



# ATTACHMENTS

Under Separate Cover

Ordinary Council Meeting  
Wednesday, 23 October 2019



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# Town of **Port Hedland**



## PORT HEDLAND LANDSCAPE GUIDELINES

*Prepared for the Town of Port Hedland 4<sup>th</sup> March 2019*

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## 1 Introduction

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These Guidelines have been produced by the Town of Port Hedland, herein referred to as the Town, to provide direction for the design, construction and maintenance of landscape infrastructure in Port Hedland and South Hedland. As development in Hedland continues to evolve it is important that a robust set of guidelines specifies a clear framework to be utilised by internal Council practices as well as designers, developers and residents responsible for creating and maintaining landscapes within the public and private domain.

For the purposes of these Guidelines public open space, herein referred to as POS includes parks, verges, medians, road reserves, drainage reserves, public access ways, street scapes and civic spaces.

These Guidelines will cover the following subjects concerning development of landscape infrastructure:

- Development Process and Requirements
- Preparatory Site Works
- Hard Elements
- Soft Elements
- Irrigation
- Maintenance and Handover

This document comprises two sections:

1. **Section A** specifies Landscape Guidelines for residential, commercial and industrial verges where maintenance is the responsibility of the owner or tenant.
2. **Section B** specifies Landscape Guidelines for POS developments and streetscapes on land ultimately managed by the Town.

Supporting Appendices for this document include:

1. Town of Port Hedland Verge Treatment Application Form
2. Standard Detail Drawings
3. Preapproved Items
4. Town of Port Hedland Preferred Planting Guide
5. Town of Port Hedland Asset Handover and Checklist
6. Town of Port Hedland Revegetation Species List

## 2 Policies and Strategies

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The following list identifies the Town Strategies and Plans that most affect the development of POS within the Town and should be referred to in conjunction with these Guidelines:

- 201706 Town of Port Hedland Policy Manual
- Town Planning Scheme No.5 (TPS5) and Amendments, including the South Hedland Town Centre Development Plan (SHTCDP) which is incorporated into TPS5 pursuant to Clause 5.2.1(a)
- Town of Port Hedland Disability Access and Inclusion Plan
- Town of Port Hedland General Provisions Local Law
- Town of Port Hedland Reserves and Foreshores Local Law
- Town of Port Hedland Play Area Renewal Strategy

- Town of Port Hedland Standard Irrigation System Specification 2014
- Town of Port Hedland Irrigation Water Network Plan
- Town of Port Hedland Recycled Water Quality Management Plan
- Town of Port Hedland Public Open Space Strategy
- Town of Port Hedland Preferred Planting Guide
- Town of Port Hedland Street Tree Management Plan
- Town of Port Hedland Engineering Guidelines
- Town of Port Hedland Design Guidelines for Specific Precincts (e.g., Kingsford-Smith Business Park and South Hedland Town Centre)
- Town of Port Hedland Weed Management Strategy

In addition to the relevant Statutory Guidelines, Council Policies and Plans, the Guidelines reference a range of existing supporting information including:

- Building Code of Australia (BCA), 2010.  
<https://services.abcb.gov.au/abcbshop/index.aspx>
- Liveable Neighbourhoods  
<http://www.planning.wa.gov.au/publications/919.asp>
- CPTED Design Guidelines  
[http://www.planning.wa.gov.au/dop\\_pub\\_pdf/docguidelines.pdf](http://www.planning.wa.gov.au/dop_pub_pdf/docguidelines.pdf)
- Public Parkland Planning and Design Guide  
[https://www.dsr.wa.gov.au/about/plan-for-the-future/public-parkland-planning-and-design-guide-\(wa\)](https://www.dsr.wa.gov.au/about/plan-for-the-future/public-parkland-planning-and-design-guide-(wa))
- Utility Providers Code of Practise for Western Australia  
[https://www.mainroads.wa.gov.au/BuildingRoads/StandardsTechnical/RoadandTrafficEngineering/RoadsideItems/GuidelinesforRoadsideServices/Pages/Utility\\_Providers\\_Code\\_of\\_Practice\\_for\\_Western\\_Australia.aspx](https://www.mainroads.wa.gov.au/BuildingRoads/StandardsTechnical/RoadandTrafficEngineering/RoadsideItems/GuidelinesforRoadsideServices/Pages/Utility_Providers_Code_of_Practice_for_Western_Australia.aspx)
- Classification Framework for Public Open Space (Department of Sport and Recreation, 2012)  
<http://www.dsr.wa.gov.au/docs/default-source/file-support-and-advice/file-facility-management/framework-for-open-space-online-version.pdf?sfvrsn=4>
- DoW Water Sensitive Urban Design  
[https://www.water.wa.gov.au/\\_data/assets/pdf\\_file/0018/1809/99294.pdf](https://www.water.wa.gov.au/_data/assets/pdf_file/0018/1809/99294.pdf)
- Water Corporation Guidelines  
<https://www.watercorporation.com.au/save-water>

### 3 Scope of Guidelines

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These Guidelines are intended for use for the following:

- Communicate expectations and uniform standards for the design, construction and maintenance of landscape infrastructure within the Town to be utilised by internal the Town

staff, design consultants, developers, statutory bodies /authorities, community groups and residents.

- Will be referred to by the Town for the application and approval process to develop or redevelop verges by residents or developers.
- Will lay the foundations for the preparation of a greening strategy for the Town and facilitate contribution to the Strategic Community Plan 2012-2028.

## 4 Objective of Guidelines

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These Guidelines provide standards and requirements for the implementation of landscape infrastructure with the key objectives to:

- Provide a framework for consistency and clarity within the Town approval process.
- Promote sustainable practices that encourage the preservation of local vegetation and landscape features.
- *Encourage and support the development of aesthetically pleasing and sustainable landscape infrastructure that enhances the unique elements of the Town whilst maintaining a level of consistency.*
- *Provide safe and functional POS for the needs of the community.*
- *Encourage the use of plant species that will endure the Pilbara environment whilst providing an element of shade and sustenance.*
- *Ensure the development of infrastructure that regards future maintenance and access requirements.*
- *Encourage a landscaping form that is economical in its water and maintenance requirements.*
- *Provide a means for minimising soil erosion.*
- *Establish a safe landscaping environment by applying Crime Prevention Through Environmental (CPTED) principles.*
- Ensure equitable access and inclusion for people with disabilities by applying principles included in the Town's Disability Access and Inclusion Plan (DAIP).
- Encourage the use of local materials that will withstand the Pilbara environment and contribute to sense of place.

## 5 Design Principles

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The following set of design principles underpins the content of these Guidelines:

### 5.1 Planning Parameters

The provision of the type and character of POS is dependent upon the consideration of current and future needs of the community, local issues, economic climate and environmental parameters. New developments and Capital Works Renewals will be individually assessed by an accessibility consultant.

The development of new subdivisions may entail a cash in lieu component for POS development. Refer to Town of Port Hedland Public Open Space Strategy.

## **5.2 Sustainability**

Sustainable methodologies and best practice are to underpin all aspects of the design, implementation and management of POS. This includes climate, soil and water responsive design considerations that address the specific nature of the Pilbara environment. As well as this, the Town is committed to preserving existing significant trees and remnant vegetation.

## **5.3 Financial Responsibility**

The Town must be accountable for the expenditure of public funds and assets and it is essential that the provision of POS be substantiated in terms of the efficient use of resources. These Guidelines outline a responsible approach to the cost of provision and ongoing maintenance of landscape infrastructure.

## **5.4 Local Character**

POS within the Town should reflect a sense of the unique local character of the Pilbara. Use of local plants, materials and finishes that speak of the place and can withstand the harsh environmental conditions and the use of local resources should be a factor in implementation of landscape infrastructure.

## **5.5 Community Safety**

Priority of the Town is the provision of POS that the community can enjoy safely. Principles of Crime Prevention Through Environmental Design (CPTED) should be incorporated into POS design and implementation to assist in reducing crime and improve feelings of safety.

## **5.6 Access and Equity**

The Town is committed to ensuring that the community is an accessible one for people with disabilities, their families and carers. Along with 8/003 ACCESS POLICY and the Town's Disability and Inclusion Plan, these Guidelines will address particular issues in regard to POS standards to address access for all.

## **5.7 Cultural Heritage**

Hedland has a rich multi-cultural heritage and there is an opportunity for landscape infrastructure to interpret and celebrate this heritage through design responses from plant species and material selection to public art installation.

## **5.8 Civic Pride**

A sense of civic pride and community ownership is to be encouraged via various collaboration initiatives in the design, development and maintenance of POS. By encouraging local ownership through various initiatives, the incidence of vandalism can be reduced and more socially sustainable spaces created.

## 5.9 Longevity

POS design and Implementation must address and account for the cost and requirements of ongoing maintenance to ensure the delivery of a long-term viable asset for the Hedland community. This includes the appropriateness of materials and products that should be proven performers in the Pilbara.

# SECTION A – LANDSCAPE GUIDELINES FOR RESIDENTIAL, COMMERCIAL AND INDUSTRIAL VERGES

## 6 Introduction

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The objective of this section of the Guidelines is to ensure that verges are considered as a landscape asset to the town and that they are designed and maintained to a high level. Verge areas are to be developed to a safe and sustainable standard with the aim of minimising ongoing maintenance. This section outlines permissible verge treatments and standards.

The following definitions pertain to this section:

Road Reserve	The portion of land between the front property boundaries that contains both verges and the road carriageway.
Verge	The section of the road reserve between the property boundary and the road kerb line.
Verge Treatment	Any soft or hard landscaping installed within the area of the verge excluding street trees.
Street Tree	A tree installed within the road reserve.
Crossover	The portion of a driveway within the verge providing access from the road to the property boundary.

## 7 Application Process for Verge Treatment

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Developers and property owners must submit an application to the Town for approval of landscaping treatments prior to commencing any work. Applications may be submitted to the Town via one of the following processes:

1. Submission of a Verge Treatment Application Form. **Refer Appendix 1**
2. Submission of landscaping designs in accordance with a Development Application process

All applications must include a plan showing the layout and location of landscaping, irrigation and information on plant species.

Applications will be assessed in accordance with this Policy, relevant Local Laws and supporting documentation. Applicants will be advised of any known work scheduled by the Town that may affect their application.

Applicants must not commence any landscaping works until the Town grants approval in writing.

The Town offers a design service to assist applicants with their submission. Fees are applicable and quoted for each project.

## 8 General Conditions

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General conditions for the installation of verge treatments are as follows:

- In terms of verge treatments, the property owner agrees to maintain the area free from hazards. Failure to comply may result in removal of the hazard and/or treatment by the Town at the owner's expense.
- In terms of verge treatments, the property owner agrees to indemnify the Town against all claims that may arise because of the treatment.
- The Town reserves the right to remove any verge treatment for the purpose of carrying out works. The Town in consultation with the property owner shall carry out reinstatement of approved verge treatments.
- The owner accepts responsibility for removal and reinstatement of landscaping if required by public utility providers.
- No assistance shall be provided by the Town for development, ongoing operation, or maintenance costs, unless specified otherwise during the approval process.
- The property owner shall be responsible for repairs to any damaged infrastructure occurring during the installation of landscaping.

## 9 Irrigation

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All applicable verge treatments must be irrigated through a connection to the property owners' water supply. The following points should be considered when irrigating within the verge:

- Contact Dial Before You Dig (1100) and other service and utility providers prior to commencing installation to ensure that underground services and infrastructure are not damaged and correct clearances are maintained.
- The Town Standard Irrigation System Specification is available as a reference document for irrigation details.

- Design and operation must comply with Water Corporation guidelines and legislation and water restrictions current at the time of development.
- Irrigation design should apply principles to ensure sustainable use of water.
- Irrigation design and operation must not affect road pavements, footpaths or other infrastructure on the verge.

Refer the *Town of Port Hedland Irrigation System Specification* for information on Irrigation standards and construction.

## 10 Hardscape Elements

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For the purposes of these Guidelines, Hardscape elements within the verge refer to all:

- Hardstand
- Structures
- Compacted surfaces

### 10.1 Hardstand

The Town permits a part of the verge to be sealed with brick paving, concrete or asphalt to form a hardstand. The maximum area to be treated by sealing is 3.0 metres wide, measured from the back of the kerb and running parallel to the kerb in the verge abutting the property, or alternatively an area of equal size.

The hardstand area shall not compromise pedestrian access.

Refer to the relevant Local Laws and Engineering Guidelines for further information.

**Refer Appendix 2** – STD Drawing Details 01, 02, 03, 08 & 09

### 10.2 Structures

For the purposes of these Guidelines, structures refer to vertical elements such as walls, letterboxes and seats, steps and crossovers in verges.

All structures are to conform to BCA Guidelines and Town approval.

#### 10.2.1 Walls, Letterboxes and Other Structures

Walls, letterboxes, seats and other structures are to be installed within the boundary of the private property and are not permissible on the Town owned verges.

#### 10.2.2 Steps

The Town will individually assess location and design of steps at the time of application.

#### 10.2.3 Crossovers

Refer to the Town Policy 9/005 for information on the construction of crossovers.

### 10.3 Compacted Surfaces

Compacted material is an acceptable treatment on verges adjoining residential properties if the material is well graded, cement stabilised, water bound and compacted to a smooth finish. The depth of such material must be an absolute minimum of 100mm.

Gravel shall be fines with a maximum aggregate size of 7mm to 14mm maximum. Permissible materials by the Town include white quartz cracker dust and red scoria.

**Refer Appendix 2** – STD Drawing Details 04 & 05

**Refer Appendix 3** – Preapproved Items 01 & 02

## 11 Softscape Elements

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For the purposes of these Guidelines, Softscape Elements refer to all:

- Verge planting areas and lawn areas
- Mulch areas

### 11.1 General Conditions for Planting in Verges

Planting permitted within the verge subject to the following:

- Planting shall generally be kept clear of the footpath to a distance of 1.2m, and shall not pose a hazard or impede on sight lines for vehicles
- An area behind the kerb shall remain clear of gardens and soft landscaping (excluding lawn) to ensure safe pedestrian access where no pathway exists. Due to inconsistent verge widths, the size of this area needs to be inspected and approved by a Town Officer prior to planting.
- Planting shall apply CPTED design principles.
- Plant species shall comply with the Town's Preferred Planting Guide. **Refer Appendix 4.**
- The garden must be irrigated through a connection to the property owners' water supply.
- The Town encourages the planting of local species to enhance local character; however, water wise exotic species that require minimum maintenance shall be permitted.

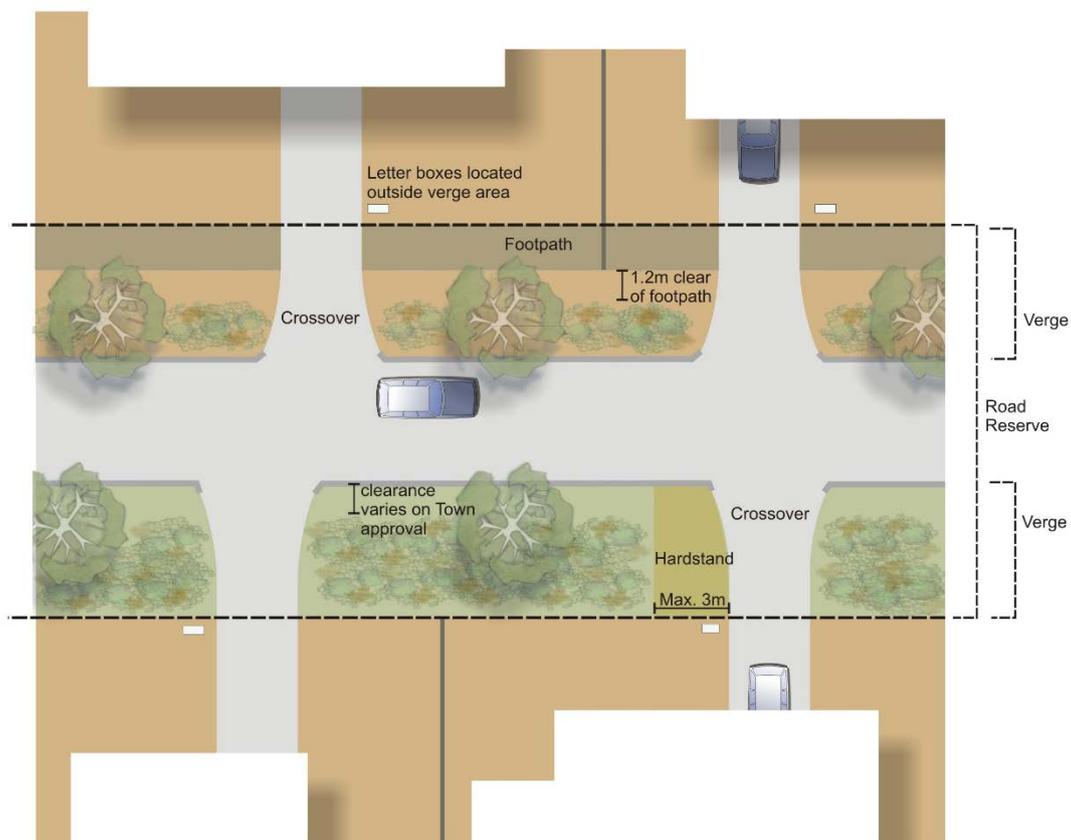


Image 1. Verge Planting

## 11.2 Mulch

Mulching shall be undertaken to planted areas on verges. 150mm mulch cover shall be maintained to all planting areas. Mulch levels shall be maintained to 25mm below adjacent hard edges at all times. Do not mound mulch levels above adjacent surface levels.

The Town predominantly utilises and encourages pine bark mulch for all planting beds; however compacted fines such as white quartz cracker dust, and rock mulches such as river shingles may be utilised with approval from the Town.

**Refer Appendix 2 – STD Drawing Details 12 & 17**

## 11.3 Turf

Turf species to be advised by the Town shall be either Winter Green (*Cynodon dactylon*) or Empire Zoysia (*Zoysia japonica*) and shall be supplied and laid as roll on turf.

Artificial turf is permissible but not encouraged by the Town.

### 11.3.1 Preparatory Work

Eradicate weeds prior to laying using environmentally acceptable methods, such as a non-residual glyphosate herbicide at the recommended maximum rate. Remove any weed growth from an area 500mm diameter from around the base of trees and structures. Hand weed any rubbish and weed growth throughout grassed and planted areas.

Prepare lawn areas by spreading topsoil to a depth of 100mm. Apply *TerraCottem Turf Soil Conditioner* at a rate of 180grams per metre squared and incorporate thoroughly to a depth of 100mm with a rotary device, across the length and width of the area. The lawn shall be watered after planting and thereafter as necessary to produce a satisfactory cover.

The Town to approve any substitute soil conditioner.

**Refer Appendix 2 – STD Drawing Detail 18**

## **11.4 Shrubs and Groundcovers**

The Town encourages the planting of local species to enhance local character; however, water wise exotic species that require minimum maintenance shall be permitted. All plant species are to be approved by the Town.

**Refer Appendix 4 – Town of Port Hedland Preferred Planting Guide**

## **11.5 Street Trees**

Street Trees provide an important amenity within the Town by the creation of attractive streetscapes, the provision of shade, contribution to local identity, improved microclimate and habitat.

Street trees may be planted within the verge subject to the following:

- The location of trees must not impede on existing infrastructure, underground services, and pedestrian or vehicle safety;
- Plant species shall comply with the Town's Street Tree Management Plan;
- Plant species and form shall comply with CPTED design principles;
- The tree must be irrigated through a connection to the property owners' water supply;
- Where the street tree has been requested by the property owner, the owner is responsible for maintenance and watering of the tree.
- Contact Dial Before You Dig (1100) and other service and utility providers prior to commencing street tree installation to ensure that underground services and infrastructure are not damaged and correct clearances are maintained.
- No Tree or Shrub to be planted within 3m of any hardstand treatment, furniture or light pole.

### **11.5.1 Street Trees for Residential Verges**

The Town will provide a free street tree/s to property owners upon application and subject to the above points. These trees will be subject to a 12 month consolidation period, whereby if the tree is removed, damaged or dies within this period the owner shall be responsible for replacement of the tree or reimbursement to the Town for costs. The distribution of free street trees is based on:

- A standard residential Lot - 1 tree
- A corner residential Lot - 1 tree for the short boundary, 2 trees for the long boundary
- Lot with boundary >70m - 3 trees

Trees within the Town owned or managed properties shall be routinely assessed for disease, hazards or damage and may be removed on approval of the Town's officers.

Residents are not permitted to plant street trees.

Refer Street Tree Management Plan for information on Street Tree Species Selection

### **11.5.2 Street Trees for Commercial and Industrial Verges**

Tree planting in road reserves controlled by MRWA will comply with MRWA standards.

The Town will base spacing of street trees on assessment and approval of plan.

Refer *Town Of Port Hedland Street Tree Management Plan* for information on Street Tree Species Selection

### **11.5.3 Removal of Street Trees on Verges**

The Town views street trees as an asset and does not support their removal. Developers can be held liable for reinstatement of street trees where removal has been undertaken without the Town's approval.

## **11.6 Planting Procedure for Plant Stock and Trees**

The Town recommends the following planting procedure be utilised:

1. Thoroughly water all plant-stock before planting. Ensure that roots of plant-stock are not exposed to drying influences such as sun or wind.
2. All plant-stock shall be set plumb and placed to ensure a normal relationship of the crown to the soil surface as per STD Drawing.
3. Incorporate TerraCottem Universal Soil Conditioner (amounts to manufacturer's instructions according to planting size) mixed thoroughly into backfill soil taken from planting hole. A portion of the mix is to be placed in the bottom of the hole.
4. Place plant-stock vertical in the centre of planting hole with care to avoid damage to roots.
5. Back-fill the planting hole with remaining excavated site soil amended with TerraCottem and water-in at the same time.
6. Form a raised bank of compacted soil around the base of each plant to contain watering as per
7. All street trees and large shrubs/trees as required shall be staked. Tree stakes approximately 50 - 70mm square or in diameter and set to 1.5 m height is recommended. Stakes are to be made from Jarrah only. Stakes are to be driven at least 400mm into the ground surface and vegetation main trunks tied with approved figure 8 expandable industry grade ties.
8. Protect newly planted areas from pedestrian traffic by suitable methods until the plant-stock is well established. Protection may include three-strand wire fence on steel star pickets.

**Refer Appendix 2** – STD Drawing Detail 19, 20 & 21

## **12 Maintenance**

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The property owner shall be responsible for maintenance of all landscaping on the verge, unless agreed otherwise during the approval process.

Developers of landscaping treatments on verges of the Town owned or managed properties shall be responsible for the maintenance of the landscaping for a period of 18 months, unless negotiated otherwise. An Asset Management Plan shall be submitted to the Town for approval. Handover of maintenance to the Town after this period shall be conditional upon coordinated inspections, approvals, training and supply of all as constructed and warranty information.

## **12.1 Lawn Maintenance**

### **12.1.1 Insect and Disease Control**

It will be the resident/developer's responsibility for insect and disease control: The period of treatment shall be until the problem is solved.

### **12.1.2 Mowing and Trimming**

Remove litter and branches before mowing. Mowing should be consistent with the growth habit of the grass variety and shall be maintained at a height of 25mm-40mm for Zoysia Empire and 15mm-25mm for Winter Green throughout the year.

Mowing should be on a weekly basis during periods of high growth and at three-week intervals at other times. Do not mow under wet conditions.

Edges adjoining plant beds, pathways, base of trees and other obstacles shall be trimmed to coincide with mowing.

Care should be taken not to damage trees or shrubs.

### **12.1.3 Top Dressing**

All wheel tracks and any other sunken areas are to be top dressed to bring them up to level with surrounding areas.

### **12.1.4 Fertilising**

Fertilising shall be applied to correct any nutrient deficiencies.

### **12.1.5 Irrigation**

Irrigation shall be programmed to suitably meet the needs of the turf and weather conditions and shall comply with Water Corporation guidelines as to programming.

All costs incurred resulting from fines for breaches of the Guidelines shall be the responsibility of the resident/developer.

Refer *Town of Port Hedland Irrigation Water Network Plan*

## **12.2 Maintenance of Verge Planting**

Verges should be maintained in a neat and tidy manner at all times. Dead plants should be removed and replaced.

Plant growth that encroaches on paths, crossovers and roads is to be pruned back so as not to obstruct public access and vehicle visibility.

### **12.2.1 Irrigation**

Irrigation shall be programmed to suitably meet the needs of the plant species and weather conditions and shall comply with Water Corporation guidelines as to programming.

All costs incurred resulting from fines for breaches of the Guidelines to be the responsibility of the resident/developer.

Refer *Town of Port Hedland Irrigation Water Network Plan*

## **12.3 Maintenance of Street Trees**

Maintenance of street trees on residential verges is the responsibility of the Town.

Developers of landscaping treatments on verges of the Town owned or managed properties shall be responsible for the maintenance of the Street Trees on verges for a period of 18 months, unless negotiated otherwise.

#### **12.3.1 Stakes & ties scheduling**

Stakes and ties are to be replaced or repaired as required. Lower ties are to be removed after 12 months and all ties and stakes are to be removed after 18 months or on trees that have a crown height greater than 4m and a trunk diameter in excess of 90mm (measured at the base) whichever occurs first.

#### **12.3.2 Pruning**

Vegetation pruning following initial site planting is to be carried out by the Town on an as required basis to maintain and promote vigorous healthy growth. Trees shall remain free of dead or damaged branches. Broken branches shall be pruned in a manner to prevent further damage to the tree and minimise the risk of injury to the public. Pruning is to encourage plant health and individual species form.

#### **12.3.3 Mulching**

150mm mulch cover to all street trees shall be maintained at all times. All mulch areas shall remain weed free.

## **SECTION B – LANDSCAPE GUIDELINES FOR PUBLIC OPEN SPACE, DEVELOPMENTS AND STREETSCAPES**

## 13 Introduction

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The objective of this section of the Guidelines is to ensure that POS is considered a landscape asset and is designed, constructed and maintained to a consistent, appropriate and high level. For the purposes of this section, POS includes parks, medians, road reserves, drainage reserves, public access ways, streetscapes, and civic spaces.

The Town encourages the design of site responsive urban parkland, delivered through appropriate structure and sustainable design. Good visual amenity through the adoption of CPTED Guidelines is also required to minimise the potential of vandalism and the creation of safe spaces. Passive supervision of the parklands by residents is of high importance especially where children's play equipment is located. The Town requires the POS be designed and constructed to minimise future maintenance costs. The Town is committed to preserving existing significant trees and remnant vegetation. All construction and products supplied to meet the Town specifications and or requirements.

Whilst this section outlines the preferred criteria of the Town for POS, it is expected that variations in design will occur where designs relate to a particular theme, narrative or landscape characteristic. These designs however, shall still adhere to the Design Principles set out in these Guidelines.

## 14 Public Open Space Framework

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The hierarchy for Public Open Space in Port Hedland is adopted from the Department of Sport and Recreation *Classification for Public Open Space 2012*. The hierarchy is divided into four categories that reflect the different roles, both form, function and accessibility served by POS within the context of Port Hedland. The hierarchy consists of:

1. Local Open Space
2. Neighbourhood Open Space
3. District Open Space
4. Regional Open Space

The hierarchy also determines a standard of provision of infrastructure for each of the categories. These are general standards only and variations will occur due to the specifics of a POS including level of use, location and contextual setting.

For further detailed information on hierarchy and level of service, refer to *The Port Hedland Public Open Space Strategy*.

