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# **GUJARRI ESTATE, BROOME NORTH** STRUCTURE PLAN 2 Landscape Report

FEBRUARY 2021 - REV5











# CONTENTS

1	INTRODUCTION	5
2	CULTURAL ASPECTS	7
3	URBAN WATER MANAGEMENT	7
4	WATER CONSERVATION STRATEGIES	9
5	VEGETATION RETENTION	9
6	WEED CONTROL	9
7	ENVIRONMENTAL CULTURAL CORRIDOR	11

8	MULTIPLE-USE CORRIDORS	13
9	NEIGHBOURHOOD PARK	15
10	local parks	17
11	STREETSCAPES	19
12	STREETSCAPE - PLANTING PALETTE	21
13	CONCLUSION	23



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DRAFT Landscape Masterplan

### 1 INTRODUCTION

The Broome North development establishes an exciting opportunity for LandCorp to provide Broome with innovative and affordable living outcomes alongside the delivery of locally site sensitive and linked open space amenity. Through a holistic and detailed understanding of the local Broome condition this development has the potential to provide benchmark results with regard to site sensitive waterwise design and culturally respectful outcomes. In addition, the above objectives are underpinned with the proposition to continue raising the capacity of the local plant nursery and landscape industry within Broome, a recognised important West Kimberley regional hub.

This Landscape Report specifically focuses on the provision of new public open space within Structure Plan Stage 2 (SP2) through developing unique streetscapes, parklands and multiple-use corridors that sensitively address the local site drainage condition. The report also focuses on retention and supplementation of existing vegetation for cultural, fauna and water quality purposes.

The landscape philosophy and treatments proposed have been informed by continuing developing experience in this region, the local social, cultural and environmental conditions and the opportunity to create meaningful, practical and pleasant linked recreational spaces with personal scale and site sensitive amenity.

Key aspectis guiding the landscape design report include:

- Creating connected spaces that promote recreation, exploration, environmental respect, growth and learning;
- Addressing better urban water management throughout the urban form via multiple-use corridors, road easements, open space and dedicated drainage reserves;
- Maintaining open space connections and linkages throughout the site via multiple-use and ECC corridors for cultural, community and habitat use;
- Protecting and repairing natural systems so traditional practices and a continued 'lifestyle' can occur alongside urban development;
- Ensuring there is minimal existing landform reshaping, significant tree removal (main trunk > 300mm dia.) and reuse of the sites precious mulch and topsoil;

- Maximum existing vegetation retention and supplementation on site;
- Combining recreation, preservation, education/ interpretation and linking urban/ natural drainage systems through multiple-use corridors;
- Supporting and raising capacity of the local land management, construction, landscape and nursery industries;
- The inclusion of interpretation and art opportunities within public open space as part of an overall open space strategy; and
- Incorporating site specific solutions including the provision of shade amenity through consistent street tree planting on verges, medians and alongside roads, shared path and pedestrian connections.



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Swale Clearing: Source UDLA

# 2 CULTURAL ASPECTS

The Yawuru people are the Registered Native Title Holders of 530,000Ha of land within the Broome region and for thousands of years their ancestors have lived and travelled along the foreshores of Roebuck Bay, across the pindan plains and along the fringes of the Great Sandy Desert. It is understood that the Broome North development including the SP2 is part of this broader cultural landscape and needs to be respected and continually cared for.

Respecting and retaining the Yawuru's strong connection and relationship to 'country' is therefore an essential consideration of the public open space design. Through ongoing dialogue with local Yawuru people initiatives to maintain an unbroken traditional 'lifestyle' with continual access to the land is a major objective.

