

# HOME IN EAST NEWMAN

## LANDSCAPE STRATEGY

REVISION C  
19/11/20

# HOME IN EAST NEWMAN

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### PROJECT DETAILS

Job number	44317
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Checked by	RD

### DOCUMENT CONTROL

Revision	File name	Document date
A	Landscape Strategy - DRAFT	29/10/20
B	Landscape Strategy - FINAL	17/11/20
C	Landscape Strategy - FINAL	19/11/20





### LAND OWNERSHIP MAPPING

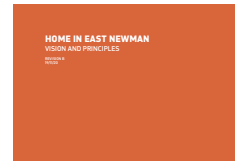
This document reviews the current Land Ownership throughout the East Newman Catchment Zone and enables an understanding of where potential built form changes may occur.



### LANDSCAPE STRATEGY

This document considers the landscape strategy for East Newman and is built on community, sustainable and climate responsive principles to achieve long-term outcomes.

### PRESENTED IN THIS REPORT



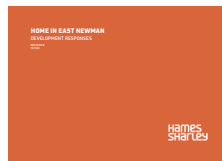
### VISION AND PRINCIPLES

This document presents an initial vision and principles for the development and planning approach for East Newman.



### OPPORTUNITIES & CONSTRAINTS

This document outlines several early considered opportunities and constraints for potential future planning, urban design, landscape, and architectural outcomes for the Home in East Newman project.



### DEVELOPMENT RESPONSES

This document outlines the range of potential approaches that may be adopted to future planning and built form to realise improvements within East Newman.



### SOCIAL PLAN (WRAPAROUND SERVICES CONCEPT, ACTIVATION CONCEPT)

A combined plan for addressing social needs within East Newman. This plan combines a wrap-around services concept, activation concept and background to the social context.



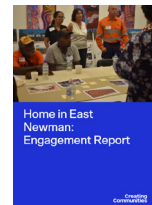
### CONNECTION TO SURROUNDING AREAS

This document considers approaches to the existing connections to surrounding land, development and facilities within a walkable catchment from East Newman.



### VILLAGE CENTRE

This document presents the Village Centre proposal.



### ENGAGEMENT REPORT

Key findings and detailed data on all community engagement conducted to inform the Home in East Newman project.



### HOUSING ANALYSIS

This document reviews the existing character and type of existing housing provided in East Newman and enables a basis for future housing approaches to be considered from.



### HOUSING APPROACHES

This document presents a number of principles for the future development of housing in East Newman along with a number of approaches for future housing and refurbishment.

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## Landscape Strategy

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## 1.1 ENGAGEMENT SUMMARY

The below table outlines a summary of the engagement and future considerations which the Landscape Strategy has been based upon.

ITEM	COMMENTS FROM ENGAGEMENT
Engagement Summary	<ul style="list-style-type: none"><li>• East Newman's parks, streets and homes need to become more shaded places. Across all engagement for the Home in East Newman project, shade and water were the major priorities for Martu and Nyiyaparli participants</li><li>• Walkable routes need to become more inviting, better connected, comfortable and safe to use</li><li>• here are opportunities to develop "cultural corridors" along routes that are currently well-used by members of the Martu community</li><li>• Parks should be places where children and families can spend time. Drinking and broken glass in parks currently make this difficult</li><li>• Vehicle entries to East Newman can become attractive landscaped spaces</li><li>• A connection to Country for Martu and Nyiyaparli is lacking in East Newman</li><li>• Front gardens of both BHP and Department of Communities homes are often unreticulated, unvegetated and unshaded</li><li>• Incentives or subsidies could be provided to tenants who plant and maintain their front yards to a high standard</li><li>• Edible fruit trees are popular in private yards: put them in public places too</li><li>• Landscaping needs to be durable and opportunities for community involvement in its delivery may help to sustain it</li></ul>

## 1.1 ASPIRATIONS

---

The landscape strategy is built on community, sustainable and climate responsive principles to achieve long-term outcomes for East Newman.

The strategy aims to establish a desired urban landscape that is a distinct character, yet promoting diversity and reinforcing the character of the surrounding landscape.

Community consultation with the Nyiyaparli, Martu and East Newman community established the following objectives that will underpin the Landscape Strategy:

**Key objectives:**

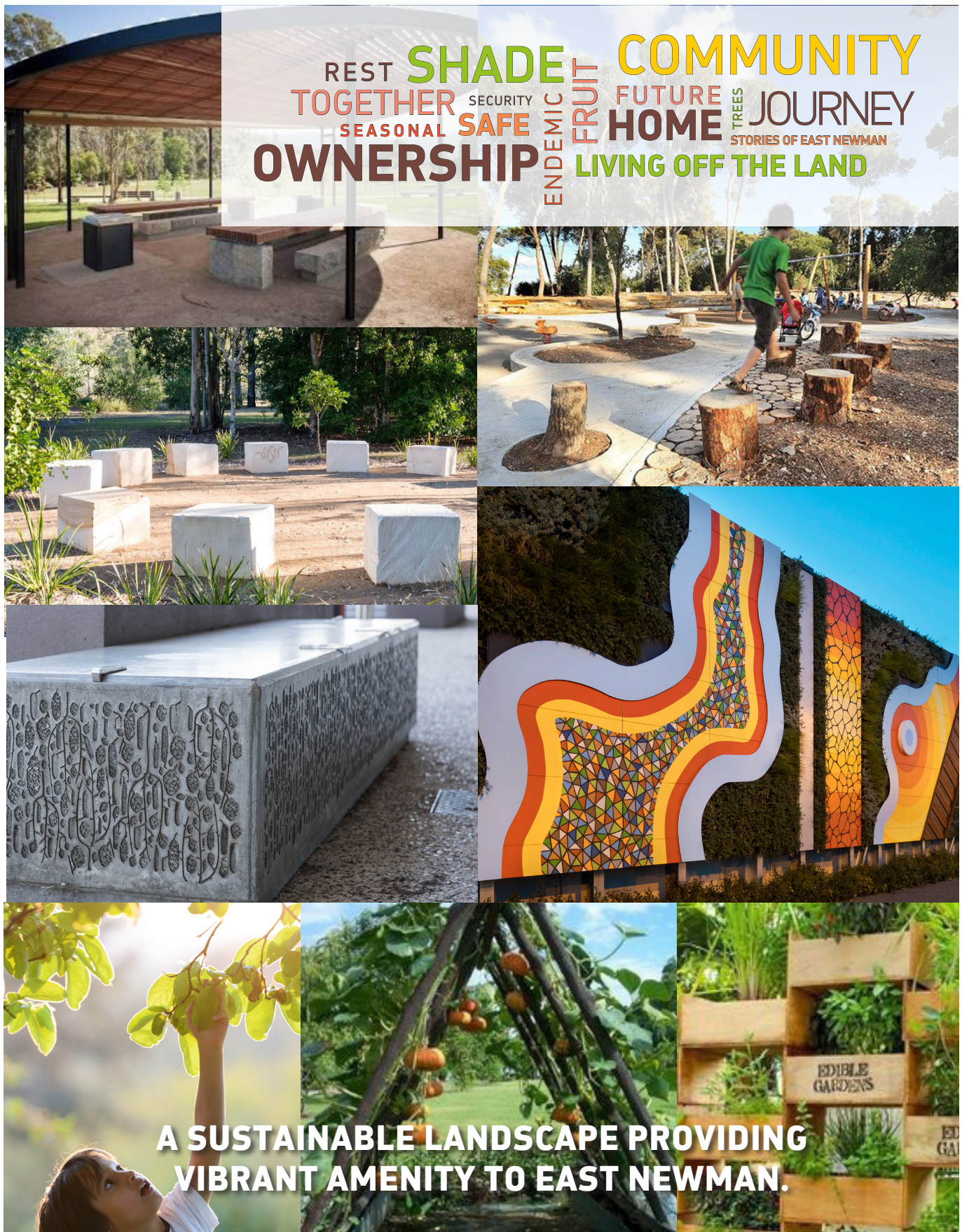
- + Building a landscape for the community by the community;
- + Creating a sustainable and climate-responsive living environment;
- + Providing a safe amenity for the residents and visitors;
- + Supporting local business;
- + Selection of native and edible based planting;
- + Improving the overall landscape quality; and
- + Phasing landscape works with long term outcomes.





## 1.2 THE VISION

The Vision for the landscape strategy has been developed through an iterative process of ideation and engagement with stakeholders.





## 1.3 PRINCIPLES

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The following overarching principles are key considerations when implementing future landscaping within East Newman and are reflected throughout the strategy:



1. STRENGTHEN THE CONNECTION TO COMMUNITY



2. CONNECT TO SURROUNDINGS



3. IDENTIFIABLE LOCATIONS



4. SAFE INCLUSIVE PLACE



5. ENCOURAGE A JOURNEY OF DISCOVERY



6. SUSTAINABLE AND CLIMATIC RESPONSE





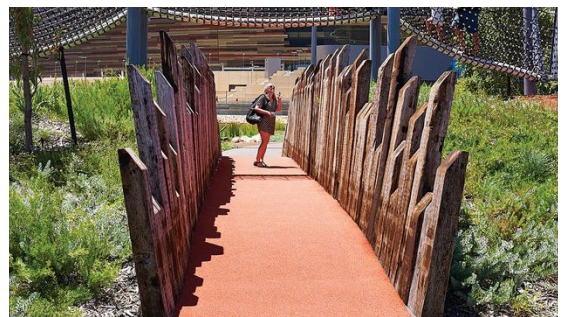
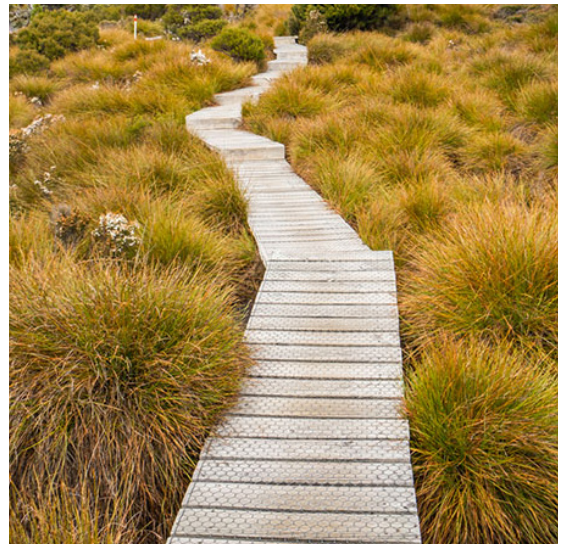
## 1. STRENGTHEN THE CONNECTION TO COMMUNITY

- + Involve the community in implementation.
- + Give ownership back to the community.
- + Enable a strong presence of a community place.



## 2. CONNECT TO SURROUNDINGS

- + Provide strong links to recreation areas and facilities.
- + Provide amenity along the cultural trails.
- + Create a unique journey through the District.

