of severe storm erosion, shoreline movement erosion and inundation allowances. The responsibility for both of these actions would rest with the proponent.

A summary of the requirements for the monitoring and review is presented in Table 8.4.

Table 8.4 Implementation Plan – Monitoring & Review

Requirement	Timing	Responsibility
Shoreline monitoring	Ongoing – to be assessed on a 2 yearly basis or as required based on the triggers being met or exceeded	Proponent
Revision of Coastal Hazard Assessment and CHRMAP	If shoreline behaviour changes substantially from that identified within the Coastal Hazard Assessment OR If guidance changes on the determination of the required allowances as a result of new information becoming available	Proponent

9. Conclusions

This CHRMAP has been completed to provide guidance on required adaptation and management actions associated with the proposed Hotel and Residential Resort assets at Lot 62 Roberts St. It has been completed in line with the recommendations of SPP2.6 and WAPC (2014), using previous investigations and studies including the wider Shire CHRMAP (Cardno 2018).

The completion of a coastal hazard risk assessment for the proposed Hotel and Residential Resort development has shown that there is a risk of coastal hazards impacting the site over the 100 year planning timeframe. Over the shorter and medium term timeframes to 2030 and 2070 respectively, these risks were deemed to be tolerable to the proponent. The 2070 timeframe also exceeds the expected service life of the proposed development assets. Despite these levels of risk being acceptable to the proponent, the ALARP approach has been adopted for the proposed development and a number of risk mitigation strategies have been proposed for implementation.

Over the 100 year long term planning timeframe to 2110, the Hotel and Residences were determined to be at High risk of erosion hazard impact. Similarly, the Commercial Carpark was assessed as being at High risk of inundation hazard impact. A number of strategies were proposed in Section 7 to mitigate these risks to acceptable levels.

The risks assessed in this report and subsequent adaptation options and Implementation Plan proposed have been completed to inform coastal hazard planning for the proposed Hotel and Residential Resort in Jurien Bay. The strategies and Implementation Plan proposed are considered to adequately address potential coastal hazard risks associated with the development. The management of such coastal hazard risks enables the development of a much needed high end Hotel and Residential Resort to promote tourism and sustain economic growth in Jurien Bay and the Shire.

10. References

- Australia Bureau of Statistics 2016. *2016 Census QuickStats*. Government of Australia.
- Burges Design Group 2016. *Lot 62 Roberts St, Jurien Bay - Shire of Dandaragan Local Development Plan*. Prepared for Aliceville Pty Ltd.
- Cardno 2018. *Coastal Hazard Risk Management and Adaptation Plan*. Document Reference 59917806 Rev D. Prepared for the Shire of Dandaragan.
- Department of Transport 2010. *Sea Level Change in Western Australia – Application to Coastal Planning*. Government of Western Australia, Perth.
- Eaton & Passarelli Town and Regional Planning et al 2012a. *Jurien Bay Growth Plan*. Prepared for Royalties for Regions Regional Centres Development Plan SuperTowns initiative.
- Eaton & Passarelli Town and Regional Planning, Urbanix and Donald Veal Consultants 2012b. *Jurien Bay City Centre Strategy Plan*. Draft report prepared for the Shire of Dandaragan.
- GHD 2015. *Coastal Hazard Risk Assessment: Jurien Bay Erosion Hazard Mapping*. Prepared for the Shire of Dandaragan.
- MRA 2009. *Jurien Bay - Dobbyn Park Coastal Processes Study*. Prepared for the Shire of Dandaragan.
- Public Works Department 1984. *Jurien Bay Boat Harbour Investigations*. Report number CIS 84/1 prepared by Harbours and Rivers Branch.
- Seashore Engineering 2018. *Design Storms for Western Australian Coastal Planning: Tropical Cyclones*. Prepared for Department of Transport, Western Australia.
- Short, A. 2006. *Beaches of the Western Australian Coast: Eucla to Roebuck Bay. A guide to their nature, characteristics, surf and safety*. Sydney University Press.
- Stul T, Gozzard JR, Eliot IG and Eliot MJ. 2014. *Coastal Sediment Cells for the Mid-West Region between the Moore River and Glenfield Beach, Western Australia*. Report prepared by Seashore Engineering Pty Ltd and Geological Survey of Western Australia for the Western Australian Department of Transport, Fremantle. WAPC 2013. Statement of Planning Policy No. 2.6 – State Coastal Planning Policy. Government of Western Australia, Perth.
- Tourism Western Australia 2012. *Local Tourism Planning Strategy*. Prepared for the Shire of Dandaragan.
- WAPC 2013. *State Planning Policy 2.6 - State Coastal Planning Policy*. Western Australian Planning Commission, Perth.
- WAPC 2014. *Coastal Hazard Risk Management and Adaptation Planning Guidelines*. Government of Western Australia, Perth.

m p rogers & associates pl

www.coastsandports.com.au

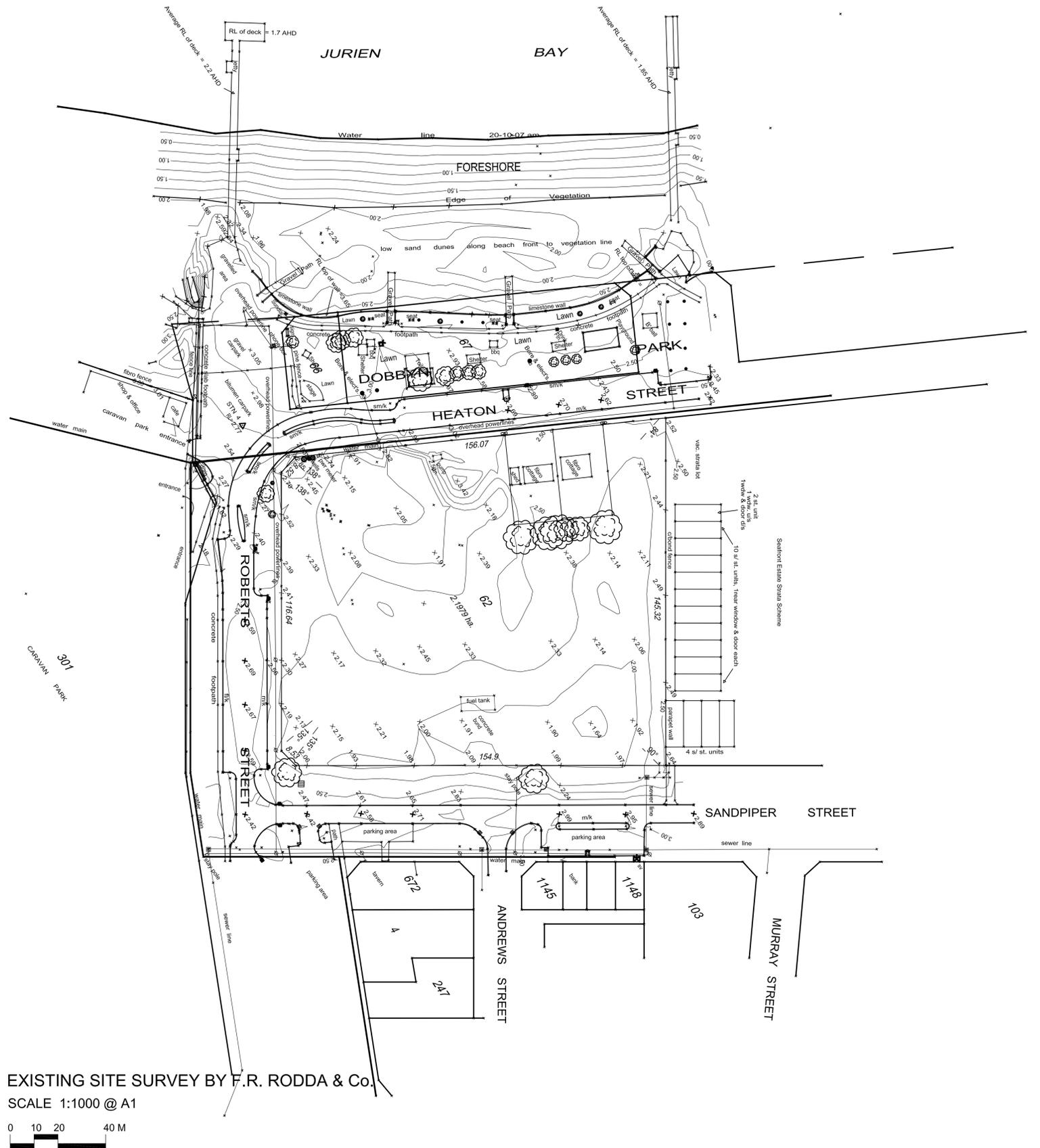


SCHEDULE OF PLANS

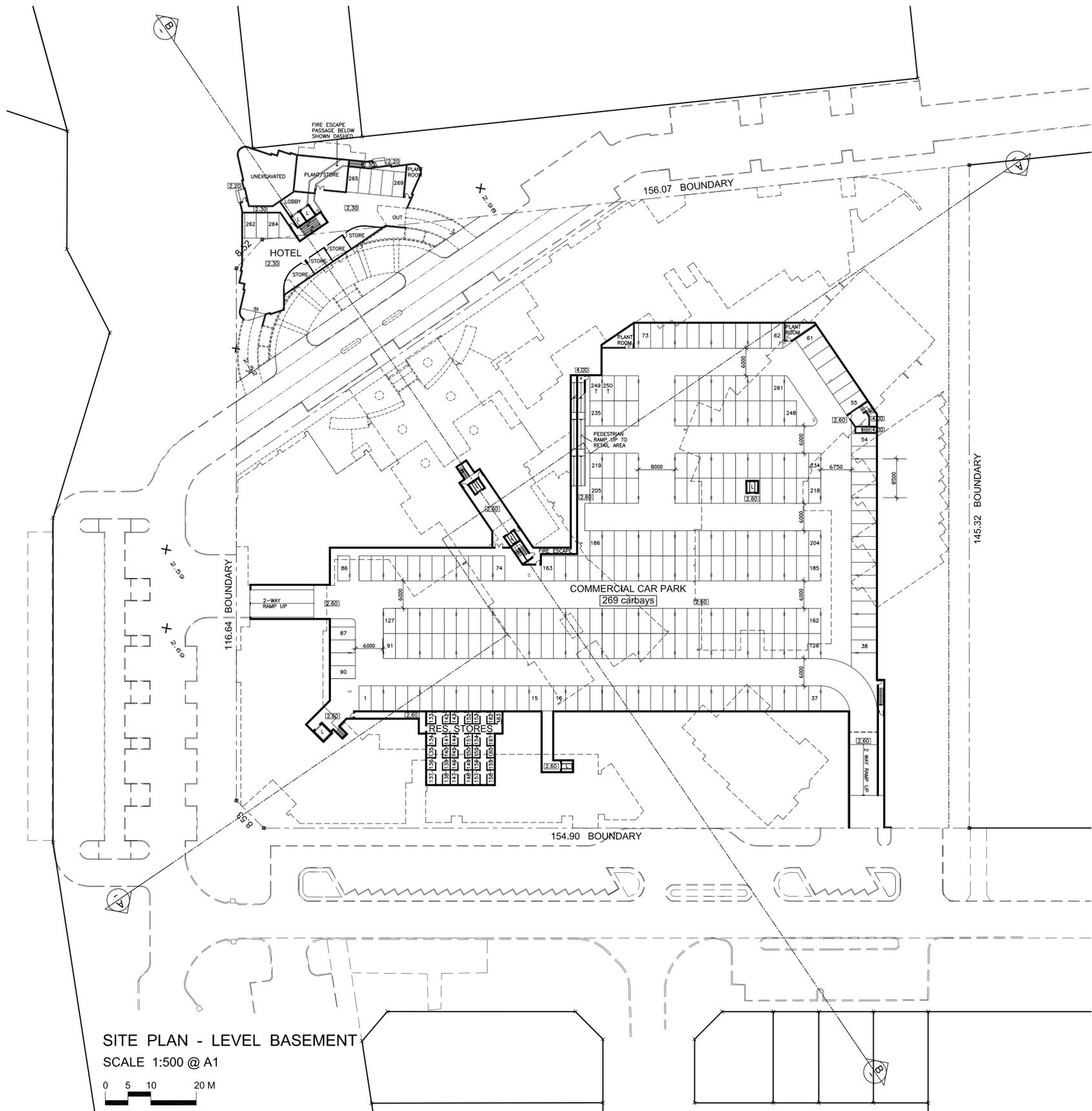
- DA01 Location Plan / Existing Site Survey
 - DA02 Rev A Level B Carpark
 - DA03 Rev A Level G Carpark
 - DA04 Rev A Level 1
 - DA05 Level Roof
 - DA06 Block A Plans
 - DA07 Rev A Block A Plans
 - DA08 Rev A Block A Plans
 - DA09 Rev A Block A Plans
 - DA10 Rev A Block A Plans
 - DA11 Rev A Block B Plans
 - DA12 Rev A Block B Plans
 - DA13 Rev A Block B Plans
 - DA14 Rev A Block B Plans
 - DA15 Block C Plans
 - DA16 Block C Plans
 - DA17 Rev A Block D Plans
 - DA18 Block E Plans
 - DA19 Block F Plans
 - DA20 Block G Plans
 - DA21 Block G Plans
 - DA22 Block G Plans
 - DA23A Block H Plans
 - Das3B Block H Plans
 - DA24 Site Section AA
 - DA25 Site Section BB
 - DA26 Rev A Site Elevation
 - DA27 Site Elevation
 - DA28 Rev A Site Elevation
 - DA29 Rev A Site Elevation
 - DA30 Context Plan
 - DA31 Context Elevations
 - DA32 Sight Line Study 1
 - DA33 Sight Line Study 1



LOCATION PLAN
NO SCALE

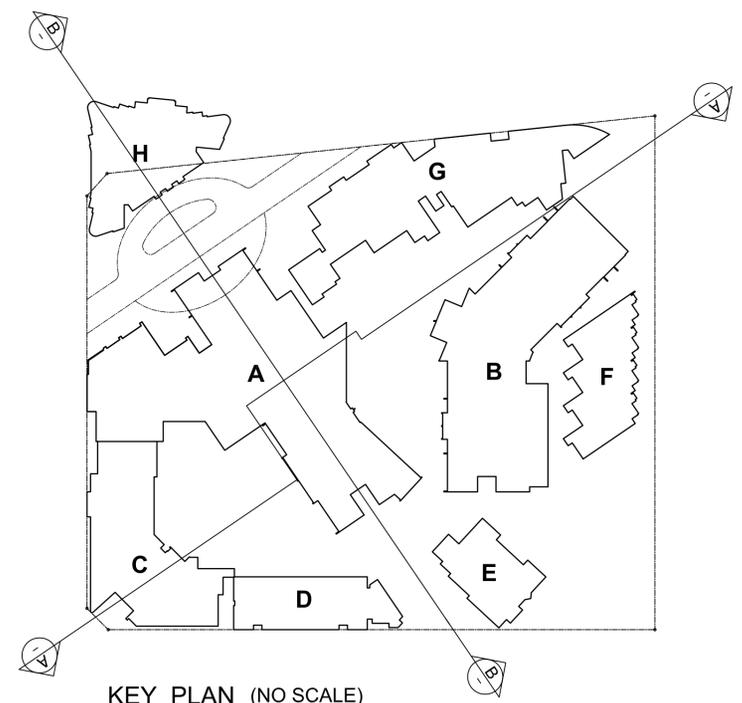


EXISTING SITE SURVEY BY F.R. RODDA & Co.
SCALE 1:1000 @ A1
0 10 20 40 M

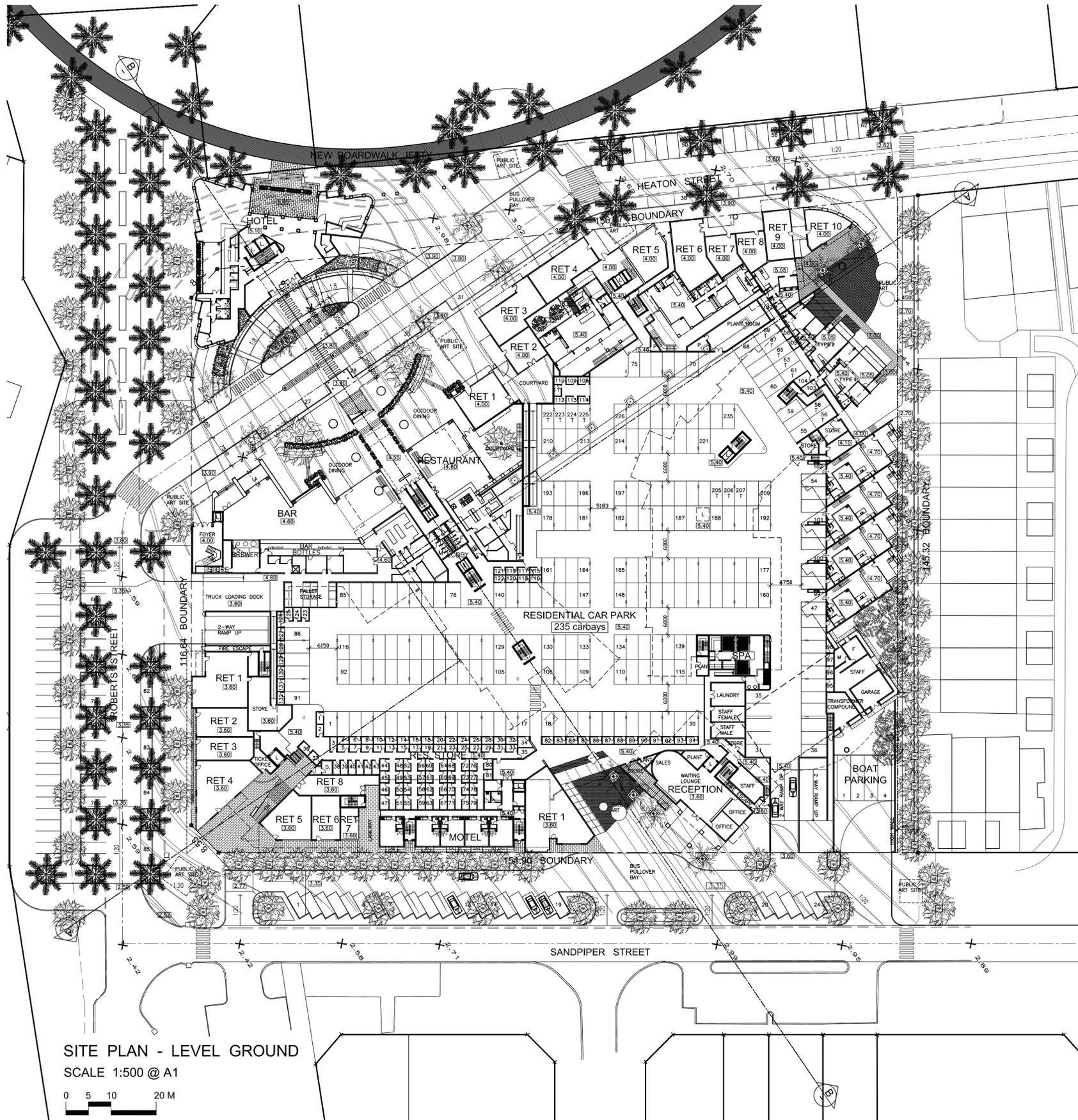


SITE PLAN - LEVEL BASEMENT

SCALE 1:500 @ A1

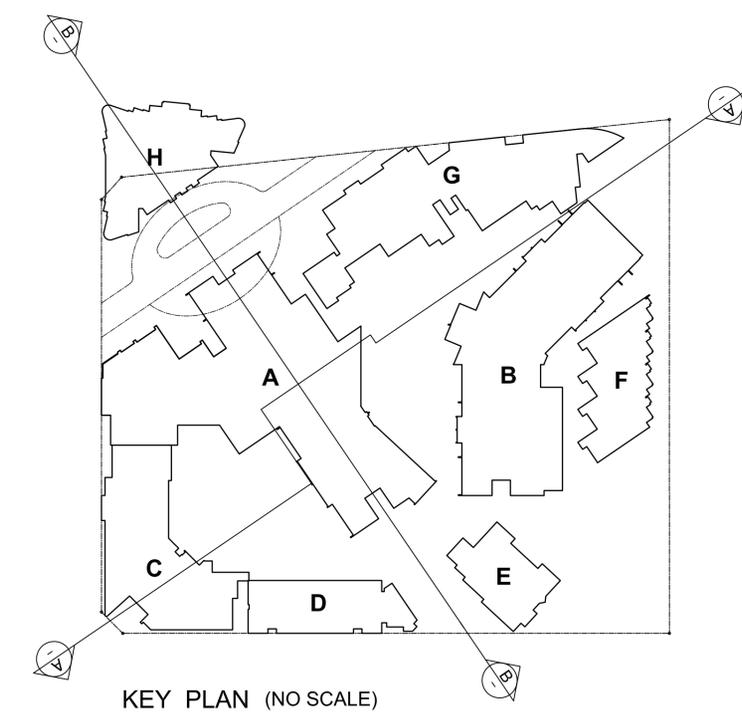


KEY PLAN (NO SCALE)