Respectful cultural design may include initiatives such as:

- The creation and continued establishment of an Environmental Cultural Corridor (ECC) to provide a 150m wide east west connection across the Broome Peninsular connecting the significant Cable Beach dunes with Dampier Creek and Roebuck Bay;
- The engagement and empowering of local Yawuru cultural/ environment custodians and artists to inform development and open space design outcomes. To also instruct on maintaining the health of existing drainage systems within and downstream of the development; and,
- Engaging local Traditional Custodians to instruct on the retention and supplementation of vegetation including species selection, use of local materials and any identified artifacts or places of significance.

The non-indigenous community identify with a specific character for Broome which involves its sub arid/tropical climate, an outdoor lifestyle, multiculturalism and tourism. Responding to these characteristics involves 'open plan' designs which allow for breezeways, shaded, shared use walkways to encourage community interaction through activated streetscapes. Multi-purpose active and passive open spaces capitalise on this outdoor orientated lifestyle, therefore adopting sustainable landscape practices need to promote the local environment and visual character of Broome.

The streetscape and public open space design has been informed through consultation and engagement with key members of the community. This input and discussion not only ensures the views and requirements of the community are addressed but also helps to foster local pride and ownership, with the public open spaces less likely to fall victim to vandalism and neglect as a result.

# 3 BETTER URBAN WATER MANAGEMENT

The streetscape and public open spaces of SP2 form an integral part of the water management strategy of the Broome North development. In broad terms, the excess urban water run-off is directed from housing lot frontages directly onto the road pavement where it is then transferred close to source via kerbing and outlet devices into locally vegetated swales within multiple-use open space drainage corridors. The specialised Northwest designed swale system's main purpose is to transport water across the site and deliver downstream run-off water at a similar quality, velocity and volume as per pre-development. A vegetated retarding swale system reduces the amount of nutrient binding sedimentation leaving the site and the transportation of contaminates such as invasive weeds and litter.

The natural water management condition in this area of the West Kimberley does not rely on formed concentrated freshwater creek lines, however on cross-country sheet flow with soil erosion controlled by a continual cover of endemic vegetation (Including *Spinifex sp.*). Water in this part of the country flows to tidal creeks or areas such as wetlands or behind coastal dunes where it replenishes ocean life or recharges underground aquifers. To mimic the natural water system in this part of 'pindan' soil country, built structures are utilised to retard and slow concentrated water volumes within these swales which include natural stone boulders, concrete culverts and in some cases (on long stretches) retardation weirs that feature low flow devices such as V notches and low flow apertures (average 300mm dia.). These weirs are constructed to contain up to 1:10 events with 1:100 events free to overflow the structures and prevent upstream flooding. In addition, drop structures are located along the swale floor as the swale grade is required to be reduced (1:700 -1:1000 grades) thus reducing water velocity.

To ensure the integrity of this modified concentrated urban water system, revegetation of the swales is a critical factor. Vegetation of swales:

- Stabilise swale bases and batters;
- Filters nutrient captive silts such as Broome's Pindan soils, which can starve downstream marine ecologies;
- Filters fine silts which if otherwise transported can clog up downstream drainage conveyances and waterways;
- Aids in providing natural drainage 'roughness' which reduces the velocity of overland flows; and

• Reduces the distribution of potential contaminates and exotic weeds. Also vital to water quality, revegetation and protection of the drainage swale system is the use of the local site mulch and topsoil collected prior to site bulk earthworks. Use of local site mulch and topsoil includes an endemic seed bank. This, along with appropriate supplemental planting, is fundamental to maintaining local biodiversity within the development area.



Swale Revegetation: Source UDLA



### 4 WATER CONSERVATION STRATEGIES

Commitment to water conservation is inherent in the design and management of the streetscapes and public open spaces of SP2 area. Landscape Water Management strategies Include the following:

- Use of endemic species within the development that require a local climate based low water-use and nutrient use regime;
- 80% percent of planting is mostly re-vegetation with drip irrigation turned off once planting is established (2 years);
- Lawn areas are minimised. The lawn species is indigenous to the Broome Peninsula (Roebuck Bay Couch) and has low water and nutrient use requirements;
- The irrigation schedule for most planting is daily during a 13 week establishment period and then reduced to irrigating twice a week or less, as required;
- During the maintenance period the assessment of water needs of the plants will be amended on a regular basis and the watering adjusted accordingly;
- Irrigation to residential street trees is to be established as part of a residential rebate package and will be the responsibility of the residence for watering and establishment; and,
- The irrigation systems will be designed in accordance with Shire of Broome Requirements and Specification.