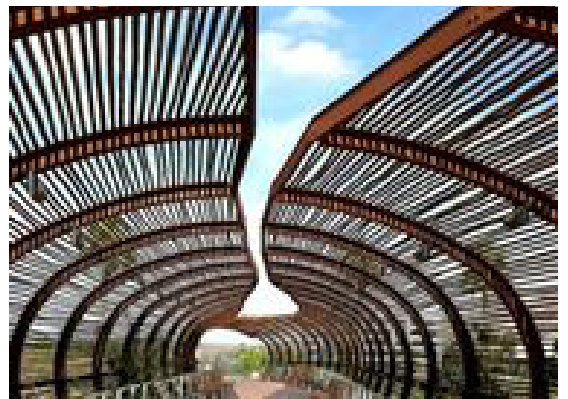






### 3. IDENTIFIABLE LOCATIONS

- + Provision of resting places.
- + A place of significance and meaning.
- + Logical intersections between journeys.



### 4. SAFE INCLUSIVE PLACE

- + Create meeting places for local residents and visitors.
- + Introduce vegetation that provides amenity.
- + Create and maintain clear lines of sight throughout East Newman.







## 5. ENCOURAGE A JOURNEY OF DISCOVERY

- + Create a native habitat for residents and visitors.
- + Soft and hard landscaping to tell the stories.
- + Create an experience through materiality and environmental factors.



## 6. SUSTAINABLE AND CLIMATIC RESPONSE

- + Native and edible vegetation.
- + Soft and hard landscape to provide shade.
- + Local procurement
- + Seasonal planting







## LANDSCAPE

### STREET RESERVES AND FRONTAGES

#### Current Character

- + Unkept with low tree canopy coverage (6%).
- + Very little to no ground covers.
- + Fig 3 below demonstrates how the current verge treatment and house frontage has little or no vegetation. This results in the following:
- + Heat radiating from the paved verge area contributing to an unbearing hot environment to walk in.
- + Paved and hard compacted soil areas that do not allow for any growth due to lack of water infiltration including lack of reticulation.
- + Lack of sustainable planting and no biodiversity.
- + Lack of shade or amenity for pedestrians.
- + Little surveillance from houses to streets and parks.
- + Footpath close to road resulting in potential dangerous environments at day and night.
- + Lack of lighting throughout streets at night providing a lack of safety.
- + Lack of pedestrian crossings and speed bumps to lower the speed of vehicles to create safer pedestrian environment.
- + Houses off corner lots with high fencing on secondary streets.
- + Dominant electrical meter boxes throughout East Newman



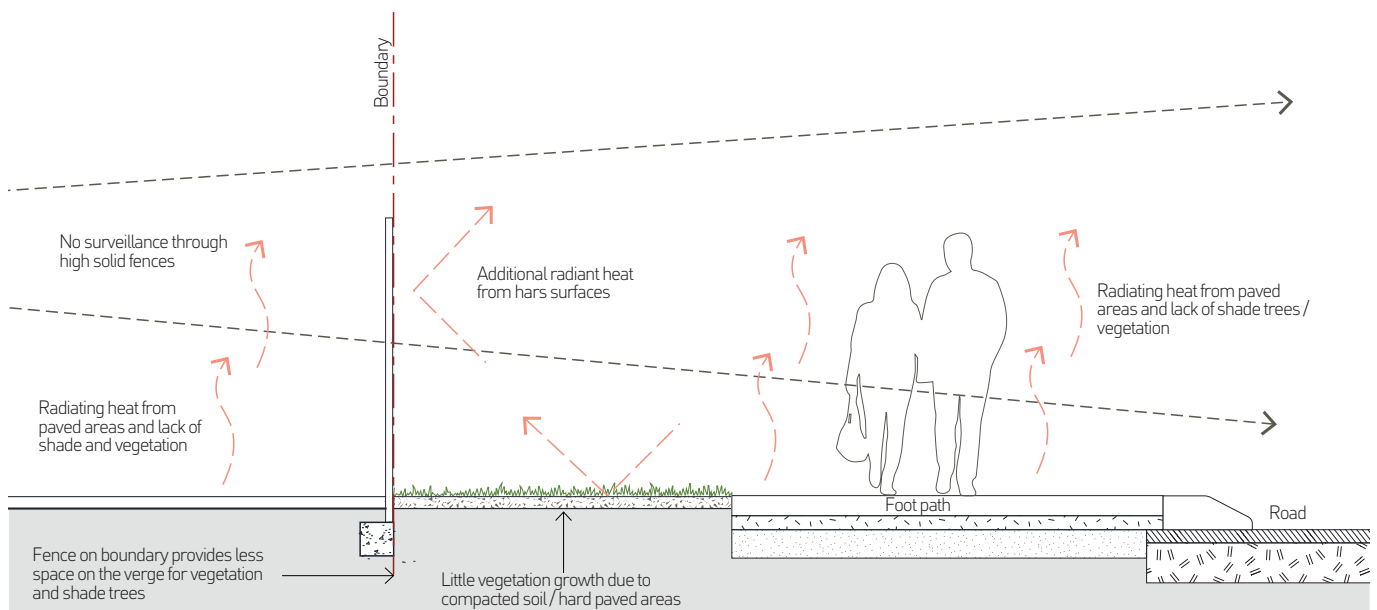
*Typical current condition of street verge and frontages*



*Typical current condition of verge on corner lot.*



*Dominant electrical meter boxes*



**Figure 3. Typical section of current verge and house frontages**

## Strategy

### Existing road verges

- + Increase tree canopy and improve public amenity.
- + Improve natural landscape incrementally.
- + Improve existing pathways where required.
- + Removal of unused pathways.
- + Pedestrian crossings along major pedestrian corridors.
- + Speed bumps and variation in road reserve design to slow down traffic.
- + Potential public art or screening at dominant electrical meter boxes.

### Future road verges

- + Provide appropriate tree planting and verge planting to create appropriate amenity and sustainable coverage.

### Future house frontages

- + Introduce sustainable planting that has low/no maintenance requirements. Refer to plant list for shade trees and low maintenance vegetation.
- + Introduce at least one shade tree per frontage.
- + The typical sections Fig 4 and Fig 5 illustrates options of how the boundary can either be a low permeable fence or a natural boundary with vegetation.
- + Fig 6 captures the future character throughout East Newman:
  - Shade to reduce heat reflected from the paths and street.
  - Mulch to retain moist in the soil and prevent the growth of weeds.
  - Informal mixture of predominantly native plants on the street frontage has the potential to extend to the front yard and contribute to the wider character of the landscape for East Newman.
  - Larger shrubs on the boundaries to form a natural fence compared to a hard fence.
  - Incorporating a height gradation planting of the vegetation to keep maintenance low (refer to Fig 7)
  - Hard fences recommended to be low and permeable to allow for good surveillance towards streets and open spaces.
  - Providing a more structured or organised landscape response will improve the aesthetic quality of the public realm and thereby increase passive surveillance due to greater utilisation of footpaths.
  - Potential incentives to the landowner for water savings if front yard is maintained consistently.
  - Reticulation to all properties.
  - Consistent outcome of landscaping, fencing letterbox etc. for all landowners.

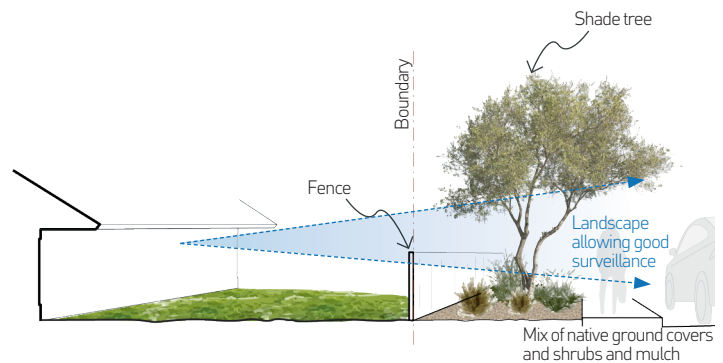


Figure 4. Typical section of street frontage with boundary fence

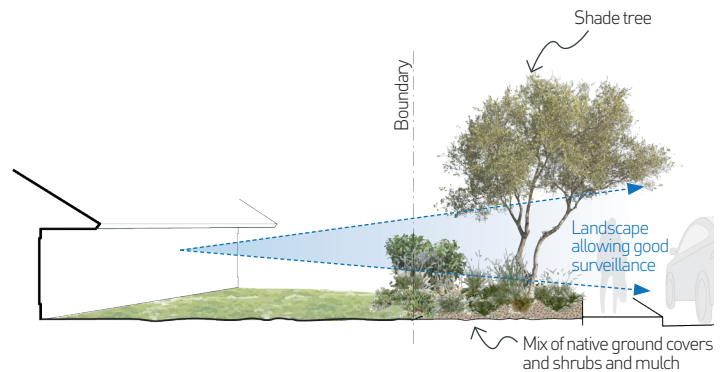
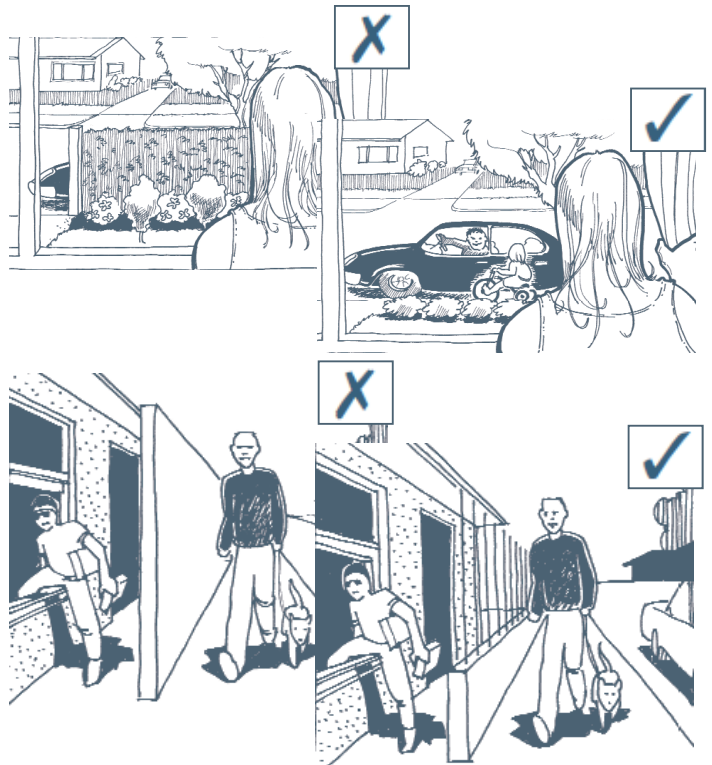