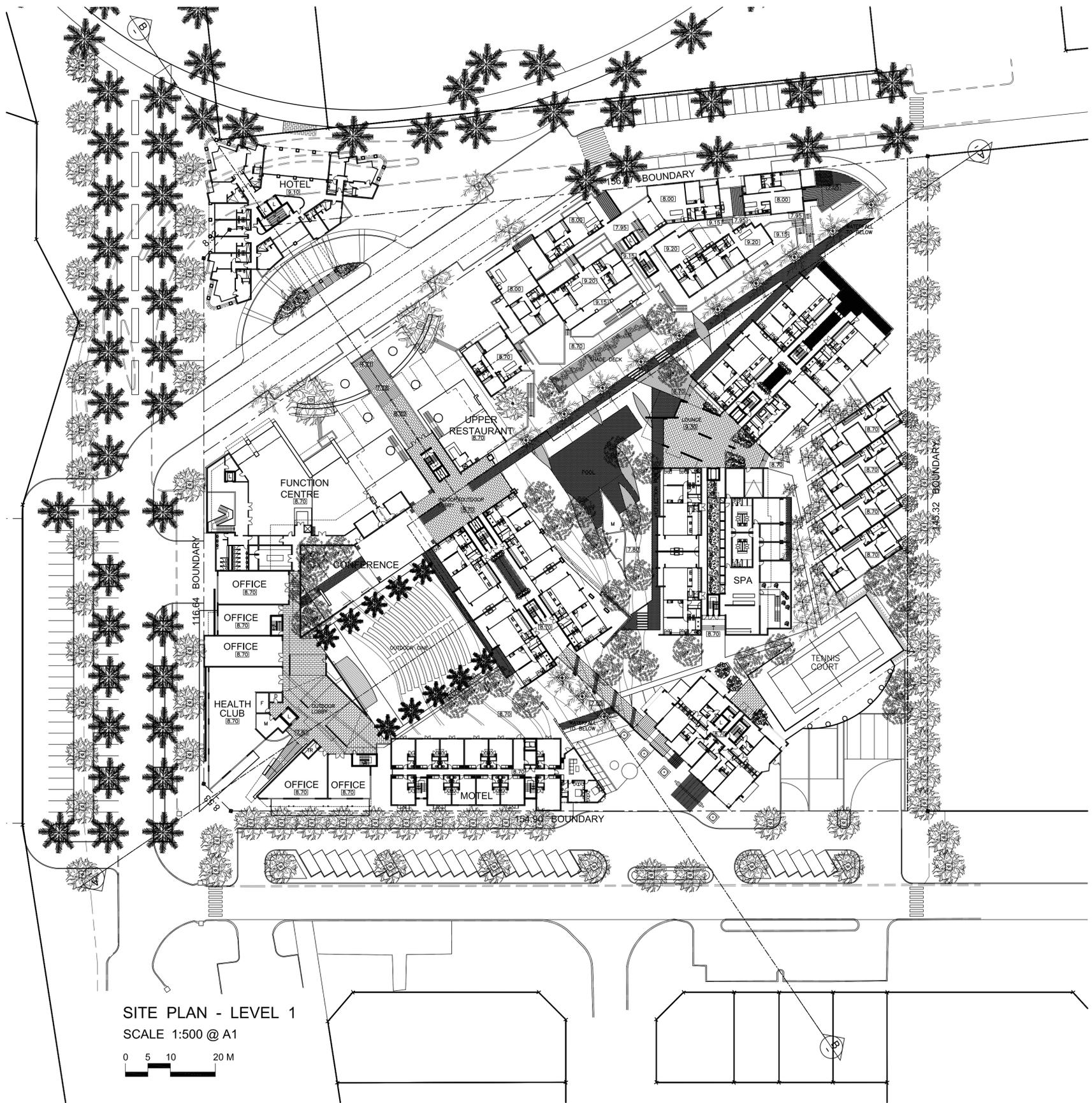


SITE PLAN - LEVEL GROUND
SCALE 1:500 @ A1

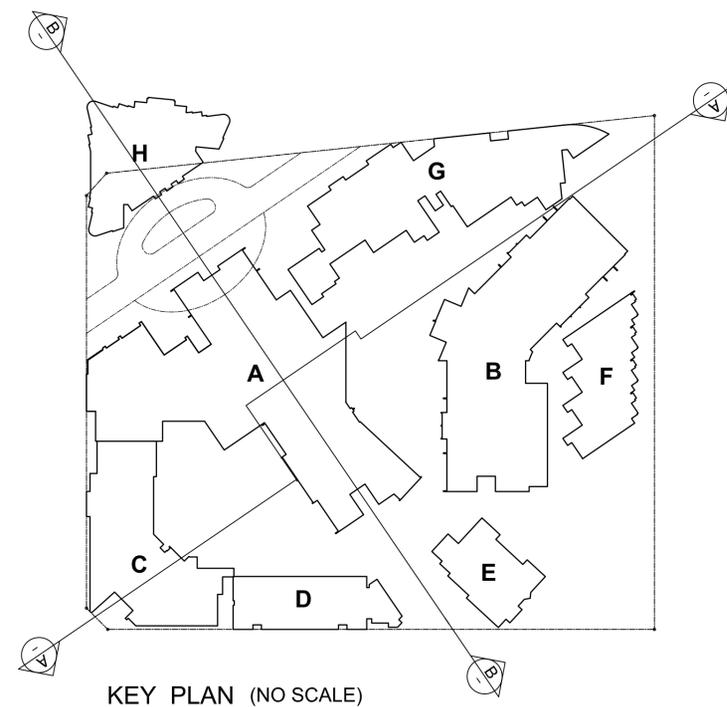
0 5 10 20 M



KEY PLAN (NO SCALE)

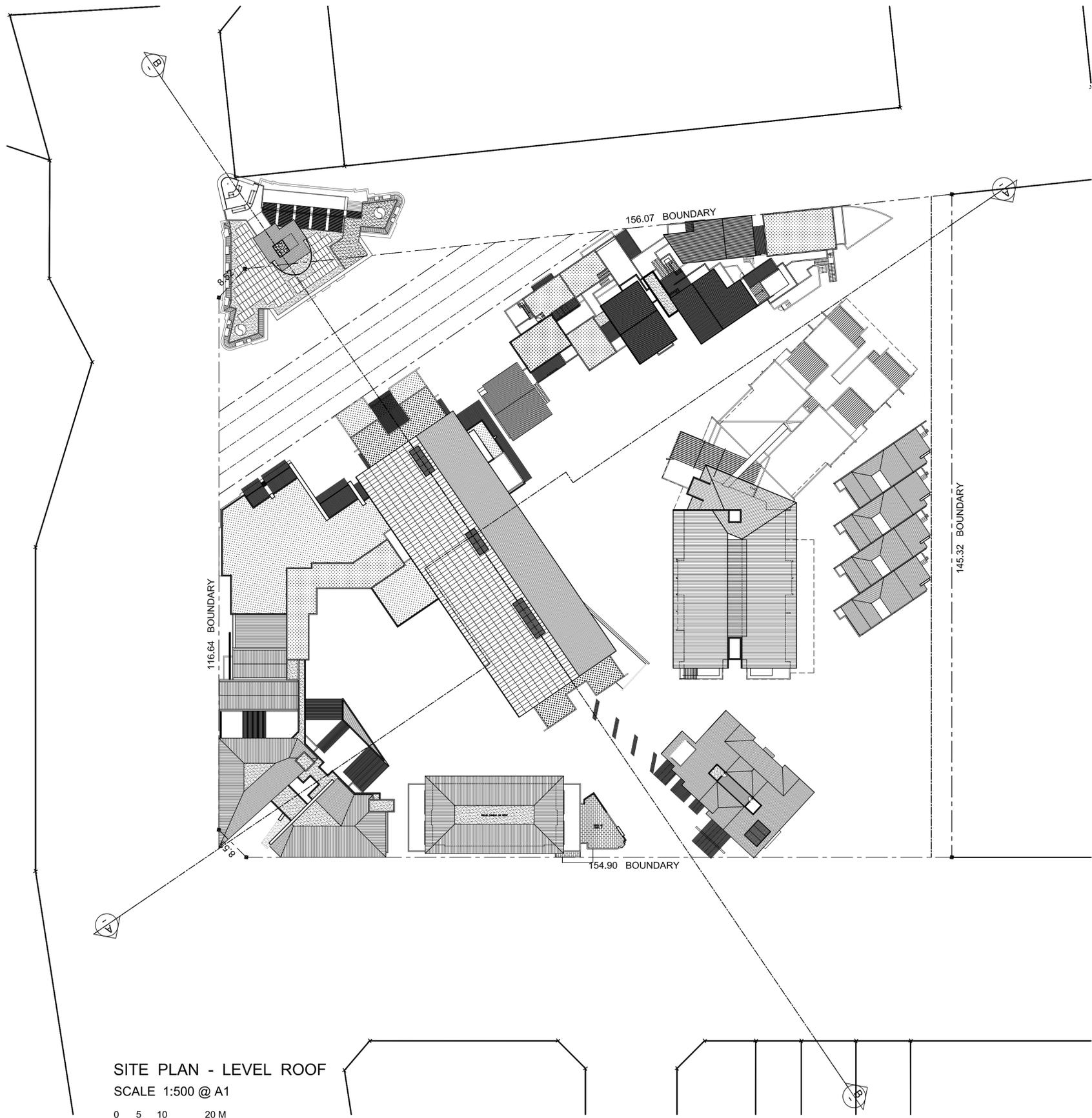


SITE PLAN - LEVEL 1
SCALE 1:500 @ A1



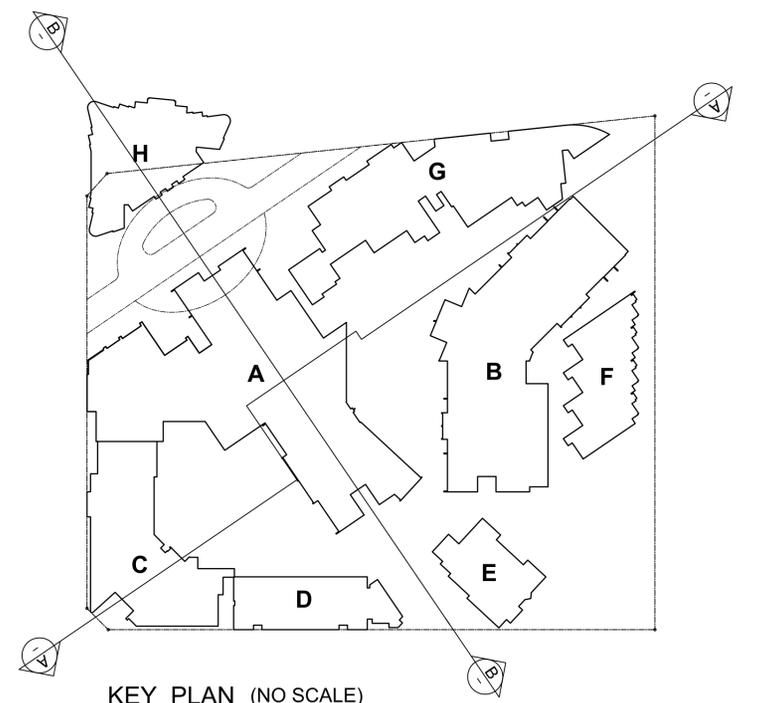
KEY PLAN (NO SCALE)



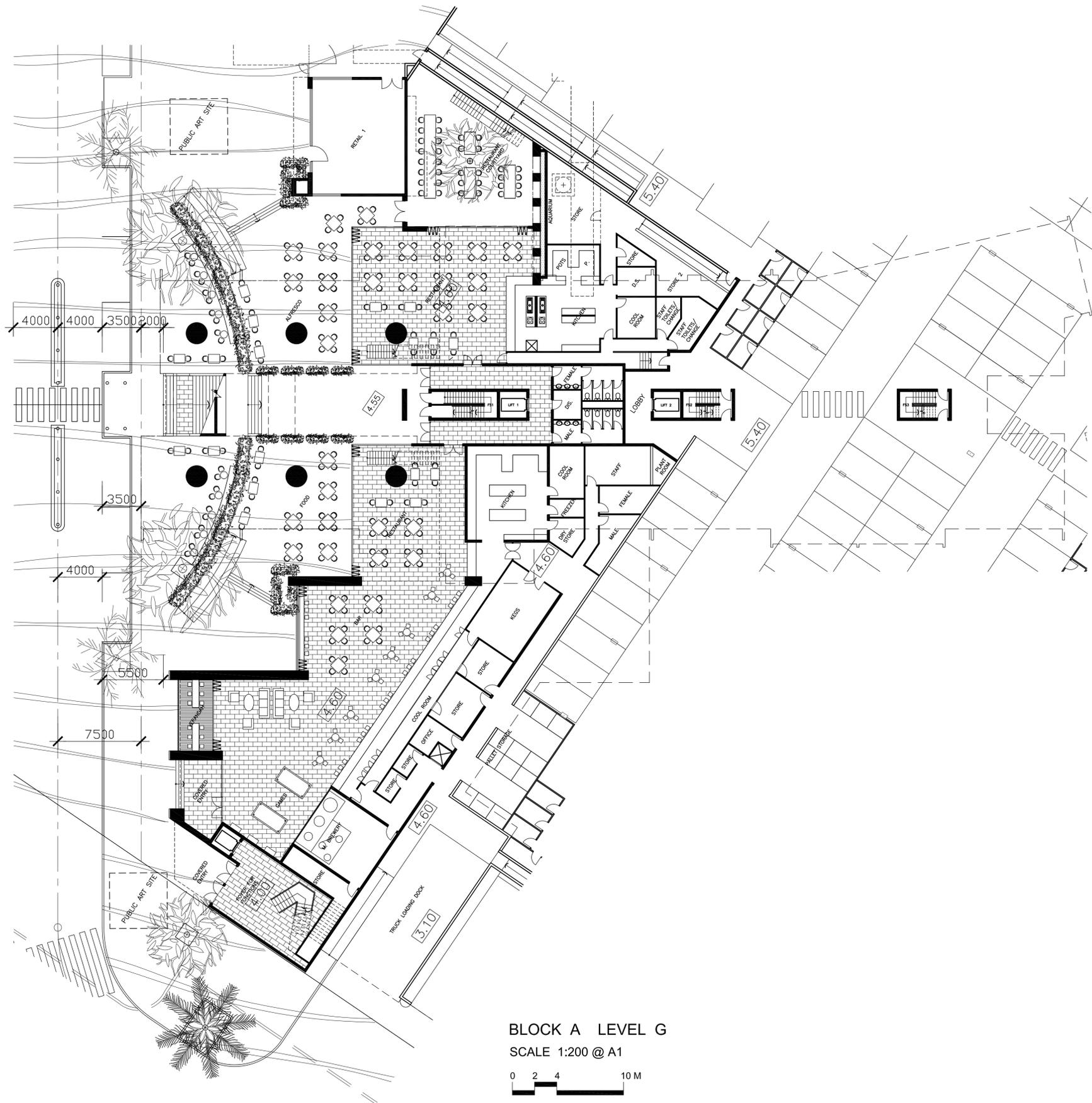


SITE PLAN - LEVEL ROOF

SCALE 1:500 @ A1



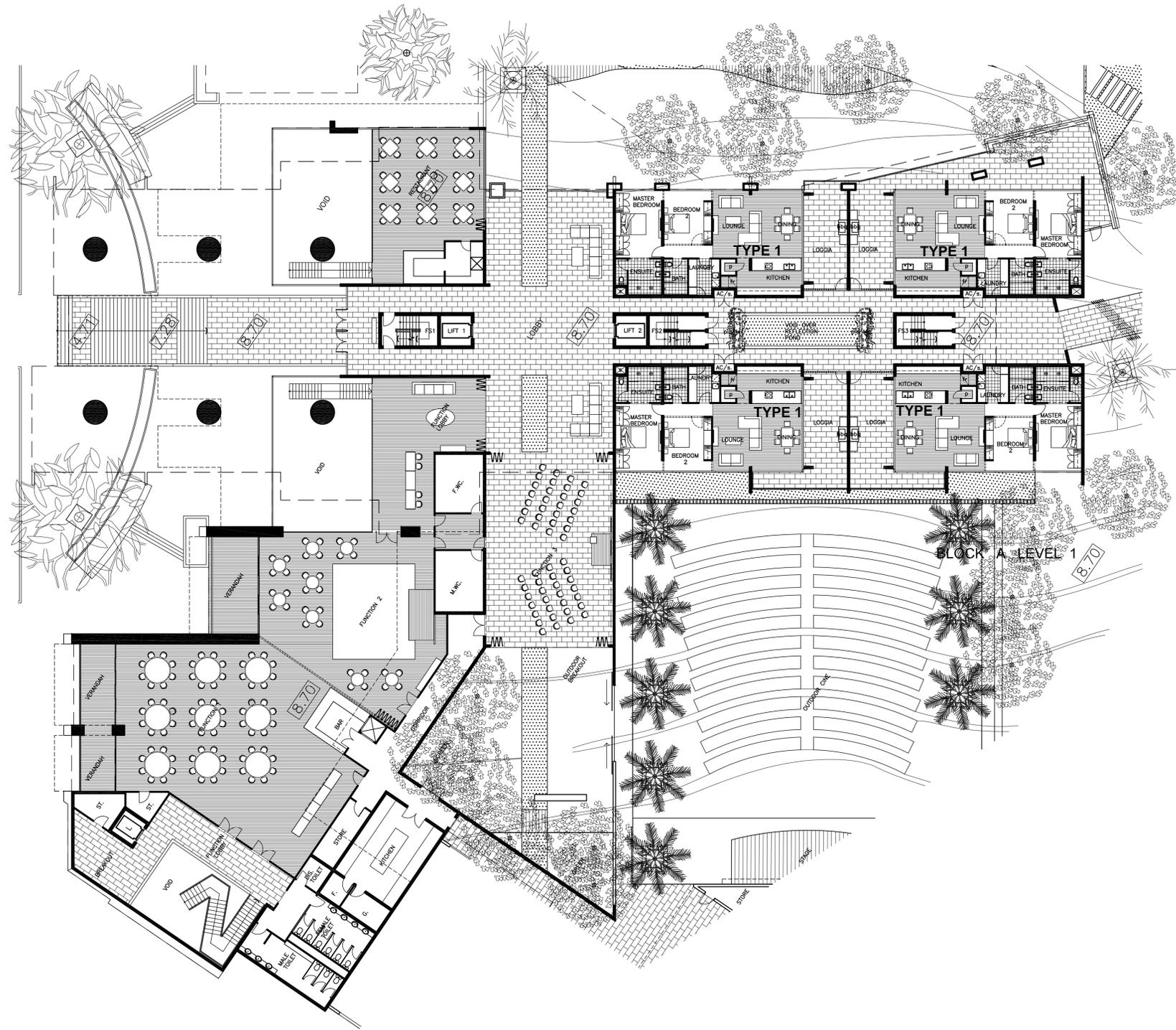
KEY PLAN (NO SCALE)



BLOCK A LEVEL G
 SCALE 1:200 @ A1
 0 2 4 10 M



KEY PLAN (NO SCALE)

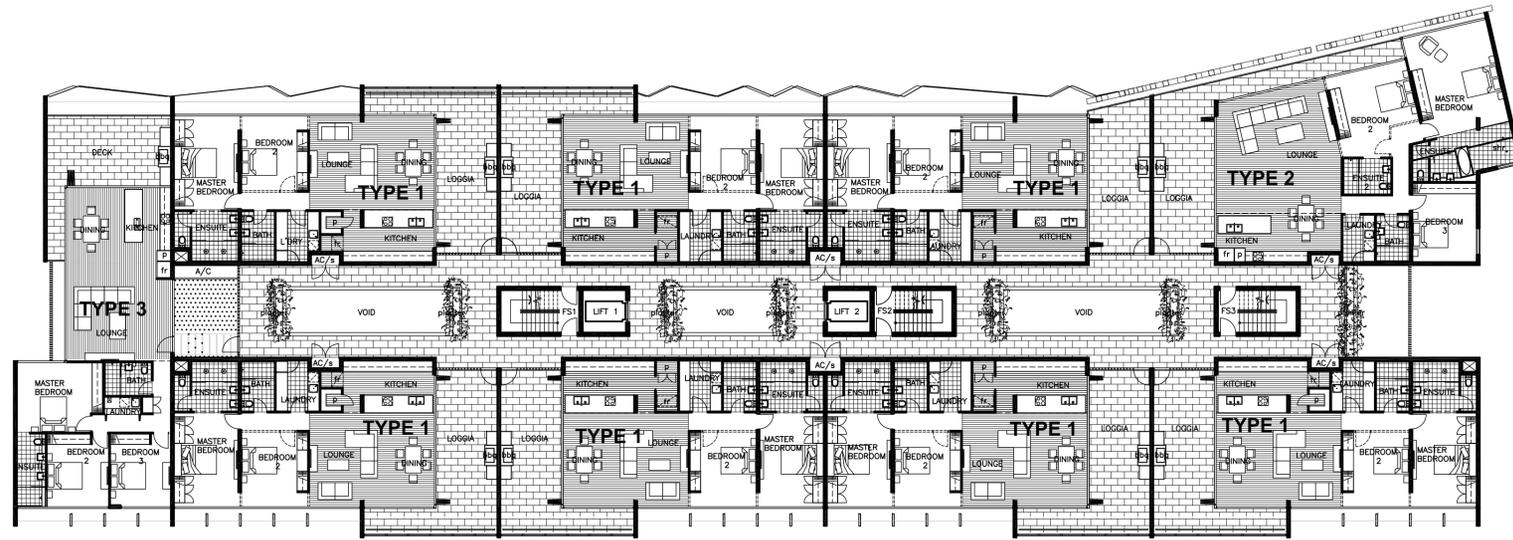


BLOCK A LEVEL 1

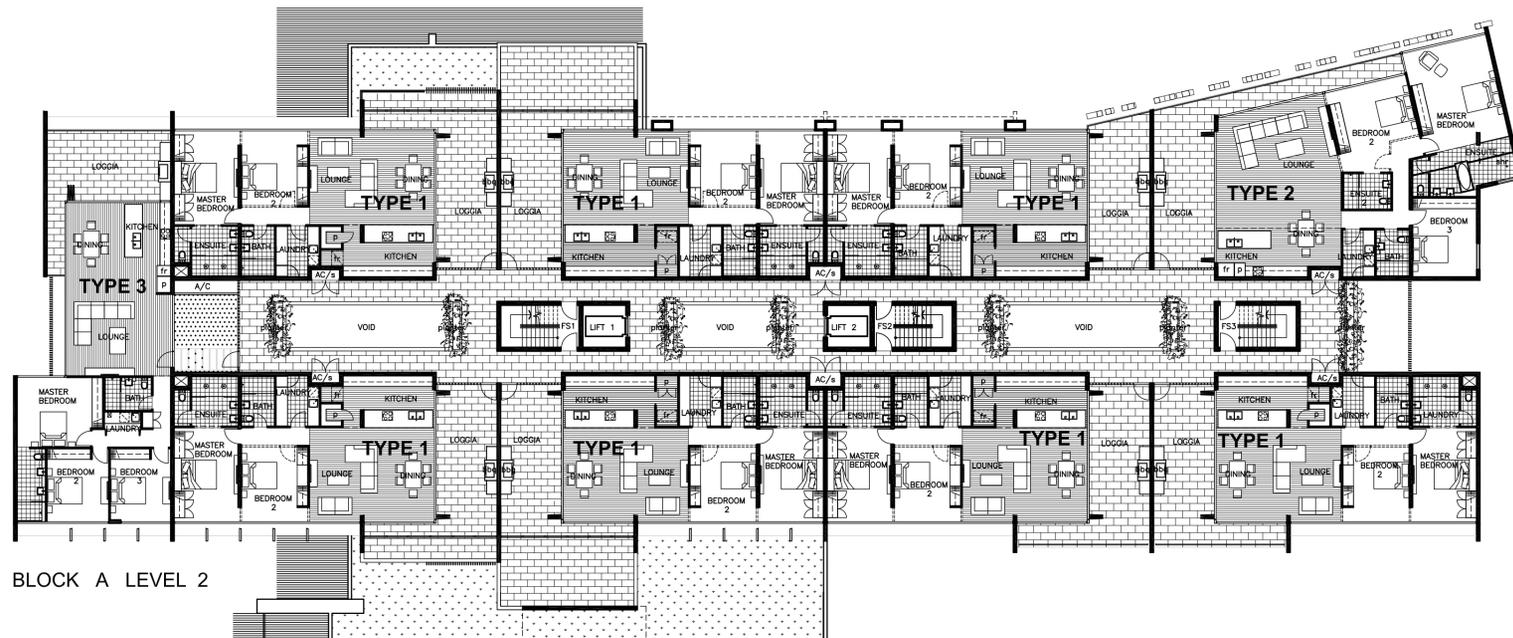
SCALE 1:200 @ A1



KEY PLAN (NO SCALE)