### 5 VEGETATION RETENTION

The SP2 site area features existing vegetation typical of a low and open West Kimberley Pindan Woodland plant ecology with scattered trees and dominate *Spinifex* species grassland. Retaining as much of this vegetation as possible has many benefits such as:

- Reduced erosion and a reduction in soil run-off into adjacent sites, waterways and the downstream marine ecology;
- Weed control;
- Maintaining flora and fauna biodiversity, including the critical specialised Broome Peninsula habitat;
- Immediate site maturity and a local sense of place;
- Shade and visual amenity;
- Cost savings on clearing;
- Respect of Traditional Owners (Yawuru) ethno-biological connection to 'country' and continuing 'lifestyle'; and,
- Allowing for the fast creation of multiple-use open space areas for recreation, drainage, flood control, dual use pathways and linkages.

In order to realise these benefits, significant individual trees and vegetation areas within the SP2 site area have been identified, surveyed and where possible, integrated into the design of the public open space, verge, drainage reserve and lot areas.

### 6 WEED CONTROL

Introduced weed species have been identified across the SP2 site area and reflect the extent of disturbance throughout Broome as a result of early farming (site was used as a dairy farm) and land clearing, vehicle access, rubbish dumping and surrounding exotic gardens. To reduce the increase and spread of weed species, the following management and control actions should be adopted:

- Minimising clearing where possible (during staged construction);
- Where possible, using existing tracks and roads, preventing uncontrolled access to the site and minimising the number of new tracks required;
- Ensuring cleared vegetation and topsoil (if contaminated with weed seed) is removed and disposed of at Shire approved dumpsites;
- Ensuring all vehicles and machinery are cleaned of plant material and soil before and after entering the site (in particular when working along the perimeter of the site or in areas noted to have an invasive weed presence);
- Imported soils and materials should be certified weed free; and;
- All litter and waste materials should be contained and removed off-site regularly.

General vegetation mitigation for the area would include the following:

- Manual/ physical selective removal of weeds;
- Weed spraying using the industry's best practice and appropriate regimes (e.g. use non-residual glysophate based herbicide sprays, limit herbicide overspray, herbicide only applied by a by qualified technician, use of an appropriate herbicide near waterways etc.);
- Regular verge slashing of invasive grasses/low shrubs before seeding occurs; and
- Controlling declared plants under the Agriculture and Related Resources Protection Act, 1976, using recommended methods outlined by the Western Australian Department of Agriculture and Food.



ECC Januburu SIX SEASONS: Source UDLA





Ecological Cultural Corridors Section



# 7 ENVIRONMENTAL CULTURAL CORRIDOR

The 150m wide Environmental Cultural Corridor (ECC) running east-west across the site is an initiative used previously within developments in Broome and was born out of extensive consultation with the Yawuru people. Essentially it is a tract of naturally vegetated land set aside to be retained freed of built form development.

The Broome North ECC is intended to provide:

- A green infrastructure buffer between the development and existing built form and significant cultural areas;
- A habitat for flora and fauna and an opportunity to support biodiversity and natural drainage / groundwater recharge networks;
- An important cultural and community connection to 'country'. The retention of a substantial portion of local bushland that traverses west to east across the Broome Peninsula provides a mostly unhindered bushland connection from the culturally significant Cable Beach dunes to the equally significant Dampier Creek marine wetlands and Roebuck Bay.