Figure 5. Typical section of street frontage without boundary fence



Images: Designing Out Crime, Planning Guidelines, June 2006, W.A

**Boundary limiting surveillance**

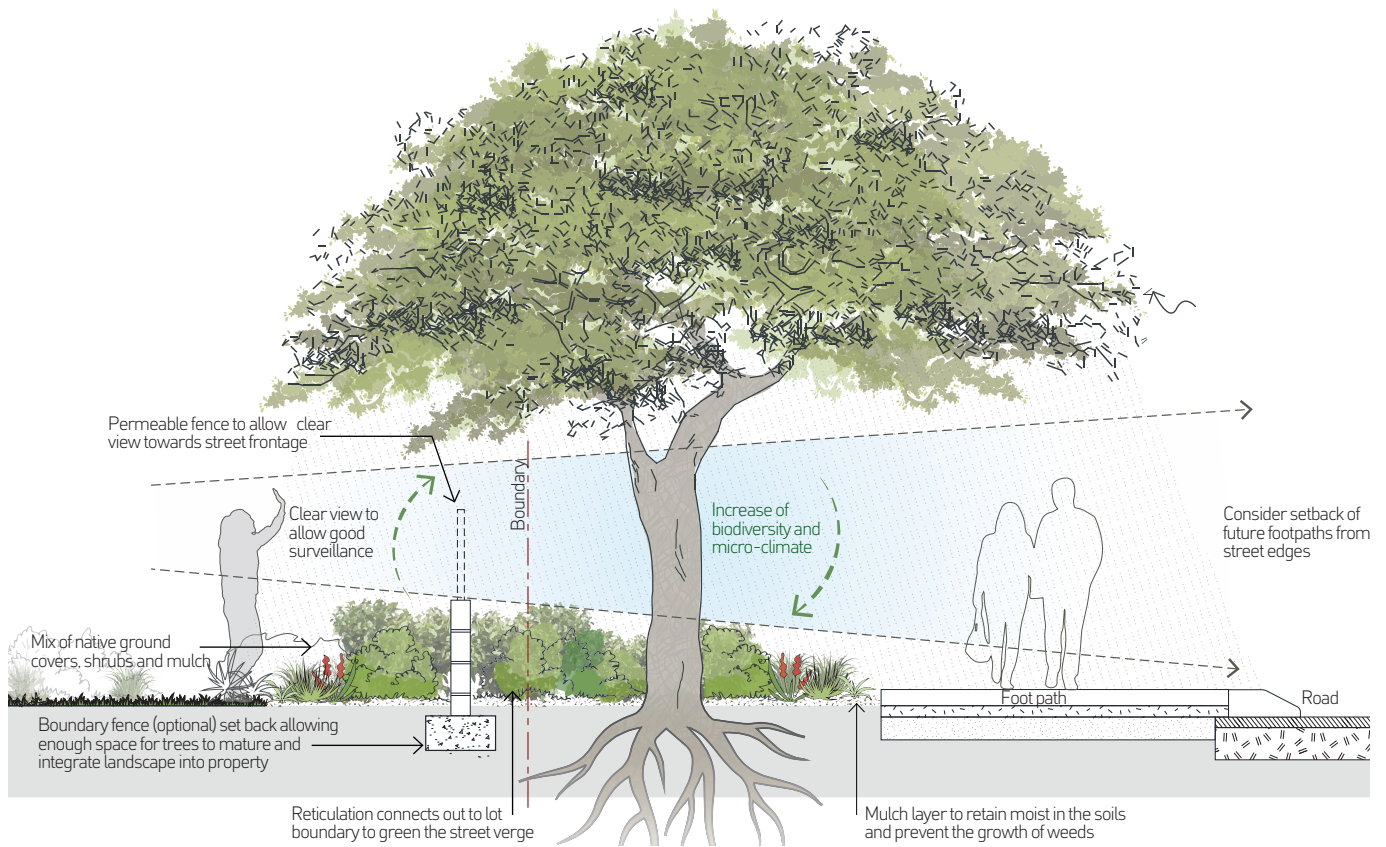


Figure 6. Typical section illustrating landscape strategy for verge areas and house frontages

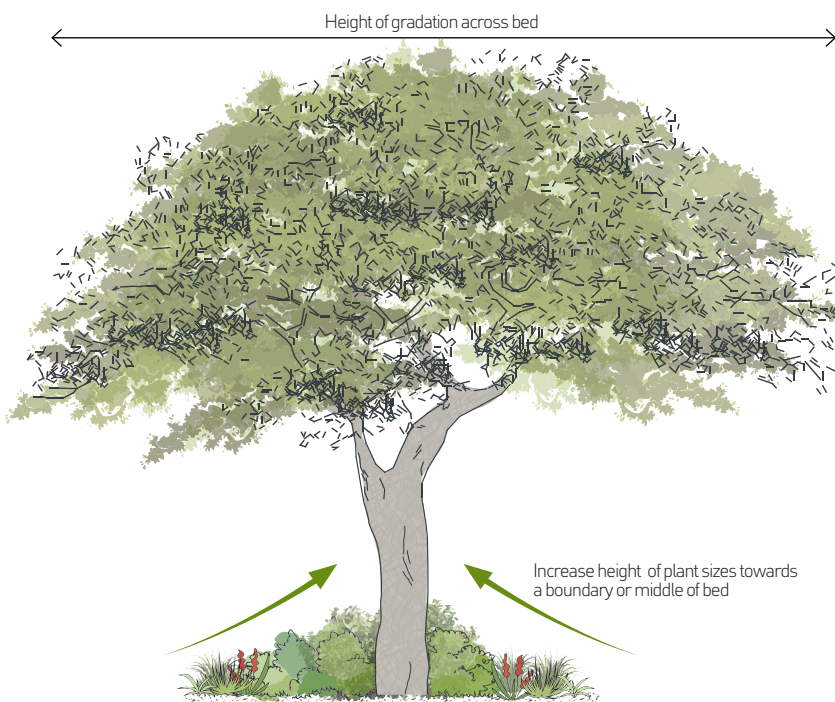


Figure 7. Height gradation across planting.

#### Low maintenance and sustainable planting:

- + Planting with height gradation across plants will contribute to low maintenance.
- + Plant low ground cover species in front of shrubs and at the front of a garden edge.
- + Shrubs will cover 100% of the ground/ mulch surface and prevent any growth of weeds.
- + A wide variety of local native species will provide the opportunity for creating shelter and food for birds, reptiles and invertebrates. This will create / increase biodiversity across the neighbourhood and showcase local elements of Nyiyaparli country.
- + Locate future trees close to existing shaded trees to enable greater shade.



## STREET RESERVES AND FRONTAGES



### Vegetation

- + Local plant species to suit the environmental and climate conditions.
- + A wide variety of native species will increase the biodiversity.
- + Water-wise species to determine the watering and maintenance resources needed. More information can be found at: <https://www.watercorporation.com.au/Water-wise/Waterwise-plants>
- + Trees to be selected should have wide canopies to provide sufficient shade to foot paths.
- + Screening plants at electrical meter boxes.



### Materiality

- + Pathways to be improved at designated major locations. (refer to Locations)
- + Hardscape materials selected to be locally sourced.
- + Use permeable hardscape materials to reduce the area of solid pavement.
- + Ensure shade is provided at majority or hard paving areas.
- + Involve community in public art options for electrical meter boxes.



### Implementation

- + Locally sourced plants and hardscape materials.
- + Local nurseries or horticulturalists to be consulted to best availability of species and location for species selected.
- + Group species with same condition requirements together to lower maintenance.
- + Focus dense planting at selected locations.
- + Apply mulch and ground covers at focal areas/ designated locations to reduce weed and to help keep soil moist and cool.
- + Involve community to encourage ownership.
- + Build of existing shade cover for future planting.
- + Consider a tree retention policy for streets and individual lots to maintain canopy cover.
- + Consider a tree/ landscape strategy for all future development applications to increase shade.
- + Provide landscape guidelines in line with this strategy for implementation on all future development applications.
- + Consider future guidelines for fencing specific to East Newman.



*Future outcome for street reserves and frontages*



*Mix of native vegetation and future landscape character*



*Public art on electrical boxes*



## Security (CPTED)

- + Houses frontage to have clear sight lines towards verge areas.
- + Fences to be permeable and low (Specific private areas to maintain high solid fence where applicable).
- + Planting along boundaries should be kept lower than fence heights to allow natural surveillance. Larger shrubs and planting on the boundaries will form a natural fence. (Height gradation - Fig 7)
- + Adequate lighting on primary pedestrian routes.
- + Resting points and gathering places along street to have clear sight lines from surrounding community with adequate lighting provided at night.
- + Providing a more structured or organised landscape response will improve the aesthetic quality of the public realm and thereby increase passive surveillance due to greater utilisation of footpaths.



*Future outcome for street reserves and frontages that allows clear sight lines towards the verge area.*



*Mix of native vegetation that will improve the aesthetic quality and increase passive surveillance to footpaths.*



*Mix of native vegetation, mulch and shade trees and low fencing.*



OPEN SPACES

There are currently a few well established parks and open spaces within East Newman. Through the site investigation, early considered opportunities, constraints and community engagement the open spaces were broken down into the following:

- + Eagle Rock Turn (North of Daniels Drive)
- + Daniels Drive Park
- + Homestead Ramble and Weeli Wolli Way
- + Nardoo Loop Park
- + Open space west of Bondini Drive
- + Miner Promise Park
- + Armstrong Way



Figure 8. Activation of open spaces



## OPEN SPACES

### Eagle Rock Turn (North of Daniels Drive)

Currently a pedestrian access way and one of the main entries to East Newman. The area is to remain as a main PAW and entry.

#### Recommendations

- + Increase shade and amenity to the entry
- + Potential to celebrate the entry as part of the landscape strategy to the resting points.
- + Provide bridge connections across swales.
- + Start of a cultural corridor heading south.
- + Adequate lighting.



Eagle Rock Turn (North of Daniels Drive)

### Daniels Drive Park

Currently an informal park and this area will remain as an informal open space / park.

#### Recommendations

- + Provision of seating, lighting, drinking fountains and bins.
- + Shade.



Daniels Drive Park

### Homestead Ramble and Weeli Wolli Way

A swale runs through both open spaces on either side of Homestead Way with picnic and play areas provided on the eastern side of Homestead and Weeli Wolli Way.

There are also seating areas provided along Angelo Street.

#### Recommendations

- + Provision of seating, lighting, drinking fountains and bins.
- + Increase shade and amenity at seating areas/ resting points.
- + Swale areas to be vegetated.
- + Footpaths not used to be removed.
- + Longterm outcome for community purpose lands as part of Development WA land on Weeli Wolli Way.
- + Maintain sight lines to the Hills east and West.
- + Replace existing shade to playgrounds with suitable shade.



Weeli Wolli Way picnic area looking towards the swale



Swale on Angelo Street



Swale from Braeside Drive looking towards Homestead Ramble Way



## Nardoo Loop Park

Fenced play area with a picnic facility and little shade provided.