## 15 POS Development Process and Requirements

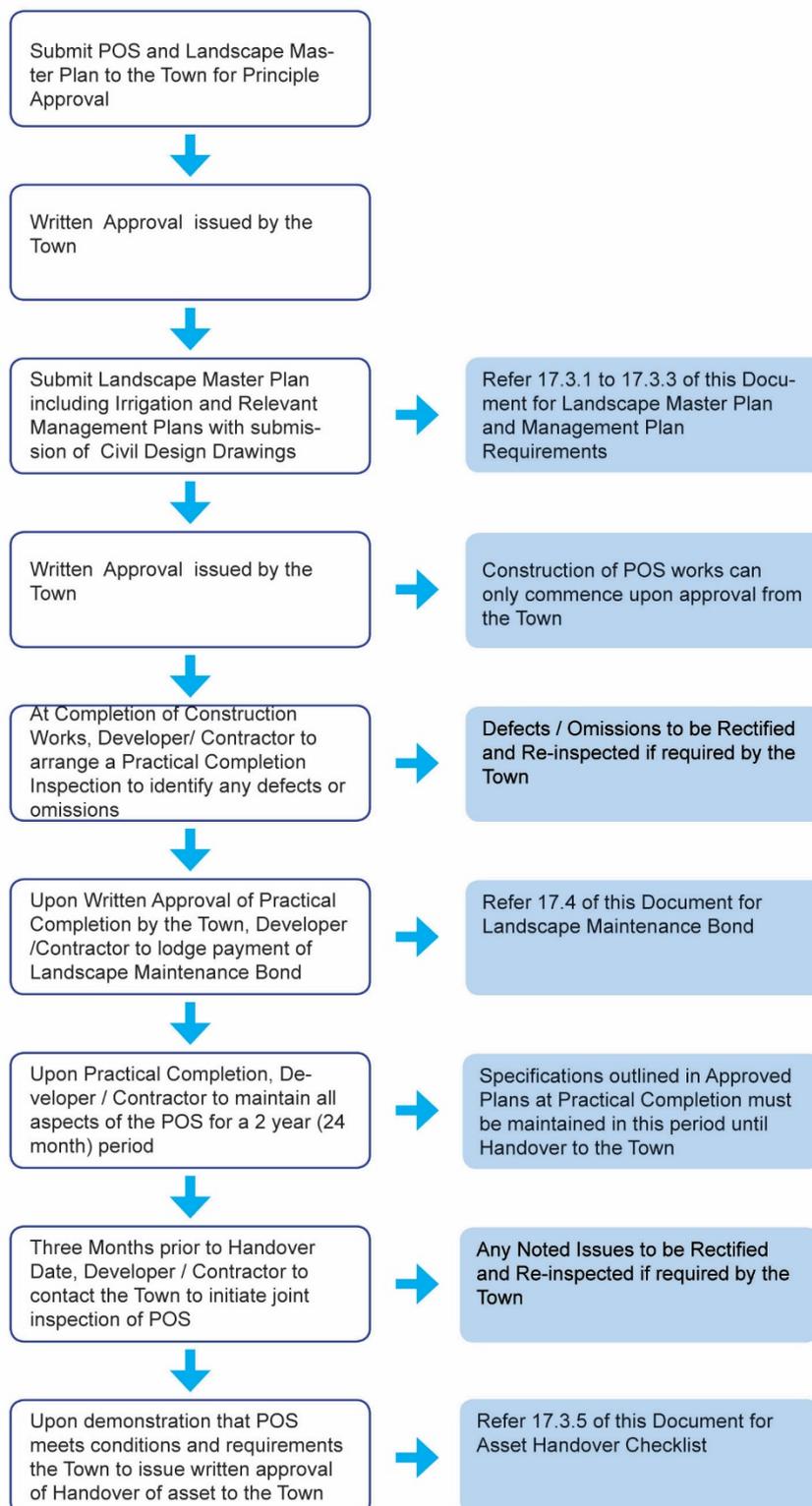
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### 15.1 Professional Assistance

To assist in processing a submission for development of POS when it is required, it is recommended that a Landscape Architect or other professional with horticultural / urban design expertise be engaged to provide drawings.

### 15.2 Development Process

The following chart summarises the process for the development of POS within the Town:



**15.3 Required Development Submissions / Documentation**

### 15.3.1 Landscape Masterplan

The Detailed Landscape Master plan is to include:

- A detailed feature and contour survey
- Location of POS with respect to the boundaries of the development
- Boundaries of the POS
- Landscape theme (If any)
- Adjoining land uses (road, private lots etc.)
- Areas of natural vegetation to be retained
- Areas of natural vegetation to be cleared
- Wetland areas to be protected
- Trees worthy of retention
- Drainage functions including drainage infrastructure
- 10 year and 100 year flood water levels where applicable
- Areas to be planted and or grassed
- Pathway alignments
- Playground locations
- Location of any structures (pergolas, boardwalks etc.)
- Entry statement location and conceptual design
- Fencing
- Reticulation
- Proposed contours (including retaining walls)
- Services
- Species and Number of Individual Plants
- Specifications for all Structures and materials used

### 15.3.2 POS Masterplan

Details of the POS are to be submitted on a separate set of plans and shall include the following:

- Paths to the Town/Austrroads specifications (See [www.onlinepublications.austrroads.com.au/items/AGRD06A-09](http://www.onlinepublications.austrroads.com.au/items/AGRD06A-09))
- BBQ's and Shade Structures if required and to the Town specifications
- Seats and Tables to the Town specifications
- Play equipment to the Town specifications
- Soft Fall to Town specifications
- Reticulation (sprinkler heads, reticulation pipes and solenoids) to the Town specifications (refer the Town Standard Irrigation System Specification 2014)

- Garden edging and or kerbs to the Town specifications
- Lawn area. Species to be confirmed by the Town
- Taps and fountains. To the Town specifications
- Plantings including Species and Numbers of Plants
- Lighting including positioning of poles. To the Town specifications
- Fencing to the Town requirements
- Rubbish/Recycling to the Town specifications and requirements
- Bollards and Entrance Gates to the Town specifications
- Any other inclusions to be approved by the Town

### **15.3.3 Management Plans**

- Introduction – preamble of site, management plan objectives
- Maintenance Program – comprehensive 24 month maintenance schedule that covers the 2 year maintenance requirement for all sites
- Recommendations and Management Strategies, incorporating:
  - Weed eradication
  - Nutrient and irrigation management
  - Drainage maintenance program

### **15.3.4 As Constructed Documentation – OSPEC format**

OSPEC will only be required for Major new developments. CAD file and ASCONS will be accepted for minor projects and developments.

### **15.3.5 Asset Handover Checklist**

The Asset Handover Checklist is intended to guide the handover of the asset to Operations and the processing of asset information records related to their creation and future operations. It is important that records relating to each asset are available for future reference.

It is the responsibility of the Project Manager to complete this document

**Refer Appendix 5 – Asset Handover Checklist**

## **15.4 Landscape Maintenance Bond**

Before Practical Completion, a landscape maintenance bond is to be provided by the developer to ensure that landscaped POS is handed over to the Town in a satisfactory condition. The bond is to be in the form of either a bank cheque or cash bond. The landscape maintenance bond is to be equal to 5% of the contract value for landscaping works (exc. GST) as accepted by the Town, as security to ensure that the POS is maintained to an acceptable standard and be held in trust until POS handover.

During the maintenance period of 2 years the Developer and/or his responsible agents shall be responsible for the maintenance of the POS to standards that is acceptable to the Town. Where it becomes apparent to the Town that these standards are not being maintained then the Town will notify the Developer and if the accepted standards are not met within a timely manner the Town shall carry out maintenance procedures to ensure this is rectified at the Developer's expense. In this case

the cost of the work shall become a debt due to the Town and the Town may draw on any retention money or bank guarantee being held, without reference to or approval from the Developer and without limiting its right to recover any balance of money due should the security be insufficient to cover the costs of the works.

### **15.5 Substitutions**

Given that these Guidelines are developed to ensure that fit for purpose assets capable of achieving their economic design life with minimal operating and maintenance costs are delivered, the Town has identified accepted proprietary items.

The identification of a proprietary item does not necessarily imply exclusive preference for the item so identified, but it does indicate the necessary properties of the item. If alternatives to the documented products, methods or systems are proposed then a written submission to the Town supplying sufficient information to permit a timely evaluation of the proposed alternatives including:

- Evidence that the performance is equal to or better than that specified
- Evidence of conformity to a cited standard
- Samples
- Essential technical information

All substitutions require approval by the Town prior to construction and or installation.

**Refer Appendix 3 – Preapproved Items**

### **15.6 Warranty and Defects**

Warranty periods commence at the date of practical completion.

The warranty period shall be for 1 year or for such a period as supplied by manufacturer whichever is the greater. A twelve months defects liability period shall apply from the date of practical completion of the POS works. During the Warranty/Defects Period, the Developer and/or his responsible agents shall be responsible for ensuring that satisfactory remedial repairs arising from faulty design, workmanship or materials are carried out. The cost of any consequential damage and claims resulting from such defects shall be charged to the Developer and/or his responsible agents. During the warranty/defect period, the Town may, at its discretion, carry out remedial repairs where the fault affects the service to customers and/or public safety and the defects are not rectified within the time required by the Town. The cost of the remedial repairs shall be charged to the Developer and/or his responsible agents. Prior to the end of the Warranty/Defects period, the Developer and/or his responsible agents will assess whether there are any defects. If so, they shall notify the Town of the list of defects and have them rectified to the satisfaction of the Town. Any defects rectified during the defects liability period shall be subject to a further 12 months defects liability period.

## **16 POS Disability Access Requirements**

To ensure equitable access and inclusion for people with disabilities POS should contain the following:

- Provision of clearly signed accessible parking close to the POS as possible

- Provision of a firm, continuous path free of obstructions and without steep slopes from parking to the entry point of the POS, linking all the accessible POS areas – playground, shaded seating, picnic tables, drinking fountain and barbecues
- Provision of an accessible barbecue, where required – connected to the rest of the POS facilities by an accessible pathway
- Provision of at least one accessible picnic table that is shaded and protected from weather connected to the rest of the POS facilities by an accessible pathway
- Provision of an accessible pathway into the playground to enable children and carers / parents to access the playground facility
- Provision of a shaded seating area adjacent the playground, connected to the rest of the POS facilities by an accessible pathway
- Where long walkways are provided, provision of signage that displays direction, distance and terrain, with resting places along its length
- Where drinking fountains are provided, ensure the provision of one that is accessible to all.

Refer to the *Town of Port Hedland Disability Access and Inclusion Plan* for further information.

## 17 Preparatory Site Works

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### 17.1 Earth Works and Drainage Works

All works are to comply with the Building Code of Australia and relevant Australian Standards and Codes.

### 17.2 Protection of Trees

The Town is committed to preserving existing significant Trees and Remnant vegetation.

Before commencing work on site, assess and identify all trees which are indicated to be retained or removed, trees which may need partial cutting back or other work, and trees which are indicated to be removed, or required to be removed, to enable construction or access. Clearly mark trees to be retained with conspicuous plastic ribbon around the trunk, and maintain ribbons until Practical Completion.

Notify the Town of all trees proposed to be removed or cut back and arrange for a site inspection to confirm and approve these trees. Existing trees outside the line of works shall be retained and protected during construction. Do not remove or cut back any trees for site sheds, storage, or access unless and before approved in writing by the Town.

Provide temporary protection to all trees in close proximity to construction work, which may be damaged by such work. Protection may include installation of fencing, barricades, or other suitable procedures.

Take all necessary precautions to protect vegetation, including the following:

- Do not add or remove any soil within the drip line of trees.

- Do not store materials under or near trees.
- Do not park cars or other mechanical plant under trees.
- Do not place spoil from excavations within the drip line of trees.
- Do not damage tree bark or hanging branches etc.
- Do not cut roots exceeding 25mm diameter unless approved by the Town.
- Avoid compaction of ground under trees.

## 18 Storm Water Drainage Infrastructure

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Although rainfall in Hedland is low, averaging just over 300mm a year, it is often concentrated in severe thunderstorms and occasional cyclones during the summer months producing heavy deluges. Therefore, stormwater drainage infrastructure must be designed and constructed to cope with these events.

The Town on a case-by-case basis will assess drainage design within individual development applications for POS.

Better Urban Water Management Guidelines – Storm Water Management objectives include:

- Limiting negative impacts on existing ecological processes and systems
- Minimising negative impacts on natural hydrologic processes of catchments
- Balancing downstream run off and peak flows from urban development
- Minimising pollution & improving quality of water discharges to the natural environment
- Incorporating collection, treatment and re-use of stormwater runoff in design solutions, where appropriate (due to infrequent rain events, collection of water in dryer climates can be Impractical and often economically unsustainable - i.e. large infrastructure cost for little return);
- Protecting and enhancing surface and ground water quality
- Limiting demand on reticulated potable water supply systems - e.g. incorporating fit-for-purpose/multiple options into supply and distribution planning
- Limiting wastewater generation - including appropriate treatment/discharge/re-use of effluent
- Acknowledging the link between water consumption and broader social, economic & community resource
- Increasing social and recreational values in urban areas through integrated green infrastructure
- Adding value while minimising development costs and provide strategies that fundamentally integrate factors previously regarded as separate aspects of urban management (e.g. drainage infrastructure & maintenance costs, multi-use open spaces, cultural and environmental corridors)
- Taking advantage of increased property market interest in environmentally responsible development
- Integrating management practices within and between institutions responsible for waterway and POS management.

At present, 'best practice' in Hedland has urban water run-off being directed from housing lot frontages directly onto the road easements where it is then transferred as close to source as possible (minimal hard pavement drainage) via one-way cross-falls including flush kerbing and/or kerbed outlet devices into endemically vegetated swales. Linear open space or multi use corridors include a specialised vegetated swale system that has an aim to retard and treat urban water volumes and flow rates. Slowing and filtering urban water minimising the amount of sedimentation (nutrient binding Pindan soils) leaving the site and the transportation of contaminants such as invasive weeds and pollutants.

In the North West, soil condition positive swale levels work efficiently between the grades of 1:700 - 1:1000. At these grades flow rates and erosion is minimised. **Drop structures** can be used to maintain the flattened grades and are to be located along the swale floor where required.

### 18.1 Swale Vegetation

Re-vegetation of the swale systems is a critical factor for Hedland drainage conveyance. Vegetation of swales achieves the following Water Sensitive Urban Design outcomes:

- Stabilisation of swale bases and batters
- Filtering of fine Pindan silts that adversely affect conveyance infrastructure
- Filtering of fine Pindan silts that can bind nutrient levels in downstream marine ecologies
- Aids in providing a natural drainage 'roughness' reducing velocity of overland flows
- Filters and minimises the distribution of potential contaminants including exotic weeds.

Vital to water quality, revegetation and protection of the drainage swale system is the immediate application of site mulch and topsoil collected prior to bulk earthworks. Use of local site mulch and topsoil provides a ready source endemic seed bank. This, along with appropriate supplemental planting is fundamental to maintaining local biodiversity within the development area.

**Refer Appendix 6 - Town of Port Hedland Revegetation Species List**

## 19 Hardscape Elements

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For the purposes of these Guidelines, hardscape refers to all

- Hardstand
- Edging
- Parking
- Structures

Hardscape elements are the surfaces and objects within a POS that contribute to amenity of the space and are the elements that we directly interact with. Because of this, they are often subject to wear that can lead to safety issues for the POS user. Therefore, consideration for appropriate materials and products for sustainability and longevity with minimal maintenance requirements for the foreseeable reasonable life of the projects and products is an important one.

The Town has compiled a range of preapproved items that are proven performers in the Pilbara environment.

**Refer Appendix 3 - Preapproved Items**

It is expected that variations in hardscape elements will occur where designs relate to a particular theme, narrative or landscape characteristic and preapproved items are not suitable. These items however, should still adhere to the Design Principles set out in these Guidelines and will need approval from the Town.

## **19.1 Hardstand**

For the purposes of these Guidelines, hardstand refers to all hard surfaces within a POS including:

- Dual use paths
- Concrete Pads for Shelters, Furniture etc.
- Unit paving areas
- Stabilised Gravel Areas

Paths and other paved areas shall be installed in accordance with AS1428.1/2/3/4:2002, Design for Access & Mobility.

### **19.1.1 Dual Use Pathways**

Paths within POS should be constructed for safe and easy access. Paths shall be those of dual use and as such shall be a minimum width of 2.5m wide with a preference for 2.8m. Paths are to be constructed to the same specifications as for paths constructed in road reserves, which includes preparation of base.

Where vehicle access is to be provided construction shall be the same as required for vehicle cross overs. Paths shall be constructed to minimise damage to any retained trees and or vegetation. Where possible, paths shall be utilised as edging to turf /garden/play areas. Location of paths through grassed areas should not negatively affect the informal active use of those grassed areas. Path alignment and construction details shall be shown on detailed landscape plans. The vertical path alignment design shall consider and accommodate the steepness and length of grades, changes of grade, sight distance and nature of the path. Where practicable, paths shall be constructed to a maximum grade of 1 in 20 to allow for disabled access.

**Refer Appendix 2** – STD Drawing Detail 01, 08 & 09

#### *19.1.1.1 Finishes*

All surfaces are to be finished to Class 1 standard in accordance with AS 3610.

Exposed aggregate including shellcrete is permissible with approval from the Town.

**Refer Appendix 3** - Preapproved Items 03, 04 & 05

### **19.1.2 Concrete Hardstand**

Shelters and Furniture in POS should be mounted onto a concrete hardstand pad.

Pads shall be constructed with a cross fall of 2% towards the kerb. Finishes

All surfaces are to be finished to Class 1 standard in accordance with AS 3610.

Exposed aggregate including shellcrete is permissible with approval from the Town.

**Refer Appendix 2** – STD Drawing Detail 01, 02 & 03

**Refer Appendix 3** - Preapproved Items 03, 04 & 05

### 19.1.3 Relevant Standards for Concrete Hardstand

Concrete is generally specified in accordance with the provisions of Australian Standards AS 1379 Specification and supply of concrete and AS 3600 Concrete structures. The following Standards are also referred to:

AS 1012 *Methods of testing concrete*

AS 2758.1 *Aggregate and rock for engineering purposes Part 1 Concrete aggregate.*

AS 3582.1 *Supplementary cementitious materials for use with Portland cement Part 1 Fly ash.*

AS 3582.2 *Supplementary cementitious materials for use with Portland cement*

*Part 2 Slag – ground granulated iron blast furnace.*

AS 3582.3 *Part 3 Amorphous silica.*

AS 3972 *Portland and blended cements.*

AS/NZS/ISO 9000 Quality management and quality assurance Standards.

### 19.1.4 Unit Pavers

Unit paving materials should be selected to allow easy access to underground services. Units should be readily available and replacement of units cost-effective in the occurrence of damage or discolouration. Paved areas need to be designed and constructed to withstand the environmental conditions in the Pilbara with low maintenance requirements.

**Refer Appendix 2** – STD Drawing Detail 03

**Refer Appendix 3** - Preapproved Items 06

### 19.1.5 Stabilised Gravel Areas

Compacted material is an acceptable treatment if the material is well graded, cement stabilised, water bound and compacted to a smooth finish. The depth of such material must be an absolute minimum of 100mm.

Gravel shall be fines with a maximum aggregate size of 7mm to 14mm maximum. Permissible materials by the Town include white quartz cracker dust and red scoria.

**Refer Appendix 2** – STD Drawing Details 04 & 05

**Refer Appendix 3** - Preapproved Items 01 & 02

## 19.2 Edging

For the purposes of these Guidelines, edging refers to constructed edges used to border a hard or soft ground treatment such as between a garden bed and lawn area. For safety reasons all edging is to be flush to the ground level.

Approved materials for edging in POS are extruded / formed concrete (profile 150 x150mm bullnose) and 4mm galvanised steel edging.

All concrete used shall be supplied by an approved firm in a ready mixed state and shall conform to the requirements of AS 1379.

All joints for steel edging are to be fully welded and finished to achieve smooth even surface. All welding shall be in accordance with relevant Australian Standards.

**Refer Appendix 2** – STD Drawing Details 10 & 11

**Refer Appendix 3** - Preapproved Items 07 & 08

### **19.3 Parking**

Parking on the verges of parks, recreation reserves, drainage reserves, and foreshore reserves without the express permission of the vested owner/occupier is not permitted. (Refer *the Town 9/007 Roadside, Verge and Reserve Parking Policy*). Adequate parking within or adjacent to any of the above reserves must be allowed for in development plans. This is to include provisions for Disability Parking and to be approved by the Town.

### **19.4 Structures**

For the purpose of these Guidelines, structures refer to vertical built forms within the POS including:

- Shelters
- Fencing and Gates
- Signage
- Retaining Walls
- Board Walks
- Bridges
- Boom gates
- Play spaces

It is a requirement of the Town that separate Building Licences for each structure within a POS need to be obtained, prior to the start of construction.

#### **19.4.1 Siting of Structures**

All structures including play spaces are to be kept outside of turfed areas unless given permission by the Town. The placement of structures/facilities is to consider ongoing maintenance of surrounding areas.

#### **19.4.2 Shelters**

Shelters within POS are to be constructed to cyclone standards and constructed from robust materials. No Shade Sails are permitted to be used in POS. It is important that the shelter is not climbable. The necessary building permit shall be applied for and approved by the Town prior to construction. The Town has an approved custom design for 4m x 4m and 6m x 6m shelters from Exteria Street and Park Outfitters. Approved colour is Windspray.

Other shelter designs including custom design are to be approved by the Town.

**Refer Appendix 2** - STD Drawing Details 16

#### **19.4.3 Fencing and Gates**

Boundary fencing and gates in a POS should have visual permeability in accordance with CPTED guidelines to allow for passive surveillance. Fencing is to comply with building codes for cyclone areas.

Fences and gates are to comply with the Australian Standard™ 'Design for access and mobility' (AS1428.1/2/3/4 - 2009).

Fencing to irrigation compounds and other service areas is to be 2.4m black galvanised palisade.

Fencing to POS is to be black galvanised palisade flat top. Height to be approved by the Town.

Other fencing designs including custom to be approved by the Town.

**Refer Appendix 3** - Preapproved Items 09 & 10

#### **19.4.4 Signage**

The Town will individually assess location and design of signage at the time of development application.

#### **19.4.5 Retaining Walls**

Refer Appendix 2 – STD Drawing Details 07

#### **19.4.6 Board walks**

**Refer Appendix 3** - Preapproved Items 11

#### **19.4.7 Bridges**

Bridge design is to be to site requirements and to be approved by the Town.

Tensile wire side barriers are discouraged due to vandalism issues.

#### **19.4.8 Boom Gates**

Boom gates are to be provided to allow access and are to be a single swing half-height gate.

Leda Security Products model MSGF or similar is the style approved by the Town. Colour is to be approved by the Town.

**Refer Appendix 3** - Preapproved Items 12

#### **19.4.9 Chicanes**

Chicanes may be used in pathways to slow bicycle traffic near playgrounds, other pedestrian areas and traffic areas.

Design and placement are to be approved by the Town.

**Refer Appendix 3** - Preapproved Items 13

#### **19.4.10 Play Spaces**

Play spaces need to ensure the provision of a diverse range of age appropriate, quality play spaces whilst maintaining an effective use of resources and efficient maintenance costs. The Town, based upon relevance and on community requirements, will individually assess all proposed play spaces.

Playgrounds are to be considered as a complete package within any development and prior to their design the intended function and hierarchical classification needs to be established (Refer 15- 16 of these Guidelines). Play opportunities, supporting amenity and landscape elements shall be designed as a whole to maximize the usefulness of each.

Play opportunities shall not be placed within close proximity to hazards such as roads and water bodies or within close proximity of private fences. Play opportunities shall allow for ease of supervision and allow for informal surveillance aligning with CPTED Guidelines.

All play areas to be enclosed by a concrete or approved hardstand edge restraint. Seating shall be provided adjacent to key play areas to enable maximum supervision. All play areas shall have

functional shade provided with a preference for permanent shade structures. Equal access and inclusion opportunities shall be provided to all play spaces.

Paths shall be utilised where possible as edging for play areas.

#### 19.4.10.1 Soft Fall

All play areas to utilise rubberised soft fall to the Town specifications and to conform to Australian Standards and be enclosed by a concrete or approved hardstand edge restraint.

All soft fall surfaces shall comply with Australian Standard™ 'Playground equipment'

AS 4422 2106

AS 46850 2017

**Refer Appendix 2 – STD Drawing Detail 13**

#### 19.4.11 Maintenance of Structures

Developers of POS are required to undertake maintenance of all structures for a period of 24 months and to provide all manuals and schedules for items.

## 20 Lighting

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Design proposals for any lighting within the POS must be designed by a suitably qualified lighting designer and demonstrate compliance with AS 1158.3.1 *Pedestrian Area Category P lighting-performance and design requirements*.

Lighting within a POS should be energy efficient with the Town's priority for solar and LED lighting.

Where a proposed POS extends from adjoining roads the POS lighting shall be consistent. POS lighting selection shall consider existing streetlights on surrounding roads. Where lighting in a POS is required, all poles shall be located outside any turfed areas where possible. Where poles are located within a turfed area the base of the poles shall be surrounded by a concrete collar 600mm in diameter.

**Refer Appendix 3 - Preapproved Items 14 & 15**

### 20.1 Siting of Structures and Light Poles

All structures including play spaces are to be kept outside of turfed areas unless given permission by the Town. The placement of structures/facilities is to consider ongoing maintenance of surrounding areas.

## 21 Bollards

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The perimeter of any POS (i.e. parks, foreshore, drainage, etc.) shall be bollarded or where appropriate fenced to prevent vehicle or pedestrian access as per the Town *Local Policy 9/001*. Where roads are closed or cul-de-sac heads and roads reserves are not enclosed by private lots, or developed lots, bollards shall be installed to prevent vehicle access to adjacent POS. Provision for bollards or barriers to protect pedestrians from vehicles and bicycle traffic shall be included in footpath construction programs consistent with relevant Australian Standards.

Removable bollards must be installed where maintenance vehicle access is required Posts shall be installed at maximum 1.5m centres. Bollards are to be avoided in areas of turf.

Bollard design and dimensions is to be approved by the Town. Preference is for recycled plastic or steel.

**Refer Appendix 3** - Preapproved Items 16 & 17

## 22 Furniture

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For the purpose of these Guidelines, furniture items include but are not limited to the following:

- seats, benches and tables
- boulder seating
- litter bins
- drinking fountains
- bicycle racks
- tree grates, and
- barbeques

It is important that durability and minimal maintenance are considerations with the selection of furniture items for POS. Furniture items should include equal access provision.

*Refer AS1428 Design for Access and mobility parts 1, 2, 3, and 4.*

### 22.1 Seats, Benches and Tables

Seats, benches and tables shall be installed onto hardstand.

Furniture to be of aluminium construction with fully enclosed Aluminium profiled sections with end caps in an Anodised Finish or similar. Colour options to be provided at plan submission for Town's approval. The use of wood is discouraged by the Town and requires Town approval.

A percentage of furniture within a POS needs to be DAIP compliant.

Exteria Parkway Seat and Garden Table & Boardwalk Bench or similar is the style approved by the Town.

**Refer Appendix 3** - Preapproved Items 18 & 19

### 22.2 Casual Boulder Seating

Large local sandstone boulders can provide casual and robust seating opportunities within a POS. The boulders are not to be quarried to avoid sharp edges. The boulders should be of a light colour to avoid heating.

**Refer Appendix 2** – STD Drawing Details 14 & 15

**Refer Appendix 3** - Preapproved Items 20

### 22.3 Litter Bins

The Town discourages the use of bin surrounds and installment of them must be approved by the Town.