- This link provides Traditional Owners (Yawuru) with the opportunity to
- Continue a 'lifestyle' passing on cultural education and traditional practices as historically and presently practiced on this land; and,
- It provides future residents with a strong sense of place by maintaining this important open space bushland.

The ECC area will comprise a simple network of low maintenance cleared pindan tracks to enable appropriate and managed pedestrian access only. A rural style perimeter fence around the ECC will also discourage illegal rubbish dumping, trail bike recreation and other motorised vehicles from entering. Areas that have been degraded through earlier land uses and weed infestation are to be re-habilitated to an appropriate standard.

This low-key approach also allows for the design of 'low-impact' drainage swale within the ECC that at intervals allows overland water to continue to sheet flow across the ECC. The Yawuru have provided permission for overland drainage to be contained within the ECC, with a swale and bund to be situated along the boundaries to direct water. The swale is to negotiate existing significant vegetation and to be a nominal width of 20m, similar to Banu Road Januburu Six Season precedent.

Current bushfire policy and guidelines state that BAL Bushfire Attack Level 12.5 must be applied to all buildings within 50m of unmodified bushland and vegetation is to be modified to create a Building Protection Zone between the ECC and Residential Lots. The shared use pathway running along the ECC northern lot boundary marks the Building Protection Zone boundary, 20m the from the residential lot boundary. All vegetation(existing and proposed) not in the ECC or in the front of Bush Living Lots must be designed according to Building Protection Zone standards (Refer Smith Consulting Bushfire Management Plan):

"A 14 metre wide road reserve separates the ECC from the proposed residential area. It is proposed that a six metre wide managed space, that is cleared and planted with trees, comprising grass area slashed and a shared path be installed along the northern boundary of the ECC. This, together with the front setback within lots (of two metres) the 14 metre road reserve and the six metre managed space will achieve a setback of 20 metres from vegetation within the ECC. This results in a BAL construction standard of BAL–12.5 for lots interfacing with the ECC. All lots within 50 metres of the vegetation will require an increased construction standard in accordance with AS 3959."

If the width of the retained bush does not exceed a maximum of 20m. If this





Inline Park: Source UDLA

- Turfed kick-about area
- Garden bed with local vegetation and large shade trees
- Vegetated swale
- 2.5m shared-use path





Multiple Use Corridors Section



maximum is exceeded, Building Protection Zone Standards must be applied.

### 8 MULTIPLE-USE CORRIDORS

These areas comprise a combination of retained existing vegetation, drainage swales, vegetated urban buffers, linear recreation and parkland. They provide a number of functions including:

- An informal connection to 'country' (through the use of local planting, materials and linkages to the ECC);
- Urban drainage and flood management including holistic management of upstream and downstream conveyance;
- Flora and fauna habitat and linkages;
- Passive and active open space with informal (grassed kick-about) areas and formally programmed, built play areas;
- Dual use paths suitable for walking, jogging, cycling etc. with rest areas and water fountains; and
- Opportunities for cultural and environmental interpretation including inter-generational education and community art projects.

A principle purpose of the multiple-use corridors is to retain and retard urban drainage flow paths and aid in mimicking natural site flow rates downstream as per pre-development. In addition support fauna / flora habitat, cultural and open space uses.

The design of the multiple-use areas ensures drainage requirements sit aside from the formalised recreation spaces, including park facilities. For example, during a large storm event, gentle grading within the corridors, normally used for informal recreation, will become infiltration areas while the formal recreation areas located on higher ground will remain dry and play equipment and other facilities protected from flood damage, this coupled with retained and supplemented vegetation provides the opportunity to work with topography providing landscape interest and places for shaded seating and slightly elevated passive surveillance.



Pindan Path Januburu SIX SEASONS: Source UDLA





- Warringari Estate Park: Source UDLA Turfed kick-about area
- Shaded sitting/meeting area







Inline Park, Tree Retention & Shade Structure - Waringarri: Source UDLA



### 9 NEIGHBOURHOOD PARK

The only Neighbourhood park within SP2 is located centrally within the northern East-West multiple-use corridors. The Park provides a strong focal and linking amenity within Gujarri Estates urban form.