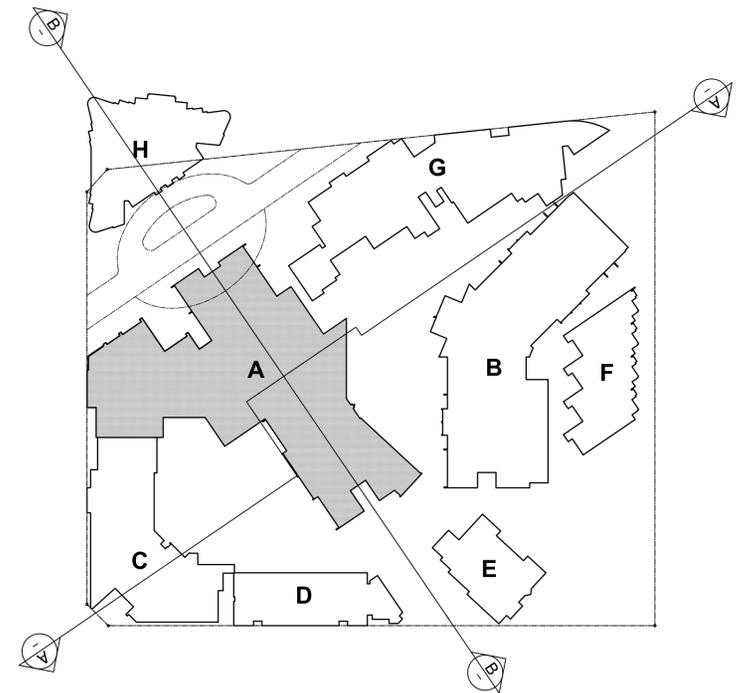


BLOCK A LEVEL 3-4
SCALE 1:200 @ A1

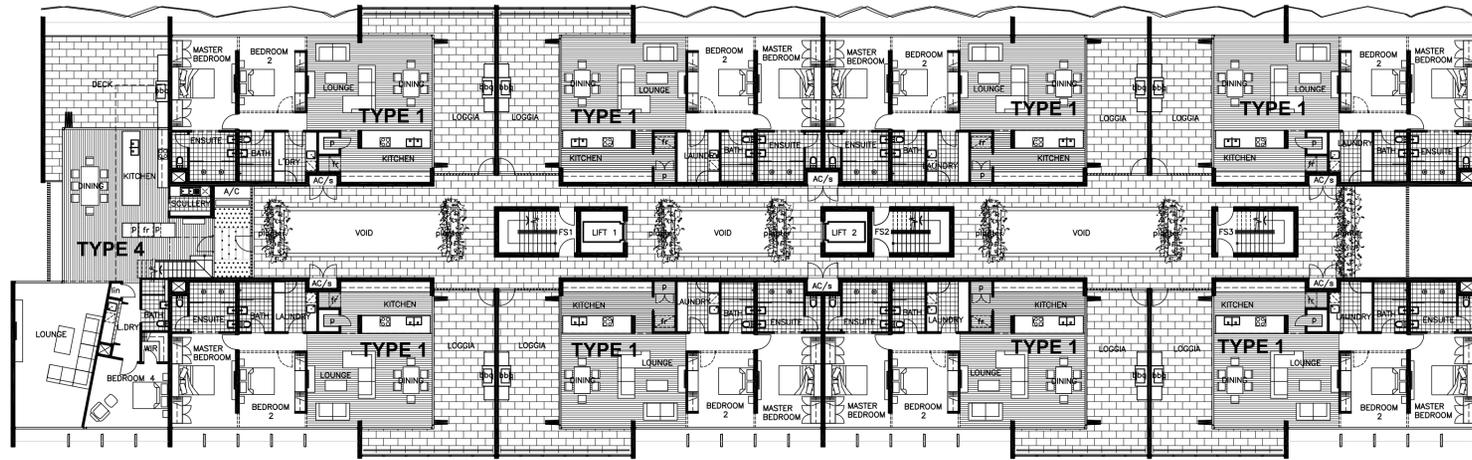


BLOCK A LEVEL 2

BLOCK A LEVEL 2
SCALE 1:200 @ A1

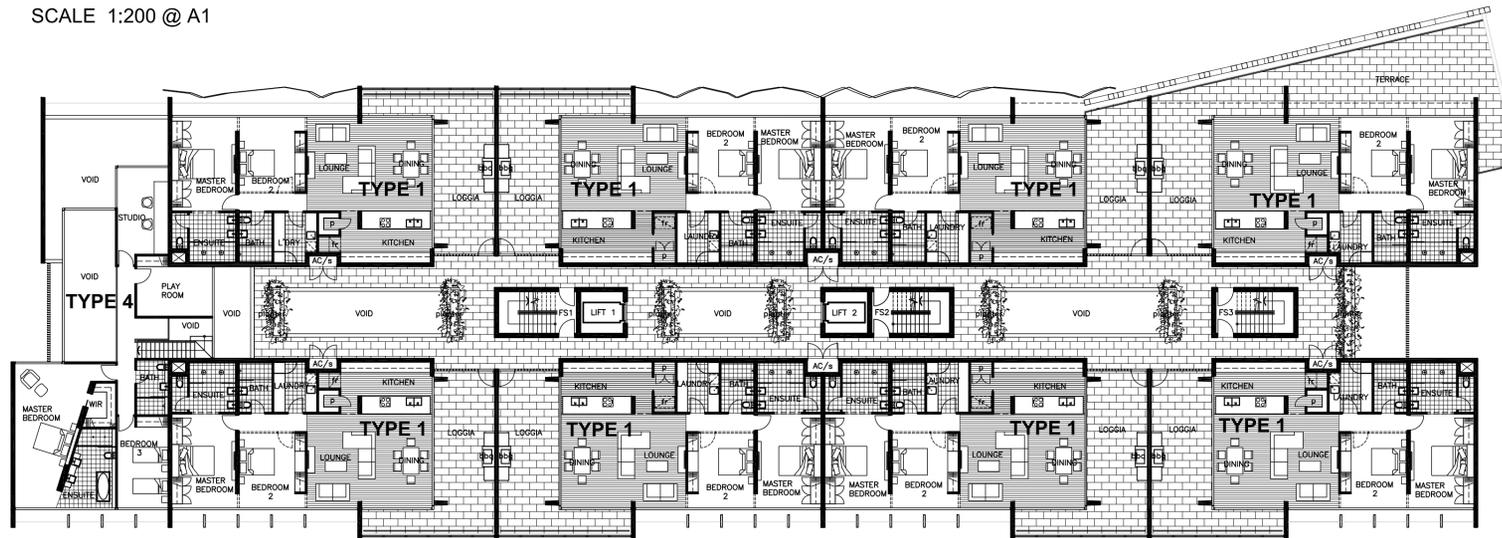


KEY PLAN (NO SCALE)



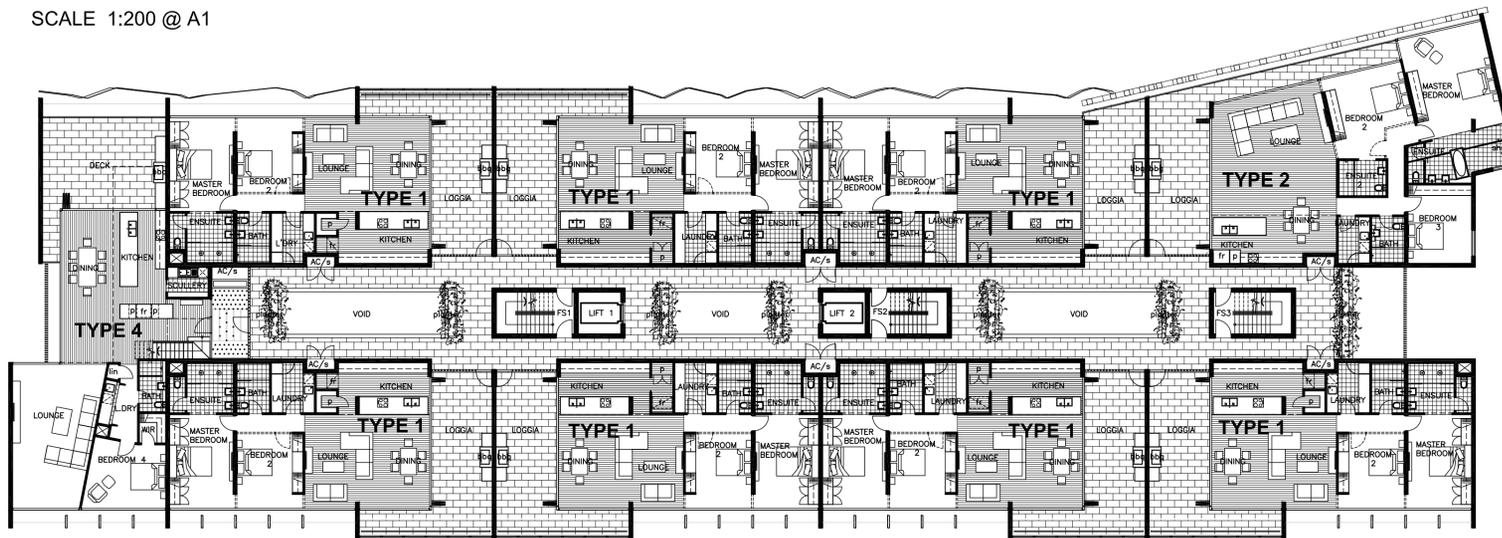
BLOCK A LEVEL 7

SCALE 1:200 @ A1



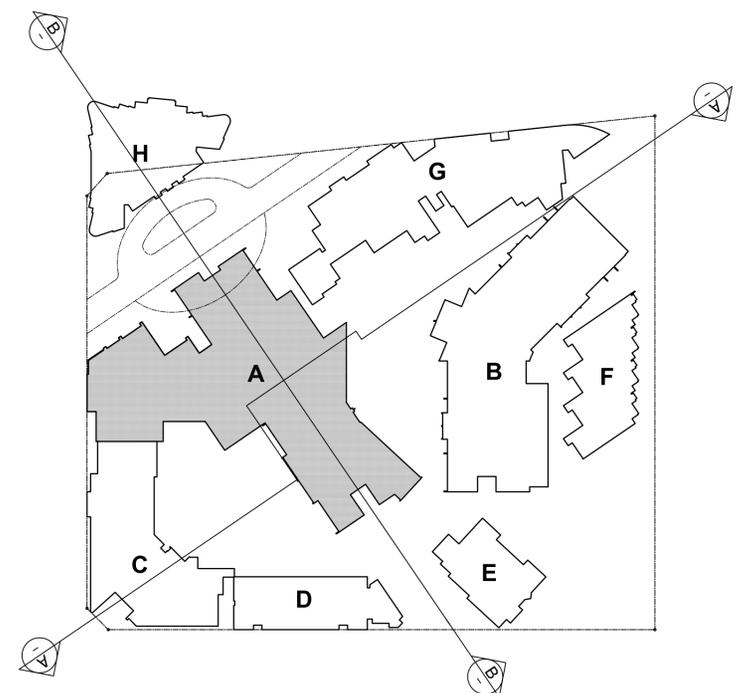
BLOCK A LEVEL 6

SCALE 1:200 @ A1



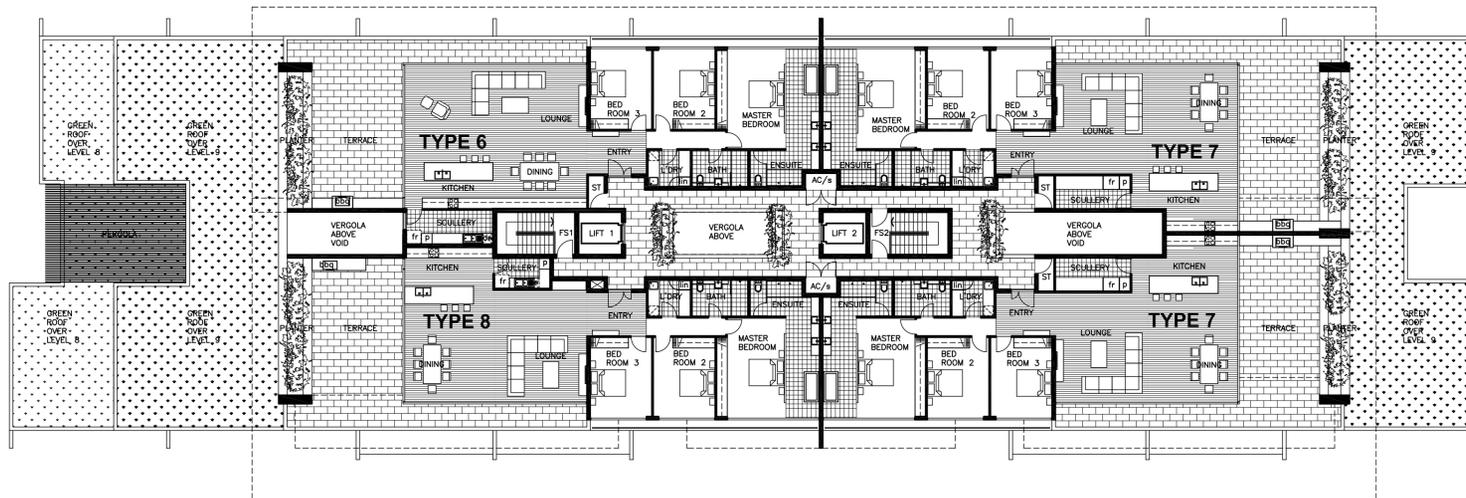
BLOCK A LEVEL 5

SCALE 1:200 @ A1

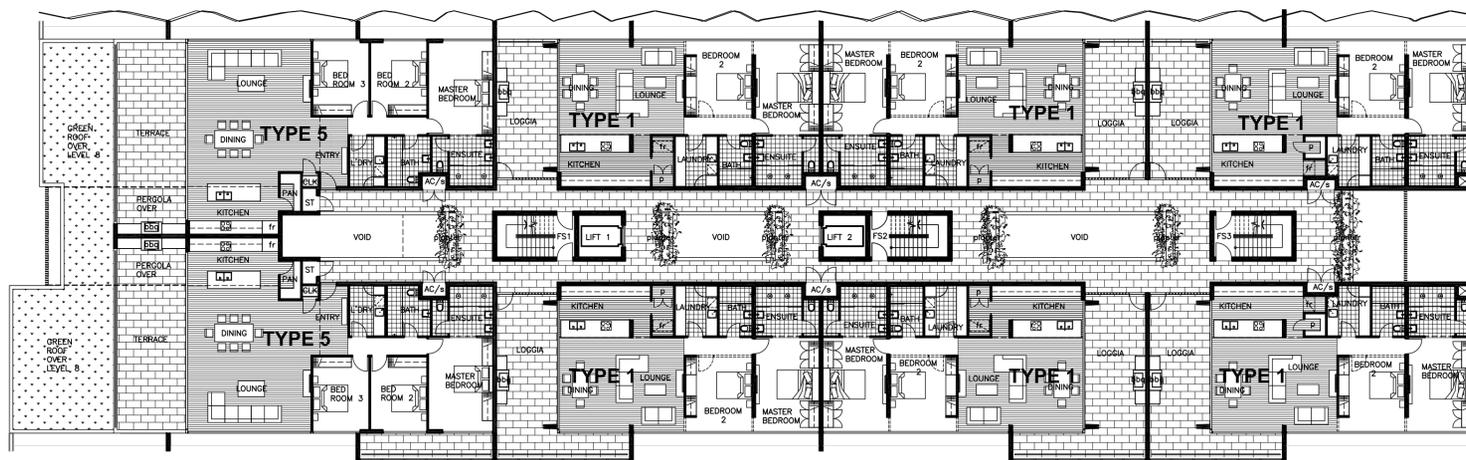


KEY PLAN
(NO SCALE)





BLOCK A LEVEL 10
SCALE 1:200 @ A1



BLOCK A LEVEL 9
SCALE 1:200 @ A1



BLOCK A LEVEL 8
SCALE 1:200 @ A1



KEY PLAN
(NO SCALE)

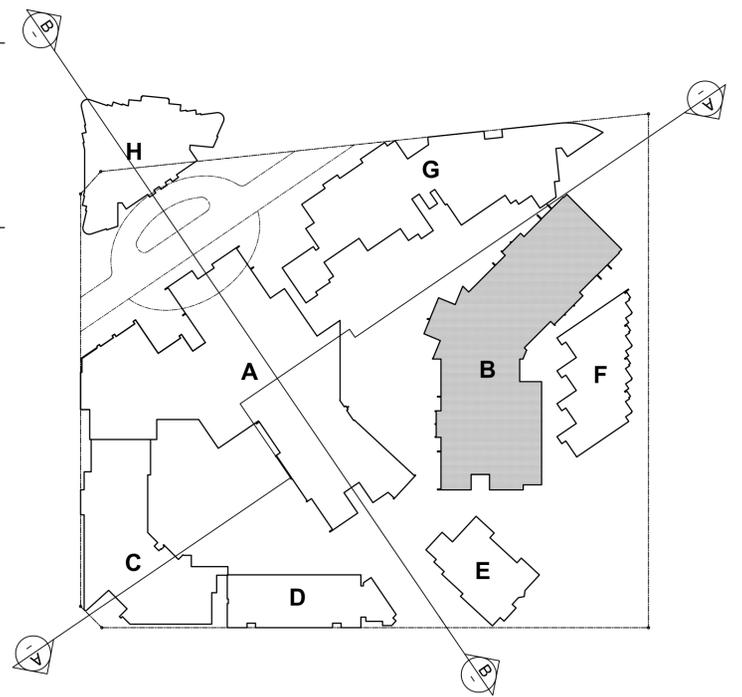




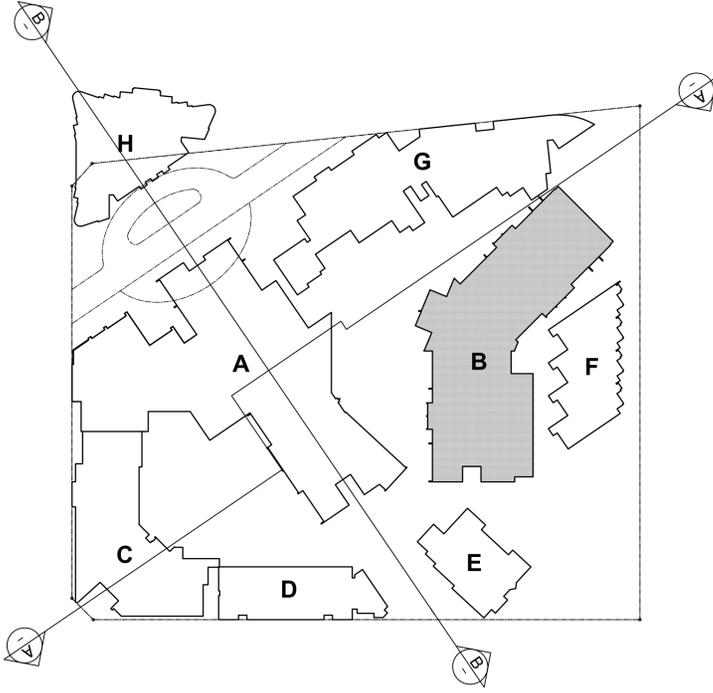
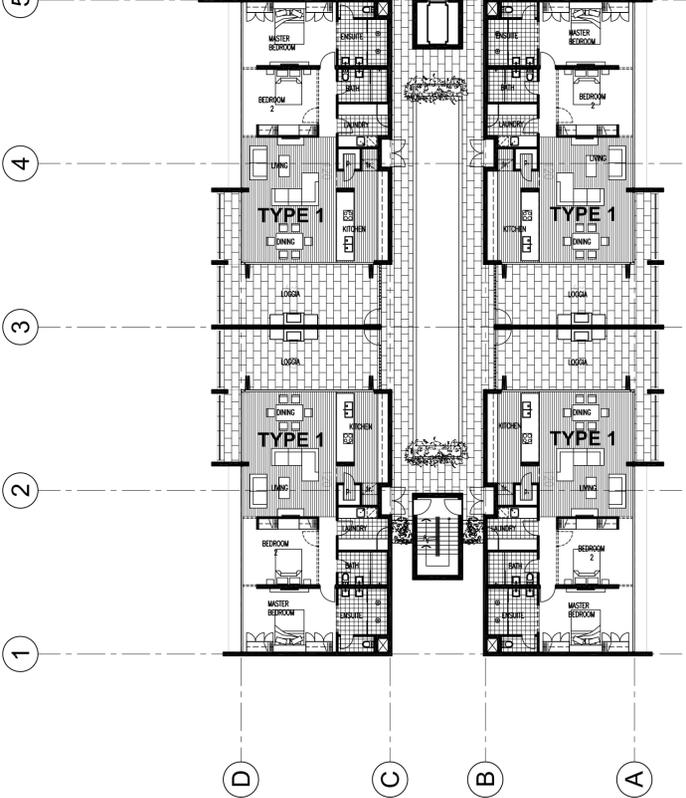
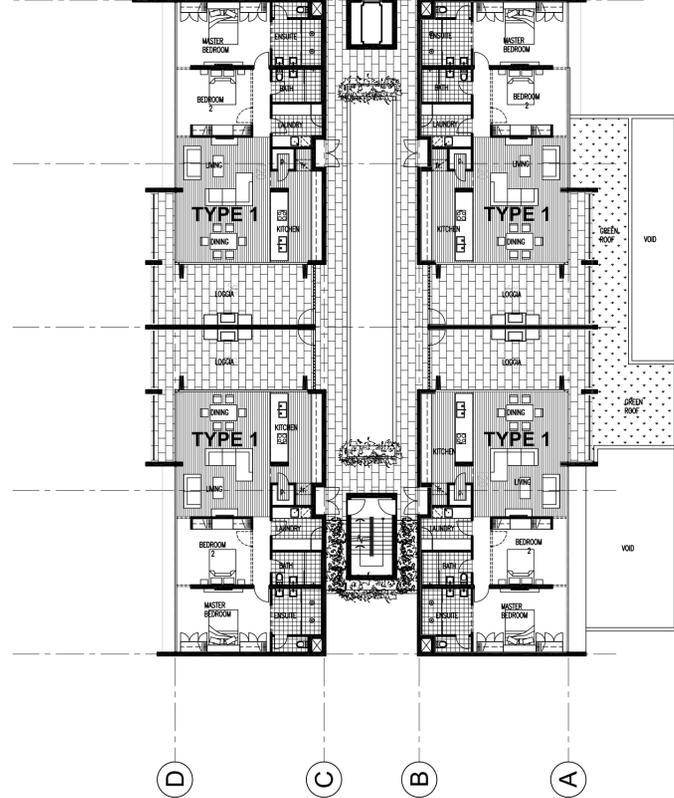
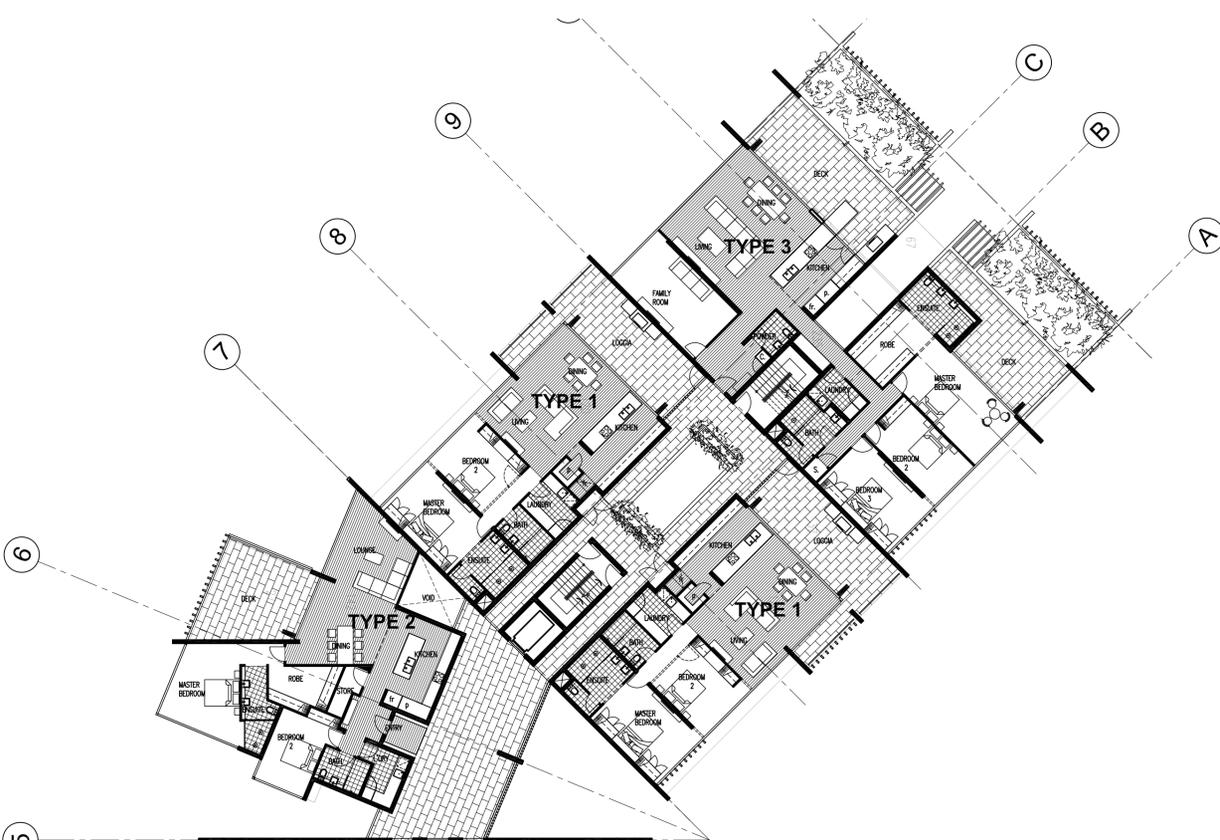
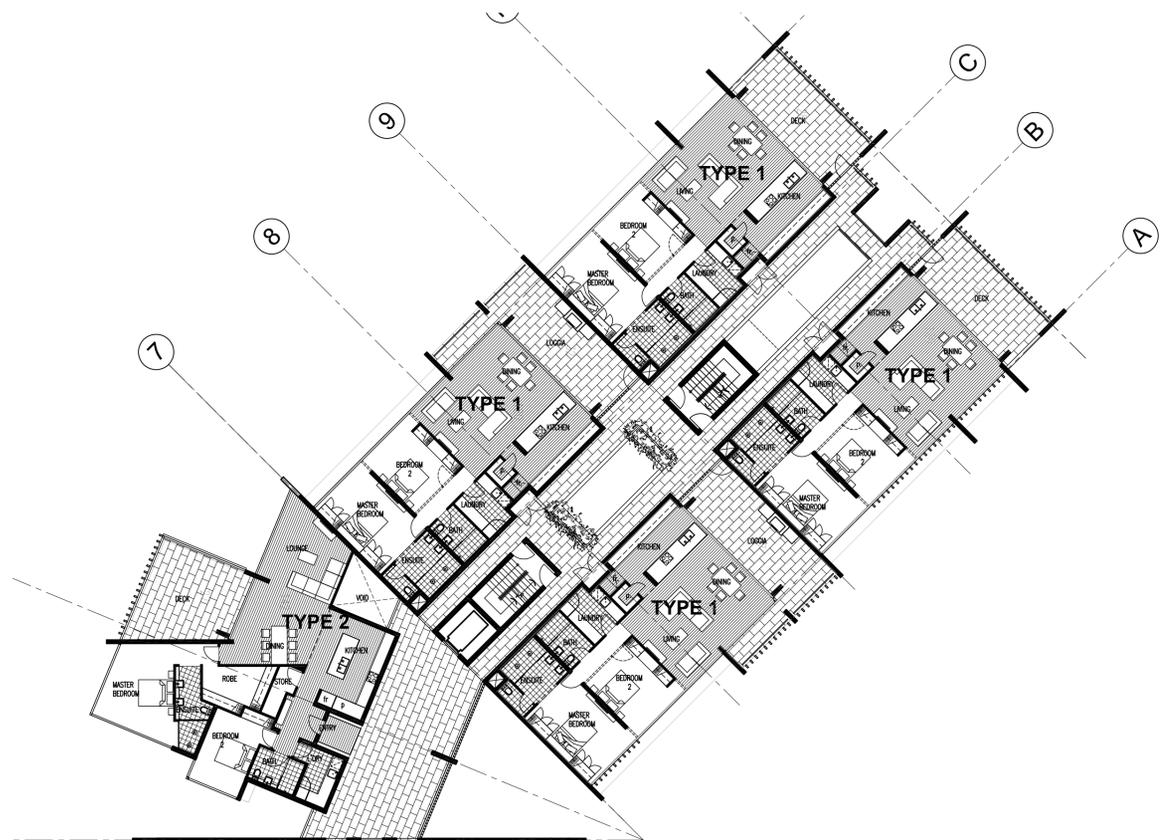
LEVEL 1
SCALE 1:200 @ A1
0 2 4 10 M