The Town recommends a 240 litre size wheelie bin. A Litter Bin Lockable Post to be used and to be positioned strategically for use by public as well as for ease of regular servicing.

The number and location of bins required to be determined by The Town Coordinator Waste / Project Operations.

The Town approves Exterior Street & Park Outfitters – Steel SHS Posts. Hot dip galvanised finish or similar.

**Refer Appendix 3 - Preapproved Items 21**

### **22.3.1 Dog Bag Dispensers**

A dog bag dispenser may be required where POS has a dog exercise area and is to be approved by the Town.

The Town approves Woodlands AMS Dog Bag Dispenser – Galvanised steel finish or similar

**Refer Appendix 3 - Preapproved Items 22**

## **22.4 Drinking Fountains**

The Town approves the use of Pet / Drinking Fountain: PF400 manufactured by Urban Furniture & Fountains or similar.

Drainage is to be provided away from fountain.

**Refer Appendix 3 - Preapproved Items 23**

## **22.5 Bicycle Racks**

The Town approves single hoop galvanized bicycle racks. Number of racks will vary due to POS size and use and to be approved by the Town.

**Refer Appendix 3 - Preapproved Items 24**

## **22.6 Barbeques**

The Town receives many requests from developers and local residents to install barbeques in POS. The Town will consider these request based upon:

- Proximity to existing BBQ's
- Target demographics (e.g. Families)
- Maintenance requirements
- POS Design Principles

Where BBQ's are to be part of a POS, they are to be situated in close proximity to play areas to enable supervision of such areas. The positioning of such to take into consideration

*AS1428 Design for Access and mobility parts 1, 2, 3, and 4.*

There shall be suitable shelter provided to enable usage in all weather and suitable lighting shall be provided so area can be utilised during restricted hours at night in summer months. Lighting shall be turned off at 8.00pm.

BBQ areas shall be surrounded by hardstand to a minimum distance of 2.5m from hot plates. Suitable drainage and soak wells, as approved by the Town shall be provided and placed in such a manner as to adequately take away any wastewater from the fat trap.

Christies Park Modular Electric BBQ is the preferred style and meets the Town standards. Bench configuration and amount of cook tops will vary depending on POS needs and approval of the Town.

**Refer Appendix 3 - Preapproved Items 25**

## 23 Public Art

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Public Art has the opportunity to communicate and celebrate the heritage and stories of a place. It can contribute to creating a unique space that relates to a particular theme, narrative or landscape characteristic.

### 23.1 Definition - Public Art

Public Art is defined in the broadest sense as artistic works or activities created for, located in, or developed as part of a public facility or space. Public Art includes any planning or conceptual contribution of an artist to the design of public facilities and spaces.

### 23.2 Policy Objective

To allow residents and visitors to discover and to enjoy a unique natural and urban environment that offers a strong sense of local place. In particular to:

- Invigorate the town by increasing its artistic profile, making it a vibrant place in which to live, work and visit
- Promote the works of artists living in or coming from the Port Hedland region
- Contribute to the growth of cultural tourism
- Improve the visual and social amenity of the Town of Port Hedland
- Encourage a greater understanding and appreciation of our cultural heritage
- Create employment and training opportunities for local people in this field.
- Create a framework for the conservation and care of the Town public art
- Create passive recreation opportunities for the community

Refer *8/002 Public Art Policy* for more information on Public Art

## 24 Irrigation

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Reticulation is an important element in intensive use areas and systems shall be designed to reflect the importance of this valuable resource. Irrigation design should apply principles to ensure sustainable use of water and the design and operation must comply with Water Corporation Guidelines, legislation, and water restrictions current at the time of development. Irrigation design and operation must not affect road pavements, footpaths or other infrastructure on the verge.

Contact Dial Before You Dig (1100) and other service and utility providers prior to commencing installation to ensure that underground services and infrastructure are not damaged and correct clearances are maintained.

*The Town of Port Hedland Standard Irrigation System Specification* is available as a reference document for irrigation details.

## 25 Softscape Elements

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For the purposes of these Guidelines, Softscape Elements include:

- All existing vegetation, swale planting, garden bed planting, tree planting and lawn areas
- All mulch areas

## 26 Relevant Standards

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Ensure that all application amount and types of soil conditioners, fertilisers, mulches and wetting agents comply with Australian Standards:

- AS 4419. Site and Imported Topsoil
- AS 4454. Composts, Soil Conditioners and Mulches
- AS 3743. Potting Mixes

## 27 Existing Vegetation

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POS development sites may contain existing vegetation that includes both native and exotic trees and plants. The Town is committed to preserving existing significant trees and remnant vegetation with the exclusion of weed species.

Vegetation to be retained needs to be clearly indicated on any landscape plans and is to be fenced off on site prior to construction works.

Any vegetation to be cleared needs to be pre-approved by the Town.

Refer Item 17.2 Protection of Trees

## 28 Revegetation

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Areas of bare or denuded land may require revegetation to mitigate such factors as erosion, dust, soil loss and aid in the protection of engineered grades and other earthworks.

Establishing long-term plant colonies can be undertaken through seeding or the planting of tubestock. The Town recommends that all species chosen for revegetation works be native to the area.

Revegetation is generally carried out via direct seeding, tubestock planting or a combination of both.

**Refer Appendix 2** – STD Drawing Detail 19

**Refer Appendix 6** – Revegetation Species List

## 29 Mulch

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All garden beds and trees are to be mulched to reduce moisture loss and soil temperature. A minimum of 150mm mulch cover shall be maintained to all shrubs and trees. Mulch on garden beds is to be 150mm thickness and to be measured at practical completion and again 3 months prior to maintenance period expiring.

Mulch levels shall be maintained to 25mm below adjacent hard edges at all times. Mulch is not to be mounded above adjacent surface levels.

Avoid having a thick layer of mulch surrounding the stem as this may induce collar rot. All mulching is to be maintained to ensure that irrigation pipework remains covered.

The Town prefers organic mulch. Mulch should not be fine, but coarse and 'chunky' to avoid compression. Mulch should not contain peat.

The Town predominantly utilises and encourages pine bark mulch for all planting beds; however compacted fines such as white quartz cracker dust, and rock mulches such as river shingles may be utilised with approval from the Town.

Larger feature stone mulch of 200-300mm is accepted by the Town for landscaped areas

**Refer Appendix 2 – STD Drawing Details 12 & 17**

## 30 Turf

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Mention design of turf space for perimeter access for mowers

### 30.1 Species Selection

The species to be advised by the Town of Port Hedland but shall be either or:

Winter Green (*Cynodon dactylon*) or Empire Zoysia (*Zoysia japonica*) shall be supplied and laid as roll on turf.

The Town does not permit installation of stolons. Installation of artificial turf is permissible but not encouraged by the Town.

### 30.2 Ground Preparation

Eradicate weeds prior to laying using environmentally acceptable methods, such as a non-residual glyphosate herbicide at the recommended maximum rate. Remove any weed growth from an area 500mm diameter from around the base of trees and structures. Hand weed any rubbish and weed growth throughout grassed and planted areas.

Prepare lawn areas by spreading topsoil to a depth of 100mm. Apply *TerraCottem Turf Soil Conditioner* at a rate of 180grams per metre squared and incorporate thoroughly to a depth of 100mm with a rotary device, across the length and width of the area. The lawn shall be watered after planting and thereafter as necessary to produce a satisfactory cover.

The Town to approve any substitute soil conditioner.

**Refer Appendix 2 – STD Drawing Detail 18**

### **30.3 Maintenance**

#### **30.3.1 Insect and Disease Control**

It will be the contractor's responsibility for insect and disease control: The period of treatment shall be until the problem is solved. Application of any treatments shall occur outside of normal working hours.

#### **30.3.2 Mowing and Trimming**

Remove litter and branches before mowing. Shall be mowed consistent with the growth habit of the grass variety and shall be maintained at a height of 25mm-40mm for Zoysia Empire and 15mm-25mm for Winter Green throughout the year.

Mowing shall be on a weekly basis during periods of high growth and at three-week intervals at other times. Do not mow under wet conditions.

Edges adjoining plant beds, pathways, base of trees and other obstacles shall be trimmed to coincide with mowing.

Care should be taken not to damage trees or shrubs.

#### **30.3.3 Top Dressing**

All wheel tracks and any other sunken areas are to be top dressed to bring them up to level with surrounding areas as soon as practicable and prior to practical completion and no later than 3 months prior to maintenance period ending.

#### **30.3.4 Fertilising**

Fertilising shall be required to correct any nutrient deficiencies and be incorporated into a maintenance program that is to include a granular application in the spring and autumn. Fertilising will be required to be done no later than 3 months prior to maintenance period ending.

#### **30.3.5 Irrigation**

Shall be programmed to suitably meet the needs of the turf and weather conditions and shall comply with Water Corporation guidelines as to programming.

All costs incurred resulting from fines for breaches of the guidelines to be the responsibility of the contractor.

## **31 Plant Species Selection**

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Proposed planting within POS shall be based on climate, soil and water responsive design considerations that address the specific nature of the Pilbara environment. The creation of shaded areas so that POS can be utilised as much of the year as possible is an important factor in planting design. Maintenance and longevity shall also be a consideration in species selection. All planting is to be approved by the Town and no weed species will be approved.

Planting selection and design shall incorporate CPTED principles to ensure the construction of safe POS.

The Town encourages the planting of local species to enhance local character; however, water wise exotic species that require minimum maintenance shall be permitted.

Supply of plant species in the Pilbara can sometimes be limited. It shall be ensured that species selected for POS are readily available.

**Refer Appendix 4 – Town of Port Hedland Preferred Planting Guide**

## 32 Trees and Garden Bed Planting Procedure

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Planting stock should be healthy and undamaged. Trees should be straight, strong and of good shape, all plants should be free of disease and insect damage and not pot-bound.

Feature trees shall be a minimum size of 45-litre container. Minimum size for general plantings shall be 140 mm pots, unless authorised by the Town.

No plantings of any trees/palms that are susceptible dropping of debris i.e. coconuts not permitted adjacent to playground areas or areas where the public has access to.

No Tree or Shrub to be planted within 3m of any hardstand treatment, furniture or light pole.

Dial 1100 for Dial Before You Dig or go on line to [www.dialbeforeyoudig.com.au](http://www.dialbeforeyoudig.com.au)

Grass, grass roots and weeds should be treated with herbicide and / or removed from the area to be planted.

### 32.1 Mass Planting

Mass planting beds for small shrubs and annuals should be thoroughly turned over ensuring that there is a good top soil layer of approximately 300mm. Where good top soil is absent this should be imported. *TerraCottem Turf Soil Conditioner* shall be applied at a rate of 180 grams per metre squared and incorporated thoroughly to a depth of 200mm with a rotary device, across the length and width of the area, before any planting is undertaken.

The Town to approve any substitute soil conditioner.

### 32.2 Planting Procedure for Plant Stock and Trees

The Town recommends the following planting procedure be utilised:

1. Thoroughly water all plant-stock before planting. Ensure that roots of plant-stock are not exposed to drying influences such as sun or wind.
2. All plant-stock shall be set plumb and placed to ensure a normal relationship of the crown to the soil surface as per STD Drawing
3. Incorporate TerraCottem Universal Soil Conditioner (amounts to manufacturer's instructions according to planting size) mixed thoroughly into backfill soil taken from planting hole. A portion of the mix is to be placed in the bottom of the hole.
4. Place plant-stock vertical in the centre of planting hole with care to avoid damage to roots.
5. Back-fill the planting hole with remaining excavated site soil amended with TerraCottem and water-in at the same time.
6. Form a raised bank of compacted soil around the base of each plant to contain watering as per
7. All street trees and large shrubs/trees as required shall be staked. Tree stakes approximately 50 - 70mm square or in diameter and set to 1.5 m height is recommended. Stakes are to be made from Jarrah only. Stakes are to be driven at least 400mm into the ground surface and vegetation main trunks tied with approved figure 8 expandable industry grade ties.
8. Protect newly planted areas from pedestrian traffic by suitable methods until the plant-stock is well established. Protection may include three-strand wire fence on steel star pickets.

The Town to approve any substitute soil conditioner.

**Refer Appendix 2 – STD Drawing Detail 19, 20 & 21**

### **32.2.1 Staking and Tying**

Small trees and shrubs should not require staking and tying. However, where necessary, the same method as described for large trees in 32.2 *Planting Procedure for Plant Stock and Trees* may be used.

Staking should always be used where mowing or slashing occurs near the plant, for protection. Ties should be inspected regularly to ensure they have not broken or that no injury occurs to the tree. Guying and anchoring may be used on very large trees that have been shifted or trees that have blown over. Each tree should have three guy lines that support the tree at the same point. The guy lines should be enclosed with a material such as rubber hose where they rub the tree. The lines should be connected to stakes or pegs in the ground about 2-3 m. from the tree. Guys should be clearly marked for pedestrians and cyclists.

**Refer Appendix 2 – STD Drawing Detail 21**

### **32.3 Median Strips**

Trees should be clear trunked so as not to impede sight lines. Planting should be set back from back of kerb with the distance to be ascertained by the Town on a case-by-case basis. No Tree or Shrub to be planted within 3m of any hardstand treatment, furniture or light pole.

**Refer Appendix 4 – Preferred Planting Guide**

### **32.4 Roundabouts**

Trees should be clear trunked so as not to impede sight lines for vehicles. Planting should be set back from back of kerb with the distance to be ascertained by the Town on a case-by-case basis. No Tree or Shrub to be planted within 3m of any hardstand treatment, furniture or light pole.

**Refer Appendix 4 – *Town of Port Hedland Preferred Planting Guide***

## **33 Maintenance**

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The Town requires that new POS be developed to a minimum standard and where the POS is classified as Neighbourhood, District or Regional POS it is maintained by the developer for a five-year period. The Town will consider requests to bond works and maintenance required as part of the development of POS.

Developers of all other POS on the Town owned or managed properties shall be responsible for the maintenance of the landscaping for a period of 18 months, unless negotiated otherwise.

A maintenance schedule shall be submitted to the Town for approval prior to construction. This shall include types of fertiliser and herbicide use, mowing frequency and heights, schedule for maintenance of irrigation equipment, irrigation schedule and types of fertiliser and herbicide use and frequency.

Handover of maintenance to the Town after this period shall be conditional on coordinated inspections, approvals, training and supply of all as constructed and warranty information.

## 34 Inspection and Testing

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Inspections are required to be carried out by a representative of the Town at the following stages:

- Completion of landscaping and irrigation work; and
- Practical completion.

## Appendices

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1. Town of Port Hedland Verge Treatment Application Form
2. Standard Detail Drawings
3. Town of Port Hedland Preapproved Items
4. Town of Port Hedland Preferred Planting Guide
5. Town of Port Hedland Asset Handover and Checklist
6. Revegetation Species List

# Verge Treatment Application



**Applicant's details**

Name		
Applicant's address		
Telephone	Mobile	Fax
<b>Owner's Name</b>		
Telephone	Mobile	Fax
Location/address of the proposed treatment		

**Contractor's details**

Name		
Contractor's address		
Telephone	Mobile	Fax

**Verge Treatment Application**

Additional Street Tree	<input type="checkbox"/>	Details:
Lawns	<input type="checkbox"/>	Details:
Reticulation	<input type="checkbox"/>	Details:
Gardens	<input type="checkbox"/>	Details:
Other	<input type="checkbox"/>	Details:

**Contractor/ owner shall:**

- a) Read the Town of Port Hedland Landscape Guidelines and Irrigation Specification
- b) Attach a plan or sketch showing location, type and design of treatment
- c) Contact Dial Before You Dig or utility service providers and locate services
- d) Design proposed treatment as per Town of Port Hedland Landscape Guidelines and Irrigation Specifications
- e) Phone Horticultural Technical Officer on 9158 9700 and arrange site inspection (24hrs notice required)

I accept the Terms and Conditions of Policy 10/003 for this Application and agree to abide by them once my request has been approved.

Owner's signature \_\_\_\_\_

Date \_\_\_\_\_

Email address \_\_\_\_\_

*Once this form is completed and signed, please send the application to the below details:*

Address: PO Box 41, Port Hedland WA 6721

Email: [council@porthedland.wa.gov.au](mailto:council@porthedland.wa.gov.au)

Phone: (08) 9158 9300

# Verge Treatment Application



**OFFICE USE ONLY**

Inspection date	Initial	Final
Officer Name		
Officer's Signature / Date		

**01 CONCRETE HARDSTAND/DUAL USE PATHWAY SECTION** Scale 1:10  
 100mm DEPTH 32MPa CONCRETE, WIDTH MIN. 2.5M FOR PATHWAYS, 2% CROSS FALL, 50mm DEEP SAND BED, COMPACTED SUB GRADE. CONTROL AND EXPANSION JOINTS REFER STD 06 AND 07.

**02 ASPHALT SECTION** Scale 1:10  
 2% CROSSFALL, 30mm ASPHALT (7mm AGGREGATE), 5mm PRIMERSEAL, 150mm ROAD BASE, 150mm DRUSHED LIMESTONE, SUB-GRADE.

**03 BRICK / UNIT PAVING SECTION** Scale 1:10  
 2% CROSSFALL, CLEAR DRY FINE SAND FOR JOINT FILL, BRICKS / UNIT PAVERS, 30mm BEDDING SAND, 150mm CRACKERDUST OR SIMILAR BASE COURSE, SUB-GRADE.

**04 COMPACTED CEMENT STABILISED GRAVEL SECTION** Scale 1:10  
 2% CROSSFALL, 100mm DEEP COMPACTED CEMENT STABILISED GRAVEL, 100mm COMPACTED SUB-GRADE, SUB-GRADE.

**05 COMPACTED CEMENT STABILISED CRACKER DUST SECTION** Scale 1:10  
 2% CROSSFALL, 100mm DEEP COMPACTED CEMENT STABILISED WHITE CRACKER DUST, 100mm BLUE METAL GRAVEL, SUB-GRADE.

**06 TYPICAL PLANTED DRAINAGE SWALE SECTION** Scale 1:20  
 PLANTING AS PER PLANTING PLAN, 150-300MM RIP RAP ROCK, DRY LAID LOCAL OUT OF MAIN FLOW DRIP LINES, PLANTING, LOCAL 15-20MM GRAVELS AS GARDEN MULCH, GEOTEXTILE SUB-GRADE AS SPECIFIED CLAUSE XX, LARGER LOCAL STONE MORTARED INTO POSITION AT BASE OF SWALE, SUB-GRADE.

**07 TYPICAL RETAINING WALL SECTION** Scale 1:20  
 COMPACTED SOIL, FINISHED GROUND LEVEL 1 IN 3 MAX. SLOPE, 3-N12 STAINLESS STEEL GRADE TYPICAL, LIMESTONE BLOCK 500X350X240 JOINTS 20MM THICK, KEYSTONE AT APPROX 3M CENTRE MAX USING 500X350X240 BLOCKS, FINISHED GROUND LEVEL, BASE COVER RETAINING HEIGHT 300MM MIN 1.720MM MAX, SLOPE 1:50, BASE WIDTH 700MM MIN, SUB-GRADE.

**08 TYPICAL CONTROL JOINT SECTION** Scale 1:5  
 CONTROL JOINT 4X10MM DEEP, CONCRETE, COMPACTED SUB-BASE, SUB-GRADE.

**09 TYPICAL EXPANSION JOINT SECTION** Scale 1:5  
 10MM WIDE APPROVED SEALANT ABLEFLEX FOAM SPACER COLOUR TO MATCH CONCRETE, CONCRETE, COMPACTED SUB-BASE, SUB-GRADE.

**10 TYPICAL CONCRETE EDGING Detail** Scale 1:10  
 TURF, 50mm CULTIVATED SITE TOPSOIL, PLANTING, 200x200mm CONCRETE KERB 20MPa CONC. 10-20mm RADIUS - BULNOSE EDGE, COMPACTED SUBGRADE.

**11 TYPICAL STEEL EDGING SECTION** Scale 1:10  
 150 X 4mm PLATE HD GAL., TURF, TOPSOIL, 100mm DEPTH MULCH, 25 X 25 X 300mm EQUAL ANGLE PEG, PEGS AT 750mm, SUB-GRADE.

**12 LOOSE GRAVEL MULCH SECTION** Scale 1:10  
 200mm LOOSE GRAVEL MULCH, TOPSOIL, SUB-GRADE. NOTE ALL MULCH IS TO BE SET DOWN 25MM FROM ADJACENT SURFACES.

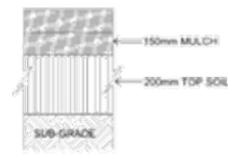
**13 TYPICAL SOFTFALL SECTION** Scale 1:20  
 15MM RUBBER LAMINATE SURFACE, 50MM RUBBER LAMINATE UNDERLAY, 50mm DEPTH N12 SHOTCRETE WITH EVEN FINISH, SOFTFALL AND CONCRETE TO BE FLUSH, CONCRETE PATH, SUB-GRADE.

**14 TYPICAL BOULDER SEATING SECTION** Scale 1:10  
 LOCAL BOULDER BURIED 1 AS FEATURE MAINTAIN MIN. 300mm HIGH, SMOOTH FACE OF ROCK IS TO BE UP AS FEATURE SIDE, AVOID SHARP EDGES OR UNSMOOTH ROCK SURFACES, COMPACTED SUBGRADE.

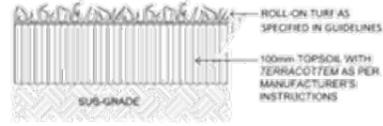
**15 TYPICAL BOULDER SEATING SECTION** Scale 1:10  
 100mm, 150mm.

**16 SHELTER PLANS SECTIONS AND ELEVATIONS**  
 SEE FOLLOWING PAGES

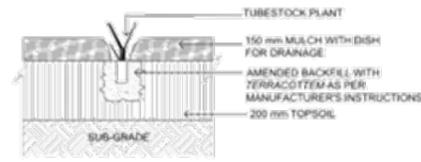
**PORT HEDLAND LANDSCAPE GUIDELINES**  
**HARDSCAPE ELEMENTS STANDARD DRAWING DETAILS**  
 Drawing: STD01 - STD15, Revision: REV B  
 Date: 6th Feb 2018, Sheet: 1 of 2, Scale: varies @ A1



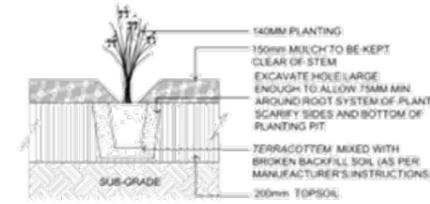
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Section Scale 1:10



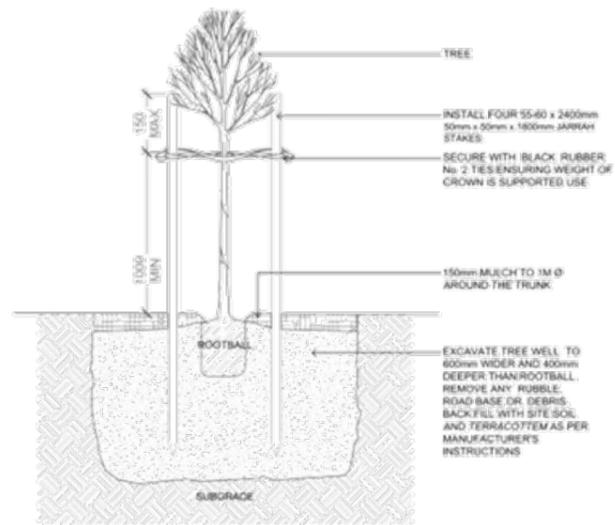
**18 ROLL-ON TURF AREAS**  
Section Scale 1:10



**19 TUBESTOCK PLANTING**  
Section Scale 1:10



**20 SHRUB PLANTING**  
Section Scale 1:10



**21 TREE PLANTING**  
Section Scale 1:20

PORT HEDLAND LANDSCAPE GUIDELINES

SOFTSCAPE ELEMENTS STANDARD DRAWING DETAILS

Design: STD16 - STD20	Revision: REV B
Date: 8th Feb 2018	Sheet: 2 of 2
Scale: varies @ A1	

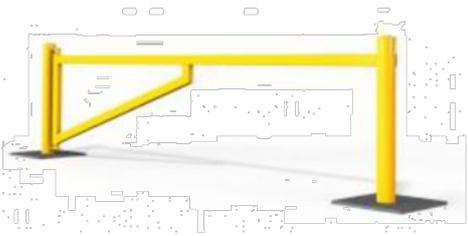
**Appendix 3.**

**Town of Port Hedland Preapproved Items**

DRAFT

ITEM	DESCRIPTION	PHOTO	APPROVED MODEL/S
01	Compacted Surfaces		White Quartz Cracker Dust
02	Compacted Surfaces		Red Scoria
03	Concrete Finishes		Grey or Red Tint
04	Concrete Finishes		Shell Crete

<p><b>05</b></p>	<p>Concrete Finishes</p>		<p>Exposed Aggregate</p>
<p><b>06</b></p>	<p>Unit Pavers</p>		<p>'Spinifex' Paving 300x300x60mm</p>
<p><b>07</b></p>	<p>Edging</p>		<p>Extruded Concrete – Bullnose edge</p>
<p><b>08</b></p>	<p>Edging</p>		<p>4mm Galvanised Steel</p>

<p><b>9</b></p>	<p>Compound Fencing</p>		<p>2.4m black galvanised palisade</p>
<p><b>10</b></p>	<p>Playground Fencing</p>		<p>2.4m black galvanised palisade- Flat top</p>
<p><b>11</b></p>	<p>Board Walks</p>		<p>Replas Enduroplank - Grey</p>
<p><b>12</b></p>	<p>Boom Gates</p>		<p>Leda Security Products – Model MSGF</p>
<p><b>13</b></p>	<p>Chicanes</p>		

<p><b>14</b></p>	<p>Park Lighting - Powered</p>		<p>Greenfrog Systems - Sentinel</p>
<p><b>15</b></p>	<p>Park Lighting - Solar</p>		<p>Greenfrog Systems - Stealth</p>
<p><b>16</b></p>	<p>Bollards - Steel</p>		<p>Galvanised Steel</p>
<p><b>17</b></p>	<p>Bollards - Recycled Plastic</p>		<p>Flexi Pole Bollards – Charcoal Dimensions may vary and need Town approval</p>
<p><b>18</b></p>	<p>Seats</p>		<p>Exteria Street and Park Outfitters – Parkway Seat Colour to be approved by the Town</p>

<p><b>19</b></p>	<p>Benches and Tables</p>		<p>Exteria Street and Park Outfitters – Garden Table with Boardwalk Bench  Colour to be approved by the Town</p>
<p><b>20</b></p>	<p>Boulder Seating</p>		<p>Unquarried Sandstone Boulders</p>
<p><b>21</b></p>	<p>Litter Bin Post</p>		<p>Exterior Street &amp; Park Outfitters – Steel SHS Posts  Hot dip galvanised finish</p>
<p><b>22</b></p>	<p>Dog Bag Dispensers</p>		<p>Woodlands AMS Dog Bag Dispenser – Galvanised Steel.</p>
<p><b>23</b></p>	<p>Drinking Fountains</p>		<p>Urban Fountains and Furniture – PF400 Pet Friendly Drinking Fountain.  Steel RHS Mai Body. Hot Dip galvanised or powdercoat (colour to be approved by the Town)</p>

<p><b>24</b></p>	<p>Bicycle Racks</p>		<p>Single Hoop Galvanised Bicycle Racks.</p>
<p><b>25</b></p>	<p>Barbeques</p>		<p>Christie Modular Electric BBQ. Bench configuration will vary depending on POS needs.</p>

# Preferred Planting Guide



1

# Preferred Planting Guide



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## Trees

### Golden Flower Tree - *cassia fistula*

The Golden Flower Tree is a fast growing Indian tree to about 6 m high with large compound leaves and about 16 pairs of leaflets per leaf, often deciduous or semi-deciduous. Massed bunches of bright yellow flowers are produced in late spring to early summer, often later in cooler climates. The yellow flowers are arranged in large pendulous sprays and the cylindrical seed pods often exceed 30 cm long. Some old pods can be found hanging on the tree at most times of the year. The pods, seeds and pulp between the seeds should not be eaten. Good wind resistance.