The neighbourhood park feature the following amenity:

- A formalised play area with play equipment, shade structures, seating and picnic facilities;
- Grassed open space areas for active and passive recreation. The larger drainage swale network will run adjacent to the park and be seamlessly separated from the main lawn area and formalised facilities;
- Strong path networks will link to the immediate community and beyond via the connected multiple-use corridors and ECC;
- Areas of retained mature existing vegetation (providing existing shade and local visual amenity);
- Hard-stand areas which use local concrete and aggregates, with further rest areas consisting of local gravels and/or compacted, stabilised pindan;
- Opportunities for lawn irrigation hydro-zoning according to active and passive uses; and,
- Interpretation and art opportunities as developed with the Traditional Owners's, community and within the proposed art strategy.



Warringari Estate Shade Structures: Source UDLA



Neighbourhood Park Two Section





 Turfed swale kick-about area

Shaded play area

2.5m shared-use path







### 10 LOCAL PARKS

Two smaller local parks are situated on the southern and eastern drainage reserves to ensure all residents are within walking distance from a formalised recreation area. While being smaller in area this local park will include similar facilities to the neighbourhood park, being:

- Formal recreation such as play equipment and exercise equipment
- Informal recreation including grass kick-about areas, picnic areas and resting places;
- Part of a strong path networks that link to the immediate community and beyond via the connected multiple-use corridors;
- Areas of retained mature existing vegetation (providing existing shade and visual amenity);
- Hard-stand areas which use concrete and local aggregates, with further rest areas consisting of local gravels and/or compacted, stabilised pindan; and,
- Opportunities for lawn irrigation hydro-zoning according to active and passive uses.

#### **Civic Amenity**

A civic amenity component is strategically located within the central local park and major access street. The Civic park will include a contemporary rotunda (shade structure) and will provide a centerpiece for official and informal community activities.



Local Access Street adjacent to POS



Babagarraburu Park - Januburu SIX SEASONS: Source UDLA



Inline Drainage, Maritana Park - Cable Beach: Source UDLA



Section 1 | Major Access Street



Section 2 | Major Access Street with swale to one side









Section 3 | Major Access Street with central swale



### 11 STREETSCAPES

#### **Major Access Streets**

Within the SP2 there has been an opportunity to provide urban diversity through numerous four major access street typologies. The diverse typologies include,

- Major Access Street
- Major Access Street Side Swale
- Major Access Street Central Swale
- Major Access Street POS Interface

The Major Access Streets will be recognised by their widened pavement a 1.5m pedestrian and 2.5 shared use path on opposite verges.

A continuous planting of the Royal Poinciana shade tree (*Delonix regia*) will be used on all verges facing lot frontages providing a high shade amenity, distinctive strong red flowering form, while flourishing through similar water and soil requirements provided by the local environmental condition.

#### Local Access Streets

The local access streets will have a similar diversity to the major access streets having to transverse the multi-use corridor, POS and built form.

The local access street character is recognised by a narrower road pavement (low speed environment) with all verges facing lot frontages having a consistent planting of the Yellow Flame shade tree (*Peltophorum pterocarpum*).

A 1.5m pedestrian path will be located on one side of the street.







Section 6 | Integrator Arterial / Neighbourhood Connector - Dual Carriageway as part of long term upgrade





Delonix regia - Royal Poinciana



Peltophorum pterocarpum - Yellow Flame



Eucalyptus miniata - Woollybutt



Eucalyptus tectifica - Darwin Box



Bauhinia cunninghamii - Jigal



Corymbia pychocarpa -Swamp Bloodwood



Eucalyptus microtheca -Coolibah



### 12 PLANT PALETTE

A plant palette consisting of two exotic large shade trees and a diversity of local, endemic species has been adopted for the SP2 development area. The nominated species are suitable and adapted to the unique Broome's environmental climate, soil and water conditions, requiring less ongoing management and maintenance.