LEVEL G
SCALE 1:200 @ A1



KEY PLAN
(NO SCALE)

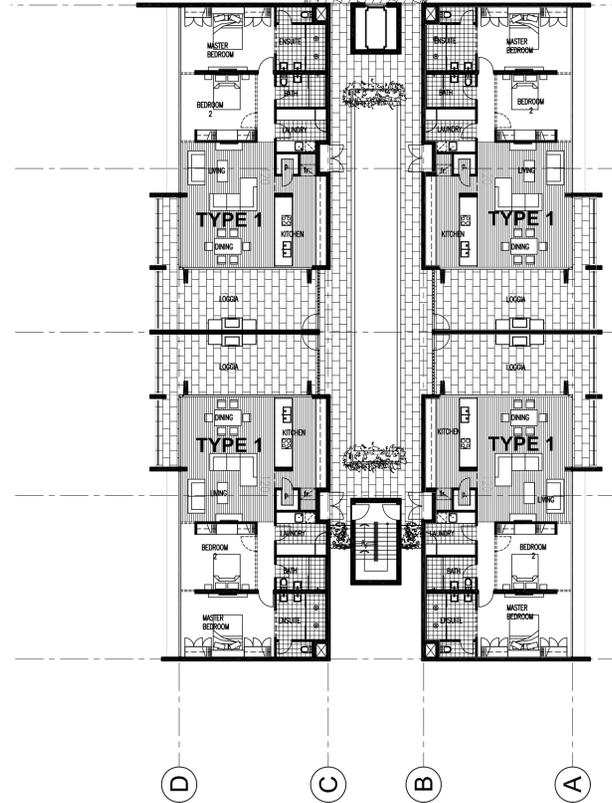


LEVEL 2
SCALE 1:200 @ A1

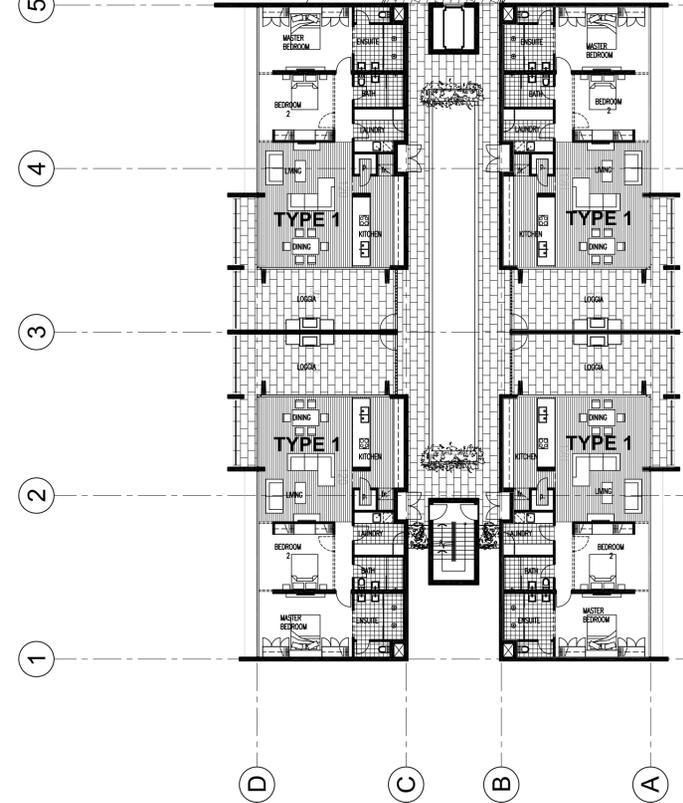
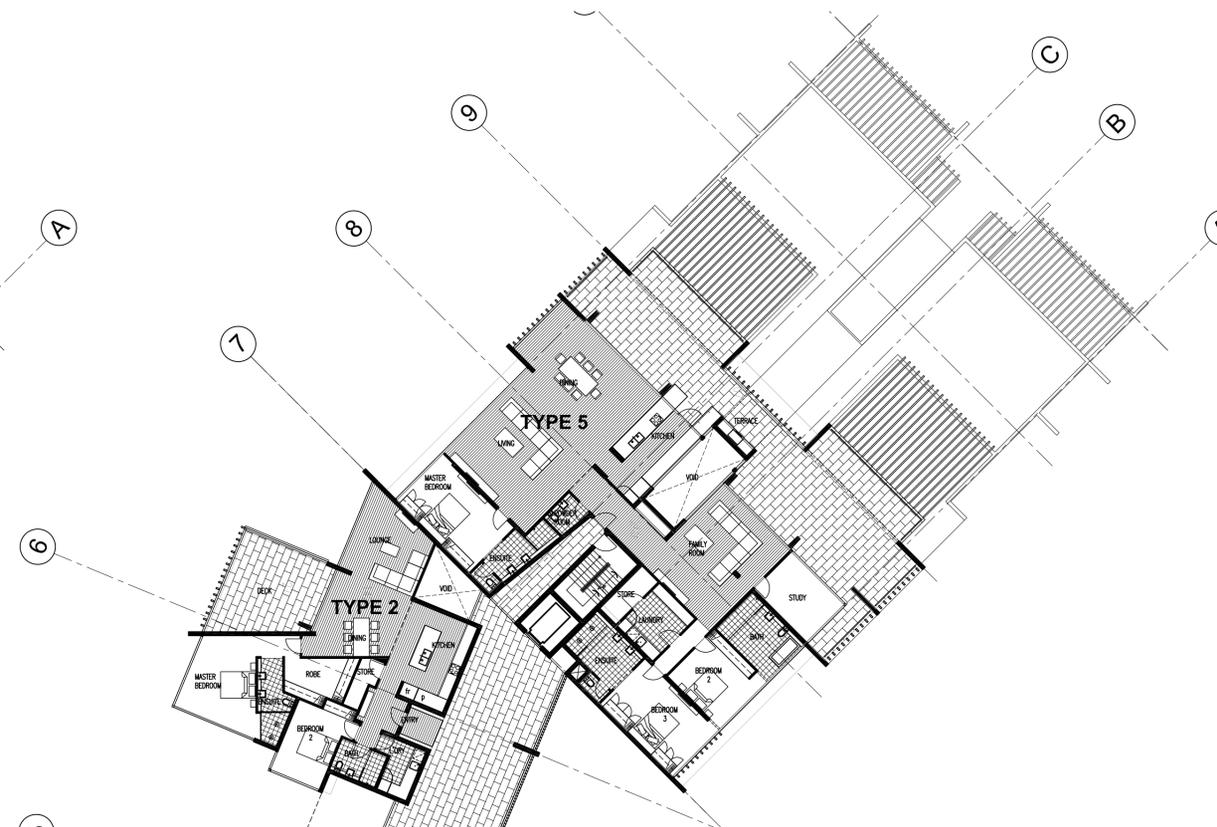
LEVEL 3
SCALE 1:200 @ A1

KEY PLAN
(NO SCALE)

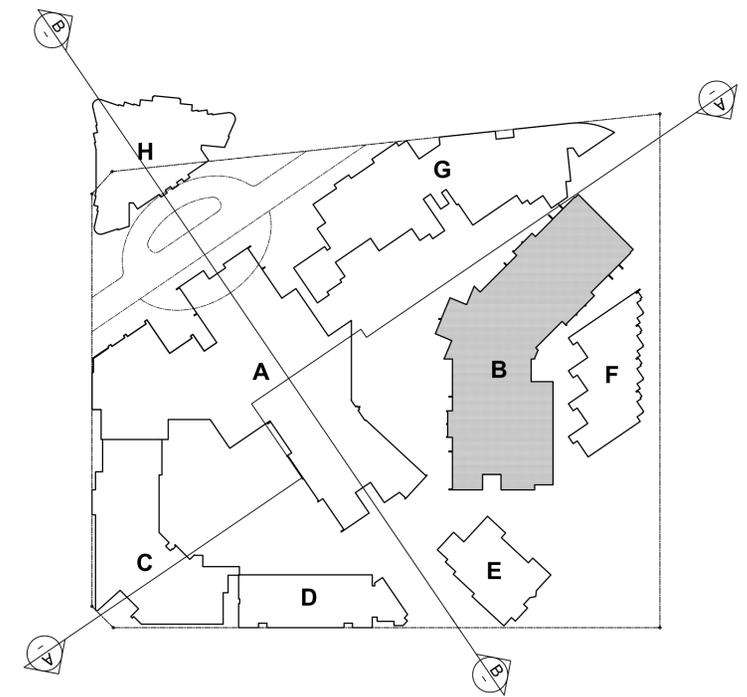




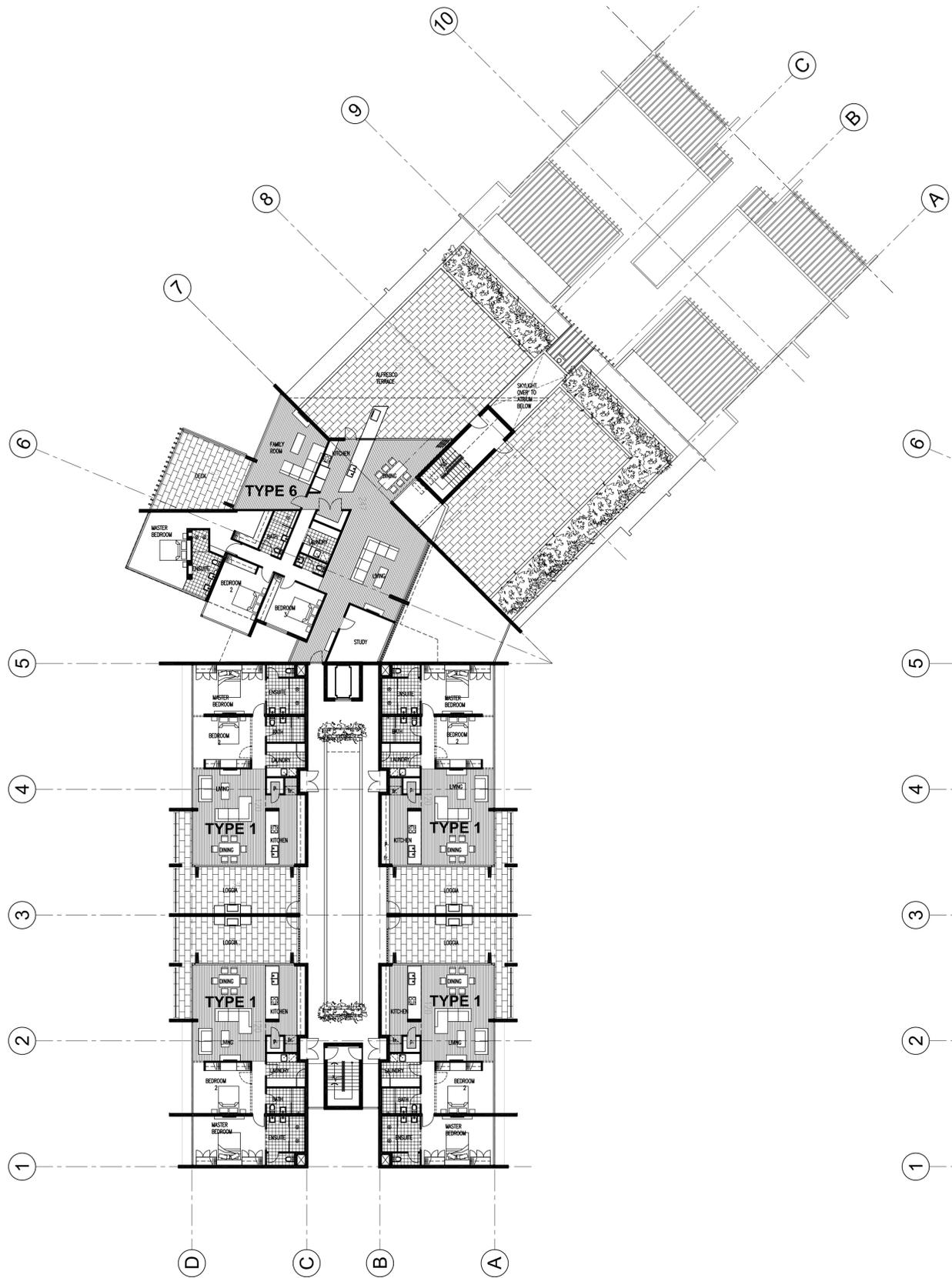
LEVEL 4
SCALE 1:200 @ A1



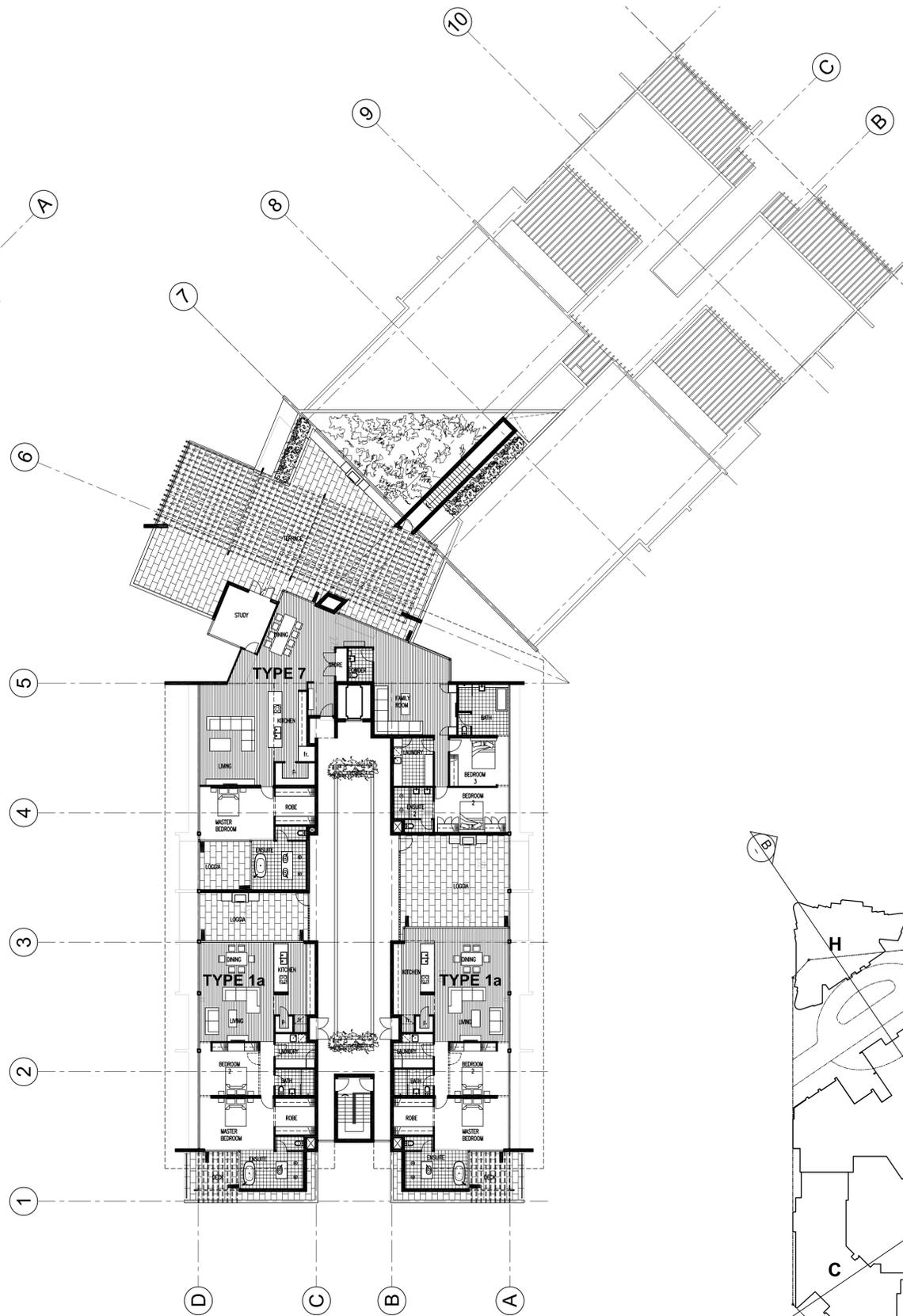
LEVEL 5
SCALE 1:200 @ A1



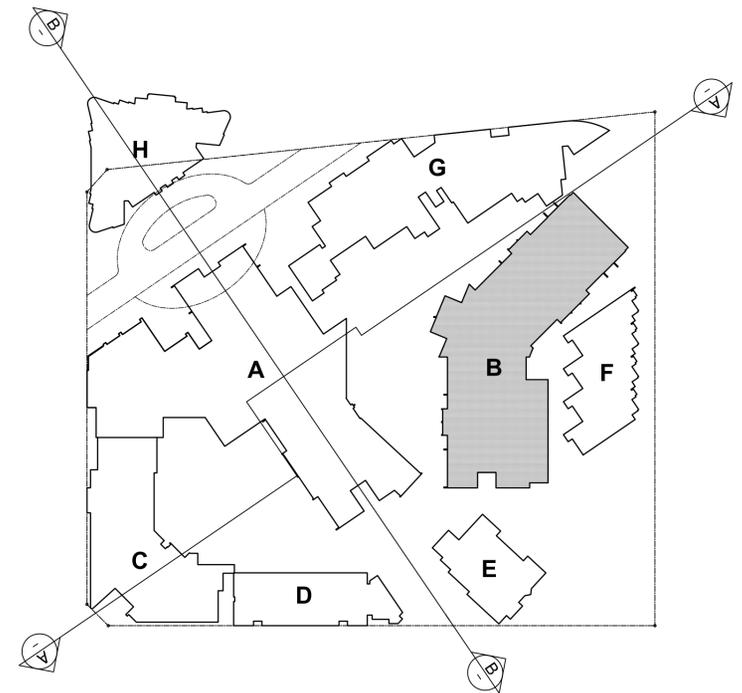
KEY PLAN
(NO SCALE)