# Preferred Planting Guide



## Royal Poinciana - *delonix regia*

This many-branched, broad, spreading, flat-crowned deciduous tree is well-known for its brilliant display of red-orange bloom, literally covering the tree tops. There is nothing like a Royal Poinciana (or better yet, a group of them) in full bloom. The fine, soft, delicate leaflets afford dappled shade during the remainder of the growing season, making Royal Poinciana a favorite shade tree or freestanding specimens in large, open lawns. The tree is often broader than tall, growing about 15m high and 10m wide. Trunks can become as large as 50 inches or more in diameter. Eighteen-inch-long, dark brown seed pods hang on the tree throughout the winter, then fall on the ground in spring creating a nuisance.



Port Hedland – Below the water tower

# Preferred Planting Guide



## Yellow Poinciana – *peltophorum pterocarpum*

This upright, handsome, spreading, semi evergreen tree has a rounded canopy and is capable of reaching 15m in height with a 10m spread. Form can be quite variable from tree to tree. With proper training and pruning in the nursery and in the landscape, a more uniform crown will develop. The dark green, delicate, feathery leaflets provide a softening effect for the tree's large size and create a welcoming, dappled shade. During spring the entire tree's canopy is smothered with a yellow blanket of flowers, appearing in showy, terminal panicles and exuding a delicious, grape-like perfume. These flower clusters are followed by four-inch-long seed pods which ripen to a brilliant, dark, wine-red.



# Preferred Planting Guide



Port Hedland Race Course.

## Summer Red Flowering Gum – *corymbia ficifolia*

Prefers infertile, sandy soils but it is readily adaptable to most temperate locations, provided it is not exposed to severe frost or sustained tropical damp. It is an ideal street tree as it is hardy, moderately fast growing, and rarely grows large enough to require pruning. Typically it will take about 7 years before it flowers for the first time and 15–20 years to reach something approaching its full size of anything between 2–8 m. For the home gardener, buying a "red flowering gum" from a nursery is something of an adventure: it may or may not be a *ficifolia*, and the flower colour does not breed true - there is no way to find out what colour the flowers will be short of planting a seedling and waiting for it to reach maturity



# Preferred Planting Guide



Pepperflower Way South Hedland

## Rosewood – *tipuana tipu*

Rosewood, Pride of Bolivia, Racehorse Tree *Tipuana tipu* is a fast growing, winter deciduous shade tree. The winged seeds look like they might belong to the maple family, but the pinnate foliage gives away its true allegiance - it's a legume. The seeds are produced abundantly and will produce almost 100 per cent germination. The long arching growth shows just how fast this tree can grow in a single season. Given access to good water, the trees will reach 30 metres.

A tree that can be grown pretty much anywhere across Australia. This tree is certainly adaptable. It can tolerate saline soils, is tolerant of frost once it's established, and temperatures of minus 4 are no problem at all. These trees cope with drought and are adaptable to different seasons. The roots will search out water wherever they can find it, so it's an aggressive rooting tree.



# Preferred Planting Guide



# Preferred Planting Guide



## Coolibah - *eucalyptus vitrix*

The Coolibah is an ideal ornamental small to medium Tree with smooth white trunk to 12m high. It has white flowers in the spring. Dull light green to grey-green lanceolate foliage. Terminally held peduncles in groups of 7 with conical to rounded operculum. Flowers creamy white, Nov–Mar. Bark smooth throughout, white and powdery. Tolerates heavier soils and temporary inundation. Drought tolerant. Generally free of any serious pests or diseases. Attracts honey & seed eating birds



# Preferred Planting Guide



## Cadjeput – *melaleuca leucadendron*

The paperbark tree gets its name from its layered and papery bark. The plant typically grows to about 75 feet in height although it also grows as a smaller shrub in some areas. The tree's new shoots, covered in thick silky hairs, give the tree a somewhat silvery appearance. Stands of paperbark occur in swampy, coastal areas in humid, hot regions. From March to December, the tree produces flowers that grow up to 5 inches in length. Once the flowers fade, small fruits appear with mature seeds ready for collection in October or November. The oil from the tree makes a good antiseptic as well as insect repellent.



# Preferred Planting Guide



## Pink Trumpet Tree – *tabebuia rosea (alba)*

This tree, with rough bark, has compound leaves with 5 leaflets, the lower pair are smaller than the other 3, margins smooth, upper leaflets lanceolate to 15 x 8 cm, midrib pale, flat with surface or slightly raised, lepidote scales present. Flowers with a bilabiate pink calyx, lepidote scales obvious; corolla pink, throat whitish.



Port Hedland Anderson Street

# Preferred Planting Guide



## *Pundul Tree-owenia reticulate*

A Small Tree, 4-14 m high, bark often black and corky. Large leaves comprise smaller smooth leathery mini leaves. Flowers are white, and occur between May and Oct to Nov. The seeds were roasted and extracted, and applied to sores. A leaf infusion was used as a poultice. The nutty fruits were possibly eaten. Grows best in Coastal areas of tropical Western Australia and the Northern Territory. Sandy soil. Full sun.



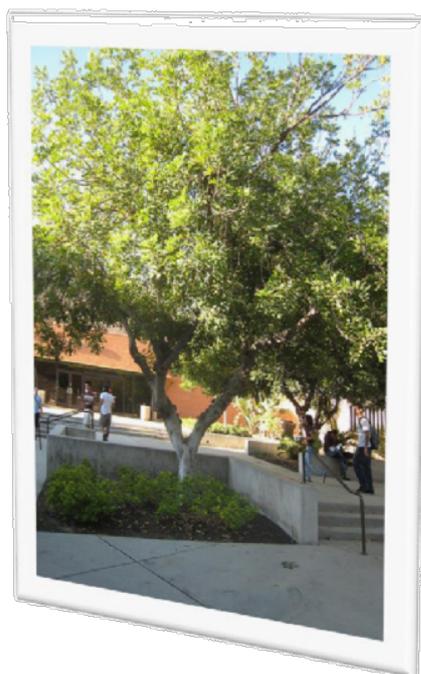
South Hedland - Cottier Drive

# Preferred Planting Guide



## Tuckeroo - *cupaniopsis anarcardioides*

A very hardy native tree growing to a height of about 8 m by 5 m wide. It will perform well in harsh conditions including poor soils, salt, wind exposure and air pollution. It has leathery leaves and produces small creamy-yellow to green-yellow flower clusters on the ends of branches, which are followed by orange-yellow berries. It is an excellent tree for screening and street planting and is also a known host for at least eight species of native butterflies.

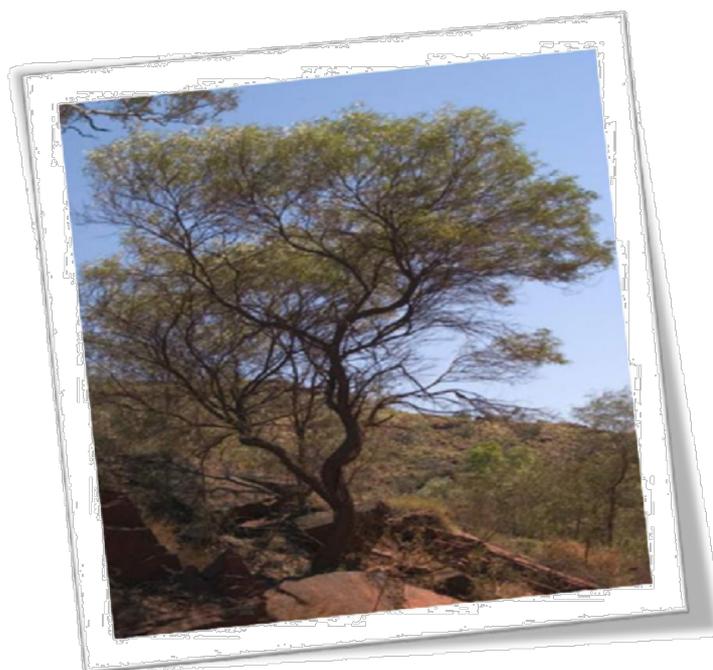


# Preferred Planting Guide



## Pilbara Jam – *acacia citrinoviridis*

Acacia citrinoviridis, commonly known as pilbara jam, black mulga, river jam, milhan or wantan. Endemic to Western Australia it occurs along creeks and rivers in semi-arid land. Black mulga grows to a height of about eight metres. It usually has just one trunk. Like most acacias species, it has phyllodes rather than true leaves. These are a grey-olive colour, and may be up to 12 centimetres long and about one centimetre wide. The flowers are yellow, and held in cylindrical clusters. The pods are around 8 centimetres long and have a lemon-green felty covering.



# Preferred Planting Guide



## Manggurda Wattle – *acacia distans*

Shapely trees with silvery grey- grey green crown 2-10 m high, grey, fissured. Flowers yellow, Mar to May. Clay, red sand, loam. Floodplains, hardpans, river beds. The common name Wattle is from the Banyjima name for the Fortesue River. are fast growers and are useful plants for restoring denuded areas, as well as being suitable for ornamental or use though their quick growth habit is offset by a short life. position in full sun with light free-draining soil. Although tolerant, once established most grow better with reliable moisture. Acacias can be given a light prune once flowering is species are short-lived and some may self-sow too freely, becoming weeds. Propagation is mostly fr seed.



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# Preferred Planting Guide



## Western Gidgee – *acacia pruinocarpa*

*Acacia pruinocarpa* (Black or Western Gidgee) is a thornless, Australian, shrub to small tree, native to dry hot inland areas. The trees mature height and width ranges from 3 to 8 mtr with leathery grey green phyllodes. In Spring a brilliant display of bright yellow ball flower cover the tree. It is a newly introduced ornamental shade tree for dry climate. It is one of the few Pilbara Wattles that flowers during the summer months.



# Preferred Planting Guide



## Neem Tree – *azadirachta indica*

The Neem Tree is an evergreen tree native to Southeast Asia. The tree will reach up to 30 m tall with limbs reaching half as wide. The shiny dark green pinnately compound leaves are up to 30cm long. Each leaf has 10-12 serrated leaflets that are 7 cm long by 2.5 cm wide. All parts of the tree have been used medicinally for centuries. It is widely used in toothpastes, soaps and lotion today, as well as being a biological insecticide. The tree grows well in containers, where its size is easily controlled by container size and selective pruning. Very drought tolerant



# Preferred Planting Guide



## Native *Bauhinia-lysiphyllum cunninghamii*

The trees are up to six metres tall with dark, coarsely leaves have two lobes which are joined like a butterfly's to-back positioning of the leaves gives rise to the this tree – "Jiggle" tree. Jiggle means mother-in-law and Aboriginal custom, mother-in-law and son-in-law must each other. The seed pods are large and reddish brown, they mature. The flowers are bright red and full of popular tree with honeyeaters. Another name given to Delight" because the sap, when dry, forms a chewy gum with the nectar resembles this sweet. The Bauhinia trees flowers spasmodically between April and August and fruits appear between November and January. It makes an ideal shade tree and is used for nesting in by native bees. A medium-sized tree, usually with a short, stout trunk, its outer branches hang down giving it a characteristic weeping appearance. The leaves of the Bauhinia are its most distinctive feature. Each consists of a paired leaflet resembling a butterfly. They are high in protein and are relished by many grazing animals, especially cattle.



flaking bark. The wings. This back Aboriginal name according to not directly facing becoming dark nectar, making this tree is "Turk which when eaten



## River She-oak-*casuarina equestifolia*

# Preferred Planting Guide



The River Oak is an attractive evergreen tree with fine greyish green needle-like foliage that grows to height of 10–35 m with a spread of about 10 metres. The trunk is usually erect, with dense rough bark. Flowers are reddish-brown in the male and red in the female. Cones are small, nearly round to elongated and about 10 mm across. Trees are usually found in sunny locations along stream banks and swampy areas. It's widely recognised as an important tree for stabilising riverbanks and for soil erosion prevention accepting wet and dry soils. Suited to windy sites and coastal areas.



Desert Bloodwood-*corymbia opa*

# Preferred Planting Guide



Desert Bloodwood grows on the plains of the Great Sandy Desert. The tree grows up to 30 feet in height. The tree features rough bark and sap that looks like thick red blood while its leaves appear tough and leathery. The roots store water for use in dry periods. In April through October, the tree produces yellow and white flowers with nectar that provides food for several desert animals including opossums and insects. This tree has been a supermarket, pharmacy and hardware store for desert Aboriginal people. You can eat the plump, green grubs from the gall (*bush coconut*) and grubs that live under the bark; collect honey or "sugarbag" from the hives of stingless native bees; make a sweet drink from the nectar; make carrying bowls from the bumps (boulders) on the bark, obtain medicine from the red sap and collect drinking water from hollows and the roots. The red sap was also used to tan kangaroo-skin water bags. The dead wood is one of the most favoured firewoods, burning with a steady, hot flame. Fruit capsules are used and as toys.

**Broome**  
*corymbia zygophylla*

Tree to 6m with bark and persistent; mature green. Flowers are contains sugarbag



**Bloodwood**

that is rough leaves dull white. Of (bush ho

# Preferred Planting Guide



## *Yulbar-erythrin vespertilio*

Deciduous tree that grows 3-15 m high. Flowers are white and occur from May to Nov. Grows in sand, clay, loam and limestone. Gorges, along rivers & creeks. Its a tree native to north-east Australia. Its common names are Grey Bats Wing Coral Tree. Traditionally used by Aboriginals for a wide range of things including using the wood to make shields for medicinal purposes. This species' alternative common name of 'corkwood' refers to the grey colour of its lightweight



orange-red flowers over basal stem to north Australia. Corkwood for a wide range of things and the botanical name of 'corkwood' refers to the grey timber.

# Preferred Planting Guide



## White Gum-*eucalyptus alba*

White Gum (*Eucalyptus alba*) is a small tree with broad leaves and creamy flowers. It has got a dull white bark, creamy-white flowers and narrow leaves.



# Preferred Planting Guide



## *Snappy Gum-eucalyptus luecophloia*

Across the Pilbara grows a small twisted eucalypt known as Snappy Gum. So called because the dead branches snap cleanly across the grain when cracked across a rock or log. This makes them ideal for firewood. The young trees are smooth and graceful, but as they age, develop into fantastic, knotted, and twisted shapes.

# Preferred Planting Guide



Port Hedland Airport

## *Ghost Gum-corymbia aparrerinja N*

Formerly *Eucalyptus papuana* and reclassified as *Corymbia aparrerinja*, this evergreen is known as the ghost gum because of its smooth white bark. It lives in red sand flats, dry creek beds and rocky slopes. Aborigines use its bark to treat colds, and it is prominent in their myths and stories.

# Preferred Planting Guide



## Red Mallee-*eucalyptus socialis* N

Mallees are Eucalyptus plants whose common feature is multi-stemmed from the ground. There are a few groups like Mallets, and woodland eucalypts, that have the branching habit, but they start branching from the ground level, while mallees most often don't have one single trunk. Mallee (*Eucalyptus socialis*) is a mallee or small tree with creamy flowers, narrow leaves and dark grey bark. It is found in inland areas of South Australia, New South Wales, Western Australia and Northern Territory.



is that they are different from other eucalypts in that they have the trunk above ground level. They have a single trunk, with yellow flowers. They are found in inland areas of Australia and

## Preferred Planting Guide



### Lebbek Tree – *albizia lebbek*

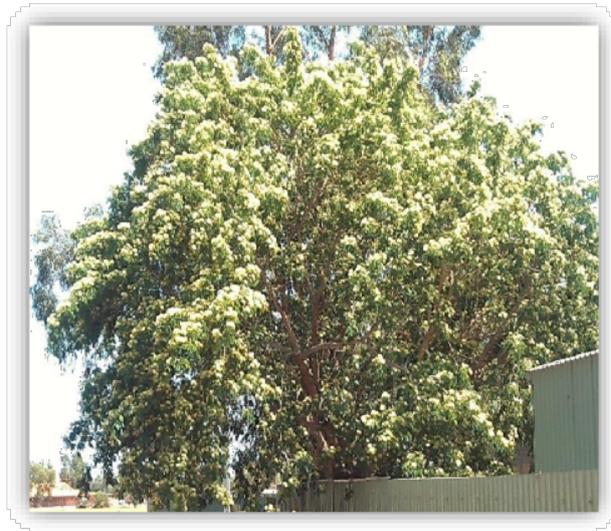
*Albizia lebbek* is a species native to Indomalaya, New Guinea and Northern Australia and widely cultivated and naturalised in other tropical and subtropical regions. English names for it include Lebbeck, Lebbek Tree, Flea Tree, Frywood, Koko and Woman's tongues Tree. The latter name is a play on the sound the seeds make as they rattle inside the pods. Being one of the most widespread and common species of *Albizia* worldwide. It is a tree growing to a height of 18–30 m tall with a trunk 50 cm to 1 m in diameter. The leaves are bipinnate, 7.5–15 cm long,



## Preferred Planting Guide



with one to four pairs of pinnae, each pinna with 6–18 leaflets. The flowers are white, with numerous 2.5–3.8 cm long stamens, and very fragrant. The fruit is a pod 15–30 cm long and 2.5–5.0 cm broad, containing six to twelve seeds



South Hedland

*Cottonwood-hibiscus tiliaceus*

# Preferred Planting Guide

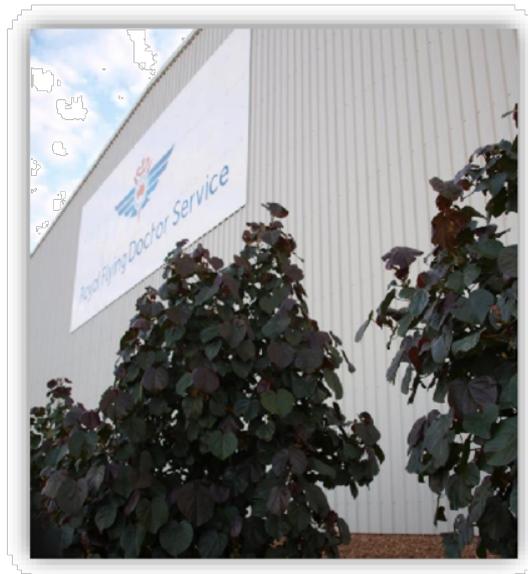


*Hibiscus tiliaceus* is a tree native to the shores of the oceans, today cultivated or naturalised throughout the subtropical regions of the world, particularly in coastal areas mainly as an ornamental tree for landscaping, although flowers have been used for various purposes. *Hibiscus* a height of up to 8-10 m (26'-32') and can grow just as It is suitable for sandy and moist soils, although it will also drier conditions and in a variety of soils. It can also stand is tolerant of salt spray, and therefore it is an excellent areas. The trees are very ornamental, with large heart-dense foliage. The leaves are usually dark green, but there are selections available with variegated or purplish foliage. The hibiscus-like flowers are bright yellow with a crimson centre, and usually point c on the tree or slightly sideways. In winter there may be few or no flowers in mild-tropical or subtropic climates, but the flowers may remain on the tree for more than a single day, creating an interesting e as both yellow and reddish flowers can trees at the same time.



Pacific and Indi tropical and areas. It is gro its wood, bark *tiliaceus* can a wide if not pru grow well und brackish water species for coa shaped leaves a

RFDS at Airport



Rain tree- *albizia saman*

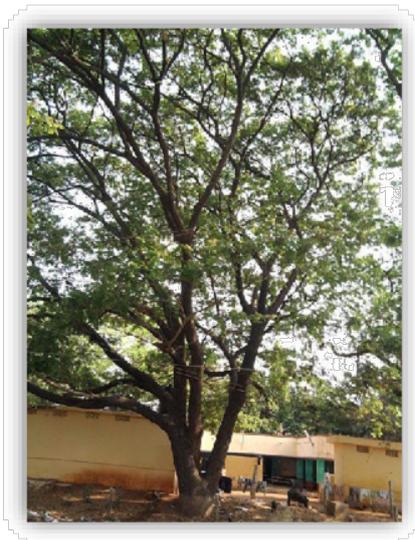
# Preferred Planting Guide



The rain tree is member of the pea family and is found tolerates dry periods. Tolerates a range of soils from infertile or waterlogged soils. Grows best in moist well leaves fold in rainy weather and in the evening, hence tree" and "five o'clock tree" (Pukul Lima) in Malay. this tree are available, e.g., with reddish pink and colored flowers. Can reach a height of 25 mtrs with a Crown. Early discoveries of these trees were made in alive today.



in tropics and heavy clays to fertilized soil. the name "rai Several lineag creamish gold large symmet 1800 and are :



South Hedland Byass Street

## *Jacaranda-jacaranda mimosifolia*

This deciduous or semi-deciduous tree is originally from South America. It has feathery foliage and clusters of pale mauve, trumpet-shaped flowers in September and October There are 4 stamens, as

# Preferred Planting Guide



there is an unusual elongated, glandular-pubescent  
fruits are round flattened, woody capsules that usually  
tree for quite a few months.



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**African Mahogany-khaya senegalensis**

# Preferred Planting Guide



African mahogany is a medium-sized tree which can grow height and 1 m in diameter. The bark is dark grey to grey-brown while the heartwood is brown with a pink-red pigment made up of grains. The tree is characterised by leaves arranged in a cluster at the end of branches. The white flowers are sweet-scented and the fruit changes from grey to black when ripening.



up to 15–30 m in height. The bark is brown while the heartwood is brown with a pink-red pigment made up of grains. The tree is characterised by leaves arranged in a cluster at the end of branches. The white flowers are sweet-scented and the fruit changes from grey to black when ripening.



## Indian Beech - *mellitia pinata*

# Preferred Planting Guide



A very hardy, fast-growing coastal native tree that is found throughout Asia (Pantropic). The Pongamia is long-lived in wet and dry tropical areas and will even grow with its roots in river estuaries. In India it has been cultivated for over a century as a useful source of lamp oil (biofuel) and a natural medicine. It produces terminal clusters of pink flowers that stand well clear of the green leaves. Useful as a shade tree, it may reach a height of 10m with a similar spread and is suitable for small to medium-sized gardens.



naturally and thrive in saline v... 3000 year... It produce broad, glo... of about 1... suitable for gardens.



McDonalds South Hedland

## Spanish Cherry - *mimusops elengi*

# Preferred Planting Guide



A most beautiful evergreen medium height tree with an elegant shapely crown. Mimusops is a native of India, Burma, Sri Lanka. highly fragrant small whitish flowers in February-March. It is also 'sacred garland tree', and 'maha gandh raj' or 'emperor of The fragrance of the flowers can be described as a combination of gardenia. These Trees have been planted in the South Hedland redevelopment.



growth habit a  
The tree bears  
known as India  
fragrance tree  
tuberose and  
CBD



*African Tulip-sapthodia companulate*

# Preferred Planting Guide



A most attractive tree when flowering, this African tree is a weed in the wet tropics. In moist areas the seeds germinate readily, as well suckers arise from damaged roots. The opposite, pinnate leaves up to about 20 cm long with 8-18 leaflets are leathery, shiny green above but with some hairs on the lower surface. The large 8-12 cm long, flowers are grouped in large clusters, when the calyx splits then the orange to red crinkly petals unfold. The freshly opened flower and the buds are filled with copious nectar, popular with birds. The fruit is an elongate follicle, up to about 20 cm long, that is usually held upright. At maturity it splits along the side to release numerous winged seeds.



**Native Almond- *terminalia canescens***

# Preferred Planting Guide



More or less a deciduous shrub or tree that grows from 1- a cream-white/white-green, Jan to Jul. Stony soils, red laterite. Variety of habitats



10 m high. Flowers sand, sandstone,

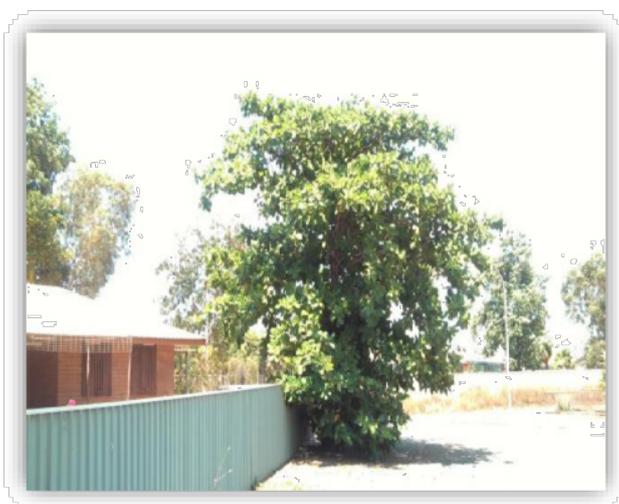


**Beach Almond- *terminilia cattapa***

# Preferred Planting Guide



Beach Almonds are large, handsome trees growing to 35 m tall, with an upright, symmetrical crown and horizontal branches, as the tree gets older, its crown becomes more flattened to form a spreading, vase shape. The leaves are large, 15-25 cm long and 10-14 cm broad, ovoid, glossy dark green and leathery. The leaves form a rosette and are found only at the end of a branch. During the dry season, the leaves turn into autumn colours of red, copper and gold before falling. The green almond-shaped fruit turns red to purple when ripe, the smooth outer skin covers an inner layer of corky fibre's which surround the nut, the seeds are dispersed by water. The nuts are edible and taste like almonds.



South Hedland- Kybra Close

# Preferred Planting Guide



## *Wild Plum-terminilia platyphylla*

Small tree with large broad leaves. Cream coloured flower spikes. The fruit is edible. Also, the harder exudate from the trunk is eaten as toffee. Native to tropical western Queensland and the Northern Territory. Often found along watercourses. Full sun.



# Preferred Planting Guide



## Paper Bark-*melaleuca luecadendra*

Melaleuca luecadendra or Cadgeput Tree is widely distributed in Western Australia. It has been used as a Street Tree in Parts of has a thick spongy bark, bright green foliage and a slightly weeping be tolerant of extreme water-logging, clay soils and seems able to with the greatest of ease.



northern parts South East As habit. It seems withstand cyc



# Preferred Planting Guide



## Silver Cadjeput- *melaeluca argenta*

Although this tree can grow large, it will flower as a shrub. It is a very useful ornamental but requires moisture for best results. Its foliage is a silvery colour with the cream, perfumed 'bottle brush' flowers attracting numerous birds. Usually grows into a medium-sized tree and is usually found along creeks and watercourses. Bark has the usual papery texture.



# Preferred Planting Guide



## Quandong- *santalum acuminatim*

The Native Peach is a small Tree that can grow up to 8mtrs but usually around 3mtrs. It is a parasitic plant with roots attaching themselves to the root of another shrub. The leaves are distinctly grey-green and are leathery and variable in size. The flowers are small, white, and occur in clusters at the ends of branchlets. The greenish or yellow fruit is about 3cm in diameter and becomes bright red when ripe. The edible fruit is high in vitamin C and various minerals, and is made into jams, pies, or eaten raw. The ground seed kernels have been used as a liniment. The root was ground and an infusion was drunk to treat rheumatism. The leaves were crushed and a poultice was made to treat sores and boils. : Native to arid and arid regions of mainland Australia. Prefers full sun and sandy soils.