### Recommendations

- + Provision of more seating, lighting, drinking fountains and bins.
- + Replace existing shade to playgrounds with suitable shade.
- + Increase shade and amenity through trees and vegetation.
- + Reconsider Nardoo Loop as one-way road in and out with permeable paving and extend future landscape improvements across road to verge.

## Open space west of Bondini Drive

The current open space has a lot of potential to the highest point that will celebrate the views and connectivity of community to the country.

### Recommendations

- + Nature play area
- + Bike track
- + Cultural corridor runs through park.
- + Telling the stories of Nyiyaparli, Martu and East Newman community.
- + Throughout improvement for more suitable access.
- + Creating into an active open space with a connection to potential visitors community and Nyiyaparli / Martu Place.

## Miner's Promise Park

Fenced play area with a picnic facilities. There is also a parking area on the western side of the park and has little shade provided for the parking area.

### Recommendations

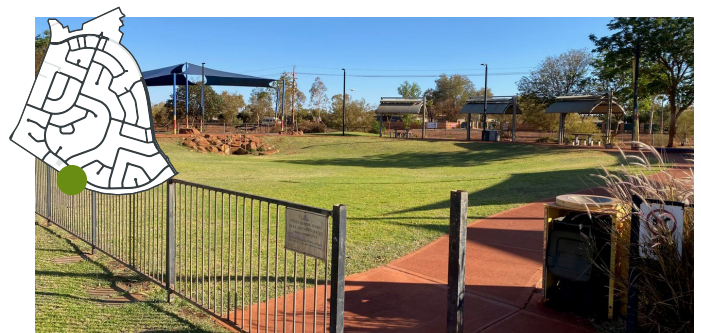
- + Increase shade and amenity through trees and vegetation.
- + Swale to be vegetated.
- + Provide sufficient shade trees for parking area to reduce heat radiating from the road.
- + Future multi use and sporting facility (Basketball, Volleyball, Badminton including skate park)



*Nardoo Loop*



*Open Space west of Bondini Drive*



*Miners Promise Park*

### Notes:

- + It is recommended that all open spaces both active and passive to be provided with an activation plan to enable frequent usage and patronage by residents and East Newman locals.
- + Any recommendations with the activation plan should be integrated into the landscape strategy and provision made for suitable structures / infrastructure to each open space.
- + Refer to The Home in East Newman Social Plan which includes an activation concept that provides examples of incidental and planned activation opportunities for open spaces.



## Strategy

### Parks

- + Determine the function of the parks to establish the maintenance requirement needed.
- + Improve amenity and Incorporate CPTED principles to create safe open spaces.
- + Introduce appropriate barriers to prevent vehicles from entering.
- + Create meeting spaces for community gatherings that include picnic facilities and amenity that can be utilised all year round.



Image: Paramatta park

**Example of picnic area shaded and surrounded by landscape amenity and good surveillance on open areas.**



Image: pinterest Cunningham Park (Tweed heads)



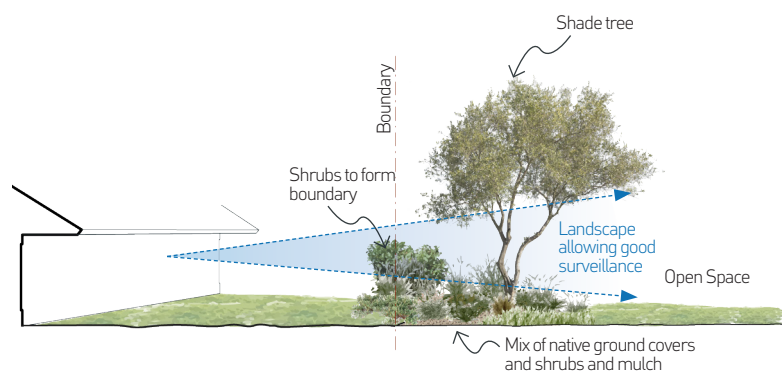
Image: Hammond Park Kalgoorlie (nicheliving)

**Example of park - well shaded and picnic facilities allowing good surveillance towards play areas.**

### House Fronting Open Spaces

- + Fig 9 captures the character of houses fronting open spaces:
  - Informal mixture of predominantly native plants on the edge fronting the open space to have the potential to extend seamless onto park and form a boundary.
  - Ground covers to be planted at the front of the bed and shrubs at the rear or on boundary to create graded planting towards the boundary.
  - Larger shrubs and planting on the boundaries will form a natural fence. (Height gradation - Fig 7)
  - Fencing to public realm and open spaces to be permeable and low.
  - Providing a more structured or organised landscape response will improve the aesthetic quality of the public realm and thereby increase passive surveillance due to greater utilisation of Open spaces.
  - Pedestrian access to park from yard through provision of gate.

- + Introduce sustainable planting that has low / no maintenance requirements. Refer to plant list.
- + Introduce trees along boundary to help create a natural buffer/ fence.
- + Lighting to fencing / gated entry points.
- + Mix of solid / permeable fencing to main privacy.



**Figure 9. Typical section of house fronting open space**

## Swales

- + Introduce sustainable native vegetation to increase biodiversity and reduce water run-off and erosion.
- + Appropriate lighting.
- + Vegetated with suitable riparian species to create a vibrant and attractive open space for community.
- + Provide appropriate cross-over for pedestrians at parks, pathways and road crossings.
- + Provide raised walkway crossings at suitable locations (where applicable) to integrate into pedestrian movement corridors.
- + Swale along Nimmingarra Drive to be landscaped to provide suitable entry statement to East Newman along with the provision of suitable lighting, signage, public art etc. whilst also minimising access across Kalgan Drive.



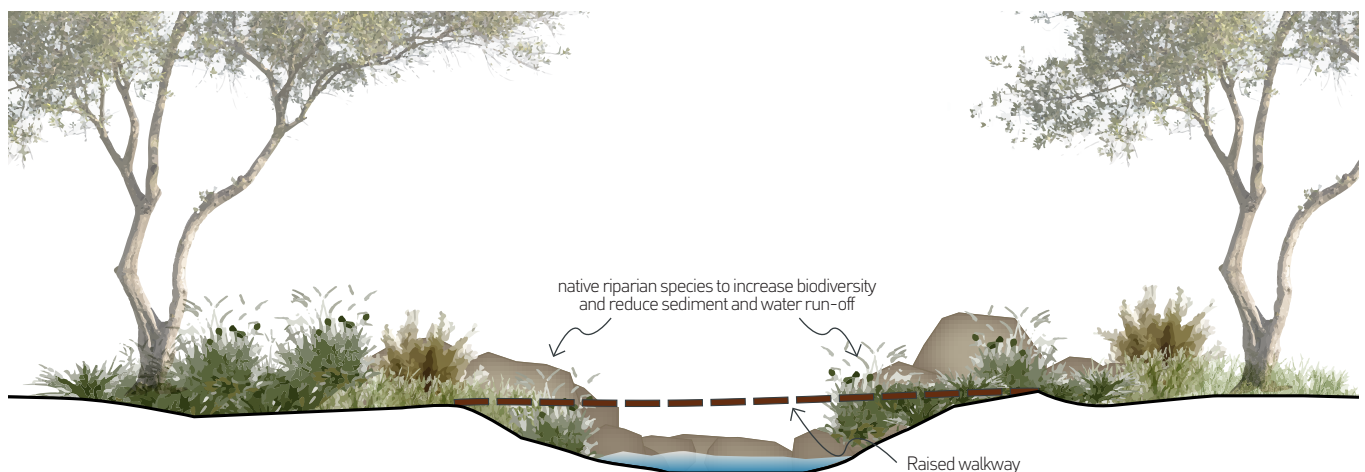
Image: River Rock

**Swale planted with riparian species and pedestrian crossing over.**



Image: City of Santa Rosa

**Vegetated Swale**



**Figure 10. Typical section potential vegetated swale**



## Public Access Ways (PAW)

- + Improve amenity and Incorporate CPTED principles to create safe open spaces.
  - Include appropriate lighting along length of PAW.
  - Low growing plants to the edge of the foot path and shrubs at the boundary (see Fig 7 for height gradation guideline) to maintain surveillance.
  - Shade trees with clear trunk areas to provide enough surveillance.
  - Landscape not to clutter the way - access ways to be functional, accessible and safe.
- + Use local native species that are water-wise and drought tolerant.
- + Future PAW to be wide enough to allow for vegetation strips along the pathway (8m preferred) and mitigate vehicle movement through.
- + Ensure future development at its edges enables appropriate surveillance of the access way including considered fencing design and landscape response.
- + Provide bough shelters or meeting points and specific locations where along walkable routes, where shade is required and where there is high passive surveillance.
- + Retain clear sight lines throughout PAW.
- + Utilise permeable paving.
- + Enable access to meet AS 1428:1-2.



Existing Pedestrian Access Way in Callawa Way



Existing Pedestrian Access Way at the Bondini Drive open space

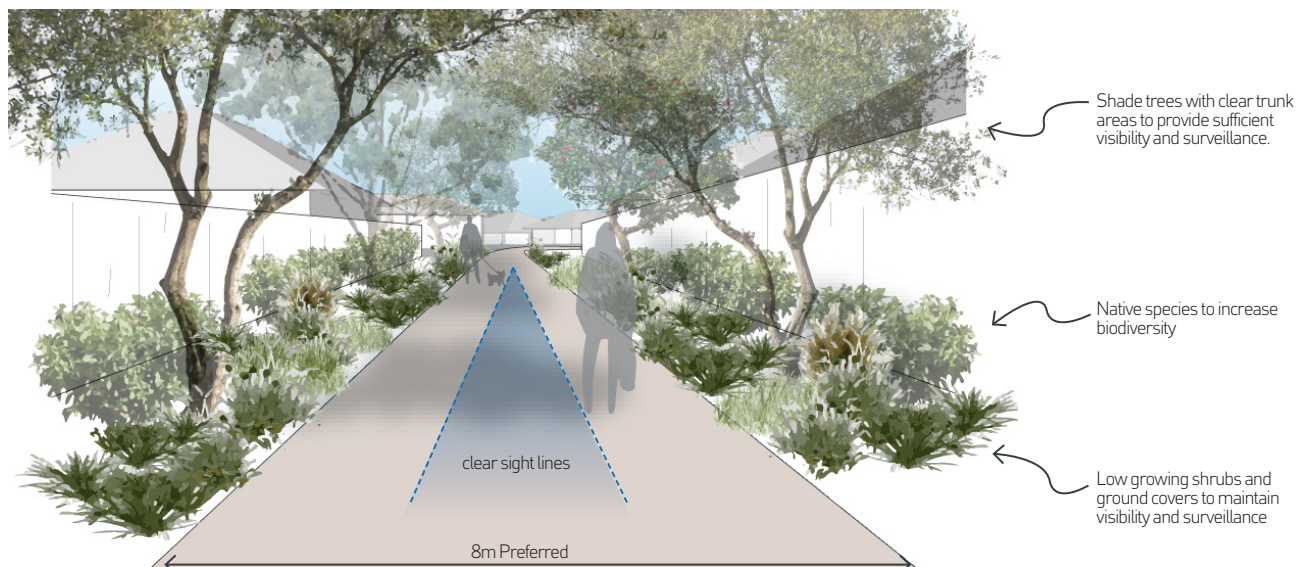


Figure 11. Typical section Pedestrian Access Ways

## PARKS AND OPEN SPACES



### Vegetation

- + Local plant species to suit the environmental and climate conditions (See plant list selection within this report).
- + Selection of trees to include majority with wide canopies to provide sufficient shade at seating areas.
- + A wide variety of native species to be selected to increase the biodiversity.
- + Water-wise species to determine the watering and maintenance resources needed.
- + Turf to be drought tolerant and native species where possible.