LEVEL 6
SCALE 1:200 @ A1

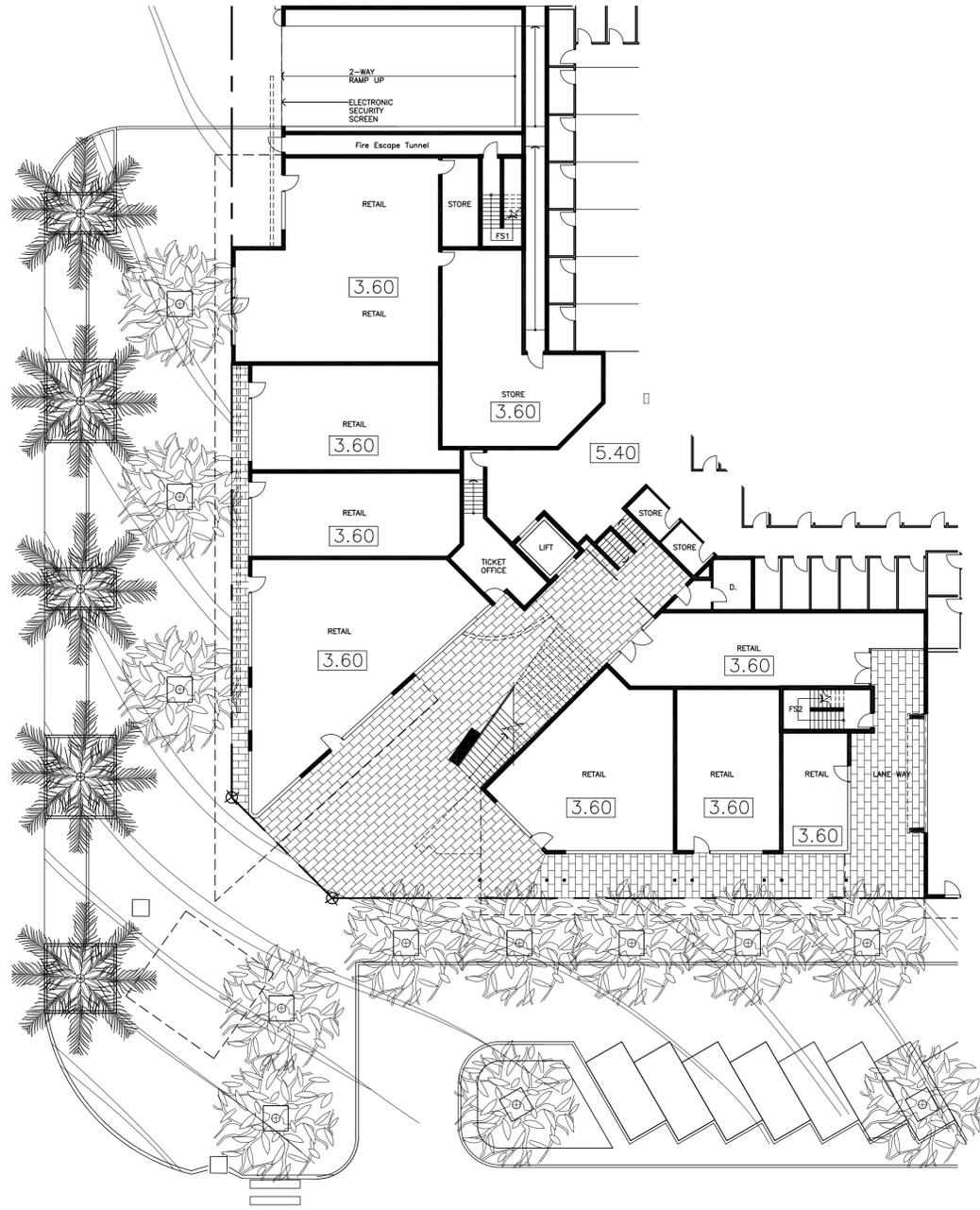


LEVEL 7
SCALE 1:200 @ A1

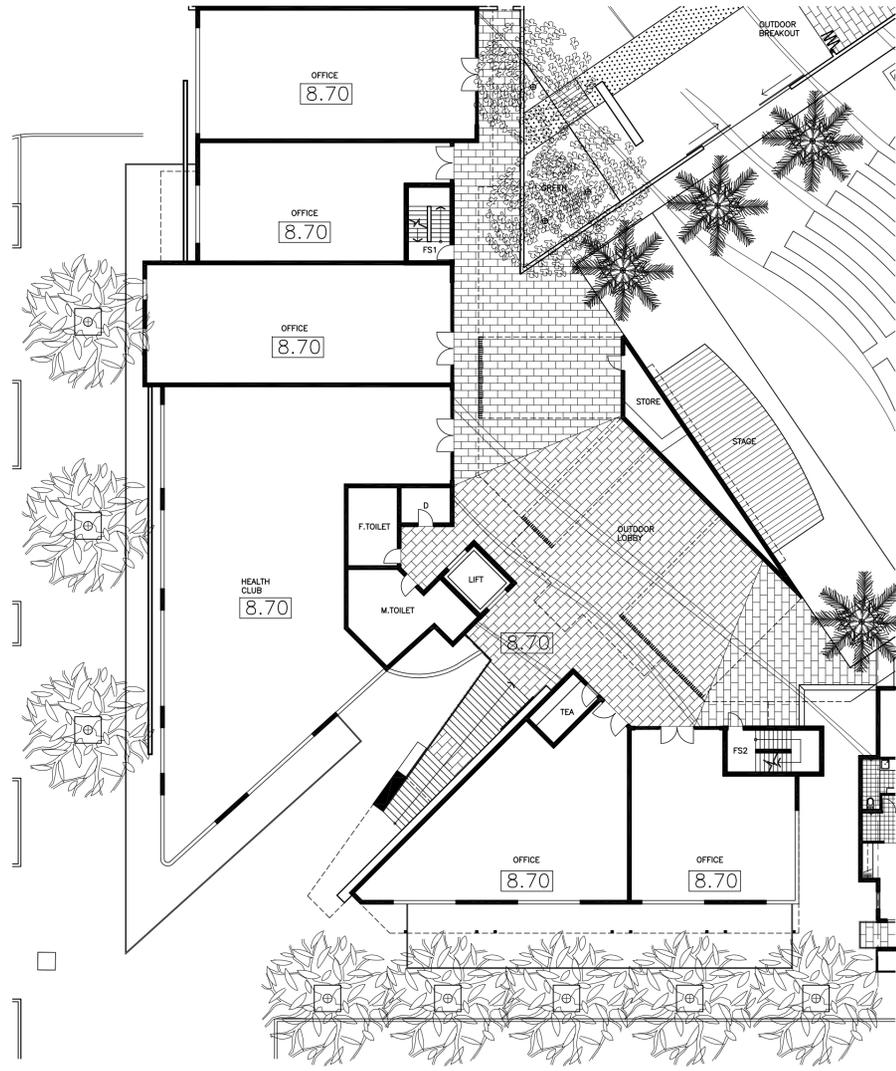


KEY PLAN
(NO SCALE)

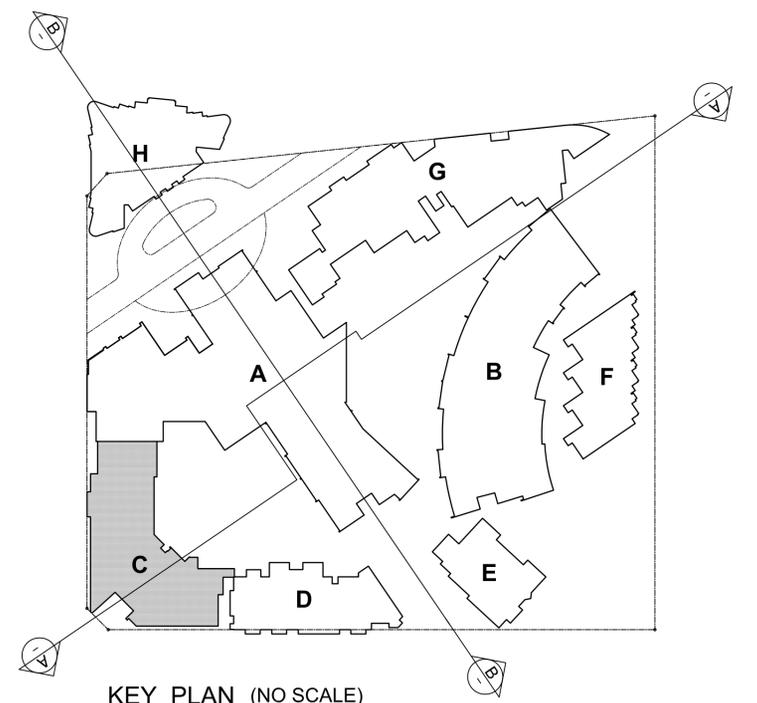




LEVEL G
SCALE 1:200 @ A1

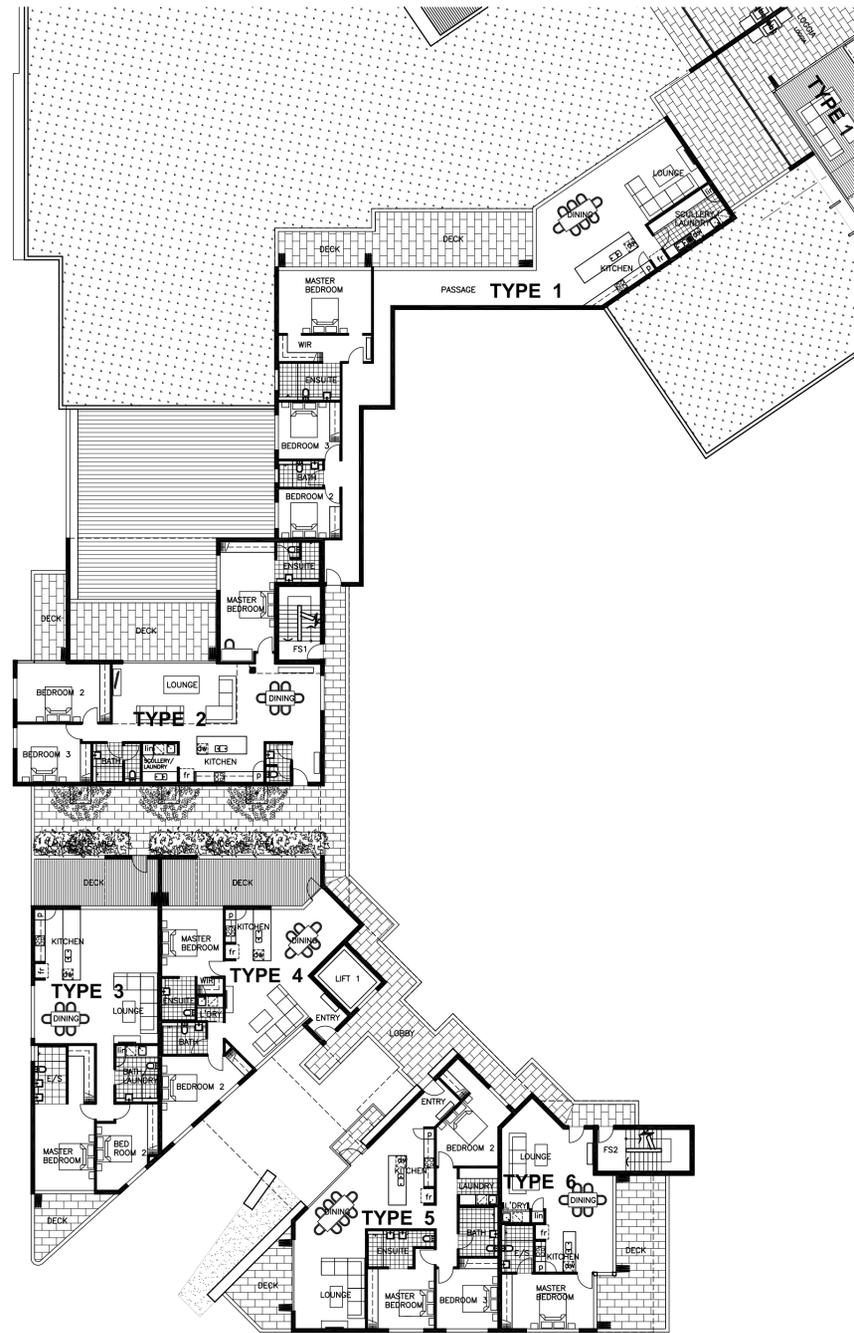


LEVEL 1
SCALE 1:200 @ A1



KEY PLAN (NO SCALE)

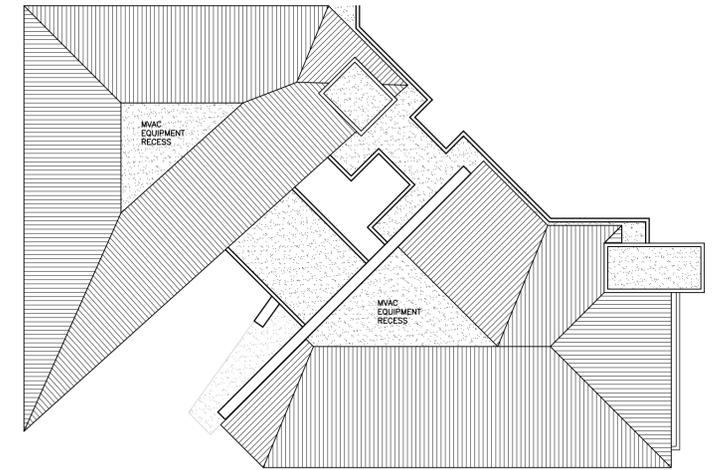




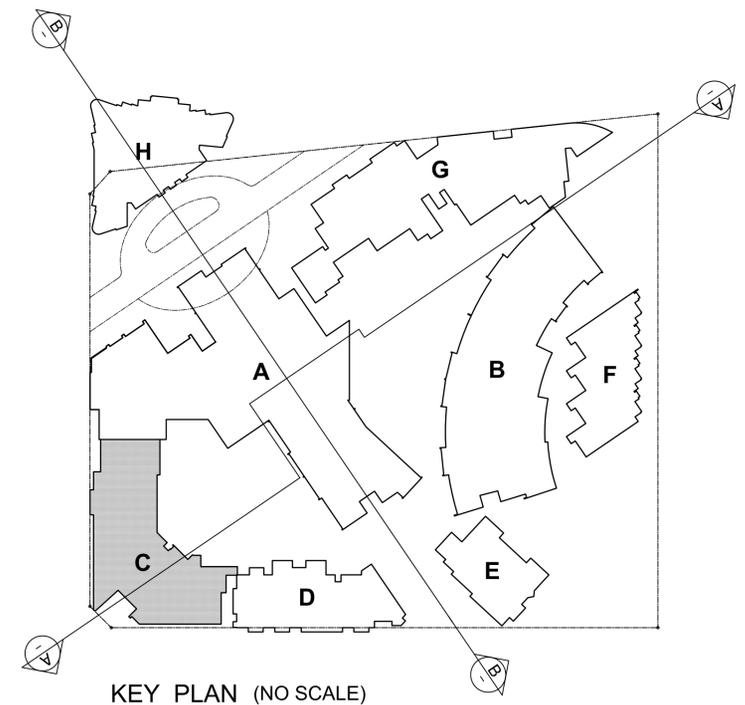
LEVEL 2
SCALE 1:200 @ A1



LEVEL 3
SCALE 1:200 @ A1

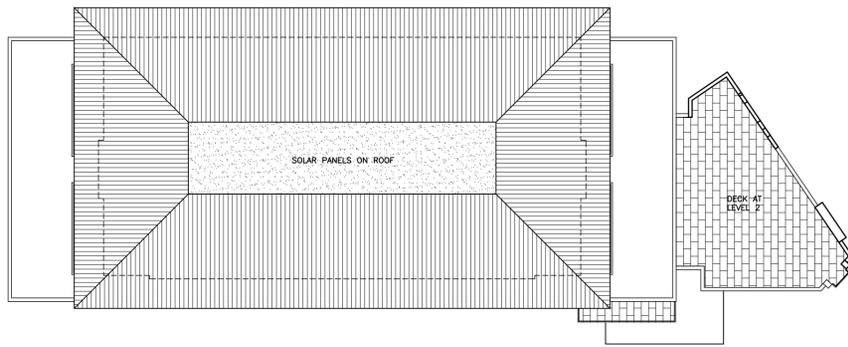


ROOF PLAN
SCALE 1:200 @ A1

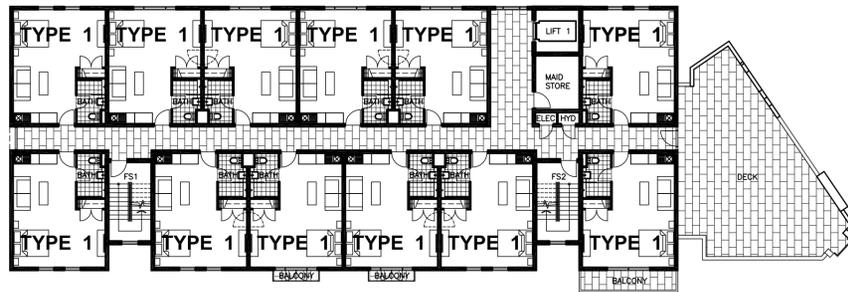


KEY PLAN (NO SCALE)