# Preferred Planting Guide



## LOCUST - *Gleditsia triacanthos*- Shademaster

Gleditsia are proven as hardy street and shade trees, being fast-growing, heat and drought tolerant and well-suited for the demands of urban environments. Trees grow with an open, spreading canopy and attractive, fine, somewhat weeping foliage. The 'Shademaster' variety is a thornless, medium to large tree, distinctive for its spreading upper canopy, persistent dark-green foliage and golden-yellow autumn colour. Suitable for lawn sites. Tolerates root covering. Urban environments. Heat and drought tolerant when established. Mildly frost tolerant.



# Preferred Planting Guide



## Small Trees

### Mulga- *acacia anuera*

The common name, *Mulga* is an Australian Aboriginal word that means dream seed, both the tree and its seed are part of their mythology. The tree has a moderate growth rate with a mature height of approx. 4m. It grows well in a variety of settings but prefers full sun and well drained soils. The densely arranged needle-like, silver-gray (leaves) give the canopy an airy, lacy quality that contrasts with the dark reddish brown branches. The canopy can extend to the ground. Typically bottom branches are trimmed to expose the trunk(s) and give the tree an umbrella form.



# Preferred Planting Guide



### Dogwood- *acacia coriacea*

Spreading shrub or tree 1–10 m high. Bark fibrous, hard or thick-spongy. Young new growth yellow-green. Flowers are pale yellow to cream coloured and often occur all year round.



### Curly-bark Wattle-*acacia monticola*

Also known as Red Wattle or Scratchy Wattle, this large shrub is a common component of the pindan vegetation especially around the Dampier peninsular. It has reddish brown bark that continuously peels in small curly flakes leaves the tree looking like it has a coat of red curly hair. Traditionally used to make digging and clapping sticks, boomerangs and spear heads out of the wood. .



### Pilbara Weeping Wattle-*acacia orthocarpa*

Often weeping or sometimes bushy and low-spreading, resinous shrub or small tree to 4 m high. Bark smooth or flaky, grey, dark grey or grey-brown. Yellow flower spikes often occur all year round.



### Pindan Wattle-*acacia tumida*

When this wattle flowers in the dry season, the air is heavily scented with a sweet perfume. The pollen, however, can cause hay fever. It often forms dense thickets in red sand with spinefex, described as Pindan country around the Pilbara area. *Acacia tumida* is a short-lived spreading shrub or tree up to nine metres. The upper bark is smooth, white and sometimes waxy, but the lower bark is dark and ruptured.



# Preferred Planting Guide



# Preferred Planting Guide



## Desert Kurrajong-*brachychiton gregorii*

A small tree found in Northern and Western Australia grows from between 3-12m with cream-yellow/green flowers occurring between November to January. Prefers Red sandy loam and grows in sand dunes as well as rocky ridges and slopes.



## Callistemon-Kings Park Special

'Kings Park Special' is a seedling that was raised at Kings Park and Botanic Gardens in Perth. The origin of the seed is not known. This cultivar grows into small bushy trees from 3 to 5m tall by 3 to 4m wide. The inflorescences are in multiple heads on branch terminals and are bright red in colour. The flowering season in Western Australia is from mid-September to October with a smaller flowering in autumn.



## Silver Cassia- *cassia artemisioides*

This is a shrub that grows up to 3 metres in height. It has pinnate leaves with between 1 and 8 pairs of leaflets. It produces an abundance of yellow flowers in winter and spring which are about 1.5 cm in diameter, followed by 2 to 7 cm long flat green pods which age to dark brown. The species adapts to a wide range of climatic conditions, although it is susceptible to frost, particularly when young. It prefers dry, well drained sites with full sun.



## Green Cassia- *cassia chatelainiana*

Shrub that grows from .6 to 3m tall. Yellow flowers appear in April through to September. Grows in red sandy, loamy, clayey often stoney soils.



# Preferred Planting Guide



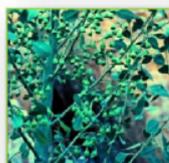
## Limestone Cassia-*cassia oligophylla*

Can be used as an informal clipped hedge, background, screen, xeric garden accent. Moderate fast grower to 2m with equal spread, rate of growth strongly influenced by water availability. Golden pea flowers in late to early spring but not fragrant.



## Desert Poplar-*codonocarpus cotinifolius*

Red sandy soils in drier inland regions. Small erect short lived tree or tall shrub, up to 4 m tall. Smooth pinkish trunk. Leaves: Broad oval tapering to a point 2-5cm long. Dull waxy bright grey-green. Borne on long stalks Flowers: Small insignificant attached to long stalks near ends of branchlets.



## Rough Leaf Ghost gum-*corymbia aspera*

A ghost gum tree of wide distribution across drier monsoonal areas of northern Australia from near Halls Creek and Kununurra in Western Australia through the Northern Territory between Wauchope and the Roper River catchment. It occurs on sandstone and quartzite ranges and ridges. *Corymbia aspera* has a trunk entirely smooth-barked or with a short tessellated stocking of rough bark.



## Desert Bloodwood-*corymbia deserticola*

Tree (mallee), 2-6 m high, bark rough, tessellated. Flowers are cream-yellow. Adapts well to Stony plains, rocky hills & mountains



# Preferred Planting Guide



**Pilbara Bloodwood-*corymbia hamersleyana***

Tree (rarely mallee), that grows from 3-10 m high, bark rough, tessellated. Flowers are white to cream and appear from April to August. Red sandy loam or sand. Drainage lines, stony hillsides, plains.



**Twin Leaf Mallee-*eucalyptus gamophylla***

Mallee, occasionally almost prostrate growing 1.5-7 m high. The bark can be smooth or rough. Flowers are white and appear between Nov to Feb. Grows in red sand, sandplains & dunes, stony spinifex country.



**Silver Leaf Grevillea- *grevillea refracta***

Grevillea refracta grows mainly in sandy, gravelly open country such as spinefex plains and on sandstone ridges. It is a common sight along roads and creeks. Flowers between March and October.



**Wickhams Grevillea- *grevillea wickhamii***

Grevillea wickhamii is an erect small tree that can reach up to 6m tall which is endemic to Western Australia. It has grey green leaves which have a holly like shaped leaves. There are a number of sub species which have a wide range of colours including red, pink, orange and yellow.



Civic Centre Port Hedland

# Preferred Planting Guide



## River Tea- tree-*melaleuca bracteata*

Melaleuca bracteata or 'river tea tree' is large shrub or small tree native to the northern regions of Australia and as the name suggests it is found growing along rivers and water courses. This species is also known variously as 'snow in summer' and 'white cloud tree' because in summer it produces a massive flowering display which envelopes the entire canopy. It is tough, has a compact canopy, single straight trunk and doesn't grow large enough to threaten overhead power lines. Good specimen tree.



## Hummock Honey Myrtle- *melaleuca eleuterostachya*

Erect shrub or tree that will grow up to 4m high. Flowers are white and occur between July through to Jan. grows on sandy or clayey soils, often over limestone. Mostly seen on plains, low hills, moist depressions.



## Native Myrtle-*myoporum montanum*

Attractive, hardy low growing small tree to 4m with deep green foliage and white flowers with purplish dots appearing most of the year. A very tough plant tolerating most well-drained soils and situations, frost and extended dry periods. Also tolerates alkaline soils. Prefers full sun but will grow in partial shade, not as dense as full sun. Can be rejuvenated by pruning or cutting back hard if it becomes too woody. Excellent for embankment and erosion control and is a good fire retardant plant.



# Preferred Planting Guide



## Frangipani-*plumeria obtuse*

The attractive flowers are most fragrant at night in order to lure insects and moths to pollinate them. The flowers have no nectar, however, and simply dupe their pollinators. The insects/moths inadvertently pollinate them by transferring pollen from flower to flower in their fruitless search for nectar.



## Orange Bells- *tecoma smithii*

Orange Bells is an attractive plant that is cultivated as an ornamental it has sharply-toothed, lance-shaped green leaves and bears large, showy, bright golden orange trumpet-shaped flowers. It is drought-tolerant and grows well in warm climates.



## Yellow Bells- *tecoma stans*

Yellow Bells is an attractive plant that is cultivated as an ornamental it has sharply-toothed, lance-shaped green leaves and bears large, showy, bright golden yellow trumpet-shaped flowers. It is drought-tolerant and grows well in warm climates.



South Hedland

## Simple Leaf Chastetree-*vitex trifolia*

*Vitex trifolia* is a large coastal shrub small tree less than 5 m in height with the stems covered by soft hairs. Grows on sand, coral, gravel or shale. Simpleleaf chastetree is occasionally found in clay over limestone but this is rare. It also grows on beaches and along the inland edge of mangrove swamps, in grasslands and in forest and secondary vegetations. It is often found near watercourses.



# Preferred Planting Guide



## Shrubs:

### Silky Wattle-*acacia acradenia*

A spindly shrub to 5m high with smooth to fibrous bark. Flower are yellow and appear from July through to August. Often growing on Stony/ rocky grounds.



### Grey Whorled Wattle-*acacia adoxa*

Acacia adoxa is a spreading shrub up to 1.2 m high with yellow flower appearing August- September. It occurs around red sandy soils, sandstone, stony plains & ridges.

Edible grubs occur in the rootstock. Seeds are harvested by ants.



### Salt Wattle- *acacia ampliceps*

Shrub or small tree 2-8 m high with a spreading canopy. Flowers are White or cream appearing between May and August. Can be found on sandy or loamy alluvial soils with an alkaline reaction and is highly tolerant to salinity.



### Arid Wattle- *acacia arida*

Arid Wattle is an erect shrub to growing to 3 m high branching from base. The bark is smooth and grey or grey-brown with rod like yellow flowers appearing from Mar through to late July-August



# Preferred Planting Guide



## Cape Honeysuckle- *tecoma capensis*

An erect, scrambling shrub, it grows to 2–3 m in height and a similar width. Normally evergreen it may lose its leaves in colder climates. In certain habitats it may scramble, meaning that it shoots out long growth tips which lean on the stems and branches of other plants, as well as boulders, trellises, fences and walls; this can lead to the plant appearing untidy. The flowers are tubular, narrow, about 7.5 cm long, and are produced at different times throughout the year. The flower colour ranges from orange to orange-red to apricot.

Hamilton Road. South Hedland



## Atkins Wattle- *acacia atkinsiana*

Open, spreading, rounded shrub that grows to 4 m high. Flowers are yellow and appear Dec or Jan to Mar or May to Jul. Rocky loam. Stony grounds, plains, ironstone hills.



## Two Nerved Wattle- *acacia bivenosa*

Widespread in the Arid Zones of Western Australia it grows in a variety of soils, including coastal sand, and on rocky hillsides and gullies, in shrubland, open shrubland and open woodland, and is often associated with spinifex.



# Preferred Planting Guide



## Coles Wattle-*acacia colei*

Coles Wattle is a native perennial bush or tree. It grows to a height of up to 9 m. and blooms from June through July and the flowers are bright yellow. Grows in a variety of soil types; frequently forms dense stands along dry, stony or sandy drainage lines. It is a component of many semi-arid, subtropical plant communities, especially the Acacia - dominated scrubs and tall open shrublands of north-western Australia.



## Wathmallu-*acacia cowleana*

*Acacia cowleana* is a shrub to small tree up to 8 metres high. The bright yellow flowers occur in elongated spikes up to 300 mm long and occur during winter and spring. The flowers are followed by slender, straight seed pods about 75 mm long. Usually grows in arid and semi-arid areas on sandplains and along creek lines.



## Red Mulga -*acacia cyperophylla*

Red mulga is a tree that grows to a height of about 7 mtrs and is endemic to Western Australia where it grows on the banks of rivers and creeks on the semi-arid plains. It is most readily identified by its distinctive bark which constantly peels off in small curling flakes making it look like the tree has a coat of curly hair.



## Maiden Wattle-*acacia ancistrocarpa*

Multi stemmed, resinous shrub that grows 1–4 m high and up to 4 m diam. Bark is smooth on upper trunk and grey to bluish on the trunk. Spikes of golden flowers 2.5–4.5 cm long.



Marquee Park South Hedland

# Preferred Planting Guide



## Waxy Wattle-*acacia dictyophleba*

Widespread in arid zones where it extends from the Pilbara region in W.A. eastwards through southern N.T. and north-eastern S.A. to south-west Qld. It is particularly common in the region of the Simpson Desert. Grows mainly in deep red or red-brown siliceous sand, on dunes or interdunal areas; sometimes found on shallow stony soils.



## Woodstock Wattle- *acacia levata*

Spreading, multi-stemmed shrub growing up to 1-3 m high, to 5 m wide. Flowers are yellow and usually appear around May-June. Prefers sand or sandy loam over granite and grows well on hillslopes. Grows alongside *Acacia hilliana* and *A. stellaticeps* and spinifex.



## Maitlands Wattle- *acacia maitlandi*

Maitland's Wattle, is a perennial tree native to Australia. It has an open and spindly habit, with a height between 0.7 - 3.0 metres. Flowers are yellow and occur sometime between May and October. The favoured soil type is red sand, or stony ground, the habitat is sandy or stony plains, and on hills. The species is used to make boomerangs and spear throwers, the gum produced is edible



## Ranji Bush-*acacia pyrifolia*

Obconic ( inverted cone shaped), rigid, erect shrub, to 4.5 m high, bark smooth grey on main stems, upper branches yellow; flower heads globular. Flowers are yellow and occur Jul or Aug. Alluvial sand, coarse red-brown sand, pebbly sand, brown loamy clay, skeletal soil, sandstone. Undulating plains, along rivers and creeks, in creek beds.



# Preferred Planting Guide



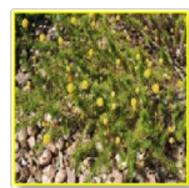
## Limestone Wattle- *acacia sclerosperma*

Commonly known as limestone wattle or silver bark wattle it is endemic to Western Australia, it occurs on floodplains and along water-courses throughout the arid north-west corner of the State. Limestone wattle grows as a spreading, tall shrub up to four metres high and six metres wide. Like most Acacia species, it has phyllodes rather than true leaves. These are bright green, oval in cross-section, and may be up to seven centimetres long. The flowers are yellow, and held in cylindrical clusters about five millimetres in diameter.



## Curry Wattle- *acacia spondylophylla*

Spreading shrub to 2 m high. Pods linear, curved, 20–40 mm long, 6–8 mm wide, with nerve-like margins, Occurs commonly in the Pilbara region and at scattered localities E to the Rawlinson Ra., W.A., in the Macdonnell and Musgrave Ranges, N.T. and E to Dajarra, Qld. Grows in shallow, sandy or rocky soil.



## Northern Star Wattle- *acacia stellaticeps*

Occurs in W.A. from the north-west coast between Exmouth Gulf and Broome E across parts of the Great Sandy Desert to the Sturt Creek area and into N.T. in the Tanami area; recorded between 1800'S and 2330'S. Grows in red, sometimes clayey sand over quartzite, limestone, laterite or ironstone, on hills or sandplains, often on flats between parallel sand dunes, in open savannah, scrub heath, grassland or shrubland, often with spinifex. Flowers Feb.–Sept.



# Preferred Planting Guide



## Pilbara Minni Ritchi-*acacia trachycarpa*

An arid to tropical Australian tree ideal for planting in frost free regions. Cold damage or death can occur at temperatures below 25 degrees F. The trunk has a curling, 'minni ritchi' bark texture with a pine scent very unique and interesting for an arid type tree. The leaf, made up of soft, pine needle-like, narrow phyllodes 1/2 to 2 inches long that are very graceful in the breeze. In bloom, during the spring, a yellow, rod shaped flower brightens up the landscape.



## Poverty Bush-*acacia translucens*

A low, spreading shrub, varying in height from 50 cm to 2 m. The thick phyllodes are obliquely elliptical or obovate and up to 2.5 cm long. The bright yellow ball flowers are borne on stalks to 2 cm long. A hardy plant for tropical areas when used in a sunny well-drained site.



## Wanyu-*acaia wanyu*

Bushy shrub or tree that grows 1.5-5 m high. Flowers are yellow and appear from March to July. Often in stony clay or loam, red sand. Along creek lines & drainage lines, sand plains.



# Preferred Planting Guide



## Paper Flower-*bougainvillea glabra*

Named in honour of the explorer and scientist, Louis Antoine de Bougainville. Known for their brilliant floral displays and ground-covering power, bougainvilleas originate from the tropics and subtropics of South America these scrambling shrubs that can become vigorous climbers in favourable conditions resembling the climate of their native habitat. While the thin-textured, downy, tapering leaves and small, tubular, ivory to yellow flowers play a role in the overall attractive appearance of these plants, it is the brilliantly coloured petal-like bracts that create its dramatic impact. All species do well in warm to hot climates and some species will tolerate light frosts. For best results, plant bougainvilleas in a light well-drained soil in a sunny position. Although drought tolerant, they need plenty of moisture during the flowering season.



## Caper Bush-*capparis spinosa*

The caper bush requires a semiarid or arid climate. A rainy spring and a hot dry summer are considered advantageous. This drought-tolerant perennial plant has favourable influence on the environment and it is used for landscaping and reducing erosion along highways, steep rocky slopes, sand dunes or fragile semiarid ecosystems.



## Dumara Bush- *cynanchum floribundum*

A herb with erect branches, twining or bent in opposite directions, up to 1 m. Leaves: opposite, long-petioled, heart-shaped, tapered at both ends, 2,5-5 cm. The wheel-like corolla is deeply 5-lobed, and the corona has twenty lobes. Flowers: white, spike-like on separate petioles. Fruit: dry, cigar-shaped, more or less winged, 2,5-5 cm long.



# Preferred Planting Guide



## Spotted Emu Bush-*eremophila maculate*

*Eremophila maculata* is probably the most common species both in the wild and in cultivation. It is usually a shrub to about 1 metre in height but occasionally grows taller. Flowers occur in the leaf axils and are tubular in shape to about 25 mm long. Flower colour is variable and may be pink, mauve, red, orange or yellow, often with a pale, spotted throat. Flowering occurs mainly through winter and spring but some flowers may also be seen at other times. Widely cultivated in many areas and, although best suited to dry climates, can be successfully grown in more humid areas. Full sun is preferred and, once established, the plant tolerates extended dry periods. It is also tolerant of at least



## Turpentine Bush-*eremophila fraseri*

Shrub, 0.5-3 m high. Flowers range from white-cream-pink-red-purple-brown, Mar to Nov. Sandy or stony soils, alluvium. Colluvial & riverine flats, rocky hills. *Eremophila fraseri* is used as a topical medicine, the liquid derived from a preparation of the leaves is used for skin complaints.



## Desert Fuchsia- *eremophila macdonnelli*

A small spreading shrub that has leaves that are small and thick and covered in short hairs. It has solitary pink to purple flowers produced on long stalks in winter, spring and summer.



# Preferred Planting Guide



### Emu bush-*eremophila compacta*

A small compact shrub with grey/ green lance shaped foliage and a profusion of tubular yellow flowers. A versatile plant that offers foliage contrast in plantings. Grows in full sun to part shade in most well drained soils - including coastal



### Silver Poverty Bush- *eremophila pterocarpa*

Shrub or tree that can get up to 4m tall. Flowers are red-pink-orange-yellow and flower from June to September. Tolerates a range of soils from Red sandy clay, clay, limestone. Clay depressions, salt or alkaline flats, salty patches.



### Tar Bush- *eremophila glabra*

This is a striking Emu Bush that develops into a dense ground cover that will cover an area of at least a square metre. The leaves are soft and silver-grey. Tubular flowers are yellow and rich in nectar. Spring and summer are the main flowering periods but flowers will appear at other times. Spent flowers carpet the ground around plants. *Eremophila* Kalbarri Carpet is one of our favourite Emu Bushes. It has proved to be extremely drought and frost hardy.



### Royal Mulla Mulla-*ptilotus rotundifolius*

A Shrub which grows from 0.4-2 m high. Flowers are pink-purple and can be up to 20cm long. Flowers between Jul to Oct. And grows in its natural habitat in stony soils preferring rocky hills & rises. Recently appointed as the floral emblem of the Pilbara



# Preferred Planting Guide



## West Pilbara Grevillea- *grevillea pyramidalis*

Caustic Bush, Blister Bush, West Pilbara Grevillea is a small tree to 10m. Blue-green leaves and bright yellow/white flower clusters. The greenish inner bark was mashed in water until it turned white, and then rubbed around women's breasts to induce lactation.



## Ixora species- *ixora coccinea*

A fairly small, bushy shrub, usually only 5-10ft tall. There are dwarf varieties that are much smaller. Ixora will flower when only a few inches high. It is commonly used a hedge or small garden plant. Ixora is too tender to grow outside of the tropics and subtropics. It prefers a warm, humid climate



## Tall Mulla Mulla- *ptilotus exaltatus*

An annual herb growing in height from 0.1-1.2m high. Its flowers form a cone of pink or purple with many cones or heads on one plant, making this a showy species, especially when many are found growing together over large areas. It flowers between April and October. It is a member of the Amaranthaceae family and is found over most of Western Australia, except in the south-west corner and along the south coast. This distinct herb appears to favour clay and loamy soils, but is also found on coastal areas.



## Thick Leaf Fan Flower- *scaevola crassifolia*

*Scaevola crassifolia* with its large, almost succulent leaves (*crassifolia* = thick leaves grows up to 1.5 metres wide and 3 metres wide and produces white, blue or pale purple flowers from July to February in its native range. It prefers limestone or dune areas and coastal distribution ranges from beyond Karratha in the north all along the western coast and beyond Esperance.



# Preferred Planting Guide



# Preferred Planting Guide



## Bird of Paradise-*strelitzia reginae*

A clump forming plant which produces large and dramatic evergreen, banana like leaves and long, straight flower stems culminating with a boat like bract at the top. Several orange and blue spiky flowers arise from these bracts and give an appearance resembling exotic birds. Flowers are borne through the warmer months of spring and summer. The blooms are fantastic for use in floral arrangements because of their unique and magnificent flower display. The plant grows to a height of 1.8 metres and over 1 metre in width.



## Cockies Tongue-*templetonia retusa*

This lovely shrub is very hardy and well worth a place in a shrubbery. It can grow to 2m high and 3 m wide although I have never seen this size in garden conditions. It can be pruned and this will keep it to a reasonable size. There are large, red pea shaped flowers very attractive to birds and butterflies, during winter and spring. This is a hardy plant suitable for front line coast and inland situations. It is moderately frost tolerant and requires good drainage.



## Grey Germander-*teucrium racemosum*

Commonly known as 'Grey Germander'. It is a small grey-leaved shrubs with white flowers that appear during spring to summer. A perennial herbaceous plant it can be found growing in many parts of Australia, along creeks, muddy depression, grassy wetlands and woodland. In central Australia, they grow in or near claypans.



# Preferred Planting Guide



## Inland Tea-tree- *melaleuca-glomerata*

Fast growing screening plant 2-5m tall with whitish paper bark and grey green leaves and cream to white honey scented flowers. Tolerates shade and salt and is a good screening plant and long lived.



## Regal Bird Flower- *crotalaria cunninghamii*

This small shrub of about 1 metre has stout woolly branches and rounded dull green leaves. Its green flowers resemble a bird attached by its beak to the central stalk of the flower head. Flowering occurs from winter to spring, and sometimes in autumn. The fruit is a club-shaped pod, about 4-5cm long, which is swollen, hard and velvety. This plant is moderately common, occurring on unstable sand dunes in mulga communities.



# Preferred Planting Guide



## Grasses and Groundcovers:

### Fire Cracker Plant- *russelia equisetiformis*

A multi-branched subshrub with slender, rush like stems that are angled with ridges and leaves that are reduced to little more than small scales. The wiry branches start out erect then fall over to cascade down in lengths as long as 1.2 m. Produces hanging clusters of scarlet tubular flowers about 2.5 cm long that look like little firecrackers inspiring the plant's common name, firecracker plant.



### Red Fountain Grass- *pennisetum setaceum (rubrum)*

This tropical annual produces mounds of narrow burgundy-red foliage and purple plumes to 1 foot long. It is invaluable for containers and stunning, annual foliage color in a border. It rarely sets seed. Grow in light, average, well-drained soil in full sun. Cut back previous year's foliage by early spring.

Medians- Anderson St- Port Hedland



### Feathertop Threeawn- *aristida inaequiglumis*

Feathertop Threeawn is a leafy erect long lived perennial grass that can grow to 60-90 cm tall, forming dense tussocks. The leaves are long and flat but tend to curl or twist with age.



# Preferred Planting Guide



### Curly Mitchell Grass- *astreba lappacea*

Tussocky perennial grasses growing to 1 m tall. Native of heavy clay soils of the downs in the arid zone of much of northern and central Australia. Extremely drought -tolerant due to their robust root system.



### Variable Daisy-*brachyscombe ciliraris*

Geographically speaking, it is very widely distributed, occurring in every Australian state. It is somewhat restricted in terms of habitat, however, favouring red earths and grey sands over limestone or clay, in disturbed areas and on the margins of salt pans.



### Pilbara Daisy- *brachyscombe iberidifolia*

Widespread, found on sands or clay, and tolerant of salinity. It favours watercourses and depressions near granite, but is widespread on sandhills and other harsh coastal environ. North to the Pilbara region, extending into Murchison, Gascoyne, Coolgardie regions, and recorded in the Gibson Desert.



### Lemon Scent Grasses- *cymbopogon species*

Alternately called scented grass or Australian lemon-scented grass (*Cymbopogon ambiguus*), Australian lemon grass grows throughout most of Australia, with the exception of the cooler areas. Like the other lemon grass plants, this plant emits a lemon-like citrus odor when cut or crushed, and is adaptable to different soil types. Australian lemon grass is often used in landscaping as ground cover or in places where watering is difficult. The plant grows to about 3 feet in height, and is drought- and frost-resistant.



# Preferred Planting Guide



## Namana- *euphorbia australis*

Prostrate annual or perennial herb that grows to 0.02-0.1 m high. A native West Australian plant that has red-pink flowers form around April to November. Will grow in a variety of soils.



## Gin Gin Gem-*grevillia obtusifolia*

Rapid growing and hardy dense ground cover with a 3m spread. Has bright green foliage with small pinkish spider flowers in winter and spring. Likes good drainage and full sun to part shade.



## Sea Spray- *grevillia thelemanniana*

A fast growing, spreading ground covering shrub that grows to approx. 1 m high and 3m across. Has small red flowers during winter and spring. Grows in full sun or part shade and grows in a variety of soil types and tolerates coastal soils.



## Native Sweet Potato-*ipomoea costata*

Commonly known as Rock Morning Glory, is an Australian native plant. It is found in northern Australia, from Western Australia, through the Northern Territory, to Queensland. It is the source of bush potato, a bush tucker food for Aborigines. Bush potatoes are cooked in the hot earth beside the fire, and potato is still eaten in the desert today. It is a fast-growing creeper with large purplish-pink trumpet flowers.



# Preferred Planting Guide



# Preferred Planting Guide



## Beach Morning Glory- *ipomoea brasiliensis*

Goat's Foot is a primary sand stabilizer being one of the first plants to colonise the dune. It grows on almost all parts of the dune but is usually found on the seaward slopes sending long runners down towards the toe of the dune. The sprawling runners spread out from the woody rootstock but the large two-lobed leaves are sparse and a dense cover on the sand is rarely achieved except in protected situations. This plant grows in association with sand spinifex grass and is a useful sand binder thriving under conditions of sand blast and salt spray.



## Native Morning Glory-*ipomoea muelleri*

Sprawling perennial ground cover up to 3 m wide, with twining stems. Heart shaped dark green leaves are up to 4 cm long and 2 to 3 cm wide. Lilac or pink flowers have a darker throat and are shaped like a funnel or trumpet. Flowers are up to 4 cm long and 5 cm in diameter.