### Materiality

- + Natural wooden or rock bollards can be introduced as barriers.
- + Park furniture selection to reflect the function of the park and to be robust.
- + Refer to the hard landscaping for walkways.



### Implementation

- + Determine park functions according to the community needs.
- + Provide spaces for informal recreation needs that can be balanced with retaining the natural existing landscape / vegetation.
- + Group tree and lower vegetation to maximise sun protection and to provide enough shade adjacent to activity areas. This will also promote habitat creation and ease of maintenance.
- + Introduce tree planting at the edges to define the open space.
- + Implement park furniture under natural shade to provide amenity.
- + Refuse bins to be easily accessible for maintenance and located close to facilities or park furniture.
- + It is recommended that all open spaces both active and passive to be provided with an activation plan to enable frequent usage and patronage by residents and East Newman locals.
- + Any recommendations with the activation plan should be integrated into the landscape strategy and provision made for suitable structures / infrastructure to each open space.



*Mix of native vegetation for low maintenance and increase biodiversity.*



*Shade trees to provide sufficient shade to open spaces.*



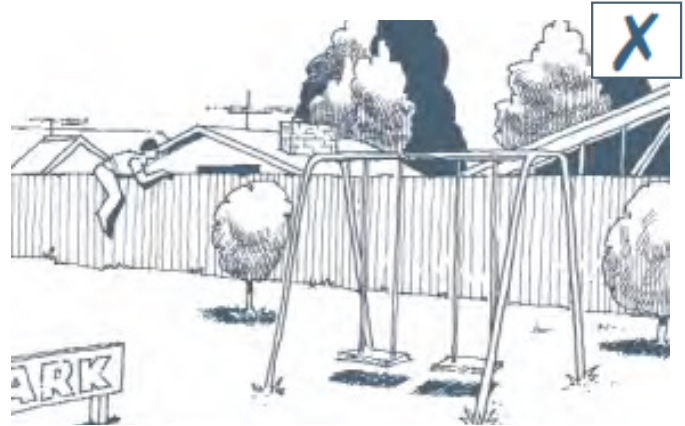
*Robust furniture with potential to incorporate public art*





## Security (CPTED)

- + Houses fronting open spaces to have clear sight towards open space.
- + Fences to be permeable and low.
- + Planting along boundary should be kept lower than fence heights to allow natural surveillance.
- + Fences and bollards to be robust.
- + Clear sight lines towards public realm spaces.
- + Adequate lighting on primary pedestrian routes.
- + PAW to have clear sight lines from surrounding community with adequate lighting.
- + Regular and ongoing maintenance of public spaces will encourage community to use the parks and open spaces:
  - Pruning of shrubs that could potentially become untidy or overgrown.
  - Mowing lawn areas.
  - Rubbish collection.
  - Repairing vandalised property.
  - Ensuring the lights are all in working order.
  - Ensure picnic facilities are in working order and clean.



*Images: Designing Out Crime, Planning Guidelines, June 2006, W/A*

**Boundary to open spaces limiting surveillance**



## LOCATIONS / RESTING POINTS

### Current Character

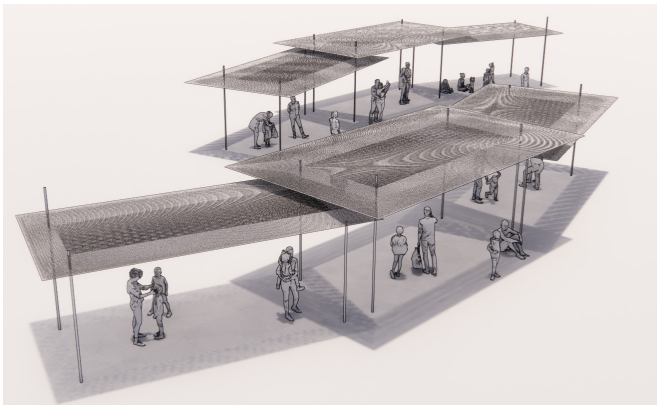
- + Lack of resting / shade amenity provided along walkways and cultural corridors.
- + Resting spaces provided along parks have little or no shade.



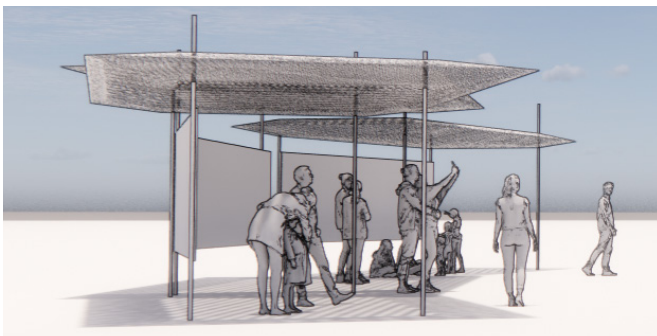
*Current seating area in Homestead Ramble*



*Bough Shelter made by local community*



*Introduction of multiple bough shelters to increase shade*



*Vertical surface as public art (painting or weaving) or creepers to mitigate direct sun when it is at a lower angle (morning / late afternoon)*

### Strategy

- + Resting points located within 100m-200 radius from each other on major cultural corridors, street intersections that will provide amenity.
- + Soft and hardscape culturally inspired and telling the stories of Nyiyaparli and Martu People.
- + CPTED Principles to be applied at installation of every location.
- + Create a sense of pride and legibility through each location to have its own identity :
  - Seasonal vegetation
  - Edible vegetation
  - Art incorporated through paving or structure.
  - Orientate appropriately to provide suitable shade all year round.



### Vegetation

- + Proposed vegetation selected to reflect cultural use.
- + Fruit bearing trees and shrubs at selected locations to give community access to edible plants.
- + Use of creepers onto bough shelter to reduce radiant heat
- + Seasonal and edible / fruit vegetation at resting points.
- + Creepers to extend vertically to mitigate lower sun angle from direct sun beneath shelter.



### Materiality

- + Concrete - precast footings (potential overflow from previous pour)
- + Steel corners cut to varying lengths with off the shelf connections, tees and corner junctions.
- + Perforated / wire-mesh (could be public art perforated panel).
- + Foliage - offcuts from Shire providing program collected and distributed regularly or community working Bee.
- + Incorporate focal paving by using recycled materials to create mosaic patterns incorporated in the paving.
- + Provide street furniture (i.e boulders/ rocks) at the resting points including water (drinking fountains / hose).
- + Signage in line with cultural history (along cultural corridor)





## Implementation

- + Community to be involved in building the structures to give ownership and authenticity to the stories of the land.
- + Involving local artist to create the paving mosaics and vertical artwork or shelter horizontal shade at the locations. which includes community's contribution to give the community a sense of pride.
- + Integrate as part of kids apprenticeship program.



## Security (CPTED)

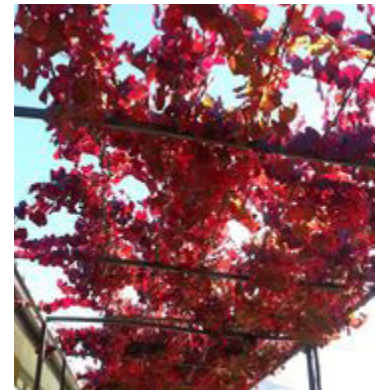
- + Low growing vegetation around bough shelter to allow natural surveillance.
- + Clear sight lines towards public realm spaces.
- + Adequate lighting on primary pedestrian routes and at bough structures.
- + Trees to have clear trunk areas to provide clear sight lines.
- + Regular and ongoing maintenance of public spaces will encourage community to use locations.



*Celebrate resting point areas with seasonal and edible / fruit vegetation*



*Robust Furniture*



*Seasonal and cultural inspired bough shading*



*Typical section - Locations / resting points*



## JOURNEY

### Current Character

- + Unkept
- + Low tree canopy coverage
- + Unused paved pathways
- + Increase in heat load.
- + Footpath close to road resulting in potential dangerous environments at day and night.
- + Lack of lighting throughout streets at night providing a lack of safety.
- + Lack of pedestrian crossings and speed bumps to lower the speed of vehicles to create safer pedestrian environment.



Existing Bondini Drive - lack of pedestrian crossing at cultural corridors



Potential wombat crossing at Bondini Drive to create safer pedestrian environments.

### Strategy

- + Defining the cultural corridors through vegetation along the walkways.
- + Each corridor's landscape outcome to vary planting and shade applications (seasonal, edible, colours, species, seating, orientation etc.)
- + Short stay journey in-between resting points and focus / more dense planting and shade at the locations to create a longer stay at the resting points for shade, rest and amenity.
- + Removal of unused pathways to reduce radiant heat.



### Vegetation

- + Local plant species to suit the environmental and climate conditions.
- + Proposed vegetation selected to reflect cultural use.
- + Fruit bearing trees and shrubs at selected locations to give community access to edible plants.



### Materiality

- + Local materials to be used for bough structures.
- + Incorporate focal paving by using recycled materials to create mosaic patterns incorporated in the paving to give presence to the stories of the community.
- + Hardscape materials selected to be locally sourced.
- + Provide wombat crossings where cultural corridor intersect roads to improve pedestrian movement and slow down traffic.
- + Provide alternative road reserve design where the road intersect with cultural crossings.
- + Provide street furniture at the resting points.
- + Provide plaques / stories integrated along cultural corridors.

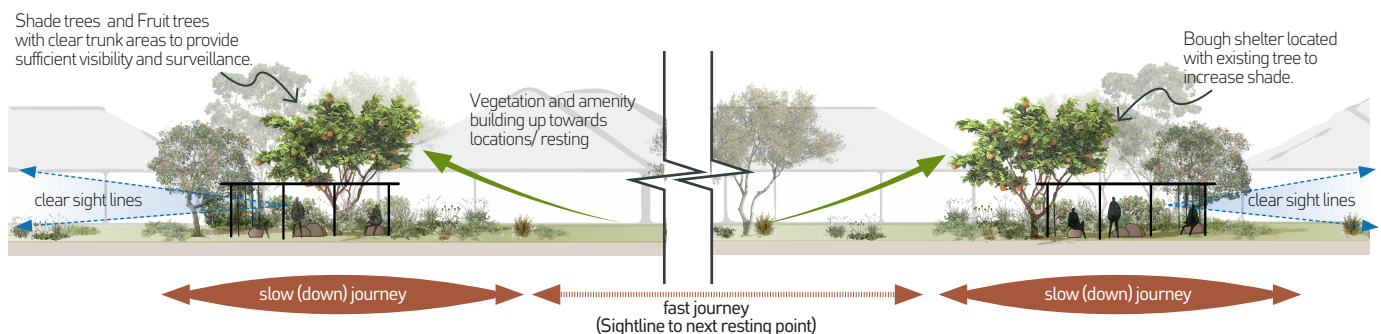


Figure 12. Typical section -Journey between / towards resting points.