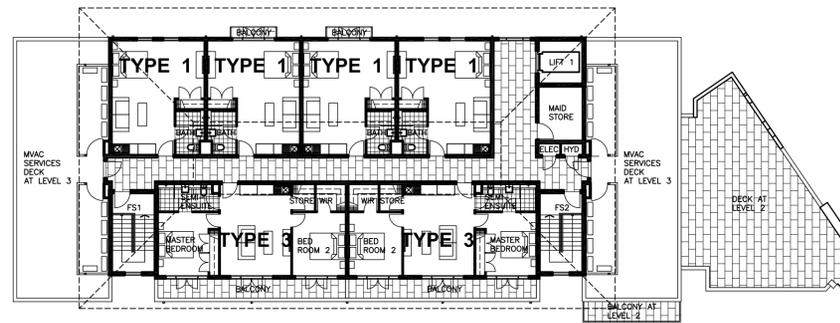




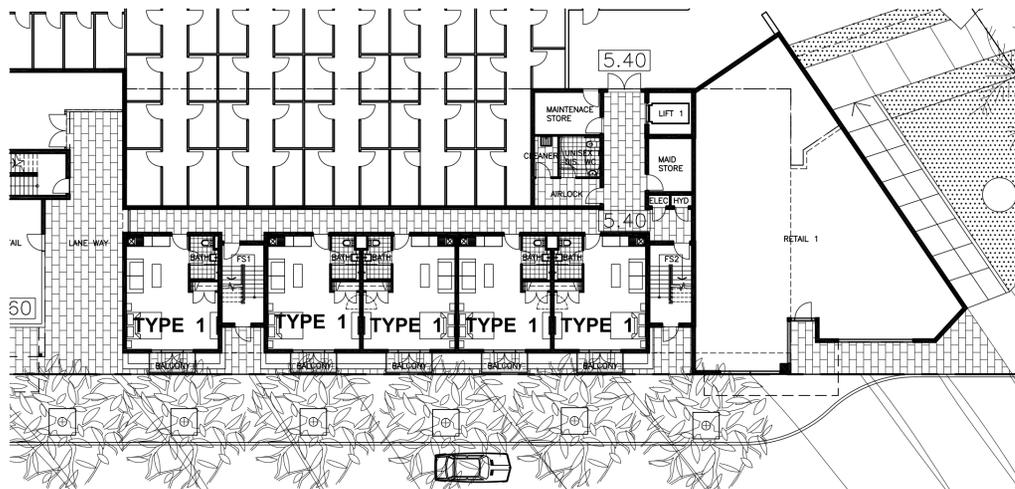
ROOF PLAN
SCALE 1:200 @ A1



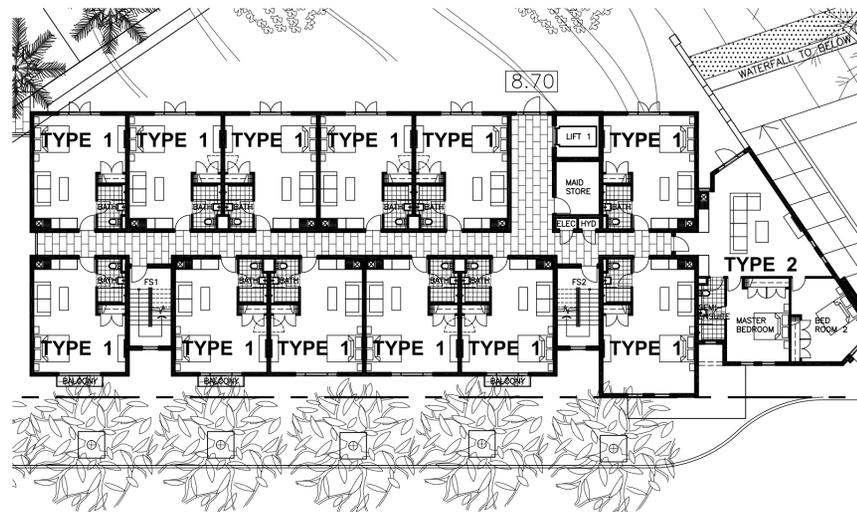
LEVEL 2
SCALE 1:200 @ A1



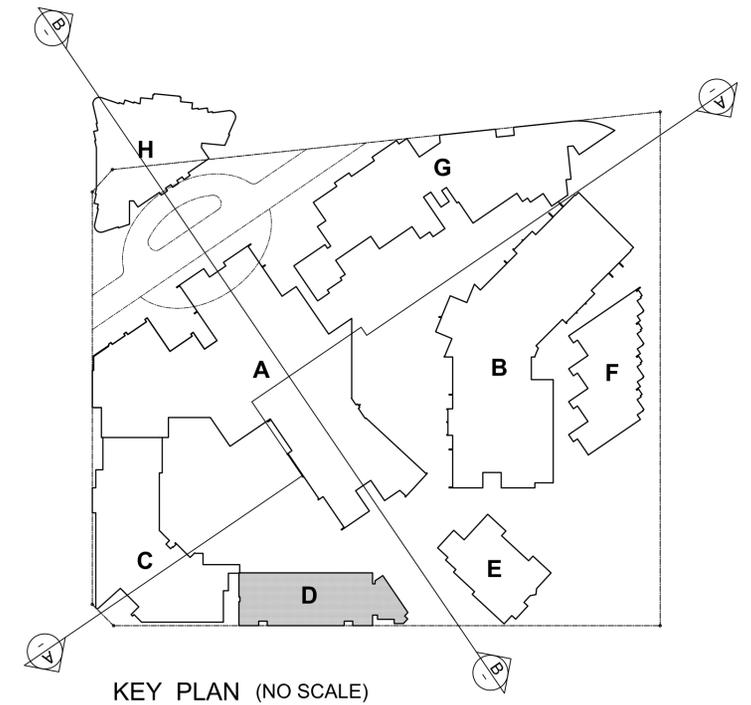
LEVEL 3
SCALE 1:200 @ A1

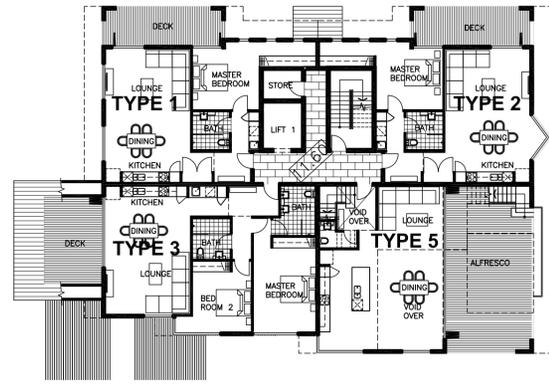


LEVEL GROUND
SCALE 1:200 @ A1

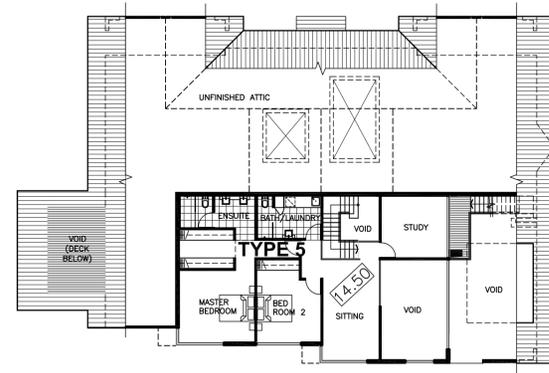


LEVEL 1
SCALE 1:200 @ A1

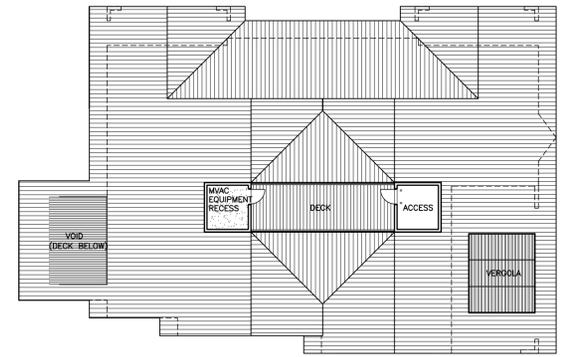




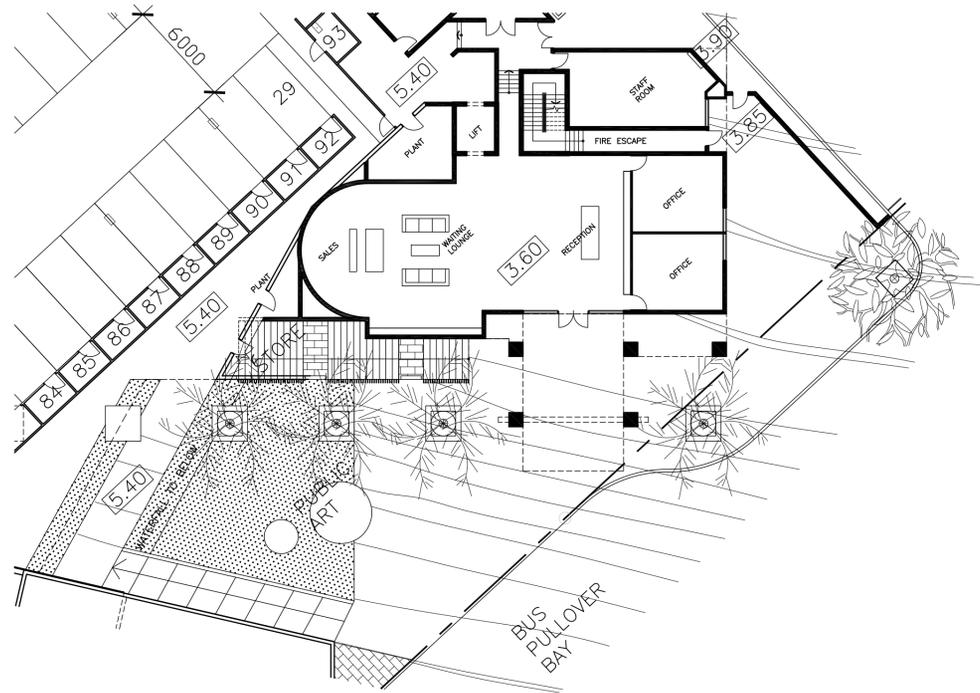
LEVEL 2
SCALE 1:200 @ A1



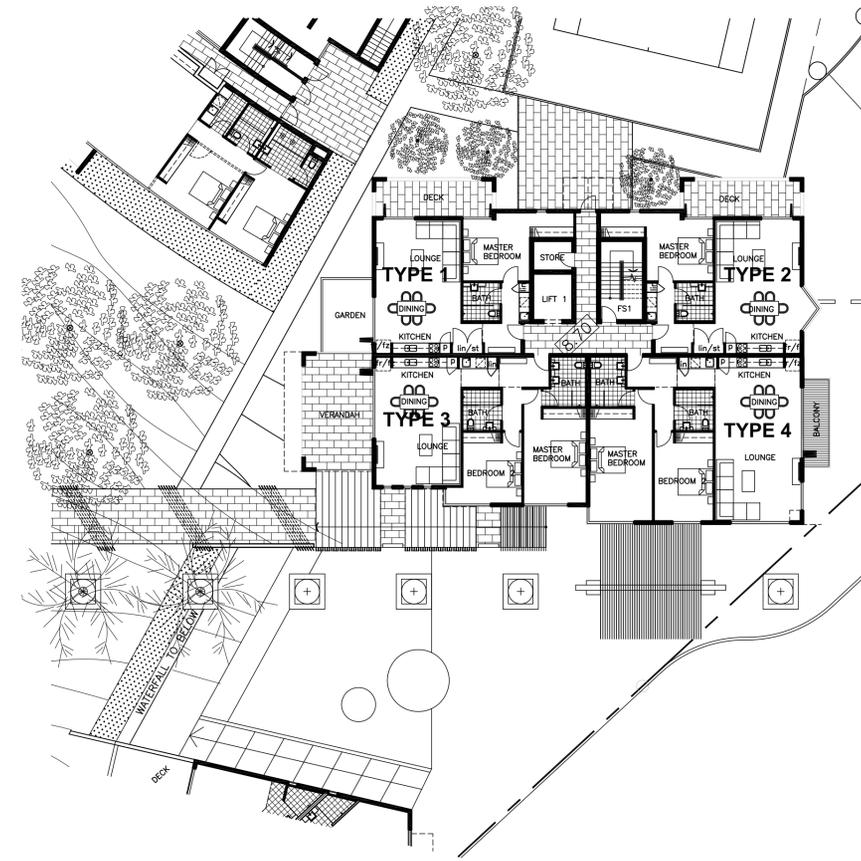
LEVEL 3
SCALE 1:200 @ A1



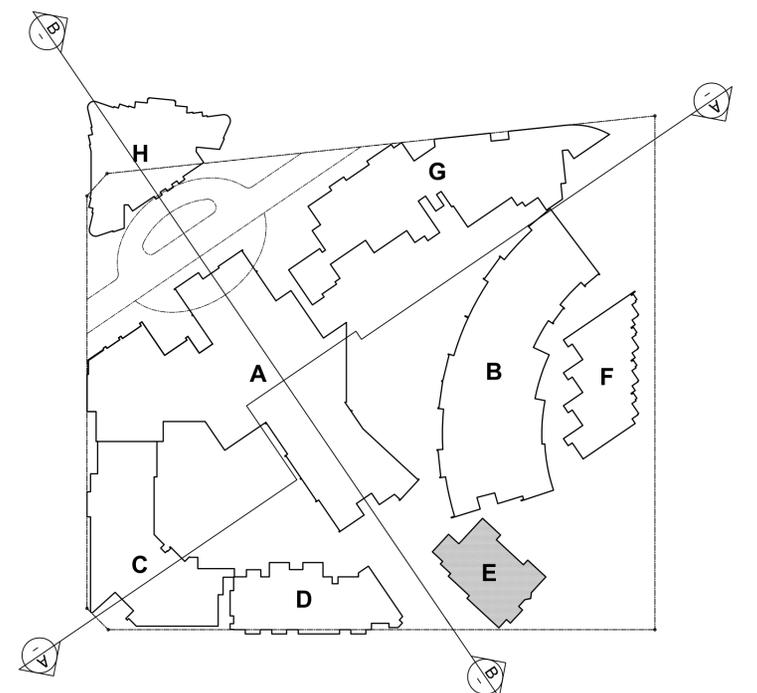
ROOF
SCALE 1:200 @ A1



LEVEL G
SCALE 1:200 @ A1



LEVEL 1
SCALE 1:200 @ A1



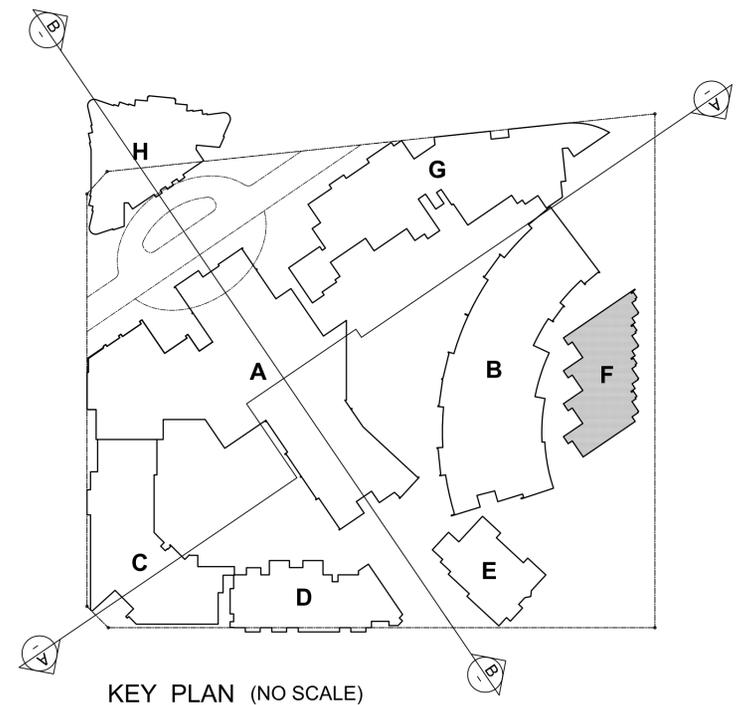
KEY PLAN
(NO SCALE)



LEVEL GROUND
SCALE 1:200 @ A1

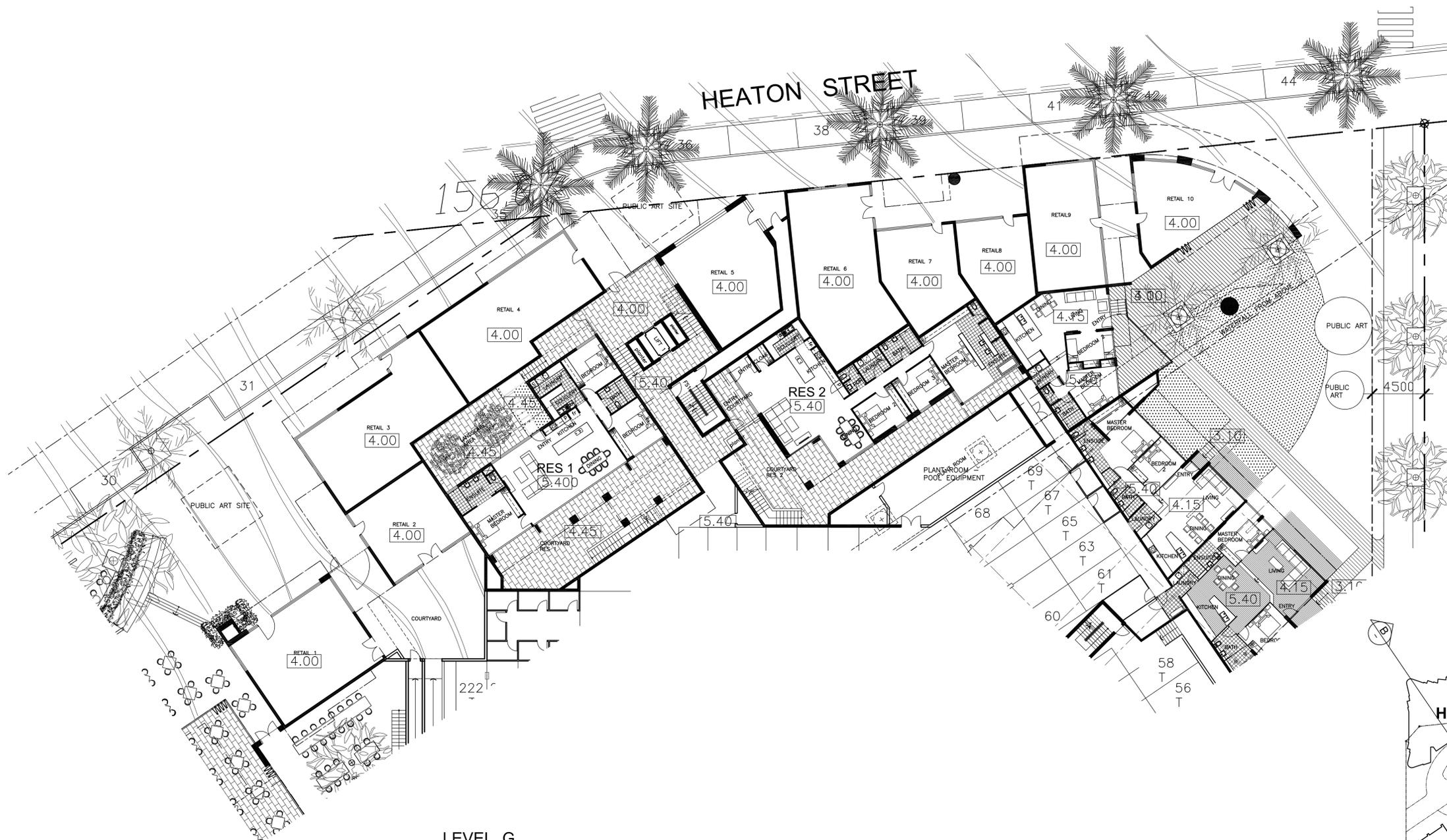


LEVEL 1
SCALE 1:200 @ A1

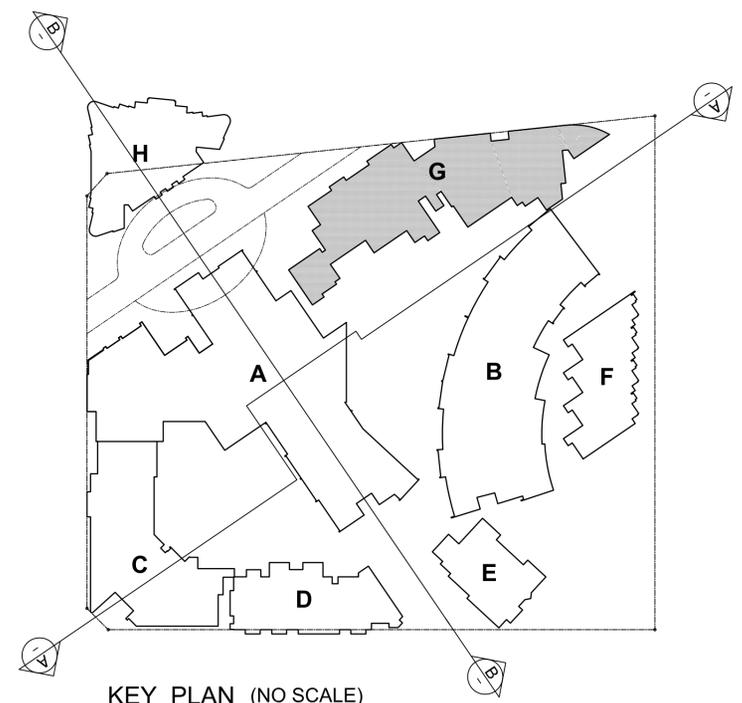


KEY PLAN (NO SCALE)





LEVEL G
SCALE 1:200 @ A1



KEY PLAN (NO SCALE)

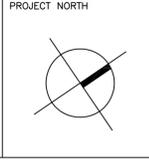


LAWRENCE SCANLAN
& ASSOCIATES PTY LTD
ARCHITECTS
FIRST FLOOR, 79 KING STREET, PERTH 6000
TEL(08) 9321 0166 FAX(08) 9485 0435

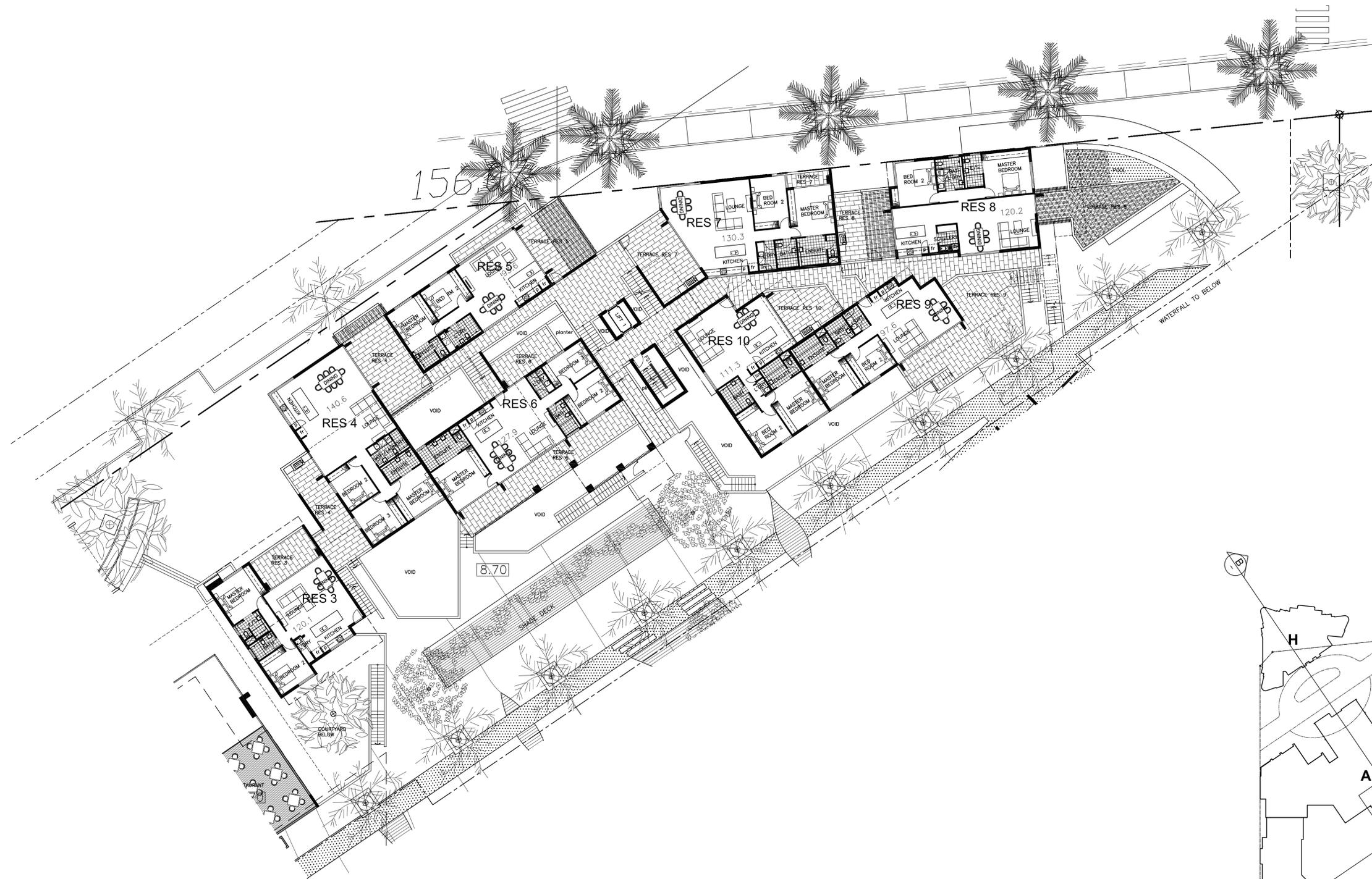
CLIENT
ALICEVILLE PTY LTD

PROJECT
**PROPOSED HOTEL AND RESIDENTIAL
RESORT DEVELOPMENT**
LOT 62, ROBERTS STREET, JURIE BAY, W A

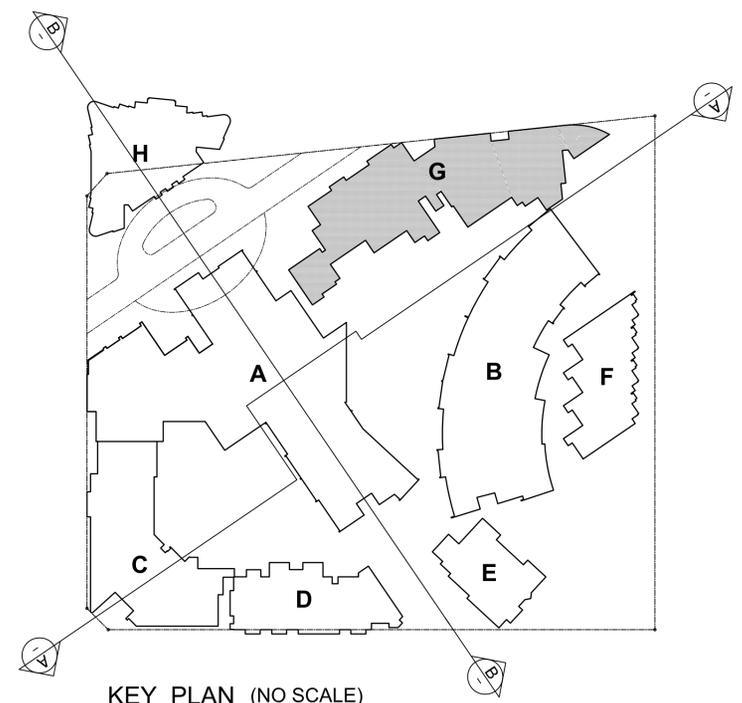
TITLE
BLOCK G - PLANS



PROJECT NORTH	JOB No 0801	DRAWING NO
	DATE 27.02.2019	DA 20
	SCALE AS NOTED	
	DRAWN	
CHECKED	ISSUE DEVELOPMENT APPLICATION	

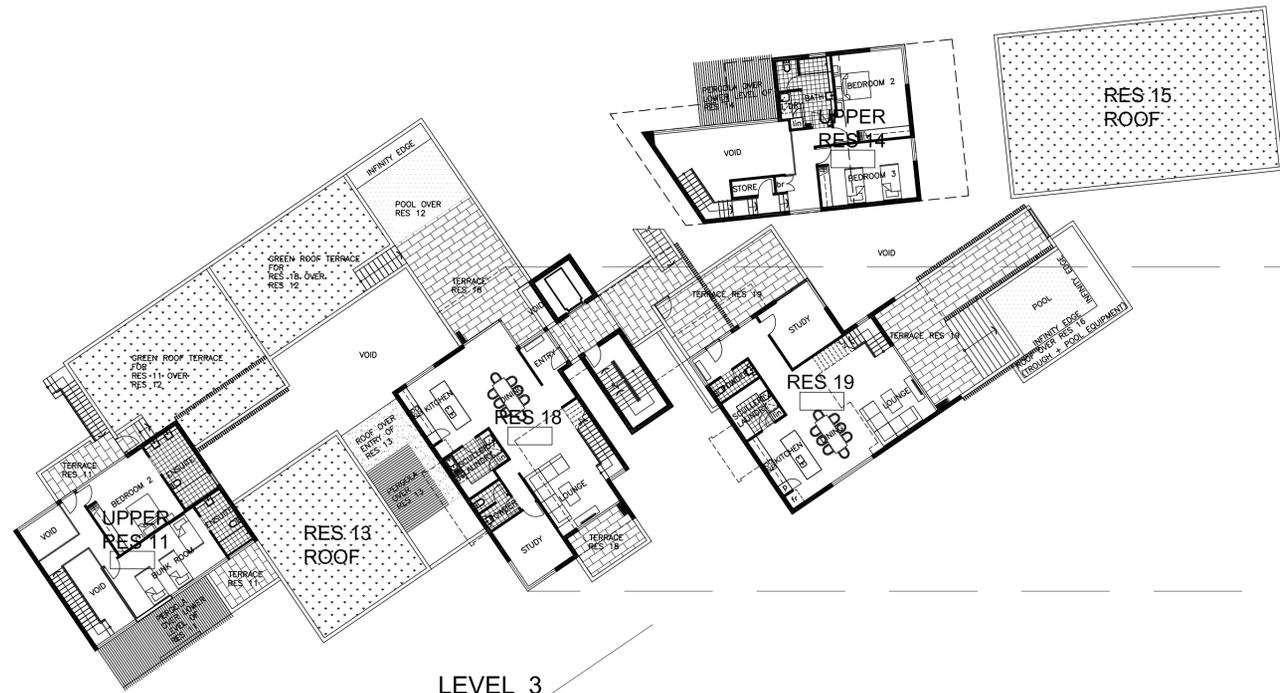


LEVEL 1
SCALE 1:200 @ A1

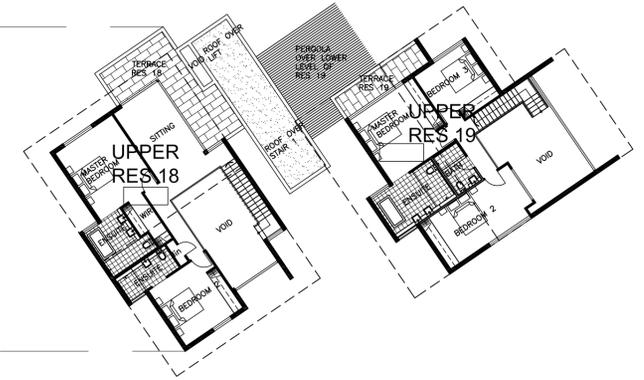


KEY PLAN (NO SCALE)