Local vegetation within the multiple-use corridors and parkland is environmentally crucial for maintaining local habitat and biodiversity. Retaining and supplementing local endemic vegetation supports Traditional Owners cultural practices and the opportunity to maintain a Broome 'sense of place' and 'lifestyle'.

A local plant palette will also support the growing Northwest landscape industry, by further establishing local plant awareness and stocks. The Two Street Trees include

The following is a locally proven exotic shade street tree species considered appropriate for use within the SP2 area:

- Delonix regia Royal Poinciana Tree
- Peltophorum pterocarpum Yellow Flame Tree

Endemic species which have performed well in Broome in establishing multiple-use corridors, open space parks and swale vegetation modules will include the following:

#### TREES

- Bauhinia cunninghamii Jigal
- Corymbia flavescens Cabbage Ghost Gum
- Corymbia polycarpa Bloodwood
- Eucalyptus jensenii Wandi Ironbark
- Eucalyptus microtheca Coolibah
- Eucalyptus tectifica Darwin Box
- Ficus opposita Sandpaper Fig
- Gyrocarpus americanus Coolamon
- Santalum lanceolatum Tropical Sandalwood

Terminalia petiolaris x Terminalia ferdinandiana - Red Gubinge

#### LARGE SHRUBS/ SMALL TREES

- Acacia eriopoda Broome Pindan Wattle
- Acacia monticola Scratchy Wattle
- Acacia platycarpa Pindan Wattle
- Dolichandrone heterophylla Lemonwood
- Ehretia saligna Native Willow
- Hakea aborescens Yellow Hakea
- Hakea macrocarpa Boomerang Tree

#### MEDIUM SHRUBS

- Acacia bivenosa Dune Wattle
- Acacia colei Soapy Wattle
- Acacia translucens Poverty Bush
- Caesalpina major Yellow Nicker
- Carissa lanceolata Conkerberry
- Crotalaria cunninghamii Green Birdflower
- Dodonaea platyptera Hopbush
- Flueggea virosa Snowball Bush

#### SMALL SHRUBS

- Acacia adoxa Prostrate Acacia
- Canavalia rosea Beach Bean
- Dodonaea lanceolata Broad-winged Hopbush
- Hybanthus aurantiacus Orange Spade Flower
- Sida hackettiana Spiked Sida





Acacia bivenosa - Dune Wattle



Hakea arborescens - Yellow Hakea



Crotalaria cunninghamii -Green Birdflower



Acacia hilliana - Hills Tabletop Acacia



Ipomea pes-caprae - Beach Morning Glory



#### GROUNDCOVERS/ GRASSES

- Acacia hilliana Hills Tabletop Acacia
- Enchylaena tomontosa Barrier Salt Bush
- Ipomea pes-caprae Beach Morning Glory
- Ptilotus exaltatus Tall Mulla Mulla
- Triodia pungens Soft Spinifex

### 13 CONCLUSION

The SP2 Landscape Strategy demonstrates a sustainable landscape approach to providing a site specific open space amenity for the future Gujarri Estate, Broome North community.

This has been achieved through jointly understanding the Broome Peninsula's unique ecological condition and acknowledging the existing Broome 'lifestyle' embodied within the Traditional Owners (Yawuru's) unique cultural relationship to the site and associated lands.

The outcome will provide a waterwise and nutrient balanced environment that is low in management and maintenance requirements, while providing future residents with green amenity, shade and a lBroome sense of place in order to promote a local wellbeing.



Hybanthus aurantiacus -Orange Spade Flower



Dodonaea lanceolata -Broad Winged Hopbush





Banu Drive Swale - Januburu SIX SEASONS: Source UDLA