## Implementation

- + Group tree and lower vegetation to maximise sun protection and to provide enough shade at the bough shelters or resting points. This will create ease of maintenance.
- + Community to be involved in building the structures to give ownership and authenticity.
- + Orientate bough shelters appropriate to the angle of the sun to ensure shade is provided below shelter and not on road.
- + Locate bough shelters adjacent pedestrian corridors.
- + Involve local artists to create the paving mosaics at the resting points which includes community's contribution and give the community a sense of pride to the cultural presence in east Newman.
- + Refuse bins to be easily accessible for maintenance and located close to facilities or seating furniture.
- + Lighting to be provided with drinking fountains and hose for watering plants.

- + It is recommended that all open spaces both active and passive to be provided with an activation plan to enable frequent usage and patronage by residents and East Newman locals.
- + Any recommendations with the activation plan should be integrated into the landscape strategy and provision made for suitable structures / infrastructure to each open space.

## Security (CPTED)

- + Clear sight lines towards public realm spaces.
- + Adequate lighting on primary pedestrian routes and at bough structures.
- + Trees to have clear trunk areas to provide clear sight lines.
- + Ensure the "journey" / trails are legible through lighting and vegetation to eliminate confusion.
- + Regular and ongoing maintenance of public spaces will encourage community to use resting points.



Figure 13. Journey between / towards resting points.



## SUGGESTED PLANT SELECTION

SEE REFERENCES FOR MORE INFORMATION ON WATER-WISE VEGETATION AND PLANT SPECIES.

### Planting with the seasons

The climate can be described as two distinct seasons :

1. Hot, dry summers; and
2. Mid, cool winters.

Planning the landscape implementation and selecting native species is important to ensure low maintenance, sustainable, water wise gardens and a landscape that is aesthetically favorable and functional .

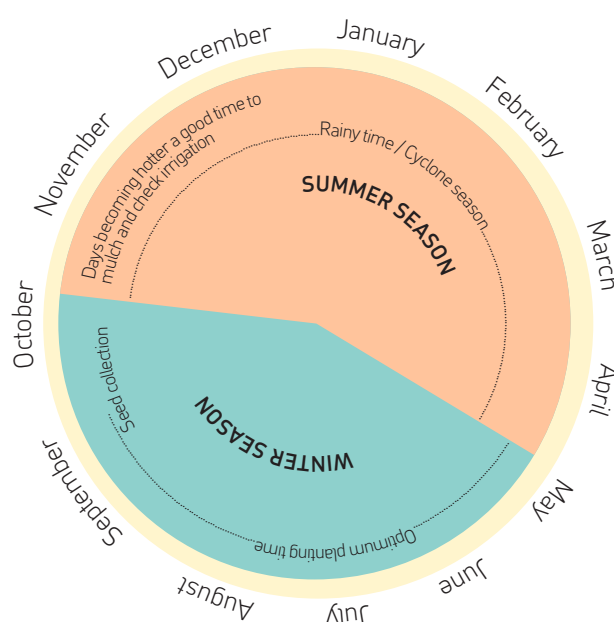
The plant selection on the following pages are based on a variety of native species that will contribute to the local character of East Newman including:

- + Seasonal aesthetic value.
- + Cultural value (medicinal and edible)
- + Create desirable micro climate.
- + Biodiversity.

### Climate throughout the year

Mean Max. (°C)	Mean min. (°C)	Mean rainfall (mm)	Rain days/ year
31.9	16.1	317.7	29.4

Table source: Pilbara native plants for gardens and landscapes.



**Figure 14. Seasons graph**

Source: Pilbara native plants for gardens and landscapes.



## SUMMER FLOWERING PLANTS

### LEGEND



Edible



Shade



Promote  
habitat



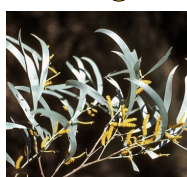
Medicinal/  
Useful herb



Cultural value

### Tree species\*:

Acacia citrinoviridis [Pilbara Jam] ● (Apr-Jun)

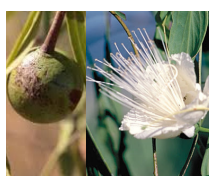


Acacia xiphophylla [Snake wood]

● (Jan-May & Aug-Sep)

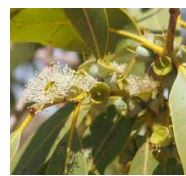


Capparis umbonata [Wild Orange] ○ (Jan-Sep)



Corymbia candida [Ghost gum]

● (Oct-Nov)



Corymbia ficifolia [Summer red flowering Gum]

● (Dec-May)



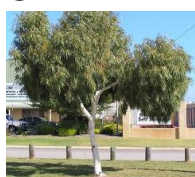
Corymbia polycarpa [Parlkarri/Bloodwood Tree]

● (Jan-Apr)

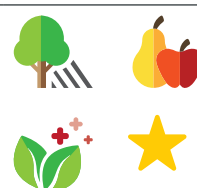
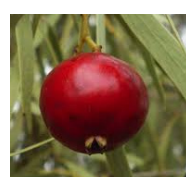


Eucalyptus vixtrix [Smoothbarked coolibah]

● (Nov-Mar)



Santalum acuminatum [Quandong] ○ (Dec-Apr)



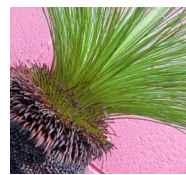
Terminalia ferdinandiana [Wild Plum]

● (Jan-Jun)



Xanthorrhoea thorntonii [Desert Grass Tree]

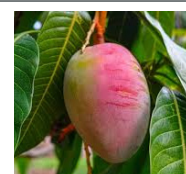
● (Aug-Dec)



Locally Grown Mango Trees

(Flowering - Sep-Oct)

(Fruit period Nov-Jan)



\* All species subject to availability - Local Nurseries to be consulted for availability and for native substitutions





## SUMMER FLOWERING PLANTS

### LEGEND



Edible



Creeper



Medicinal/  
Useful herb



Ground cover



Cultural value



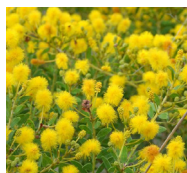
Shrub



Promote  
habitat

### Ground cover and shrub selection\*:

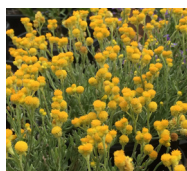
*Acacia stellaticeps* [Northern Star wattle]  
● (Feb-Aug)



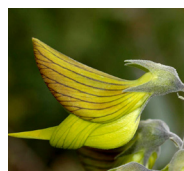
*Brachyscome ciliaris* [Variable Daisy]  
○ (Dec-Apr)



*Chrysocephalum apiculatum* [Golden everlasting]  
● (Mostly all year round)



*Crotalaria cunninghamii* [Green bird flower]  
● (Mostly all year round)



*Cyperus bulbosus* vahl [Bush Onion]  
● (Mostly all year round)



*Eremophila compacta* subsp. *compacta*  
[Compact Emu bush] ● (Mostly all year round)



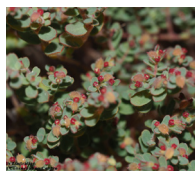
*Eremophila fraseri* [Turpentine bush]  
● (Mostly all year round)



*Eremophila glabra* [Tar bush]  
○ (Mostly all year round)



*Euphorbia australis* [Namana]  
● (Apr-Nov)



*Grevillea eriostachya* [Flame Grevillea]  
● (Mostly all year round)



*Grevillea junctifolia* [Honey-suckle Grevillea]  
● (Jan-Nov)



*Grevillea pyramidalis* [West Pilbara Grevillea]  
● (Sep-Nov)



\* All species subject to availability - Local Nurseries to be consulted for availability and for native substitutions



## SUMMER FLOWERING PLANTS

### LEGEND



Edible



Creeper



Medicinal/  
Useful herb



Ground cover



Cultural value



Shrub



Promote  
habitat

### Ground cover and shrub selection\*:

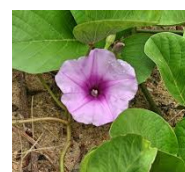
*Hibiscus sturtii* [Sturt's Hibiscus]

● (Mostly all year round)



*Ipomoea brasiliensis* [Beach Morning Glory]

● (Feb-Nov)



Grows well with  
Spinifex grass

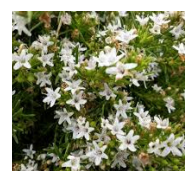
*Marsdenia australis* [Bush Pear]

● (Nov-Feb)



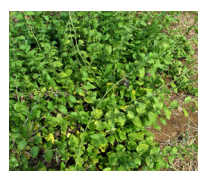
*Myoporum parvifolium* [Creeping Boobialla]

○ (May- Dec)



*Plumbago zeylanica* [Natie Plumbago]

○ (Jan-Aug)



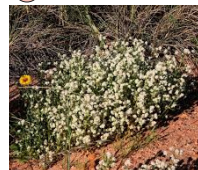
*Ptilotus nobilis* [Tall Mulla Mulla]

● (Mostly all year round)



*Ptilotus villosiflorus* [Mulla Mulla]

● (Jul- Dec)



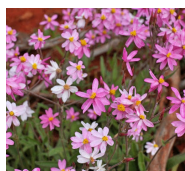
*Sarcostemma viminale* subs. *australe*

[Caustic Bush] ● (Jan-Nov)



*Schoenia cassiniana* [Schoenia]

● (Jun-Nov)



*Tinospora smilaciana* [Snake vine]

● (Aug- Jan)



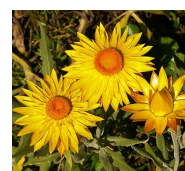
*Trichosanthes cucumerina* (Snake Gourd)

○ (Jul-Sep)



*Xerochrysum bracteatum* [Golden Everlasting]

● (After summer rain)



\* All species subject to availability - Local Nurseries to be consulted for availability and for native substitutions