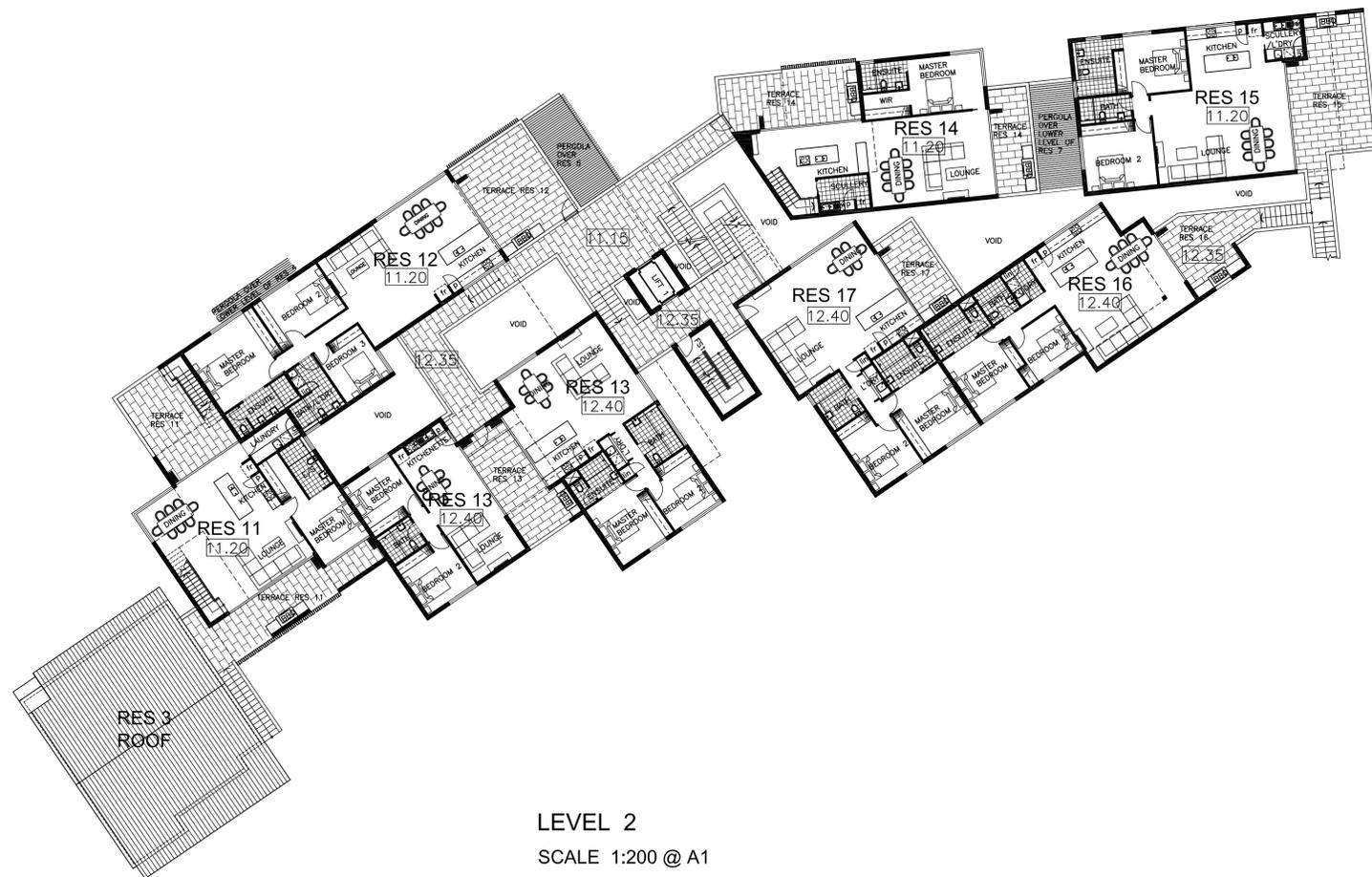




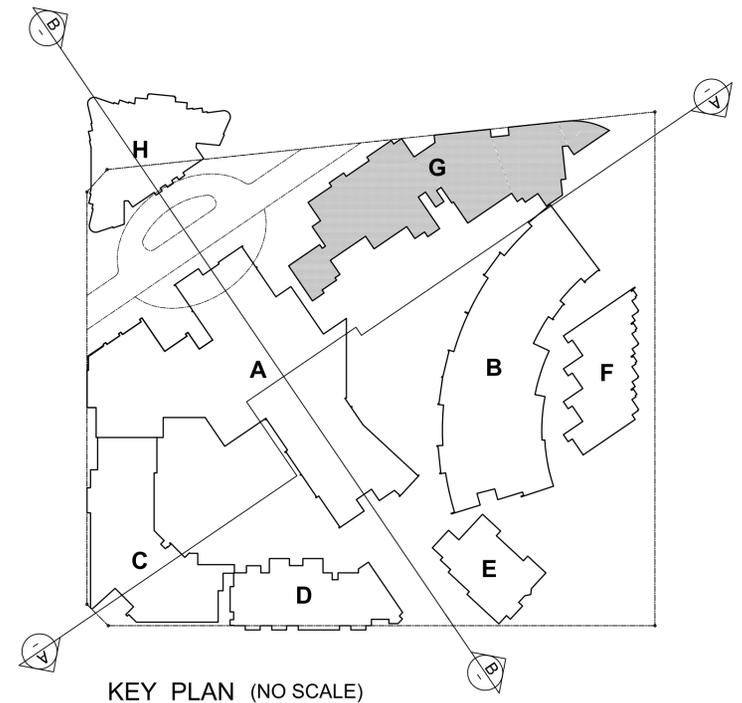
LEVEL 3
SCALE 1:200 @ A1



LEVEL 4
SCALE 1:200 @ A1

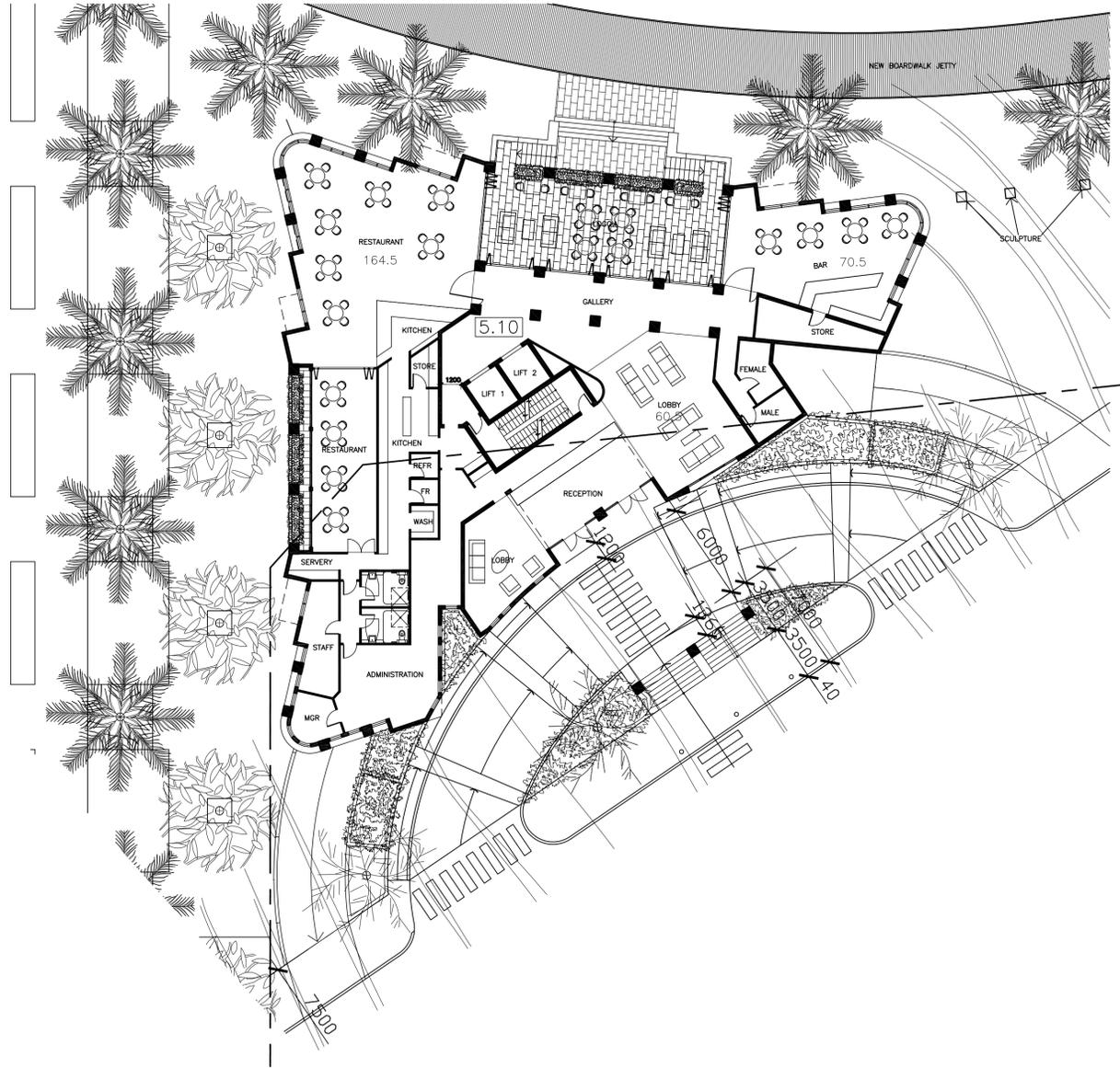


LEVEL 2
SCALE 1:200 @ A1



KEY PLAN (NO SCALE)

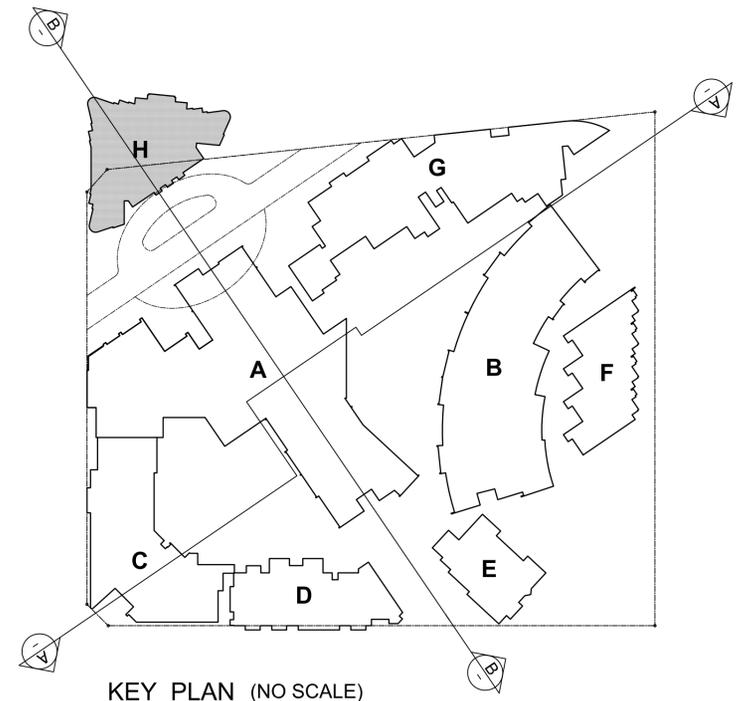




LEVEL GROUND
SCALE 1:200 @ A1



LEVEL FIRST
SCALE 1:200 @ A1



KEY PLAN (NO SCALE)





LEVEL 2
SCALE 1:200 @ A1



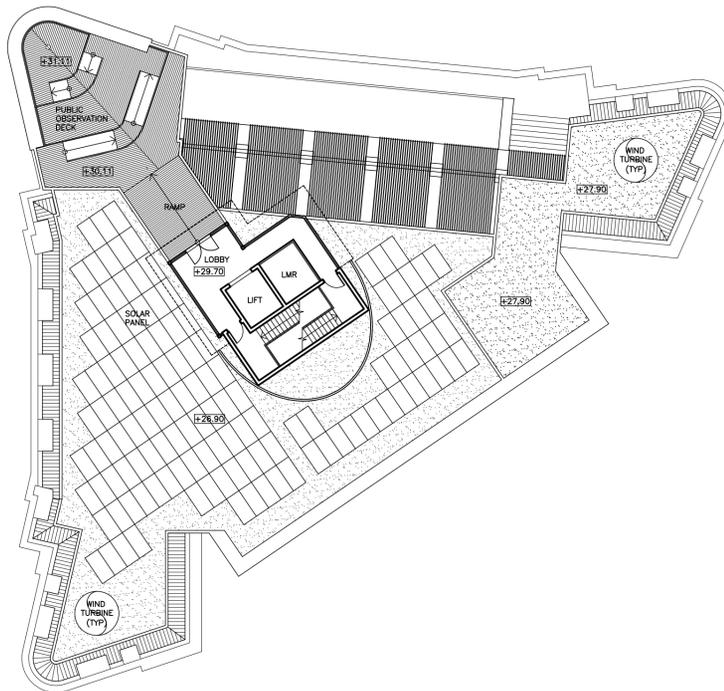
LEVEL 3 AND 5
SCALE 1:200 @ A1



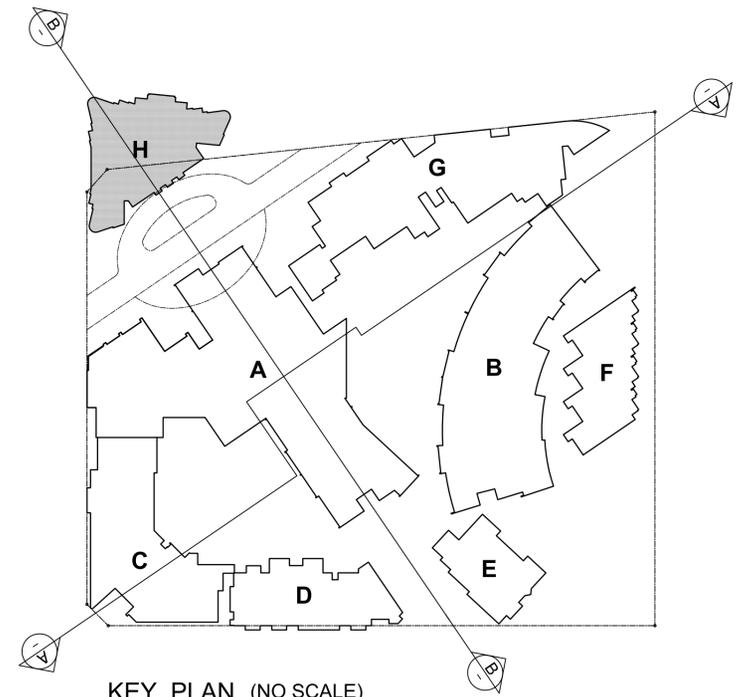
LEVEL 4
SCALE 1:200 @ A1



LEVEL 6
SCALE 1:200 @ A1

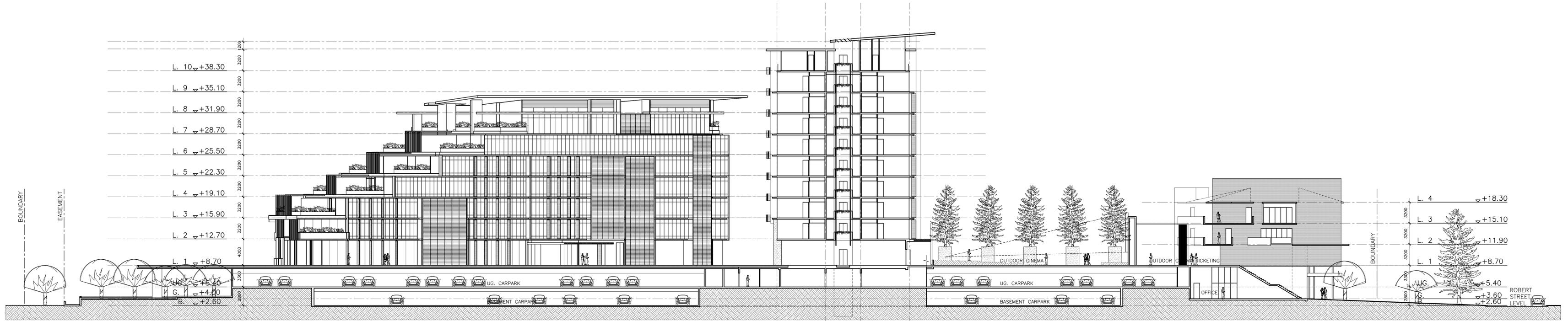


LEVEL 7
SCALE 1:200 @ A1

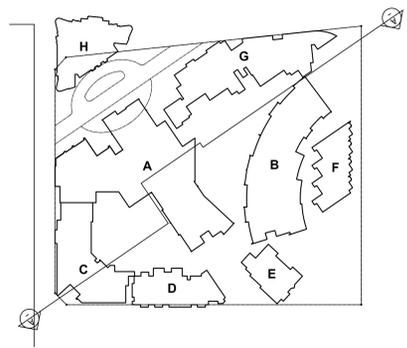


KEY PLAN (NO SCALE)





SECTION AA
SCALE 1:200 @ A1
0 2 4 10 M



KEY PLAN (NO SCALE)

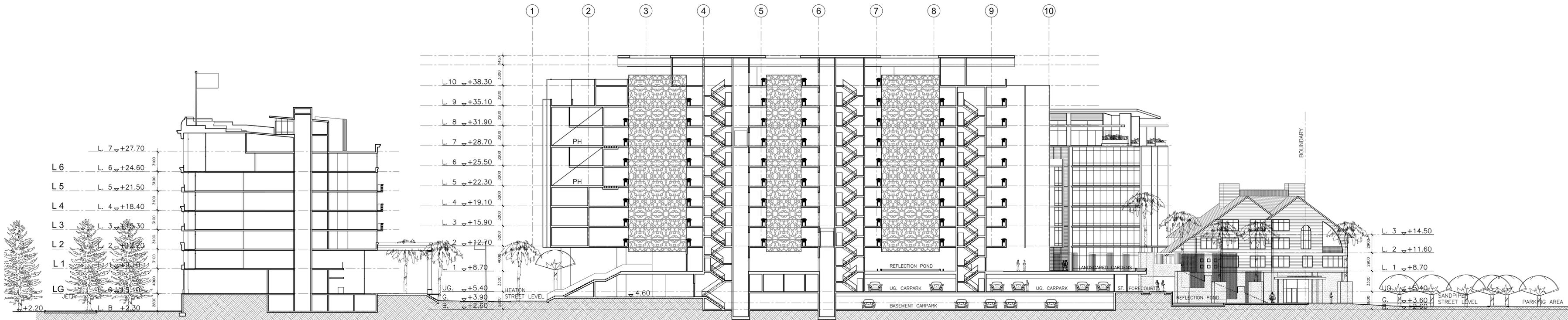
LAWRENCE SCANLAN
& ASSOCIATES PTY LTD
ARCHITECTS
FIRST FLOOR, 79 KING STREET PERTH 6000
TEL(08) 9321 0166 FAX(08) 9485 0435

CLIENT
ALICEVILLE PTY LTD

PROJECT
**PROPOSED HOTEL AND RESIDENTIAL
RESORT DEVELOPMENT**
LOT 62, ROBERTS STREET, JURIE BAY, WA

TITLE
SITE SECTION AA

PROJECT NORTH	JOB No 0801	DRAWING NO
	DATE 27.02.2019	DA 24
	SCALE 1:200	
	DRAWN	
CHECKED	ISSUE	DEVELOPMENT APPLICATION



SECTION - B

SECTION BB
SCALE 1:200 @ A1



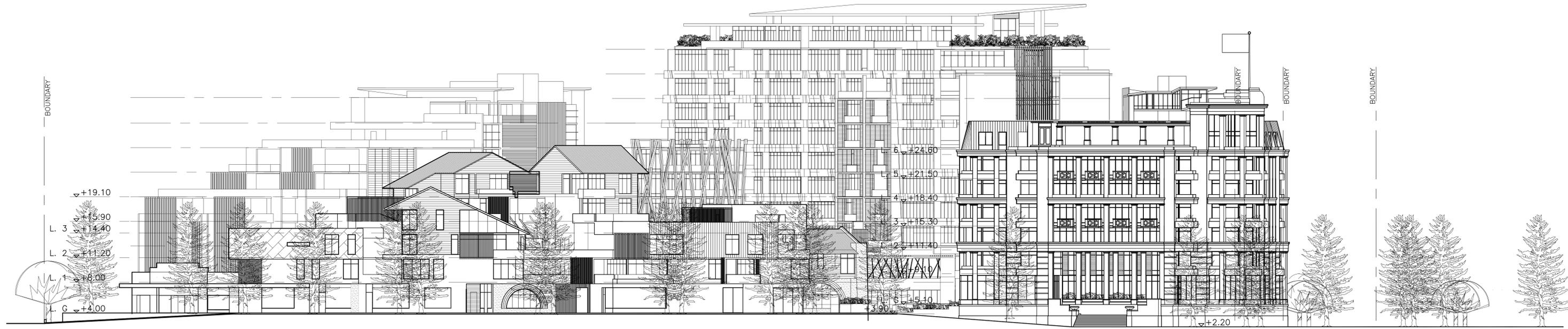
LAWRENCE SCANLAN
& ASSOCIATES PTY LTD
ARCHITECTS
FIRST FLOOR, 79 KING STREET, PERTH 6000
TEL(08) 9321 0166 FAX(08) 9485 0435

CLIENT
ALICEVILLE PTY LTD

PROJECT
**PROPOSED HOTEL AND RESIDENTIAL
RESORT DEVELOPMENT**
LOT 62, ROBERTS STREET, JURIE BAY, WA

TITLE
SITE SECTION BB

PROJECT NORTH	JOB No 0801	DRAWING NO
	DATE 28.02.2019	DA 25
	SCALE 1:200	
	DRAWN	
CHECKED	ISSUE	DEVELOPMENT APPLICATION



NW ELEVATION (HEATON STREET)