Civic Centre Front Gardens

## Creeping Boobiella- *myoporum parvifolium*

This is a ground-cover plant with fleshy green leaves and white flowers in summer, both frost and drought tolerant. This plant has trailing stems to about 1m or more and the leaves are green or grey in colour. Its flowers are white and are borne in summer. Grows to about 1m in height and the width is unlimited. The plant can be effectively hedged and formally shaped.



## Sturts Desert Pea-*swainsona formosa*

Is famous for its distinctive blood-red leaf-like flowers, each with a bulbous black centre, or "boss". It is one of Australia's best known wildflowers. It is native to the arid regions of central and north-western Australia, and its range extends into all mainland Australian states with the exception of Victoria.



Entrance Statement Broome Highway

# Preferred Planting Guide



## Dampier Pea- *swainsona pterostylis*

Small semi-prostrate shrub. The leaves are compound. The beautiful flowers are violet, with a sweet fragrance. The whole plant was mashed up and a boiled poultice was made to treat bruising and inflammation. A native to hot semi-arid areas of northern Western Australia and NW Northern Territory. Full sun.



## Kangaroo Grass- *themeda triandra*

This attractive grass can be used as an ornamental in rockeries, as part of a native habitat garden or can be grown in a more formal garden for its interesting colour and texture. It grows in full sun to part shade on sandy to clay soils and needs little water once established. Because of its large distribution, growing conditions for *T. triandra* can be quite variable so it is best to source seeds or nursery stock native to your local area.



## SnakeVine- *tinospora smilaciana*

Communities in Central Australia used to crush sections of the vine to treat headaches, rheumatoid arthritis and other inflammatory-related ailments. The sap and leaves were sometimes used to treat sores and wounds. The leaves are triangular to arrow-shaped, up to 10 x 6 cm, 5 prominent veins arise from the base. Flowers unisexual, males are greenish, females have white sepals; fruits are ovoid, red berries to 10 x 9 mm.



# Preferred Planting Guide



## Spinifex- *triodia sp*

Spinifex thrives on the poorest, most arid soils Australia has to offer. It is Spinifex that has prevented our deserts from becoming a Sahara-like world of bare, shifting sand.

Spinifex roots go down a long way: approximately 3 metres. Generally the roots develop from the same nodes as the shoots so that each shoot has its own personal water supply. The spiky leaves contain a lot of silica which makes them stiff and rigid.

Spinifex is tough and indigestible to most animals except termites. These tiny grazers thrive on the Spinifex litter. A grass that's very poor in nitrogen and phosphorus poses no problems for them. Desert Aboriginal people collect certain species of Spinifex and bash it with a stick on a clean surface to begin the extraction of resin which occurs at the base of the stems. The chaff is heated with a fire stick causing the resin to melt. It is then rolled into a ball and used as an adhesive, mainly for attaching stone cutting chips to wooden implements such as spears.



## Needle Grass- *triraphis mollis*

A tufted perennial grass-like herb. Grows 0.3-0.45 m high. Flowers are purple-green from May to Sep. Red sand, loam, clay, sandstone. Coastal sand dunes, creek floodouts.



# Preferred Planting Guide



## Turf

### Winter Green

Although the Wintergreen variety is more commonly utilised within commercial applications due to its hard wearing characteristics, it is also suitable to many domestic applications, especially in tougher environmental conditions. The Wintergreen lawn is ideal for high wearing areas such as golf courses, tennis courts, bowling greens, parks and gardens, sports ovals, soil stabilisation areas, roadsides, urban in-fill areas or where hard wearing or close mowing is required. With its low maintenance qualities it is also great for your rental property or home!



## Preferred Planting Guide



### Zoysia

*Zoysia* is a genus of creeping grasses native to southeast and east Asia (north to China and Japan) and Australasia. These species, commonly called zoysia or zoysiagrass, are found in coastal areas or grasslands. The genus is named after the Austrian botanist Karl von Zois. Because they can tolerate wide variations in temperature, sunlight, and water, these grasses are among the most widely used for lawns in temperate climates. Zoysia grasses stop erosion on slopes, and are excellent at repelling weeds throughout the year. They resist disease and hold up well under traffic. 'Empire Zoysia' is particularly popular.

# Asset Handover Process & Check List

**Important Notes:**

It is the **responsibility of the Project Manager** to complete this document.

The Asset Handover Checklist is intended to guide the handover of the asset to operations and the processing of asset information records related to their creation and future operations. It is important that records relating to each asset are available for future reference.

Send an electronic copy of this the completed form to : [Daniel Vo - dvanvo@porthedland.wa.gov.au](mailto:dvanvo@porthedland.wa.gov.au)

Project Information	Details
Project Name:	
Project Value:	
Synergy File Ref & Folder	
Project Description:	
Project Management Representative:	
Asset Management Representative:	
Asset Custodian Representative:	
Contractor Representative	
Other Key Representatives:	

Project Dates	Date	Notes
Project Completion Date (Practical Completion):		
Defects Liability End Date:		
Date of Site Inspection / Handover Meeting with Project Manager, Asset Management, Operations, etc.		

Handover Element Deliverable	Yes	No	WIP	TRIM Ref	Comments
<b>PRACTICAL COMPLETION</b>	<b>(soft and hard copies)</b>				
Practical Completion Certificate					
Representative Responsible for Management of Defects During Defects Liability Period:					

<b>COMMISSIONING &amp; APPROVALS</b>	<b>(soft and hard copies)</b>				
Copies of all Commissioning Certifications/Approvals					
Copies of all Commissioning Reports					
<b>ORIGINAL ENGINEERING MANUAL</b>	<b>(soft and hard copies)</b>				
Bill of Materials (Equipment inventory listing in hierarchy with quantities)					Hard copy location:
As Constructed Drawings (Final and Approved) (AutoCAD AND pdf)					
Major Asset Cost Breakdown					
A12 Warranties and guarantees					
Schedule of project subcontractors and/or supplier contact details					
Asset Design Lives					
Final Project Cost Report					
<b>OPERATING &amp; MAINTENANCE MANUAL</b>	<b>(soft and hard copies)</b>				
Contractor/Supplier/Manufacture Recommended Maintenance Procedures for all assets					
Operational Manuals with procedures					
Maintenance schedules and procedures for maintainable assets					
Spare Parts Lists with Supplier/Manufacture Details					
Support Contacts with Supplier/Manufacture Details					
<b>ASSET DATA</b>	<b>(soft copy)</b>				
Asset Data with GIS Data (A Spec)					
<b>TRAINING</b>					
Relevant Staff Trained and Competency Achieved					
<b>ASSET DECOMMISSIONING AND DISPOSAL</b>					

List of Decommissioned Assets Issued to Asset Management for Update of Database					
<b>ASSET REGISTRATION DETAILS</b>					
All Asset Registration Form Details are Completed					
<b>ASSET Risk Assessment</b>					
ASSET Risk Assessment Documentation					
<b>ASSET Handover Checklist</b>	<b>(soft copy)</b>				
Copies of this Handover Checklist has been issued to all stakeholders.					Name of each stakeholder:
<b>OTHER</b>					
Security and access information					
<b>FINAL HANDIVER INSPECTIONS</b>					
Project Manager					
Asset Custodian					
Asset Mgmt. Reprerentative					



<b>AMENDMENT RECORD</b>						
<b>Rev. No</b>	<b>Rev. Date</b>	<b>Page</b>	<b>Details of Change</b>	<b>Author</b>	<b>Reviewer</b>	<b>Approver</b>
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# 1 INTRODUCTION

This document is designed to ensure that appropriate equipment, material and workmanship are employed when designing, installing and maintaining irrigation systems for the Town of Port Hedland or future Town of Port Hedland systems.

The main objective is to standardise equipment being used in irrigation systems that are to be handed over to the Town of Port Hedland. This allows for ease of maintenance.

## 2 DESIGN, AND OPERATION OF IRRIGATION SYSTEM

### 2.1 DESIGN OBJECTIVES

The objectives and requirements outlined below are the minimum expected design outcomes to be achieved by the designer for when the system is operational.

### 2.2 DESIGN APPROVAL

All designs must be submitted to Town for assessment and approval. Installation **MUST NOT** commence until Council has provided written approval.

#### 2.2.1 CID DESIGNER

All design work undertaken for Town of Port Hedland is to be undertaken or approved by a currently certified irrigation designer.

#### 2.2.2 DESIGNS

All designs shall be presented in AutoCAD 2013 format on a current landscape base. The irrigation designs shall include:

- Water supply source information including Potable water or Reuse water
- Water supply location including size, expected flow rate, backflow prevention requirements and treatment requirements.
- Tank and pump location including details on tank size, pump model and layout of associated equipment.
- Sleeve plan specifying size and location.
- Location of solenoid valves including diameter and flow rate, electrical pits, pipe-work (showing nominal diameter) and all sprinklers.
- Legend of sprinkler valves and associated equipment outlining brands and model names and specifying nozzle sizes, flow rates and operating pressure.
- Proposed station schedule outlining valves to be operated concurrently, including combined flow rate requirement, landscape type and precipitation rate.
- Standard installation detail drawings for solenoid valves, thrust blocks, isolation valves, flushing valves, air release valves, sprinkler installation, and pump and tank details

#### 2.2.3 EXISTING IRRIGATION

Where installed piping is to be connected to any area of existing irrigation, the contractor shall ensure that a flushing point (valve) is provided immediately prior to the point of connection to the existing system, including an additional isolation valve at the point of connection to the existing irrigation system.

The contractor shall utilize the flushing point to thoroughly flush the newly installed piping to ensure that no debris enters the existing irrigation.

The contractor shall remedy any fouling of existing valves/equipment, where the Contractor has failed to adequately flush newly installed piping (as evidenced by fouling of existing valves/sprinklers)

#### **2.2.4 POTABLE WATERING REQUIREMENT**

Unless specified otherwise, watering requirements shall be based on a minimum of 100mm per fortnight evenly distributed over all surfaces within 56 hours (7 days per fortnight). If the available water supply does not make this possible, the total weekly watering time shall be the minimum possible with the available supply.

#### **2.2.5 FLOW AND PRESSURE TEST**

The Contractor shall carry out a flow and pressure test from the scheme water connection point and use these figures as a basis for design. The Contractor, at his expense, shall rectify any sprinkler operating with inadequate flow and pressure.

## 2.2.6 EFFLUENT REUSE IRRIGATION SYSTEMS

The Town of Port Hedland (ToPH) recycled water quality management plan (RWQMP) is a stand-alone document to be used by all parties in the day-to-day operation and management of the ToPH recycled water scheme.

The RWQMP is to read in conjunction/conformed to the current WA Health Department “**Guidelines for the Non-potable Uses of Recycled Water in Western Australia**” 2011.

It also must conform with regard to lilac colour identification. All mainline pipe, sprinkler tops, solenoid isolation valves, solenoid valve flow control handles and valve box lids are to be lilac in colour.

Any omissions will not be considered and on final handover, if any irrigation equipment does not conform to the WA Health Department regulations then those items will be replaced at the contractor’s expense.

### **WARNING SIGNS**

Wherever water is being used for non-potable applications, erect prominent warning signs indicating, in English and any other primary languages predominately spoken in the area: “**Recycled Water – Do Not Drink**”



All recycled water storage areas should also be clearly signposted. The wording of these signs should state: “**WARNING – RECYCLED WATER – DO NOT DRINK OR SWIM**”.

These signs must incorporate the following requirements:

- A minimum size of 20cm x 30cm on a white background with black lettering of at least 20mm in height.
- Contain the recommended International Public Information – Drinking Water Symbol with the Prohibition Overlay in RED.
- In compliance with AS1319 – 1994 Safety Signs for the Occupational Environment.

- The number of signs and size of wording should be determined based on the visual distance from the observer.

**SPRAY IRRIGATION**

For spray irrigation in Town of Port Hedland these are the requirements to comply with the Western Australian Department of Health guidelines on the use of recycled water.

Spray Irrigation Start Time	9:00 pm or when public access to lawn areas is restricted
Maximum Run Time for Spray Irrigation	6 hours i.e. (9:00pm to 3:00am)
Retention Time	4 hours
Potable Water Flushing	5 minutes for every spay station

Potable water flushing is required to reduce the risk of biofilms building up in the pipes.

**2.2.7 HYDROZONING**

The irrigation system shall be designed so there is hydro zoning between:

- Active turf
- Passive turf
- Planted garden beds
- Trees.

All tree irrigation must be independently hydro-zoned to allow for decommissioning after two (2) or three (3) years without affecting the irrigation of turf and garden bed areas.

**2.2.8 PRESSURE LOSS**

The pressure loss through any automatic solenoid valve is not to exceed ten (10) percent of the system operating pressure.

**2.2.9 OPERATING PRESSURE**

The maximum and minimum operating pressure of sprinklers in a system shall not vary by more than 10%.

**2.2.10 WATER VELOCITY**

The water velocity in a mainline should not exceed 1.52 metres per second.

**2.2.11 OVERSPRAY**

No overspray will be permitted on adjoining properties, roads or buildings. Desirable to use low trajectory angle, part circle sprinklers in these situations and offset a minimum of 300mm from property lines. When using recycled water, no pooling of water is allowed on any surface.

**2.2.12 SOLENOID VALVE ISOLATION**

The control valves shall be isolated from the mainline by means of a Philmac ball valve or equivalent.

All isolation valve used for reuse water are to have **lilac** coloured handles.

**2.2.13 BACKFLOW PROTECTION DEVICES**

All potable water systems need to incorporate the necessary backflow protection device as per Water Corporation specifications.

**2.2.14 CYCLONE RATING**

All equipment and structures installed in the Town of Port Hedland must be designed to withstand adverse wind conditions of **Region D Terrain Category 2**.

All structures are required to be designed and certified by a practicing certified structural engineer in accordance with the Building Code of Australia and Australian Standards

**2.2.15 REGULATIONS**

The system to be designed to achieve all watering within current rules and regulations for water of public open spaces enforced on Local Governments.

### **3 MATERIALS AND INSTALLATION**

#### **3.1 MATERIALS**

##### **3.1.1 UNDERGROUND PIPEWORK**

###### **MAINLINE PIPES**

All mainline pipework installed on the downstream side of the irrigation water supply point is to be either PN12.5 PE100 Poly pipe or Class 12 PVC pipe as per design.

All poly pipework shall be manufactured in accordance with AS4131-1997 and AS 4130-1997.

All mainline pipe used for reuse water is to be **lilac** in colour. If Lilac pipe is not available then the mainline pipework is to be sleeved in a reclaimed water pipe sleeve.

###### **LATERAL PIPES**

All lateral pipework installed on the downstream side of the solenoid control valves is to be a minimum of class 12 PVC pipe, and utilise the Solvent Weld method of joining (SWJ).

All lateral uPVC piping shall be manufactured to Australian Standard AS1477-2006.

All lateral pipe used for reuse water is to be **lilac** in colour. If Lilac pipe is not available then the lateral pipework is to be sleeved in a reclaimed water pipe sleeve.

###### **METRIC POLY PIPE FITTINGS**

All poly pipework is to be joined using metric compression fittings. These are to be manufactured to the requirements of Australian Standard AS/NZS 4129.

###### **PVC FITTINGS**

All fittings used in the installation must be new, manufactured to AS1477-2006 and shall be compatible with PVC pipe. Changes in direction of pipework shall be with standard fittings. Excessive bending of the pipes will not be permitted.

###### **PRIMERS AND SOLVENTS**

Primers and solvents used for the PVC piping connections shall be of approved manufacture and shall be used in accordance with the manufacturer's recommendations. Cleaners must be coloured.

##### **3.1.2 SOLENOID CONTROL VALVES**

###### **POTABLE WATER**

Electrical control valves shall be 25mm Irritrol 2400 series jar top valves or equivalent.

40mm or 50mm Rain Bird PEB normally closed 24-volt 50 cycle solenoid valves or equivalent.

###### **REUSE WATER**

Electrical control valves shall be 25mm, 40mm or 50mm Rain Bird PRSB-R normally Plastic.

All valve flow control handles are to be **lilac** colour as required for water reuse.

**3.1.3 PRESSURE CONTROL**

**POTABLE WATER**

All pressure regulation shall be done with a pressure regulation device shown below:

Valve Size	Pressure Regulator	Spring Colour
25mm Valve	100-PRV	Black
40 & 50mm Valves	Incorporated onto the Rain Bird valve using a PRS-Dial pressure regulating module	

**NON POTABLE WATER**

All pressure regulation shall be done with a pressure regulation device shown below:

Valve Size	Pressure Regulator
40 & 50mm Valves	Incorporated onto the Rain Bird valve using a PRS-Dial pressure regulating module
80mm	Bermad 700 low-pressure hydraulic valves

**REUSE WATER**

Where pressure regulation is required on a station of sprinklers this shall be done by means of a Rain Bird PRS-Dial pressure-regulating module on the solenoid valve.

**3.1.4 THREADED FITTINGS**

All plastic threaded (BSP) pipe fittings are to be utilised for connection of the mainline tapping bands to the solenoid valves shall be manufactured from glass fibre reinforced nylon or polypropylene material. They shall be rated at a maximum working pressure of 1600 kPa (PN16) as tested by the manufacturer in accordance with AS1460.

**3.1.5 ISOLATION VALVES**

Solenoid Valves, Air Release Valves and Flushing Valves shall be isolated from the mainline utilising a **Philmac** Ball Valve or equivalent. All equivalent or replacement parts can only be approved if town of Port Hedland nominated Superintendent or representative provides written approval

All isolation valves used for reuse water are to have **lilac** coloured handles.

**3.1.6 MAINLINE ISOLATION VALVE**

On 90mm and greater mainline size, isolation valves shall be an AVK ductile iron resilient seated sluice valves with spindle cap. These valves shall be manufactured to Australian Standard 2638. 2-1999, be suitable for Table 'D' flange.

Valves shall be configured for 'clockwise turning' to close and the top of the spindle cap shall have an arrow indicating the direction to turn for closing.

All mainline isolation valves used for reuse water are to have **lilac** coloured spindle caps

**3.1.7 AIR/VACUUM RELEASE VALVE**

Shall be a 25 or 50mm combination air vacuum release valve that incorporates in one body a kinetic air and vacuum release. The locations of these air valves shall be such that any trapped air in the mainline is able to be readily exhausted whilst minimising the risk of water hammer in the system.

**3.1.8 VALVE BOXES**

Valve Boxes shall be **Rain Bird** reinforced plastic valve boxes with lockable lids. Valve boxes shall have minimum dimensions in accordance with the following models:-

All valve boxes used for reuse water are to have **lilac** coloured lids.

Equipment	Valve Box Size
25mm & 40mm Solenoid Valves	Standard Rectangular Series (VB-STD) (368 mm x 239 mm x 307mm)
50mm Solenoid Valves	Jumbo Rectangular Series (VB-JMB) (430mm x 300mm x 305mm)
Mainline Flush Valves	Standard Rectangular Series (VB-STD) (368 mm x 239 mm x 307mm)
25mm, 40mm and 50mm Filters	Jumbo Rectangular Series (VB-JMB) (430mm x 300mm x 305mm)
Solenoid Isolation Valves	Inside Solenoid Valve Box
Mainline Air Release Valves	10" Round Series (VB-10RND)
ABB Water Meter	Jumbo Rectangular Series (VB-JMB) (430mm x 300mm x 305mm)

**3.1.9 SPRINKLERS**

**PREFERRED SPRINKLER**

The Town of Port Hedland typically utilises sprinkler products from Rain Bird, Hunter and Toro as outlined in the table below. Any proposed alternative sprinkler must to the written satisfaction and approval meeting or exceed the specifications of the preferred sprinklers listed.

All sprinklers used for reuse water are to have **lilac** coloured caps.

<b>Preferred Sprinkler</b>			
<b>Brand Name</b>	<b>Type</b>	<b>Series</b>	<b>Nozzles</b>
Rain Bird/Hunter	Pop-up gear drive	8005-SS / I-25	
Rain Bird/Hunter	Pop-up gear drive	5505-SS / I-20	
Rain Bird/Hunter	Pop-up gear drive	5000 / PGP	
Rain Bird/Hunter	Pop-up gear drive	3000 / SRM	
Toro	Pop-up fixed head	570 series	
Toro	Pop-up Tree bubbler	570 PC Flood Bubbler	

**SPRINKLER OFFSET**

All sprinklers adjacent to any hardscape shall be offset 300mm (Rotors) and 150mm (Pop-up) off the hardscape edge including any kerbing.

**SPRINKLER CONNECTION**

All sprinklers will be connected to the lateral pipework via a suitable diameter 300mm artic risers articulated riser of quality manufacture. These risers shall be reinforced threaded poly elbows and the nipples shall be at an angle of 45 degrees when correctly installed.

All tree bubblers shall be on Olson Ezel flexible swing pipe (500mm minimum) with E - Z elbows or equivalent.

**3.1.10 DRIPLINE**

In the Town of Port Hedland all garden bed areas are to be irrigated with dripline.

**DRIPLINE – POTABLE WATER**

<b>Items</b>	<b>Requirements</b>
Dripline Type	Netafim 13mm, Techline AS 1.6LPH, pressure compensating
Emitter Spacing	400mm
Row Spacing	400mm
Dripline Pressure	200 kPa
Dripline Fittings	13-mm (low density polyethylene pipe) fittings with Cobra Clamps
Installation Depth	75mm Sub Mulch

**DRIPLINE – REUSE WATER**

<b>Items</b>	<b>Requirements</b>
Dripline Type	Netafim 13mm Techline AS Purple (Bioline AS) 1.6LPH, pressure compensating
Emitter Spacing	400mm
Row Spacing	400mm
Dripline Pressure	200 kPa
Dripline Fittings	13-mm (low density polyethylene pipe) fittings with Cobra Clamps
Installation Depth	100mm Sub Mulch

**3.1.11 FITTINGS**

All fittings are to be as per manufactures recommendations.

**3.1.12 COBRA CLAMPS**

All dripline connections are to be secured using stainless steel Cobra Clamps. The cobra clamp sizes used is to be as per manufactures recommendations.

**3.1.13 VACUUM BREAKER**

These shall be 15mm Bermad vacuum breakers or equivalent and will be housed in a 910 round valve box.

**3.1.14 MANUAL FLUSHING VALVES**

These shall be a 15, 20 or 25mm Philmac or approved Equitant Ball valve on a suitable diameter articulated riser of quality manufacture all housed in valve boxes.

**3.1.15 HEADERS/COLLECTORS**

All header and collector pipework installed on the downstream side of the solenoid control valves shall be Low Density Poly Pipe (LDPE) or (SWJ) PVC depending on the flow of the stations.

<b>Header / Collector s Size</b>	<b>Recommended Flow (LPM)</b>
19mm (LDPE)	30
25mm (HDPE)	45
40mm (SWJ)	120
50mm (SWJ)	240
80mm (SWJ)	480

**3.1.16 DRIPLINE STAKING**

All dripline is to be secured by Antelco asta hold down stakes #43615. These hold down stakes are suitable for securing polyethylene tubing (up to 22 mm OD).

### **3.1.17 FILTERS**

#### **PRIMARY FILTER**

All primary filter to be used are Filtaworx. It shall be sized to suit the flow and water quality.

The filter body shall:

- Constructed from 316 grade stainless steel.
- Be fitted with pressure differential (PD) control mechanisms to allow for the automatic activation of the filter flushing cycle.
- Have Table 'E' flanges.

#### **SECONDARY FILTERS**

All secondary filters shall be Triangle Plastic Screen Filters with a 120 Mesh. They shall be sized to suit the flow.

### **3.1.18 TANKS**

All tanks are to be a minimum of 50,000lt in capacity & of poly construction. Where there is a requirement for additional water storage steel walled liner tanks are to be installed, individual designs will be required and written approval granted by Port Hedland nominated Superintendent or representative.

#### **PENETRATIONS AND FITTINGS**

Penetration through the tank walls and the installation of other fittings and accessories shall be carefully programmed during construction so as not to reduce the tank performance in any respect. Modifications or retrofit after construction will not be acceptable.

#### **TANK / PUMP COMPOUND**

The tank and pump shall be installed in a 2400mm high garrison fenced compound. It shall be powder coated in a colour nominated by the Town of Port Hedland.

Gates are to be matching and use heavy-duty hinges and locks. All locks are to be keyed to Town of Port Hedland requirements.

### **3.1.19 PUMPS**

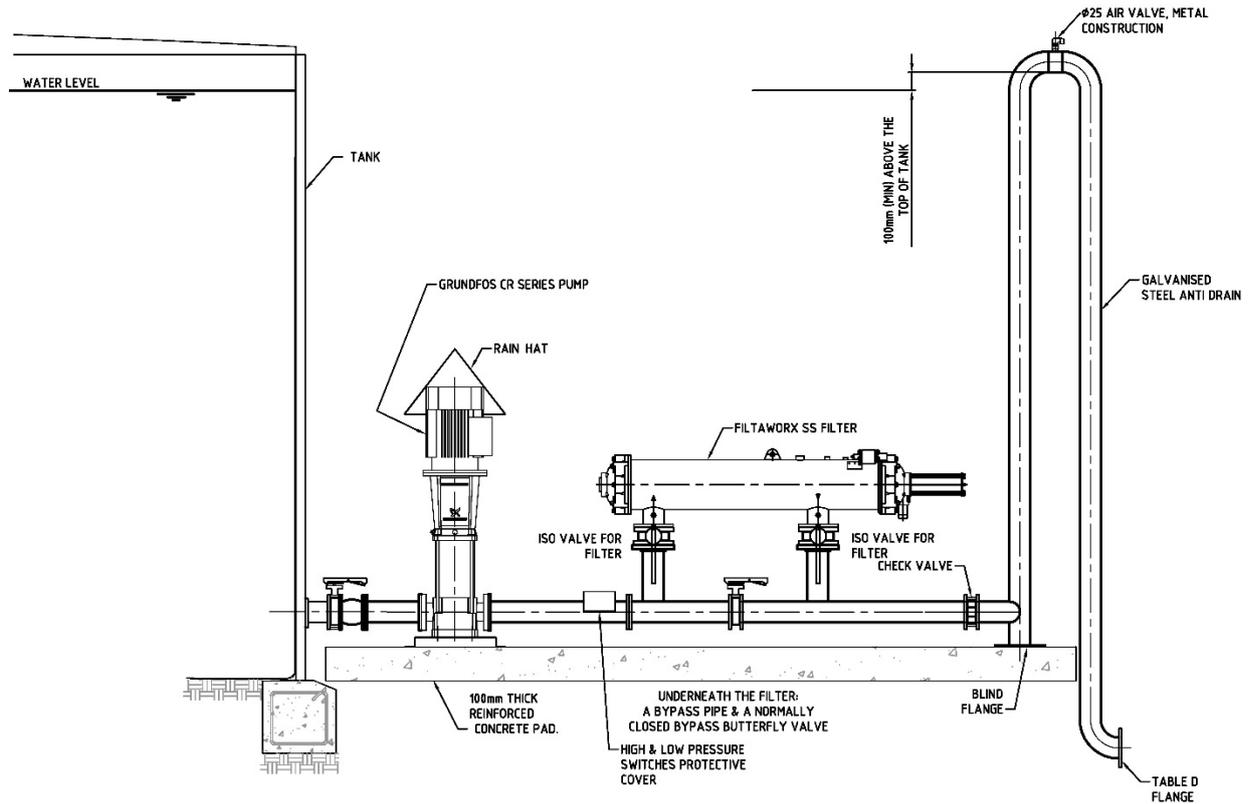
The Town of Port Hedland preferred pump manufacturer is Grundfos. The model to be utilised is CR or CRI series vertical multi-stage.