## WINTER FLOWERING PLANTS



### LEGEND



Edible



Shade



Promote habitat











































Medicinal/  
Useful herb



Cultural value

### Tree species\*:

<p>Acacia aneura [Mulga Tree] ● (May)</p>    	<p>Acacia citrinoviridis [Pilbara Jam] ● (Apr-Jun)</p>     
<p>Acacia pruinocarpa [Western Gidgee] ● (Oct-Dec)</p>   	<p>Acacia pyrifolia [kanji bush wattle] ● (Jul-Aug)</p>     
<p>Acacia xiphophylla [Snake wood] ● (Jan-May &amp; Aug-Sep)</p>   	<p>Atalaya hemiglaucous [Whitewood] ○ (May-Oct)</p>   
<p>Bauhinia cunninghamii [Native Bauhinia] ● (Apr-Oct)</p>    	<p>Brachychiton gregorii [Desert Kurrajong] ● (May-Oct)</p>    
<p>Capparis umbonata [Wild Orange] ○ (Jan-Sep)</p>      	<p>Corymbia candida [Ghost gum] ● (Oct-Nov)</p>   

\* All species subject to availability - Local Nurseries to be consulted for availability and for native substitutions





## WINTER FLOWERING PLANTS

### LEGEND



Edible



Shade



Promote habitat



Medicinal/  
Useful herb



Cultural value

### Tree species\*:

*Corymbia opaca* [Desert Bloodwood]

○ (May-Aug)



*Corymbia terminalis* habit [Inland Bloodwood]

○ (Mar-Oct)



*Erythrina vesperillo* [Yulbar / Grey corkwood]

● (Aug-Sep)



*Eucalyptus luecophloia* [Snappy Gum]

● (Mar-Aug)



*Eucalyptus xerothermica* [Pilbara Box]

○ (May-Aug)

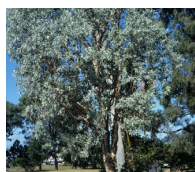


*Grevillea wickhamii* [Wickham's grevillea]

● (Apr-Oct)



*Melaleuca argentea* [Silver Cadjeput] ○ (Jul-Nov)

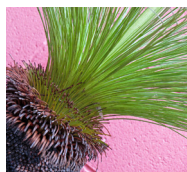


*Ventilago viminalis* [Supple jack] ○ (May-Sep)



*Xanthorrhoea thorntonii* [Desert Grass Tree]

● (Aug-Dec)



Locally Grown Mango Trees

(Sep-Oct)



\* All species subject to availability - Local Nurseries to be consulted for availability and for native substitutions



## WINTER FLOWERING PLANTS

### LEGEND



Edible



Medicinal/  
Useful herb



Cultural value



Creeper



Ground cover



Shrub



Promote  
habitat

### Ground cover and shrub selection\*:

*Acacia bivenosa* [Two nerved wattle]

● (May- Oct)



*Acacia colei* [Coles Wattle]

● (May- Sep)



*Acacia dictyophleba* [Waxy Wattle] ● (Mar-Sep)



*Acacia maitlandi* [Maitlands Wattle] ● (May-Oct)



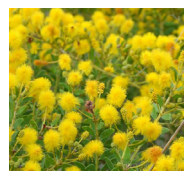
*Acacia orthocarpa* [Pilbara weeping wattle]

● (Apr-Nov)



*Acacia stellaticeps* [Northern Star wattle]

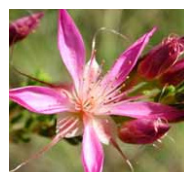
● (Feb-Aug)



*Acacia pachyacra* [wattle] ● (Apr-Aug)

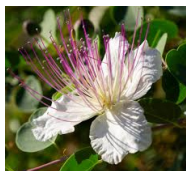


*Calytrix carinata* [Starflower] ● (Mar-Oct)



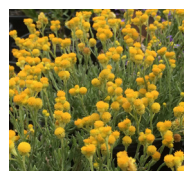
*Capparis spinosa* [Caper Bush]

● (Mar-Dec)



*Chrysocephalum apiculatum* [Golden everlasting]

● (Mostly all year round)



*Crotalaria cunninghamii* [Green bird flower]

● (Mostly all year round)



*Cynanchum floribundum* [Native Pear]

○ (Mar-Nov)



\* All species subject to availability - Local Nurseries to be consulted for availability and for native substitutions





## WINTER FLOWERING PLANTS

### LEGEND



Edible



Creeper



Medicinal/  
Useful herb



Ground cover



Cultural value



Shrub



Promote  
habitat

### Ground cover and shrub selection\*:

*Cyperus bulbosus* vahl [Bush Onion]

● (Mostly all year round)



*Diplopeltis eriocarpa* [Hairy pepper flower]

○ (Jul-Oct)



*Enchylaena tomentosa* [Barrier salt bush]

● (May-Sep)



*Eremophila compacta* subsp. *compacta*

[Compact Emu bush]

● (Mostly all year round)



*Eremophila forrestii* subs. *forrestii*

○ (Apr-Oct)



*Eremophila fraseri* [Turpentine bush]

● (Mostly all year round)



*Eremophila glabra* [Tar bush]

○ (Mostly all year round)



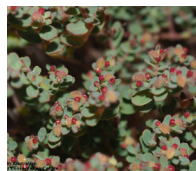
*Eremophila maculate* [Spotted Emu bush]

● (May-Nov)



*Euphorbia australis* [Namana]

● (Mostly all year round)



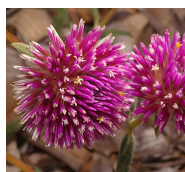
*Gompholobium polyzygum* [Royal Mulla Mulla]

● (Jul - Nov)



*Gomphrena canescens* [Bachelors Buttons]

● (Apr-Oct)



*Grevillea eriostachya* [Flame Grevillea]

● (Mostly all year round)



\* All species subject to availability - Local Nurseries to be consulted for availability and for native substitutions



## WINTER FLOWERING PLANTS

### LEGEND



Edible



Creeper



Medicinal/  
Useful herb



Ground cover



Cultural value



Shrub



Promote  
habitat

### Ground cover and shrub selection\*:

*Grevillea junctifolia* [Honey-suckle Grevillea]

● (Jan-Nov)



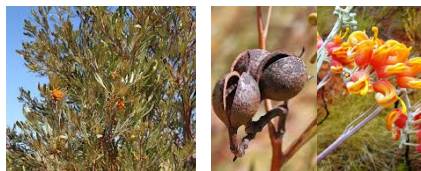
*Grevillea pyramidalis* [West Pilbara Grevillea]

● (Sep-Nov)



*Grevillea refracta* [Grevillea]

● (Apr-Sep)



*Hibiscus sturtii* [Sturt's Hibiscus]

● (Mostly all year round)



*Ipomoea brasiliensis* [Beach Morning Glory]

● (Feb-Nov)



Grows well with  
Spinifex grass

*Keraudrenia nephrosperma* [Keraudrenia]

● (March-Nov)



*Myoporum parvifolium* [Creeping Boobialla]

○ (May- Dec)



*Ptilotus axillaris* [Mat Mulla Mulla]

○ (Jun-Nov)



*Ptilotus calostachyus* [Weeping Mulla Mulla]

○ (Mar-Oct)



*Ptilotus fusiformis* [Mulla Mulla]

○ (Mar-Oct)



*Ptilotus helipteroides* [Hairy Mulla Mulla]

○ (Apr-Oct)



*Ptilotus nobilis* [Tall Mulla Mulla]

○ (Mostly all year round)



\* All species subject to availability - Local Nurseries to be consulted for availability and for native substitutions





## WINTER FLOWERING PLANTS

### LEGEND



Edible



Creeper



Medicinal/  
Useful herb



Ground cover



Cultural value



Shrub

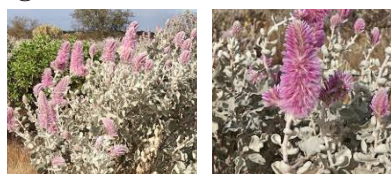


Promote  
habitat

### Ground cover and shrub selection\*:

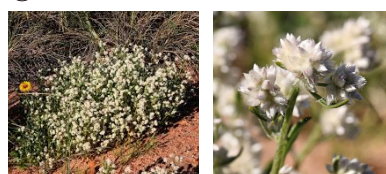
*Ptilotus rotundifolius* [Royal Mulla Mulla]

● (Jul- Oct)



*Ptilotus villosiflorus* [ Mulla Mulla]

● (Jul- Dec)



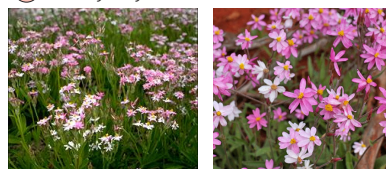
*Sarcostemma viminale* subs. *australe*

[Caustic Bush] ● (Jan-Nov)



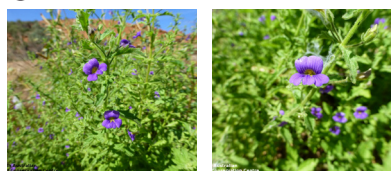
*Schoenia cassiniana* [Schoenia]

● (Mostly all year round)



*Stemodia viscosa* [Pagurda]

● (Apr-Sep)



Grows well in moist  
areas- possible  
species for swales.

*Swainsona formosa* [Sturts Desert Pea]

● (Jun-Oct)



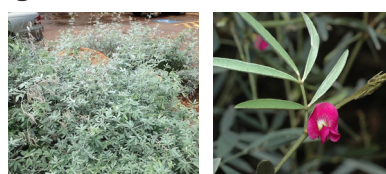
*Swainsona pterostylis* [Dampier Pea]

● (Apr-Oct)



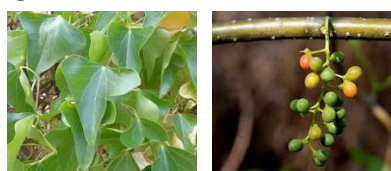
*Tephrosia rosea* var. *clementii* [Patterson's poison]

● (Apr-Oct)



*Tinospora smilaciana* [Snake vine]

● (Aug- Jan)



*Trichosanthes cucumerina* (Snake Gourd)

○ (Jul-Sep)



\* All species subject to availability - Local Nurseries to be consulted for availability and for native substitutions