SCALE 1:200 @ A1



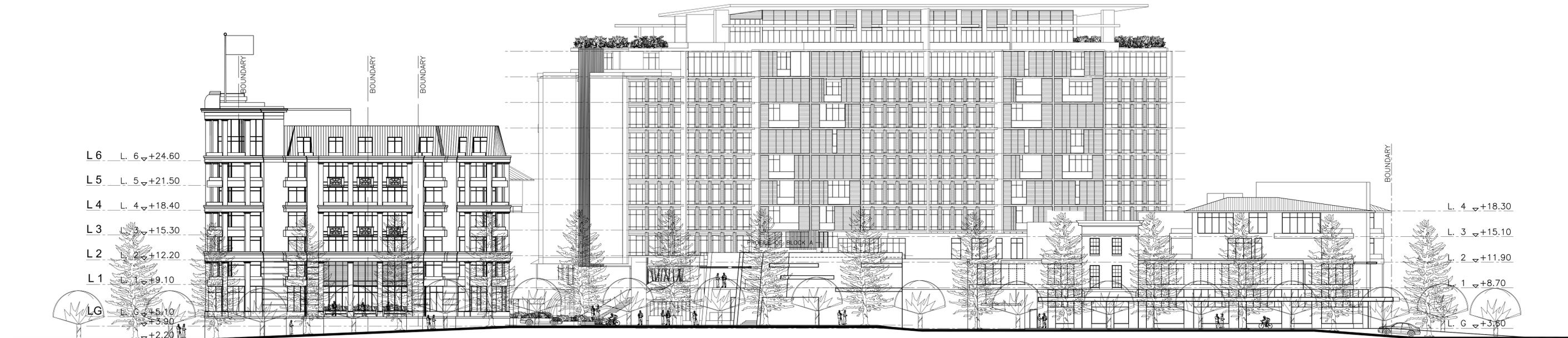
LAWRENCE SCANLAN
 & ASSOCIATES PTY LTD
 ARCHITECTS
 FIRST FLOOR, 79 KING STREET PERTH 6000
 TEL(08) 9321 0166 FAX(08) 9485 0435

CLIENT
ALICEVILLE PTY LTD

PROJECT
**PROPOSED HOTEL AND RESIDENTIAL
 RESORT DEVELOPMENT**
 LOT 62, ROBERTS STREET, JURIE BAY, WA

TITLE
SITE ELEVATION

PROJECT NORTH	JOB No 0801	DRAWING NO
	DATE 27.02.2019	DA 26
	SCALE 1:200	
	DRAWN	
	CHECKED	ISSUE DEVELOPMENT APPLICATION



SW ELEVATION (ROBERTS STREET)

SCALE 1:200 @ A1



LAWRENCE SCANLAN
 & ASSOCIATES PTY LTD
 ARCHITECTS
 FIRST FLOOR, 79 KING STREET PERTH 6000
 TEL(08) 9321 0166 FAX(08) 9485 0435

CLIENT

ALICEVILLE PTY LTD

PROJECT

PROPOSED HOTEL AND RESIDENTIAL
 RESORT DEVELOPMENT
 LOT 62, ROBERTS STREET, JURIE BAY, WA

TITLE

SITE ELEVATION

PROJECT NORTH

JOB No

0801

DATE

27.02.2019

SCALE

1:200

DRAWN

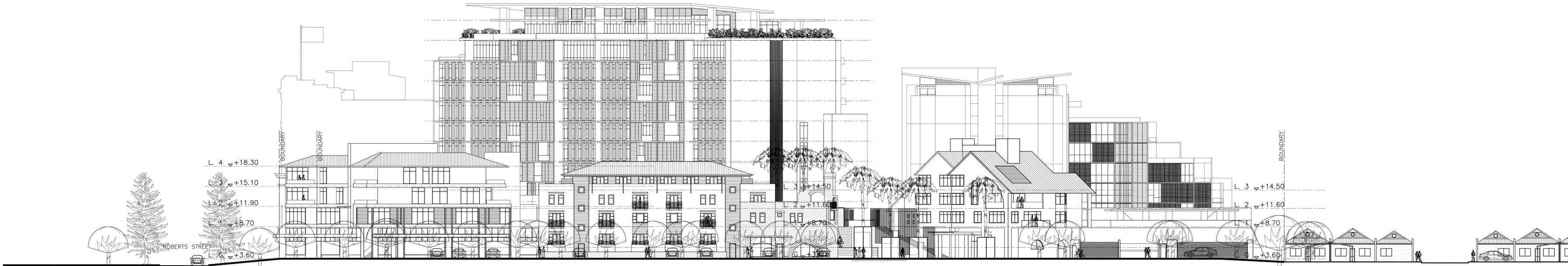
CHECKED

DRAWING NO

DA 27

ISSUE

DEVELOPMENT APPLICATION



SE ELEVATION (SANDPIPER STREET)

SCALE 1:200 @ A1



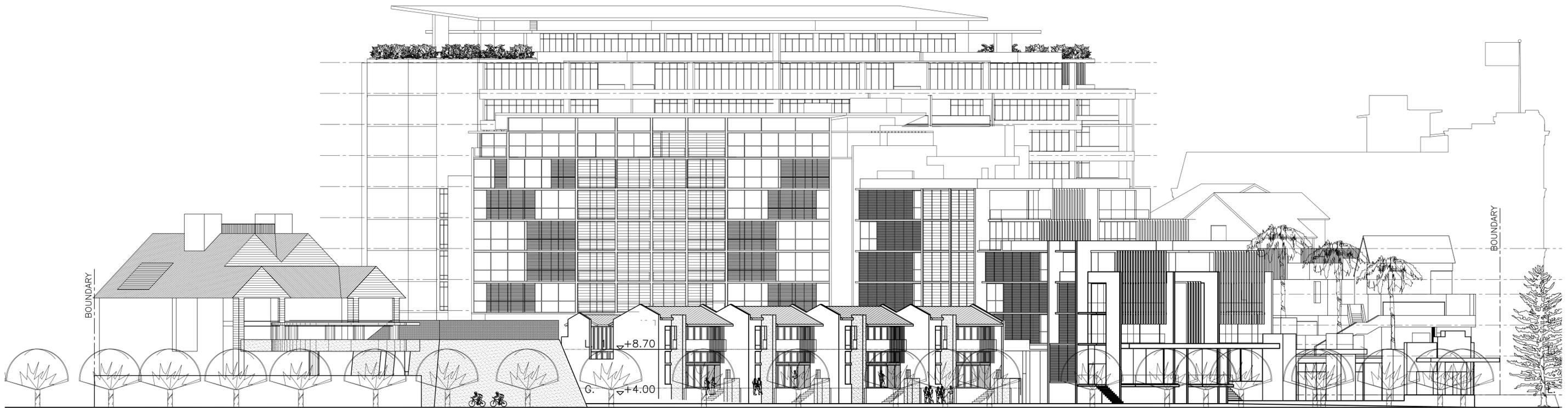
LAWRENCE SCANLAN
 & ASSOCIATES PTY LTD
 ARCHITECTS
 FIRST FLOOR, 79 KING STREET PERTH 6000
 TEL(08) 9321 0166 FAX(08) 9485 0435

CLIENT
ALICEVILLE PTY LTD

PROJECT
**PROPOSED HOTEL AND RESIDENTIAL
 RESORT DEVELOPMENT**
 LOT 62, ROBERTS STREET, JURIE BAY, WA

TITLE
SITE ELEVATION

PROJECT NORTH	JOB No 0801	DRAWING NO DA 28
	DATE 27.02.2019	
	SCALE 1:200	
	DRAWN	
	CHECKED	ISSUE DEVELOPMENT APPLICATION



NE ELEVATION

SCALE 1:200 @ A1



LAWRENCE SCANLAN
& ASSOCIATES PTY LTD
ARCHITECTS
FIRST FLOOR, 79 KING STREET PERTH 6000
TEL(08) 9321 0166 FAX(08) 9485 0435

CLIENT

ALICEVILLE PTY LTD

PROJECT

**PROPOSED HOTEL AND RESIDENTIAL
RESORT DEVELOPMENT**
LOT 62, ROBERTS STREET, JURIE BAY, W A

TITLE

SITE ELEVATION

PROJECT NORTH

JOB No
0801

DATE
27.02.2019

SCALE
1:200

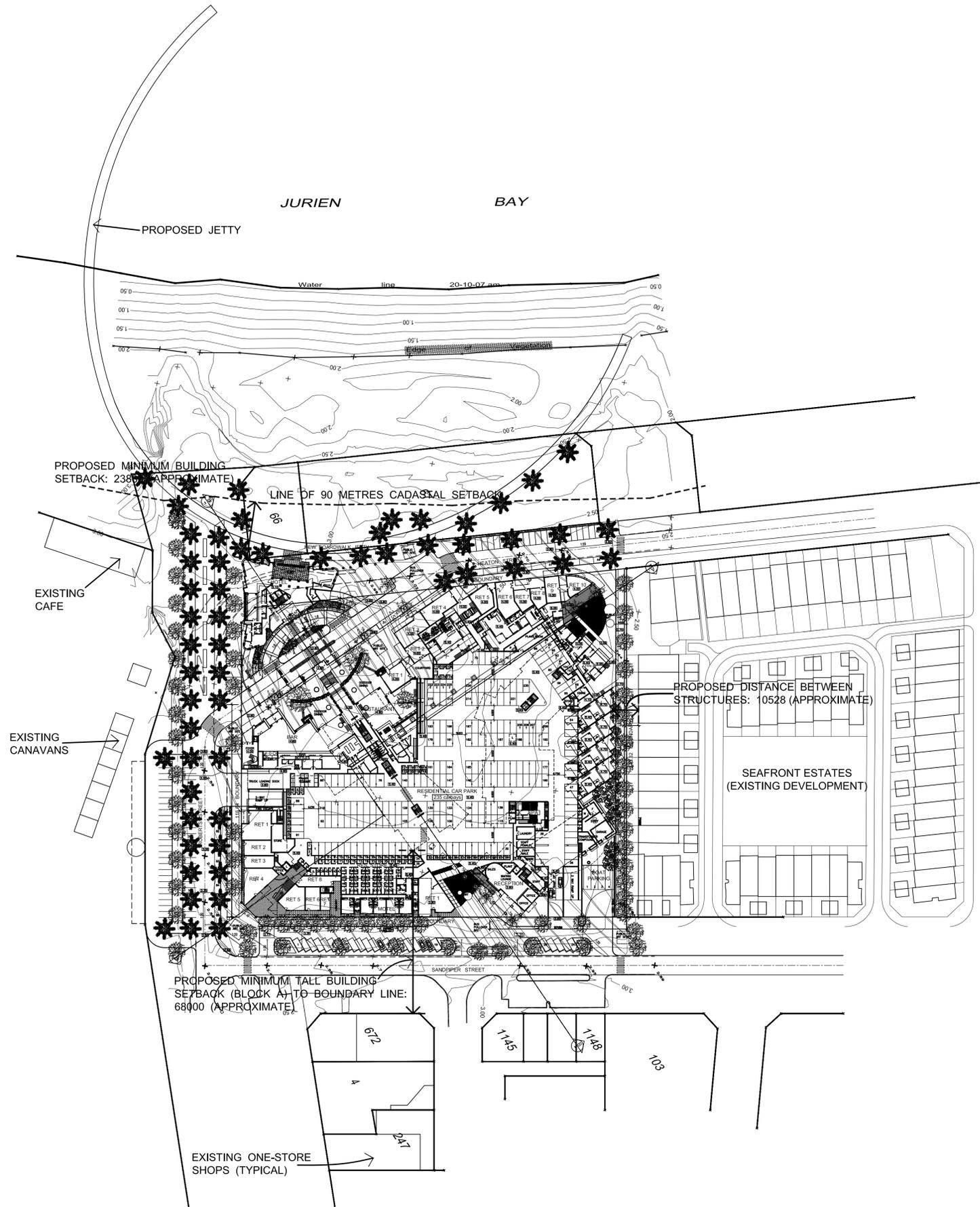
DRAWN

CHECKED

DRAWING NO

DA 29

ISSUE
DEVELOPMENT APPLICATION



PLAN - LEVEL GROUND
SCALE 1:1000 @ A1

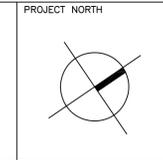


LAWRENCE SCANLAN
& ASSOCIATES PTY LTD
ARCHITECTS
FIRST FLOOR, 79 KING STREET PERTH 6000
TEL(08) 9321 0166 FAX(08) 9485 0435

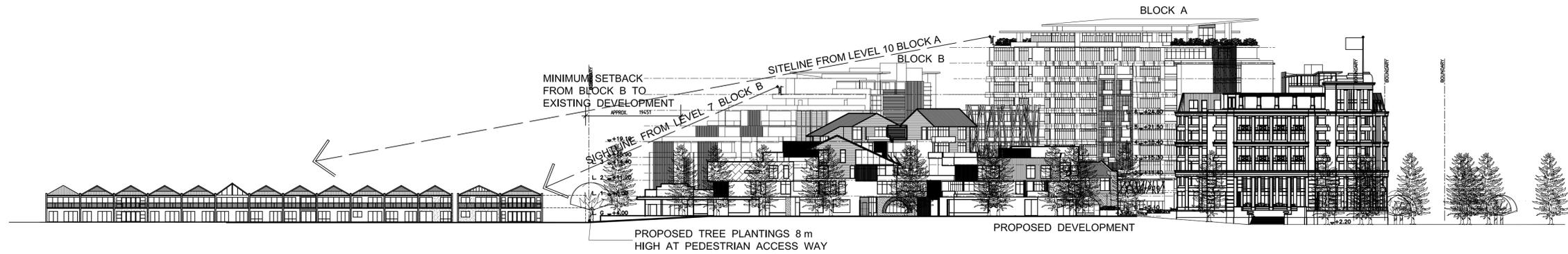
CLIENT
ALICEVILLE PTY LTD

PROJECT
**PROPOSED HOTEL AND RESIDENTIAL
RESORT DEVELOPMENT**
LOT 62, ROBERTS STREET, JURIEN BAY, W A

TITLE
CONTEXT PLAN

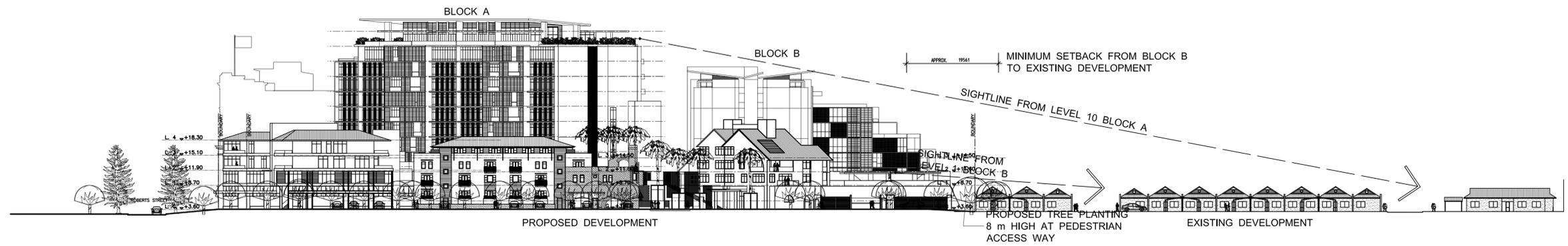


JOB No	0801	DRAWING NO	DA 30
DATE	02.06.2016		
SCALE	1:1000		
DRAWN			
CHECKED		ISSUE	DEVELOPMENT APPLICATION



HEATON STREET ELEVATION

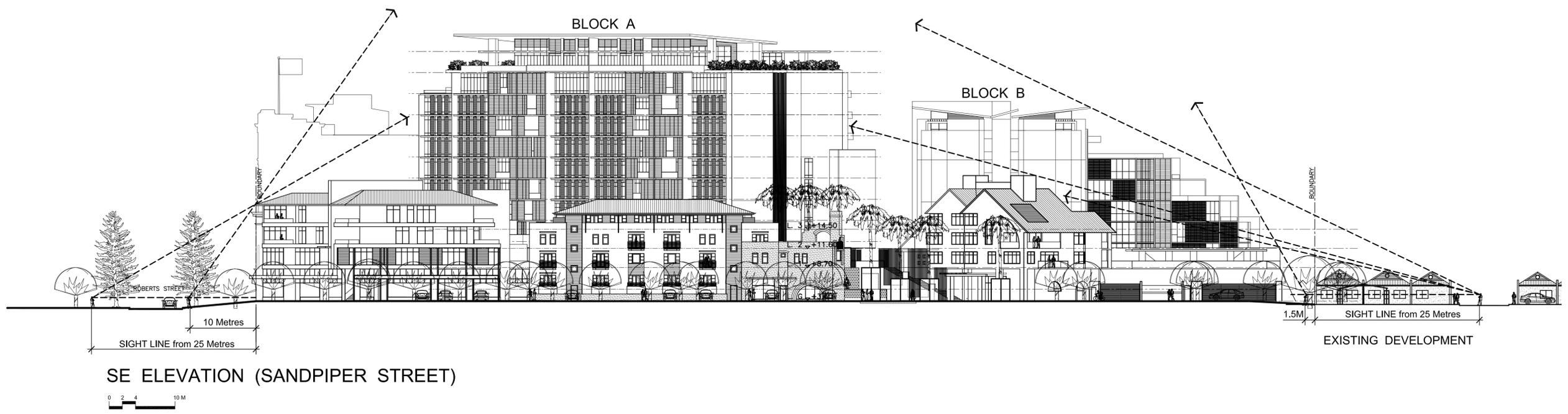
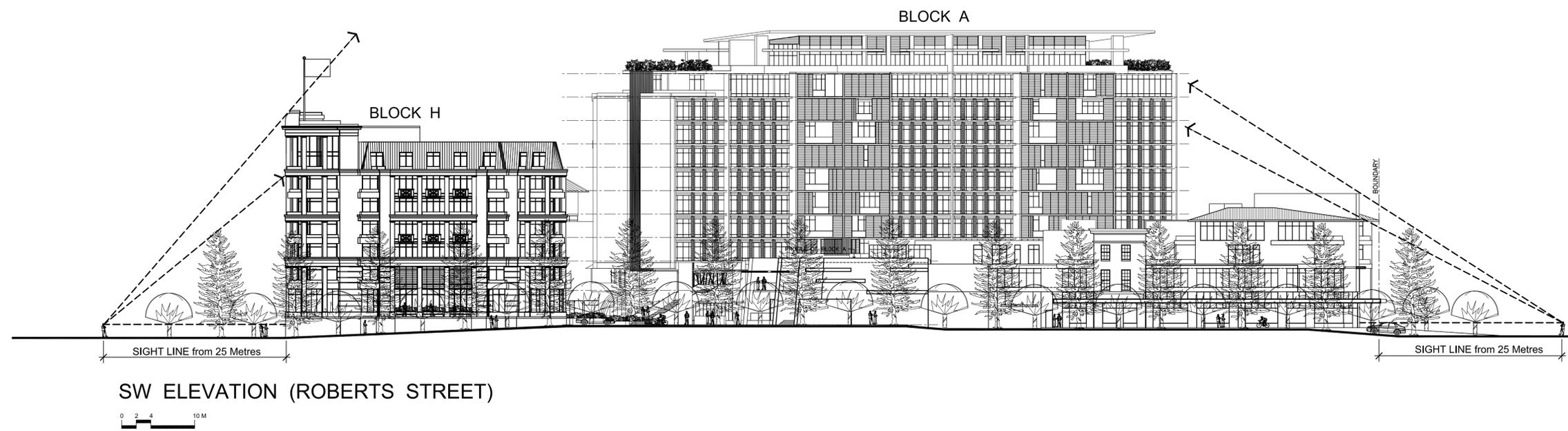
SCALE 1:500 @ A1

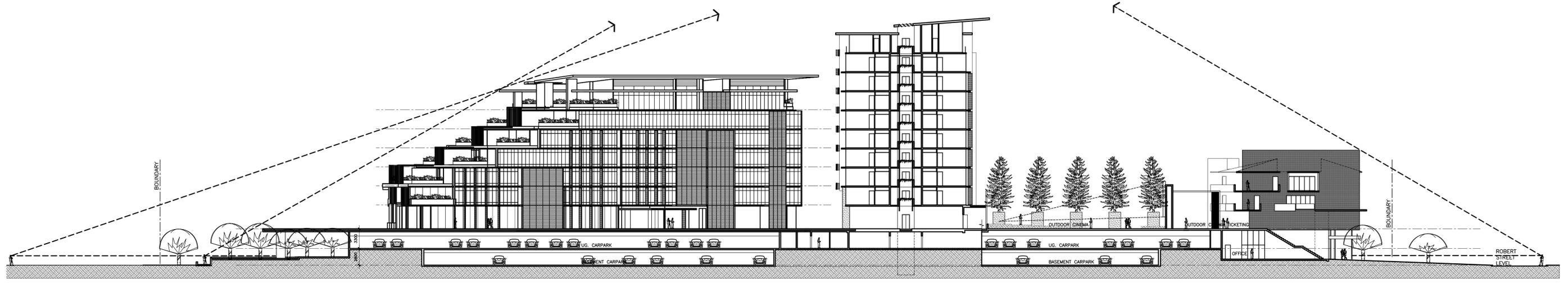


SANDPIPER STREET ELEVATION

SCALE 1:500 @ A1







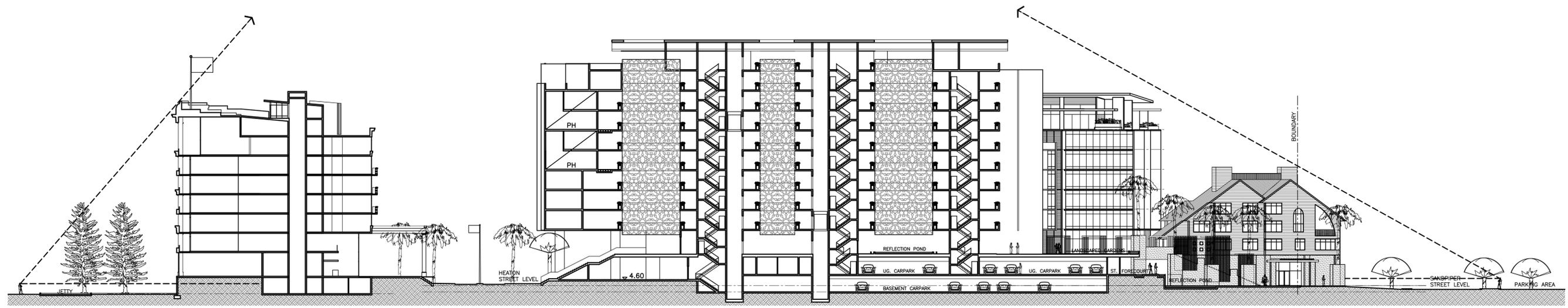
SITE SECTION AA

0 2 4 10 M

SIGHT LINE from 25 Metres

9 Metres

SIGHT LINE from 25 Metres



SITE SECTION BB

0 2 4 10 M

SIGHT LINE from 25 Metres

SIGHT LINE from 25 Metres

LAWRENCE SCANLAN
 & ASSOCIATES PTY LTD
 ARCHITECTS
 FIRST FLOOR, 79 KING STREET PERTH 6000
 TEL(OB) 9321 0166 FAX(OB) 9485 0435

CLIENT
ALICEVILLE PTY LTD

PROJECT
**PROPOSED HOTEL AND RESIDENTIAL
 RESORT DEVELOPMENT**
 LOT 62, ROBERTS STREET, JURIE BAY, W A

TITLE
SIGHT LINE STUDY - 2

PROJECT NORTH	JOB No 0801	DRAWING NO
	DATE 27.02.2019	DA 33
	SCALE	
	DRAWN	
	CHECKED	ISSUE DEVELOPMENT APPLICATION