### **3.1.20 PUMP DELIVERY AND DISCHARGE MANIFOLDING**

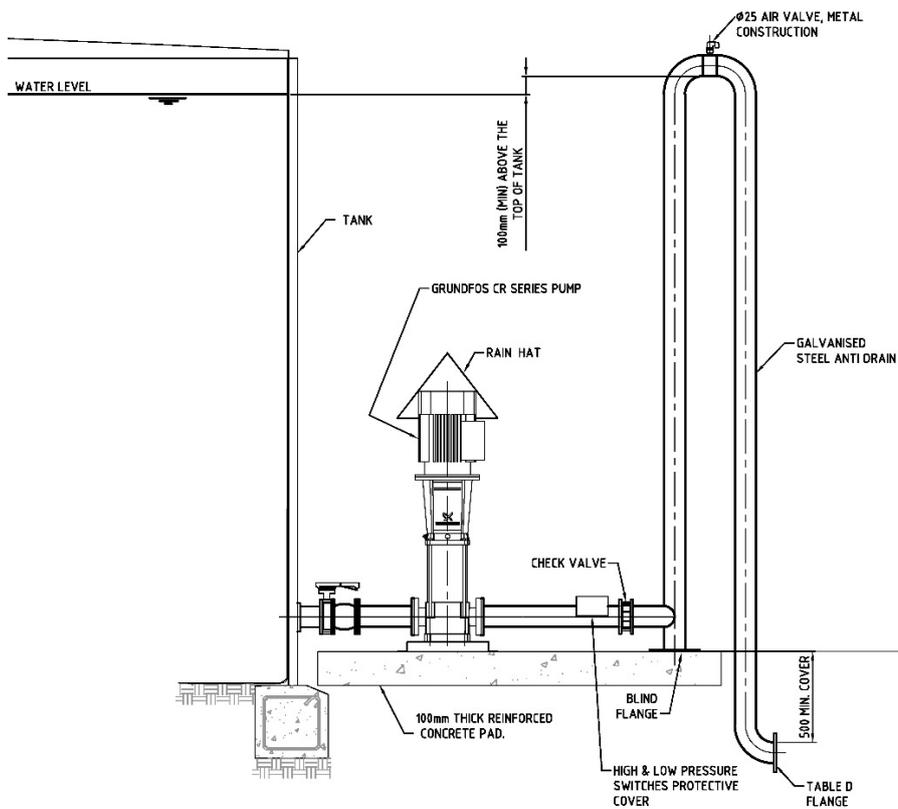
All pipework and fittings within the discharge manifold shall be manufactured from fusion welded PE100 poly onsite to suite nominated size & specification

Essential components of the discharge manifolds are:

- Epoxy coated cast iron butterfly valve with a stainless steel spindle installed on the discharge manifold - sized as shown.
- Epoxy coated cast iron wafer check valve with a stainless steel spindle installed on the discharge manifold - sized as shown.
- Flow switch for an irrigation pump.
- An anti-drain manifold that is 100mm higher than the tank.
- All flanges shall be joined with galvanised bolts, nuts and washers.



TYPICAL PUMPING STATION & FILTER



TYPICAL PUMPING STATION

**3.1.21 SIEMENS MAGFLOW**

A Siemens Magflow type meter with a remote readout attachment. The meter is to be installed downstream of the water source as per manufacturers specifications. The contractor shall allow connecting the signal output from the meter to the satellite controller sensor input at each site.

Each magnetic flow meter element shall be installed in such a way that a straight length of pipe is provided 6 diameters before and 3 diameters after the sensing element. When installing in non-metallic pipes, earth rings shall be installed at each side of the sensor

Special cabling from Siemens links the sensor element to the remote readout, which is normally housed within the irrigation control cabinet. In turn, the readout is linked to the controller via a Modbus RS485 connection.

The contractor shall carry out whatever calibration/configuration is required to ensure that the flow rate is accurately recorded. The contractor shall provide a flow verification certificate from the manufacturer, with each new flow meter supplied.

The Siemens Magflow sensing element is to be housed in one (1) Rain Bird Jumbo Rectangular Series (VB-JMB) valve box.

**3.1.22 SOLENOID CONTROL WIRES**

All low voltage (24 Volt) solenoid control valves shall be TYFLO multi-core cable multi-strand copper conductors sheathed in polyethylene.

A separate 2.5mm<sup>2</sup> multi-strand black common cable shall be installed with the multi-core.

Minimum cable sizes shall be:

- Common Wires - 2.5mm<sup>2</sup> conductor
- Active Wires < 400m - 1.5mm<sup>2</sup> conductor when cable run is under 400m.
- Active Wires 400m-800m 2.5mm<sup>2</sup> conductor when cable runs are between 400m.
- 800m – above 2 wire installations. The two-wire path shall be 4mm decoder wiring. The wiring must be as specified and recommended by the manufacturers of the controller and decoders.

**3.1.23 WIRE CONNECTORS**

All solenoid cable joints shall be fitted with a crimp and sealed with DBY or DBR connectors or to manufactures specifications.

Product	Wire Range mm <sup>2</sup>
DBY or One King connectors	0.823 - 3.31 mm <sup>2</sup>
DBY or One King connectors	1.31 - 5.26 mm <sup>2</sup>

**3.1.24 MD CONDUIT**

All low voltage solenoid wires and 2 wire paths and wires shall be installed in an appropriate sized MD electrical conduit.

**3.1.25 HD CONDUIT**

All high voltage power is to be installed in an appropriate sized HD electrical conduit.

**3.1.26 CABLE PITS**

P2 cable pits are to be used for all irrigation cabling.

**3.2 INSTALLATION**

**3.2.1 EXISTING SERVICES**

The Contractor shall determine the exact location of all existing site services and shall conduct his work to prevent disturbance or damage to them. Any damages to existing services shall be repaired at the Contractor's own expense.

**3.2.2 ROAD CROSSINGS**

Where irrigation sleeves do not exist, all road crossings must be done by means of horizontal under-road boring. Sleeves must be two sizes larger than the irrigation pipe nominated to be installed. Ducts shall be constructed as nominated below:

- All sleeves are to be class 9 PVC pipe.
- All sleeves are to extend to start and finish under non hard surfaces by minimum of 400mm (paths etc.).
- All sleeves are to be capped to stop ingress of soil.
- All sleeves are to be installed 750mm under the finished road surface.

**3.2.3 SETOUT**

The contractor shall do all setting out in accordance with the approved CAD irrigation drawings.

**3.2.4 PIPEWORK COVER**

Minimum Cover of Pipe		
Pipe Type	Landscape	Roads
Mainline	450mm	750mm
Laterals	350mm	750mm

**3.2.5 TRENCHING PARALLEL WITH ROADS**

Trenching which runs parallel with the road shall be no closer than 600mm from the kerb.

Lateral lines need to be offset even though this may not be indicated on the irrigation drawing.

**3.2.6 EMBEDMENT & BACKFILLING**

The bedding, overlay and backfilling of all pipework trenches shall be accomplished with material previously excavated from the site trenches providing it is in accordance with AS-2032 and should be of the following:

1. Sand or soil, free from rocks greater than 10mm, and any hard clay lumps greater than 75mm in size.
2. Crushed rock, gravel, or graded materials of even grading with a maximum size of 15mm.
3. Excavated material free from rocks or vegetable matter.
4. Clay lumps that can be reduced to less than 75mm in size.

Where trench work encounters unsuitable bedding material a 100mm bed of sand will be provided at the contractor's cost. This will be placed below pipe in the trench prior to pipe lying.

This will apply to overlaying and backfilling of all trenches, where the pipe will be covered with a minimum of 100mm of sand to prevent similar debris from coming in contact with the pipe or control cables. Under no circumstances will construction debris of any kind be included in any backfill material. Allowances should be made for not backfilling during the heat of the day to minimise the effects of thermal expansion and contraction on pipe already laid.

### **3.2.7 COMPACTION**

Compaction should take place only after suitable bedding and backfilling has been completed to the satisfaction of the principal. Compaction can be achieved by plate compaction or by flooding, depending on the application. However, irrespective of which method is used, it will remain the contractor's responsibility to ensure that reinstatement of trenches, due to subsidence, is not required throughout the defects liability period. Repair of any subsidence during this time shall be the contractors' responsibility.

### **3.2.8 EXCESS SPOIL**

Excess trenching spoil will be removed and disposed to a location of the site of as directed by the Town of Port Hedland.

### **3.2.9 TURFING**

Where trenching is required through existing turf, the turf must be removed via a turf cutter by the Contractor and then replaced after the trench has been backfilled and compacted. The Contractor is responsible for keeping the turf in good condition until it is replaced.

The Contractor shall re-turf all trenches and excavations nominated by the Town of Port Hedland under the contract.

All turf shall be kept in a healthy condition until re-laid and shall be re-laid within a six (6) hour period. The Contractor shall allow for the cost of a water truck to hand water newly laid turf at the end of each day.

### **3.2.10 CROSS STACKING OF FITTINGS**

Cross-stacking of fittings will not be accepted

### **3.2.11 PIPE BETWEEN FITTINGS**

A minimum length of 300mm of pipe shall be installed between fittings.

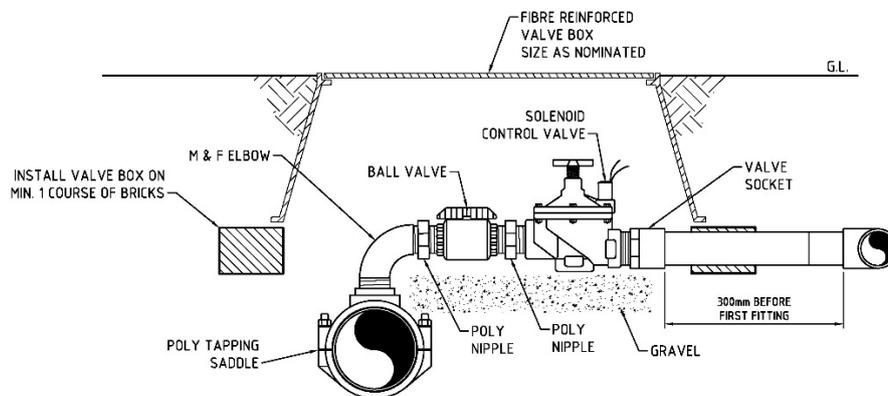
### **3.2.12 BENDING OF PIPE**

Bending of pipes will not be accepted.

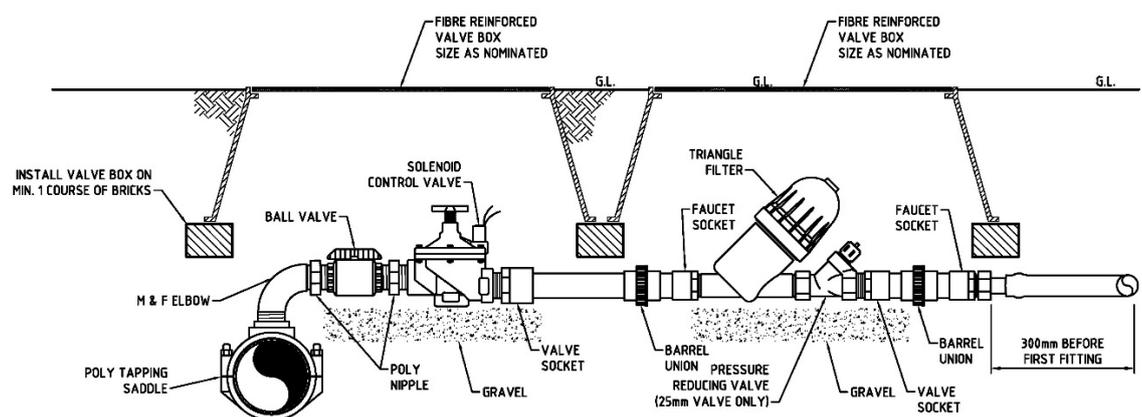
### 3.2.13 SOLENOID CONTROL VALVES

- Solenoid valves shall be installed as nominated below:
- Joints on the upstream side of the valve can use SWJ PVC.
- Top of the valve is to be located a maximum of 350mm below finished ground level.
- To be housed in the nominated valve box.
- Valve boxes are to be centrally located over the solenoid valve and isolation ball valve to allow for easy operation and servicing.
- All valve boxes are to have 50mm of gravel to cover the base.
- Upstream/downstream pipework mustn't come into contact with the valve box

### SPRINKLER VALVE



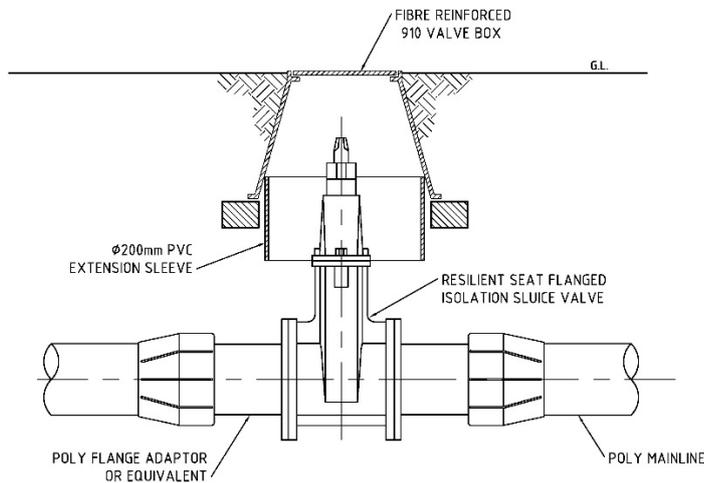
### DRIP VALVE



### 3.2.14 MAINLINE ISOLATION VALVE

Mainline isolation valves shall be installed as nominated below:

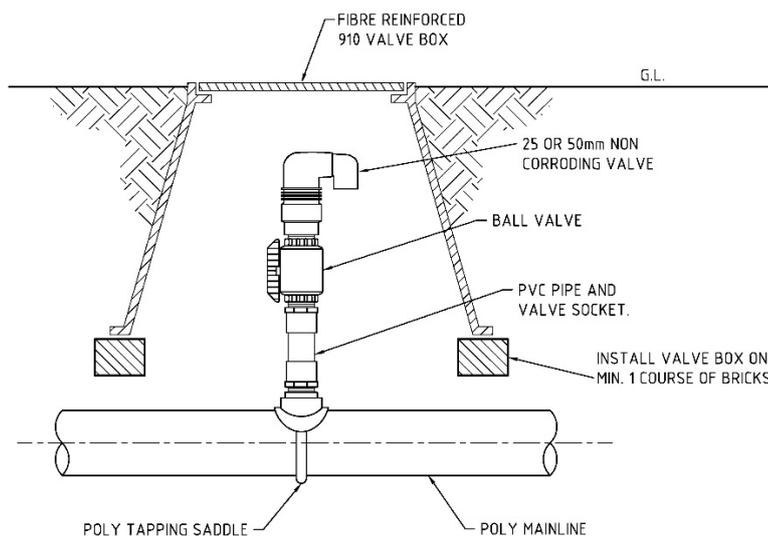
- To be housed in the nominated valve box.
- Valve boxes are to be centrally located over the mainline isolation to allow for easy operation.



### 3.2.15 AIR/VACUUM RELEASE VALVE

Air / Vacuum release valves shall be installed as nominated below:

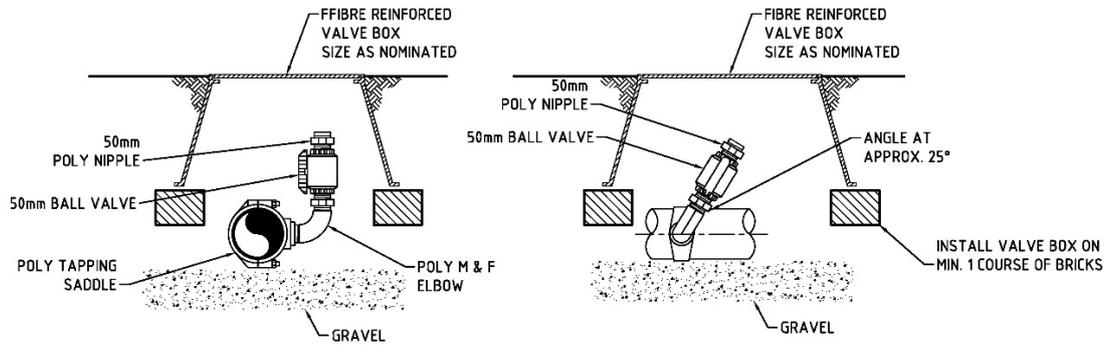
- To be housed in the nominated valve box.
- Valve boxes are to be centrally located over the air/vacuum release valve to allow for easy operation.



**3.2.16 FLUSHING VALVES**

All mainline shall have a 50mm flushing valves at each capped ends.

- To be housed in the nominated valve box.
- Valve boxes are to be centrally located over the flushing valve to allow for easy operation.



**SPRINKLER INSTALLATION**

All sprinklers shall be installed as per the manufacturer’s instructions. The Contractor shall be responsible for:

- Ensuring all sprinkler heads fully retract when not in operation.
- Each sprinkler is set to the correct height.
- Each sprinkler is set straight.

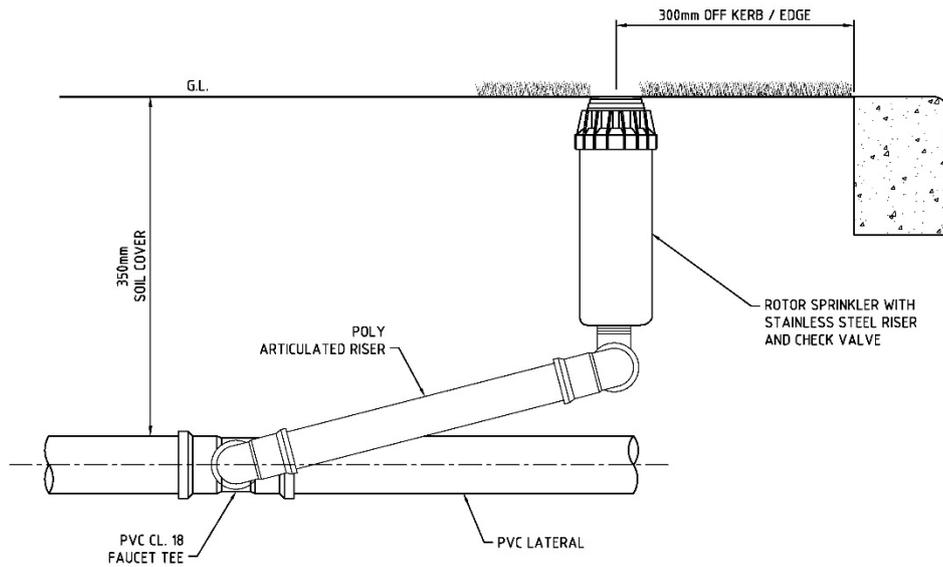
**SPRINKLER SET HEIGHT**

Area Type	Planting	Sprinkler Height relative to GL
Turf Area	Seeded	Flush
Turf Area	Roll On	Flush
Garden Areas	Plantings with Mulch	75mm under mulch

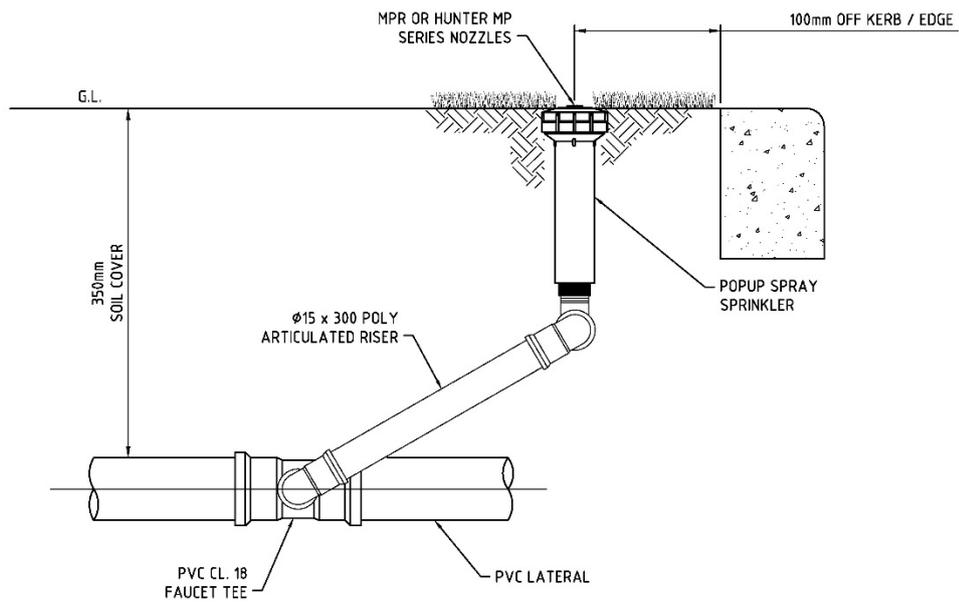
**ROAD VERGE SPRINKLERS**

Sprinkler Type	Offset from the back of kerb
Gear Drive	300mm
Popup Spray	100mm

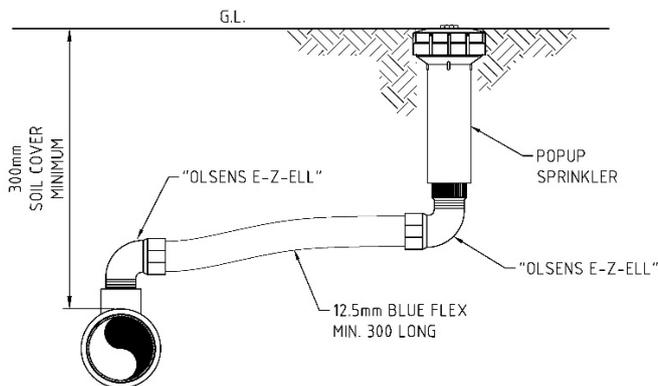
**ROTOR SPRINKLER**



**POPOP SPRAY SPRINKLER**



**TREE BUBBLER**

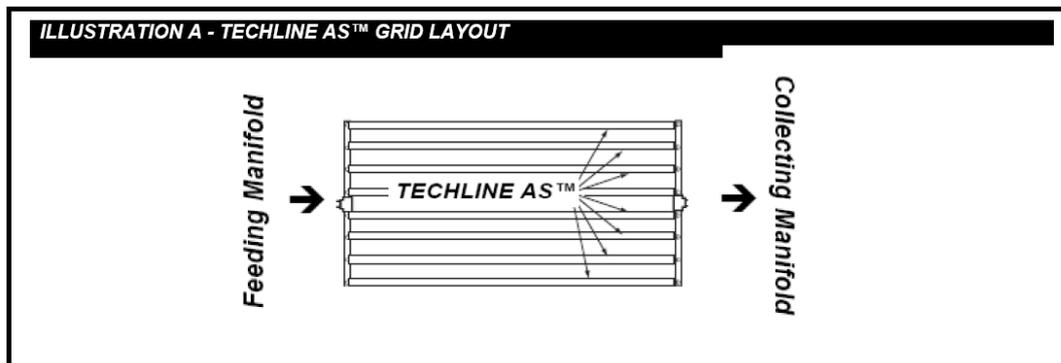


**3.2.17 TANK INSTALLATION**

The tank must be installed on a concrete slab must be at least 25mpa and 100mm thick with F62 mesh halfway through the mix. The slab should be screeded flat and level with no high or low spots. The finished surface should have a trowelled finish.

All tanks when installed must be secured for when they are exposed to adverse wind conditions applicable to the Town of Port Hedland.

### 3.2.18 DRIPLINE



The Grid Layout is the preferred method for installing Techline AS sub-surface under 75mm of mulch.

This method requires supply and collecting manifolds with rows of Techline AS connected at each end.

The supply manifold delivers water to each row of Techline AS. The collection manifold forms a continuous loop in the system. A manual flushing point is to be installed on the collecting manifold.

This interconnection of the piping network forms “GRID layout”. This evens out the flow, helps ensure water is being delivered downstream of any breaks in the laterals and allows for much easier repairs of any line breaks.

All fittings are to be secured with Cobra Clamps and dripline is to be secured with Antelco asta hold down stake every five (5) metres.

### 3.2.19 SOLENOID CONTROL WIRING

The control wires shall be:

- Laid in a conduit alongside, but no closer than 100mm too, the mainline.
- A minimum of 2 spare wires or 10% (whichever is greater) should be left at the end of all mainlines. If the mainline is a ring main, the spare wires shall be run bidirectional.
- Wire connectors shall only be installed by experienced tradesmen to manufacturer’s specifications.

Note: Solenoid valves shall not be paired in the field. Any pairing of solenoids shall be done back at the control cabinet.

### 3.2.20 CABLE PITS

P2 cable pits are required every 100 meters or change of direction. All cable pits will have a hole in the base of 50mm minimum size.

### 3.2.21 FINAL INSPECTION AND COMMISSIONING

On completion of all works the Town of Port Hedland must be contacted to arrange a date for final inspection and commissioning. This process must not proceed without Council, or their appointed representative, being present.

### **3.3**

## 4 ELECTRICAL

The Contractor shall ensure that all materials and workmanship shall be accomplished in accordance With the regulations and requirements of Horizon, industry Codes of Practice and with current S.AA. Wiring rules, standard specification for cabinet size and layout is to be used.

### 4.1 REGULATIONS

The contractor shall ensure that all materials and workmanship shall be accomplished in accordance with the regulations and requirements of Horizon, industry Codes of Practice and with current S.A.A. wiring rules (AS-3000).

### 4.2 POWER SUPPLY, LABELLING, EARTHING

The power supply to this installation will be 415/240 volt, plus or minus 6%, 3 phase, 4 wire, 50 hertz, which is to be sourced from the power pole installed as part of these contract works.

The contractor shall make all the necessary applications to the Horizon Corporation, to obtain a suitable 'off-peak tariff' power supply for the project works, with all materials and equipment supplied under this contract being designated for this supply, unless otherwise specified.

The contractor shall supply and install a 100mm galvanised power pole, connections and underground power supply cables/conduits to the proposed location of the new bore & cabinet, in accordance with the rules and regulations of Horizon Corporation.

The Contractor shall:

- Install the earthing system in accordance with the multiple earthed neutral (MEN) system requirements, if applicable.
- Use earthing conductors of high conductivity copper unless otherwise specified.
- 

The Earth shall be:

- Installed from the pit electrode via a conduit to the cabinet.
- Connect an earth electrode with approved copper or brass band type clamps, or proprietary made clamp assemblies.
- Ensure that steel clamping bolts are galvanised or stainless steel and paint exposed parts of the connection with an approved metallic paint.
- Earth electrode shall be 3000mm long copper clad steel cored type, of 16mm diameter and driven to a depth of 2900mm into the ground.
- Provide additional earth electrodes as necessary to achieve S.A.A. wiring rules earthing resistance requirement.

### 4.3 IRRIGATION CONTROL CABINET

#### 4.3.1 CABINET CONSTRUCTION

- Free-standing cabinets shall comply with Category D Cyclone rating
- The irrigation control cabinet shall be a fully weatherproof, freestanding, cabinet type enclosure of 2.5mm (minimum) marine grade aluminium construction. It shall be IP56 rated.
- External finish of the irrigation control cabinet shall be powder coated white
- Cabinet doors shall be constructed from 2.5mm (minimum) marine grade aluminium adequately constructed to protect against unauthorized entry.