## GRASS AND TURF SPECIES

### LEGEND



Edible

Medicinal/  
Useful herb



Cultural value



Promote  
habitat

### Grasses and Turf selection\*:

<p><i>Aristida inaequiglumis</i> [Feathertop Three-awn]</p> 	<p><b>Tuft / clump grass:</b></p> <ul style="list-style-type: none"> <li>+ Fill-in between shrubs and trees.</li> <li>+ Suitable to plant close to foundation.</li> </ul>	<p><i>Aristida holathera</i> [Erect kerosene grass]</p> 	<p><b>Tuft / clump grass:</b></p> <ul style="list-style-type: none"> <li>+ Courtyard friendly.</li> <li>+ Border or backdrop and fill in plant.</li> <li>+ Feature plant when plant in mass.</li> </ul>
<p><i>Astrebula lappacea</i> [Curly Mitchell Grass]</p> 	<p><b>Tuft / clump grass:</b></p> <ul style="list-style-type: none"> <li>+ Suitable at seasonally wet areas.</li> <li>+ Border or backdrop plant.</li> <li>+ Suitable to plant close to foundation.</li> </ul>	<p><i>Bothriochloa ewartiana</i> [Desert blue Grass]</p> 	<p><b>Tuft / clump grass:</b></p> <ul style="list-style-type: none"> <li>+ Suitable at wet areas and drainage floors.</li> <li>+ Border or backdrop and fill in plant.</li> <li>+ Suitable to plant close to foundation.</li> </ul>
<p><i>Cynbopogon</i> species [Lemon Scent Grasses]</p> 		<p><i>Cyperus vaginatus</i> [Stiff-leaf sedge]</p> 	 <p><b>Tuft / clump grass:</b></p> <ul style="list-style-type: none"> <li>+ Suitable at seasonally wet areas.</li> <li>+ Border or backdrop and fill in plant.</li> <li>+ Courtyard friendly.</li> </ul>
<p><i>Digitaria brownii</i> [Cotton panic grass]</p> 	<p><b>Tuft / clump grass:</b></p> <ul style="list-style-type: none"> <li>+ Courtyard friendly.</li> <li>+ Border or backdrop and fill in plant.</li> <li>+ Feature plant when plant in mass.</li> <li>+ Suitable to plant close to foundation.</li> </ul>	<p><i>Enneapogon polyphyllus</i> [Leafy Nineawn]</p> 	<p><b>Tuft / clump grass:</b></p> <ul style="list-style-type: none"> <li>+ Courtyard friendly.</li> <li>+ Border or backdrop and fill in plant.</li> <li>+ Feature plant when plant in mass.</li> <li>+ Suitable to plant close to foundation.</li> </ul>
<p><i>Eulalia aurea</i> [Silky Browntop]</p> 	<p><b>Tuft / clump grass:</b></p> <ul style="list-style-type: none"> <li>+ Courtyard friendly.</li> <li>+ Border or edging and fill in plant.</li> <li>+ Feature plant.</li> </ul>	<p><i>Themeda triandra</i> [Kangaroo grass]</p> 	<p><b>Tuft / clump grass:</b></p> <ul style="list-style-type: none"> <li>+ Feature grass.</li> <li>+ Suitable to plant close to foundation.</li> </ul> 
<p><i>Triraphis mollis</i> [Needle grass]</p> 	<p><b>Tuft / clump grass:</b></p> <ul style="list-style-type: none"> <li>+ Courtyard friendly.</li> <li>+ Ideal low border or edge plant.</li> <li>+ Feature plant.</li> <li>+ Plant in clumps or mass.</li> </ul>	<p><i>Triodia</i> sp. [Spinifex]</p> 	<p><b>Tuft / clump grass:</b></p> <ul style="list-style-type: none"> <li>+ Feature grass.</li> <li>+ Excellent barrier/ border plant.</li> </ul> 
<p>Winter Green</p> 	<p><b>Ideal for high traffic areas where close mowing is required:</b></p> <ul style="list-style-type: none"> <li>+ Sports ovals</li> <li>+ Parks</li> <li>+ Roadsides</li> </ul>	<p>Zoysia</p> 	<p><b>Creeping grass:</b></p> <ul style="list-style-type: none"> <li>+ Erosion control</li> <li>+ Repel weeds</li> <li>+ Tolerate traffic</li> </ul>
















\* All species subject to availability - Local Nurseries to be consulted for availability and for native substitutions


























## OTHER / ADDITIONAL SPECIES

### Other Tree Species:

Acacia aptaneura [Mulga Tree]	★
Acacia coriacea subs. pendens [Weeping dogwood]	 
Allocasuarina decaisneana [Desert Oak]	★  
Corymbia hamersleyana [Pilbara Bloodwood]	 
Ehretia saligna [False cedar]	 
Eucalyptus socialis subs. eucentrica [Red Mallee]	 
Ficua brachypoda [Rock fig]	  
Hakea chordophylla [Corkwood]	 

### Other Ground Cover and Shrubs Species:

Acacia anaticeps [Duck-head wattle]	 
Acacia acradenia [Silky wattle]	
Acacia ampliceps [Salt wattle]	 ★
Acacia ancistrocarpa [Fitzroy wattle]	 ★
Acacia cowleana [Halls creek wattle]	 
Acacia gregorii [Gregory's wattle]	
Acacia ligulata [Dune wattle]	
Acacia monticola [Curley-bark wattle]	 ★
Acacia retivena [Net-veined wattle]	
Clerodendrum floribundum [Lollybush]	 
Cymbopogon ambiguus [Scent grass]	★ Tuft grass along watercourses and good for backdrop fill-in planting
Convolvulus angustissimus [Native morning glory]	
Dipteracanthus australasicus [Desert Petunia]	
Eremophila cuneifolia [Pinyry]	  ★
Eremophila lachnocalyx [Woolly-calyxed Emu bush]	  ★
Eremophila magnifica [Hamersley Range Fuchsia]	  ★

### LEGEND



More information on water-wise speices can be found at: <https://www.watercorporation.com.au/Water-wise/Waterwise-plants>

Eremophila species	  ★
Frankenia cordata [Heart leaved Frankenia]	
Gardenia pyriformis [Turpentine Tree]	  
Grevillea berryana [Grevillea]	 
Grevillea stenobotrya [Sandhill Spider flower]	  
Indigofera rugosa	 
Keraudrenia valentina subsp elliptica [Keraudrenia]	
Myoporum montanum [Native Myoporum]	 
Ptilotus obovatus [Cotton bush]	  ★
Ptilotus polystachyus [Prince of Wales Feather]	
Senna artemisioides [Senna]	  ★
Senna varieties species	  ★
Sporobolus actinocladius [Ray grass]	Tuft grass ideal for edging and feature display.
Streptoglossa macrocephala	
Teucrium racemosum [Grey Germander]	

\* All species subject to availability - Local Nurseries to be consulted for availability and for native substitutions

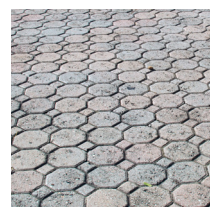
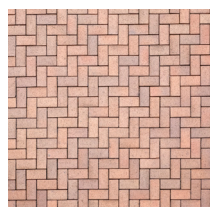
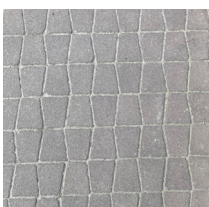


## SUGGESTED HARDSCAPE SELECTION

### Paving materials\*:

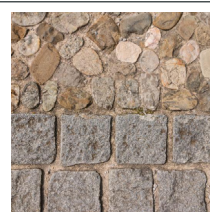
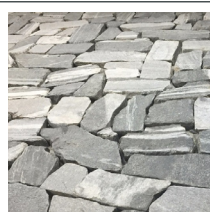
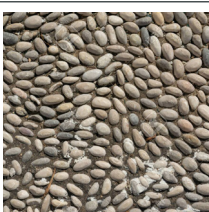
#### Brick paving

- + High traffic areas.
- + Allow water to permeate.



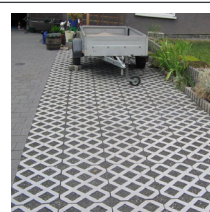
#### Natural stone paving

- + High traffic areas
- + Allow water to permeate
- + Natural character
- + Alternative to feature paving



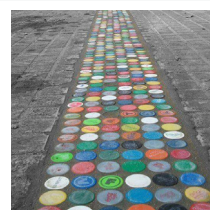
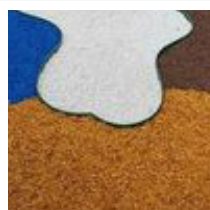
#### Permeable paving

- + Moderate traffic areas
- + Allow water to permeate
- + Combined with vegetation
- + Reduce heat reflecting from surface.



#### Feature paving

- + Allow water to permeate
- + Recycled materials.
- + Natural materials
- + At feature areas (Resting points and entries.)



\* All products subject to availability - Local suppliers to be consulted for availability and similar substitutions





## SUGGESTED FURNITURE

### Street furniture\*:

#### Seating

- + Robust.
- + Preferred boulders/ large rocks.
- + Located appropriately below shade.

#### Picnic facilities

- + Robust.
- + Preferred boulders/ large rocks.
- + Located appropriately below shade.

#### Bins

- + Robust.
- + Located appropriately.
- + Recycling.

#### Bollards

- + Robust.
- + Preferred boulders/ rocks
- + Additional lighting to park road edges.

#### Drinking fountains

- + Robust.
- + Timer.
- + No loose breakable features.
- + Run-off to swales/ district drainage.

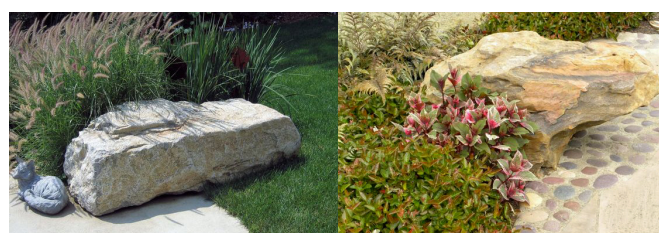
#### Lighting

- + Robust.
- + Lighting to be appropriate to location and use.
- + Sustainable ,solar lighting and reduce light pollution.
- + White lights, not yellow / orange.
- + Potentially sensor lights for footpaths.
- + Lighting to be 360° not directional.

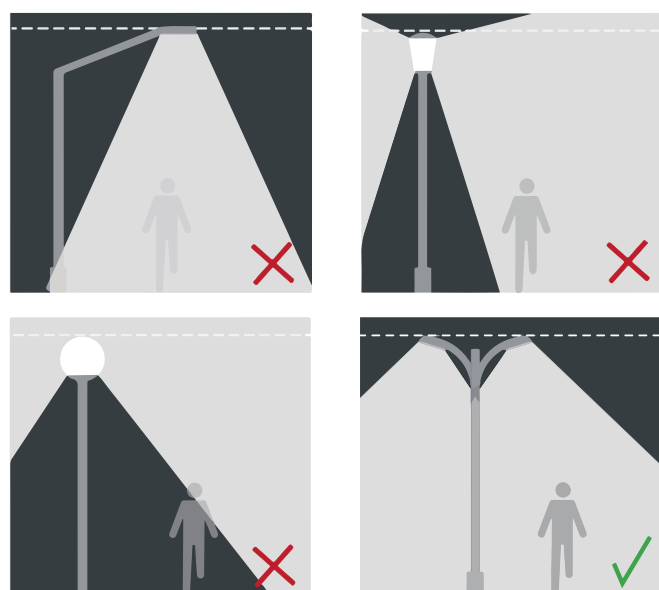


Image: Woodleigh School, Langwarrin South, Victoria

#### Rock/ boulder seating and edges (bollards)



#### Integrate rock/ boulder seating with landscape



#### Adequate lighting for pedestrians

\* All products subject to availability - Local suppliers to be consulted for availability and similar substitutions

## 1.5 REFERENCE MATERIAL

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  - <https://www.pinterest.com.au/>





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