- The front irrigation cabinet door (for non-qualified personnel) shall be complete with one-off half Euro swing handle with 3 point linkage locking mechanism (keyed to the Town of Port Hedland standard irrigation key). The hinges shall be chrome plated.
- The rear irrigation cabinet door (for qualified electrical personnel) shall be complete with one-off half Euro swing handle with 3 point linkage locking mechanism (keyed to the Town of Port Hedland standard irrigation key). The hinges shall be chrome plated.
- The irrigation control cabinet shall include a 75mm x 40mm PFC hot dipped galvanised or aluminium base fixed to the irrigation cabinet with galvanised bolts with spring washers and NYLOC nuts. The base shall be fixed to the concrete foundation with six off 100mm x 10mm galvanised bolts.
- The cabinet shall incorporate a separate section within the cabinet for the installation of the Horizon Corporation meter and equipment, and shall conform to the requirements of the Corporation.
- The cabinet shall be ventilated in accordance with the recommendations of the manufacturer of the equipment that is to be installed within the cabinet, and in accordance with sample drawings included with this specification (if any).
- Provide and install labels within the pump cabinet for all the power and control equipment.
- All meters, indicator lamps, key-operated switches, pressure gauges etc. being panel mounted.
- Provide and install a laminated copy of the control schematic in A4 format within the pump cabinet inside a document holder.

#### **4.3.2 ANCILLARY EQUIPMENT**

Below is the Ancillary equipment that is required for a potable system and a tank/pump system.

##### **POTABLE MAINS SYSTEM**

- Horizon Corporation meter
- General Power Outlet – 240VAC panel mounted within the cabinet
- An automatic irrigation controller

##### **TANK / PUMP SYSTEM**

The contractor shall incorporate into the electrical switchboard, but not limited to, the following equipment:

- Horizon Corporation meter.
- An electrical circuit for connection to the pressure transmitter and configured to provide the system with protection from high and low-pressure fault, together with 1-10 minute programmable timing delay, electrical 'lock-out' of the irrigation pump, a visual indication of the low-pressure fault and a reset button via the touchscreen.
- An approved pressure gauge, connected to the high/low-pressure hydraulic pipe, with a scale to 1000 kPa.
- One level transmitter to be configured to provide the system with protection from a low water level in the tank, electrical 'lock-out' of the pump, a visual indication of the low-level fault and a reset button.
- An automatic irrigation controller providing complete pump operating functions.

#### **4.3.3 CONCRETE BASE**

The concrete base shall be sized to suit the requirements of the irrigation control cabinet. The exact location is to be verified with the Town of Port Hedland prior to installation.

The finished level of the concrete base shall be a minimum of 150mm above finished ground level and 400mm minimum below finished ground level.

The concrete base shall be constructed from a minimum of 40 MPa concrete and shall conform to all relevant standards.

All electrical conduits shall be complete with sweep bends installed below the concrete base.

## 5

## PARK MANAGEMENT SYSTEM SPECIFICATION

### 5.1 GENERAL

A Park Management System will be required to provide both local and remote control/monitoring of each of the parks as indicated in the scope of work. Each local control system shall be able to communicate periodically (and upon request) to the Central System via a 3G/4G wireless router.

Each controller shall be able to communicate to a Central Server to provide instantaneous internet access of the park controller

Full details on each of the components of the proposed Park Management System have been included in the following sections.

Controllers shall be Waterman Irrigation Smart Park controllers or equivalent.

#### 5.1.1 HARDWARE

The local park management controller shall utilize standard industrial hardware for the control of solenoids, pumps and sensors. This will have the following specification:

1. The controller shall be programmable using standard internationally accepted programming languages in accordance with IEC specifications
2. The controller shall communicate between the processor and input/output modules using open standard protocols. Manufacturer specific protocols will not be acceptable.
3. The controller shall be identical for all sizes with only the quantity of input/output modules varying per location.
4. The controller shall be made of industrial standard hardware with the main processor capable of operating in temperatures of up to 70°C
5. Replacement parts are to be off the shelf components and capable of being fitted on-site.
6. All outputs shall be fully isolated volt free contacts
7. The controller shall be able to control solenoids via an encoder/decoder system.
8. All sensor inputs shall accept industry standard 4-20 mA input signals
9. The controller shall provide remote I/O capability providing cable, wireless routers and radio-based extension of the control system.
10. Local operation of the controller shall be via a programmable touch screen operator interface.
11. Local operation shall also be possible via the use of a laptop computer or via a 3G based mobile phone/ PDA.
12. The controller shall be able to accept multiple sensor inputs via an RS485 data link
13. Each controller shall have soft start and soft stop facilities for pump outputs as well as VSD control functions.
14. With each pump control function the controller shall be able to accept all the following signal inputs
  - Flow meter (pulse or 4-20 mA)
  - Pressure transmitter (4-20 mA)
  - Level transmitter for bore depth or tank level (4-20 mA)
  - Pump current (4-20 mA)
  - Salinity (4-20 mA)
  - pH level (4-20 mA)
  - Temperature (4-20 mA)

#### 5.1.2 FIRMWARE AND SOFTWARE

1. Each controller shall be capable of controlling as a minimum
  - 100 stations in 100 groups
  - 4 pumps
  - 8 light circuits
  - 8 electric BBQ circuits

2. All controllers shall be pre-programmed to accept all the above functions with features being able to be switched on or off
3. Every controller shall have an integral alarm reporting system with time and date stamping
4. Changes made to the local controller program shall be able to be viewed and modified from the central control system.
5. Each controller shall display soft start and soft stop settings for each pump
6. With each pump control, function the controller shall be able to display all the following signal inputs.
  - a. Flow meter (pulse or 4-20 mA)
  - b. Pressure transmitter (4-20 mA)
  - c. Level transmitter for bore depth or tank level (4-20 mA)
  - d. Pump current (4-20 mA)
  - e. Salinity (4-20 mA)
  - f. pH level (4-20 mA)
  - g. Temperature (4-20 mA)
7. The controller shall be able to display weather station data and retransmit this to the central control system from where the info can be retransmitted to other sites
8. Individual controllers shall be able to calculate evapotranspiration figures.
9. Separate control features shall be able to be selected to separate standard pumps from jockey pumps or tank fill pumps.
10. Faults in the transmitters are to be recorded in the local alarm list
11. Each pump control shall have alarm functions for:
  - a. No flow
  - b. High flow
  - c. Low flow
  - d. Low current
  - e. High current
  - f. Low level
  - g. High pressure
  - h. Low pressure
12. Each controller shall be able to skip or stop the irrigation program based on flow (high or low) or pressure (high or low). The setting shall be able to be adjusted from the local touchscreen as well as from the central control system
13. Each station shall be able to be grouped together in freely assignable groups. A total of 100 groups shall be able to be programmed using stations more than once and not necessarily in numeric order.
14. Pump or main valve outputs shall be able to be selected per program. E.g.: program 1 can use pump 1 while program 2 uses plain scheme water.
15. Each controller shall have as a minimum of 6 programs and 3 starting times each.
16. Manual control of valves or groups of valves shall be selectable from the controller. This shall be independent from the programmed settings.
17. Semi-automatic control of valves and groups of valves shall be selectable from the controller. This shall be independent from the programmed settings and shall use 1 sec interval settings to a maximum of 9999 seconds.
18. Access to the controller shall be secure via the use of multiple passwords
19. A single programmable value (duration factor) shall be able to vary the irrigation times between 0-999% of settings
20. Irrigation times shall be selectable between 0-9999 minutes in intervals of 1 minute.
21. Full status information shall be available for all functions via the touchscreen. Values shall be displayed in an easy to follow format allowing all relevant info regarding a single operation to be displayed within one screen.
22. The controller shall be able to log operational alarms and events in its own memory. A minimum of 5 MB of data log space shall be available in each controller.

### 5.1.3

## **HANDHELD CONTROL DEVICES**

A single handheld controller shall be able to provide bi-directional control of all the controllers in the system

The device shall be connected to the 3G network and be able to provide instantaneous feedback of the following values:

- a. Line pressure
- b. Flowrate
- c. Time remaining

All functions that are available on the local touchscreen should be available on the mobile devices.

### **Communications**

Each controller shall be equipped with multiple communication ports for the provision of communication between the following:

1. Between the central control system and each controller using a 3G wireless router
2. Between the controller and remote I/O devices using radio
3. Between the controller and remote I/O devices using RS485
4. Between the controller and a laptop computer using Ethernet

## **5.2 LOCAL CONTROLLERS**

Domestic housing controllers are to be Hunter Pro - C controllers either four (4), six (6) or eight (8) stations depending on what is required.

# **6 INTERNET ACCESS**

## **6.1 HARDWARE**

Each controller shall be capable of connecting directly to the Central Control system for the immediate access to the controller functions using the internet and a standard browser. As such, a wireless router with programmable VPN functions shall be included with each controller. Antennae selected for the router shall be non-obtrusive vandal resistant.

### **SOFTWARE**

The Central Software shall provide instantaneous access to all controllers. All information stored in the local controllers shall be able to be viewed as well as modified from the central control system.

In addition to the viewing and modifying of data, the central control system shall also provide extensive reporting facilities to provide graphical as well numerical data reports.



# Town of **Port Hedland**



## WEED MANAGEMENT STRATEGY

DOCUMENT REGISTER			
Version	Date	Amendments	Prepared By
1	28.08.2019	Draft	MJ

## **1.0 PURPOSE**

The purpose of the Town of Port Hedland (the Town) Public Open Space (POS) and Urban Landscapes Weed Management Strategy is to provide an integrated approach to weed management; to prevent, monitor and control the spread of weeds and conserve the amenity, aesthetics and functionality of the Town's POS and Urban Landscapes.

The Strategy encompasses the following:

- Identify and priorities local weed species
- Recommended integrated weed management strategies to control the spread of weeds
- Provide advice and recommendations for weed control strategies in specific sites and for priority weeds.

### 1.1 INTEGRATED WEED MANAGEMENT APPROACH

Integrated weed management involves using a variety of techniques to monitor, prevent and control weeds. Using a variety of control methods, rather than just one, ensures that weeds are less adaptable to the control methods and do not develop herbicide resistance. The integrated weed management approach for the management of weeds in the Town's POS and Urban Landscapes Areas are as follows:

- Weed monitoring
- Weed prevention
- Weed control (physical and chemical)

### 1.2 GLYPHOSTATE

The Town has made the decision to remove Glyphosate based products from their spray program. Alternatives to Glyphosate are being trialled including the use of selective and pre-emergent herbicides where suitable.

## 2.0 PRIORITY WEEDS

The most common weeds that are managed in the Town's POS and Urban Landscapes Areas include:

- Kapok bush (*Aerva javanica*)
- Coffee bush (*Leucaena leucocephala*)
- Caltrop (*Tribulus terrestris*)
- Neem Tree (*Azadirachta indica*)
- Medic burr (*Medicago polymorpha*)
- Buffel Grass (*Cenchrus ciliaris*)
- Purple top Rhodes grass (*Chloris virgata*)

Calotropis (*Calotropis procera*) and Noongoora burr (*Xanthium strumarium*) are declared pest plants in Western Australia under the *Biosecurity and Agriculture Management Act 2007 (BAM Act)*. Harmful organisms that are present in the state, such as Calotropis and Noongoora burr, are declared pests under the *BAM Act* so that they can be appropriately controlled. Under the *BAM Act*, the Town is obliged to search for, and eradicate all Calotropis and Noongoora burr on Town owned land. All Calotropis and Noongoora burr (see Appendix A for identification guide) must be reported to the WA Department of Primary Industries and Regional and treated to prevent spread within 48 hours.

The Department of Agriculture and Food can be notified in the following ways:

- Weed Watcher smartphone and tablet app, or;
- Online Reporting Tool on the Department of Primary Industries and Regional Development website

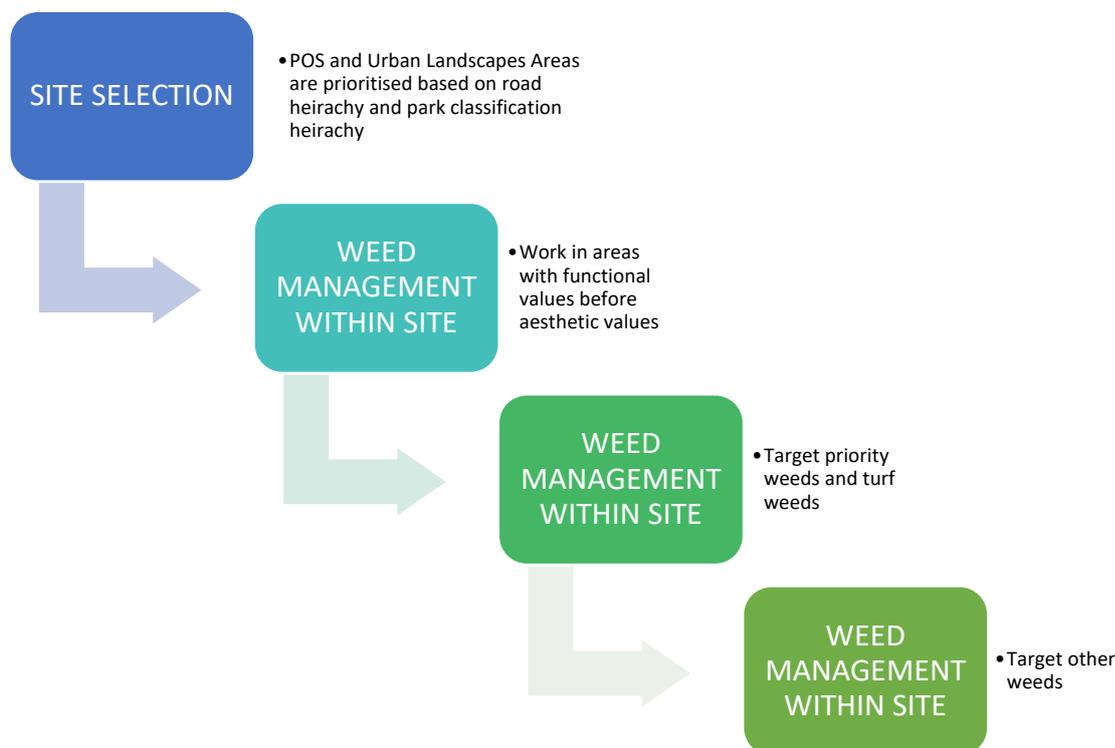
Weed identification guide in Appendix A and B.

## 3.0 WEED MANAGEMENT SITE PRIORITISATION

The Town will approach weed management prioritisation of POS and Urban Landscapes Areas as detailed in the following sections.

### 3.1 PRIORITISATION OF SITES

The Town will conduct weed management on a priority basis using the criteria shown below.



### 1.3.2 SITE CATEGORIES

#### Public Open Space

Park sites are categorised based on the classification set out in the *Town of Port Hedland Public Open Space Strategy*. A brief description of these classifications and their weed management priority (1 – Very high priority and 4 – low priority) are as follows.

#### *Local Open Space (Medium Priority - 3)*

Local Open Space (LOS) are small parks that are designed to accommodate the daily recreation needs of the immediate population. Generally they are used for recreation and may include small areas of nature space but not usually suitable for formal or informal sport.

*Neighbourhood Open Space (High Priority - 2)*

Neighbourhood Open Space (NOS) serves as recreational and social focus of a community. A variety of features and facilities attract residents.

*District Open Space (Very High Priority - 1)*

District Open Space (DOS) are designed to provide for organised formal sports. DOS consists of space to accommodate a range of uses and serve several communities.

*Regional Open Space (Very High Priority - 1)*

Regional Open Space (ROS) accommodate recreation and organised sport spaces. They may also serve for significant conservation and environmental values and features.

## Urban Landscapes Areas

Urban Landscapes Areas are contained within roads or along road reserves and thoroughfares including carparks. Also in this category includes areas that have functional requirements including the open stormwater drainage network. Urban Landscapes Areas are broken down into the following categories and weed management is based on priority rating:

*Central Business District (Very High Priority – 1)*

The Central Business District (CBD) includes POS, verges, road reserves and pedestrian access-ways in both the Port Hedland and South Hedland town centres. The CBD's should be maintained to a high standard of appearance and increased frequency of all aspects of landscape maintenance within these areas, including weed management.

*Streetscapes (High Priority – 2)*

The streetscape is the visual identity of a neighbourhood and includes footpaths, medians and landscaping along streets and roads. Streetscapes are prioritized by road hierarchy (Appendix C) with priority set as:

- Regional Distributor (High Priority – 2)
- Local Distributor (Medium Priority – 3)
- Access Road (Low Priority – 4)
- Primary Distributor covered under Private Works

*Pedestrian Access Ways (Medium Priority – 3)*

A pedestrian access way is any path in the public domain that is available for use by pedestrians and vehicles that are not regulated by the *Road Traffic Act 1974* (i.e. bicycles and skateboards).

*Open Stormwater Drainage Network (Low Priority – 4)*

The open drainage network include drains, sumps and swales will be maintained to ensure visual amenity and prevent the spread of weeds throughout the extensive drainage network of the Town.

*Private Works*

The Town is currently contracted to maintain the verge and footpaths of Great Northern Highway regional distributor (Appendix C) three times a year, or as per contract.

The Town also maintains the public school ovals. These ovals are maintained on a Medium – 3 priority basis.

**4.0 WEED MONITORING**

Weed monitoring is an important aspect of integrated weed management. Ongoing monitoring conducted will assist in effective identification and management of weed populations to ensure aesthetic appeal of POS and Urban Landscapes Areas. Weed monitoring will contribute to assessing the success of weed management strategies.

The Town's Parks and Gardens Leading Hand will conduct observational weed monitoring on a monthly basis for all of the Town's POS and Urban Landscapes.

**5.0 WEED PREVENTION**

Prevention of weeds in POS and Urban Landscapes Areas are a contributor to effective weed control. Eradication usually required more effort than prevention.

*Mulching*

Pathogen and weed free mulch to Australian Standard 4454:2012 is to be applied to suppress weed growth in gardens beds or suitable non-turf areas. Alternatives to mulching are outlined in the *Town of Port Hedland Landscape Guidelines*.

*Turf Management Practices*

Fertiliser is to be applied to improve the quality of the turf and promote healthy turf. Healthy turf reduced the ability for weeds to grow in the turfed area. A yearly fertiliser program will be based on annual turf soils and leaf analysis.

*Turf renovation works*

Turf renovation works will be undertaken twice a year to improve the density and coverage.

*Suppression of weed seed bank*

Weeds are suppressed through the use of chemical pre-emergent herbicides. These types of chemicals can only be applied to certain areas such as hardstands.

*Hygiene practices*

Horticultural hygiene is important to ensure that weeds, pathogens and pests are not spread between POS and Urban Landscapes Areas. Town staff and contractors will undertake hygiene measures on vehicles and plant used for turf maintenance and renovation at the end of each day, and between sites where necessary.

**6.0 WEED CONTROL STRATEGIES**

Weed prevention is important for reducing the number of new weed infestations from occurring or spreading between POS and Urban Landscapes Areas; weed control is necessary to reduce or eradicate weed infestations. Failure to control weeds can have significant impacts such as affecting the quality of playing surfaces, and the aesthetics and amenity of POS.

A component of the Town's integrated weed management strategy includes the use of approved herbicides. Weed control can involve the use of a number of methods to reduce infestations to manageable levels, or where possible eradicate infestations. Weed control methods for POS and Urban Landscapes Areas include chemical and mechanical controls.

**6.1 PHYSICAL WEED CONTROL**

Physical control is primarily undertaken in Public Open Space. This method is used when weed infestation is significantly affecting the presentation of the landscape, and chemical application has been determined to not be the most effective control method. Physical controls include weed removal by hand, mowing or mulching.

## 6.2 CHEMICAL WEED CONTROL

The majority of weeds controlled in the POS and Urban Landscapes Areas are managed with approved herbicides, as they are effective, economical and less labour intensive on large infestations. Two main methods of chemical application used by the Town are blanket spraying and targeted application.

The chemicals are used in accordance with the manufacturer's specifications and guidelines.

### *Blanket Spraying*

Blanket spraying will be undertaken with the vehicle mounted boom sprayers, as this is the most efficient and effective method to apply chemicals over large areas such as sporting ovals.

### *Targeted Application*

Targeted application is undertaken using backpack/handheld sprayers, vehicle mounted spray units, hand applicator or paint/basal bark treatment. Targeted application is generally for small areas of where large machinery are unable to reach.

Given the climate of Port Hedland, there must be consideration on the selection of pre-emergent herbicides based on the requirement for set amount of rain or irrigation within a defined period after application to ensure the full pre-emergent effect.

To ensure efficiency and consistency of chemical application, SDS and Label should be checked to determine at what temperature spraying should cease, procedure should change (including addition of water or surfactant) or alternative controls considered.

In addition, if wind speeds exceeds 15km/h, adjustments must be made to the application procedure. These adjustments may include ceasing application until wind speed decrease, adjusting droplet size adjusted (which will require a review of herbicide application rate) or alternative control method selected.

All herbicide application is to be as per the manufactures specifications and guidelines.

## 6.3 SITE SPECIFIC CONTROL STRATEGY

### *POS*

Weed control on all parks, recreational and sports facilities will be through the following methods:

- Turf
  - Pre- and post-emergent broadleaf selective blanket spray.
  - Target spray of grasses surrounding infrastructure (i.e. fences / light posts)
  - Turf management practices
- Garden beds
  - Target spray
  - Hand weeding
  - Mulch application
- Hardstands and footpaths
  - Targeted application, use of pre-emergent herbicides where appropriate

### *Streetscapes*

Weed control in the streetscapes is to be conducted through the following methods:

- Kerbs
  - Targeted application, use of pre-emergent herbicides where appropriate
- Median strips
  - Blanket spraying, use of pre-emergent herbicides where appropriate
  - Targeted application, use of pre-emergent herbicides where appropriate
- Hardstands and footpaths
  - Targeted application, use of pre-emergent herbicides where appropriate

*Central Business District*

Weed control through the CBD is given a high priority due to the requirement for a high standard of visual appearance required in these areas. Weed control in the CBD is conducted through the following methods:

- Turf
  - Pre- and post-emergent broadleaf selective blanket spray.
  - Target spray of grasses surrounding infrastructure
  - Turf management practices
- Garden beds
  - Selective targeted application
  - Hand weeding
  - Mulch application
- Hardstands and footpaths
  - Targeted application, use of pre-emergent herbicides where appropriate
- Kerbs
  - Targeted application, use of pre-emergent herbicides where appropriate
- Median strips
  - Blanket spraying, use of pre-emergent herbicides where appropriate
- Streetscapes
  - Hand weeding
  - Targeted application
  - Mulch application

*Pedestrian Access Ways*

Weed control is conducted in Pedestrian Access Ways through the following methods:

- Fence lines
  - Targeted application
- Hardstands and footpaths
  - Targeted application, use of pre-emergent herbicides where appropriate

#### *Open Stormwater Drainage Network*

Weed control in drains must primarily occur during the dry season. It should consist of mowing and herbicide application. Care must be taken to ensure that herbicide chosen for use in drains has low or no aquatic life toxicity, this information can be found on the specific herbicide's SDS and Label.

Where herbicide application, in drainage infrastructure is deemed necessary South Australia Environmental Protection Agency recommends using a herbicide with the following characteristics:

- Low eco-toxicity
- Nil or low volatility at all temperatures (e.g. <10-6mm Hg)
- Low water solubility (e.g. <3mg/L)
- High soil absorption coefficient (e.g. Koc >1900cm<sup>3</sup>/g)
- Short half-life (e.g. in water <15days; aerobic soil metabolism <610 days; anaerobic soil metabolism <9 days).

All weed control within the Open Stormwater Drainage Network will be carried out based on seasonal and tidal conditions fluctuations.

#### *Private Works*

The Town will mow, whip and spray Great Northern Highway three times a year, or as per contract. Preferably, pre-emergent herbicides will be used where appropriate. If no suitable non-selective pre-emergent herbicide is identified, consideration must be given to alternating between selective herbicides each time the contract is carried out.

The Public School ovals are primarily maintained by mowing and whipping. Should infestations of weeds be present on the oval, all effort should be made to treat them through school holidays using an appropriate control method.

### **6.0 TRAINING**

Whilst a Pesticide Technician Licence is not essential for local government, as the pest management is not for a profit, it is recommended that all employees undertake formal chemical certification training to ensure that safe chemical handling and application practices are understood and adhered to.

### **7.0 REVIEW**

As per the Town of Port Hedland Landscaping Policy 10/003, the Town of Port Hedland Weed Management Strategy is to be reviewed on a yearly basis , on the direction from the Manager of Parks, Gardens and Engineering.

**APPENDIX A - BIOSECURITY AND AGRICULTURE MANAGEMENT ACT 2007  
DECLARED WEEDS**

**CALOTROPIS**

**Botanical name:** *Calotropis procera*

Declared pest in Western Australia.

**Growth form:** Shrub or small tree growing approximately 4m tall.

**Recommended control:** Cut stump/ basal bark or foliar application on smaller specimens. Using following herbicides Picloram + 2,4-D amine, Access™, Picloram + triclopyr.



NOONGOORA BURR

**Botanical name:** *Xanthium strumarium*

Declared pest in Western Australia

**Growth form:** erect annual herb growing up to 2.5 m tall.

**Recommended control:**

Seedling stage: 2,4-D amine; MCPA

Apply to actively growing plants: Metsulfuron

Before plants reach height of 20cm:

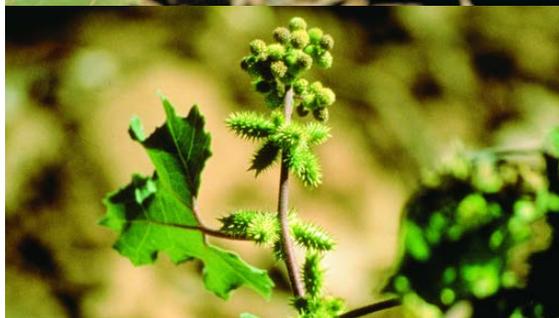
Fluroxypyr

Early as possible before flower formation: 2,4-D ester

Prior to burr formation: Glyphosate

Older weeds:

MCPA; Picloram + 2,4-D



**APPENDIX B – LOCAL PRIORITY WEEDS**

**KAPOK BUSH**

**Botanical name:** *Aerva javanica*

**Growth form:** Small slightly woody shrub or herbaceous plant

**Recommended control:**



**CALTROP**

**Botanical name:** *Tribulus terrestris*

**Growth form:**

**Recommended control:** dicamba (80g/L) + MCPA (340g/L)



<p>NEEM TREE  <b>Botanical name:</b> <i>Azadirachta indica</i>  <b>Growth form:</b> Tree reaching 15-20m, often multiple stem.  <b>Recommended control:</b> Seedling – foliar spray; adult – cut stump. Using the following herbicides Triclopyr 300 g/L + Picloram 100 g/L</p> <p>Note: In numerous locations throughout the Town Neem trees have been planted as shade trees. These trees do not warrant treatment. Focus for treatment of neem trees should be where they have self-seeded and pose the risk of spreading, such as in the drainage network.</p>	 
<p>MEDIC BURR  <b>Botanical name:</b> <i>Medicago polymorpha</i>  <b>Growth form:</b> groundcover herb  <b>Recommended control:</b> Metsulfuron methyl 10g/100L</p>	

COFFEE BUSH

**Botanical name:** *Leucaena leucocephala*

**Growth form:** tree growing to a height of 10m. Produces many suckers and seeds.

**Recommended control:** cut stump or basal bark



**BUFFEL GRASS**

**Botanical name:** *Cenchrus ciliaris*

**Growth form:** tufted perennial grass

**Recommended control:** Use the following herbicide follicular application: Haloxfop or other grass herbicide



PURPLE TOP RHODES GRASS

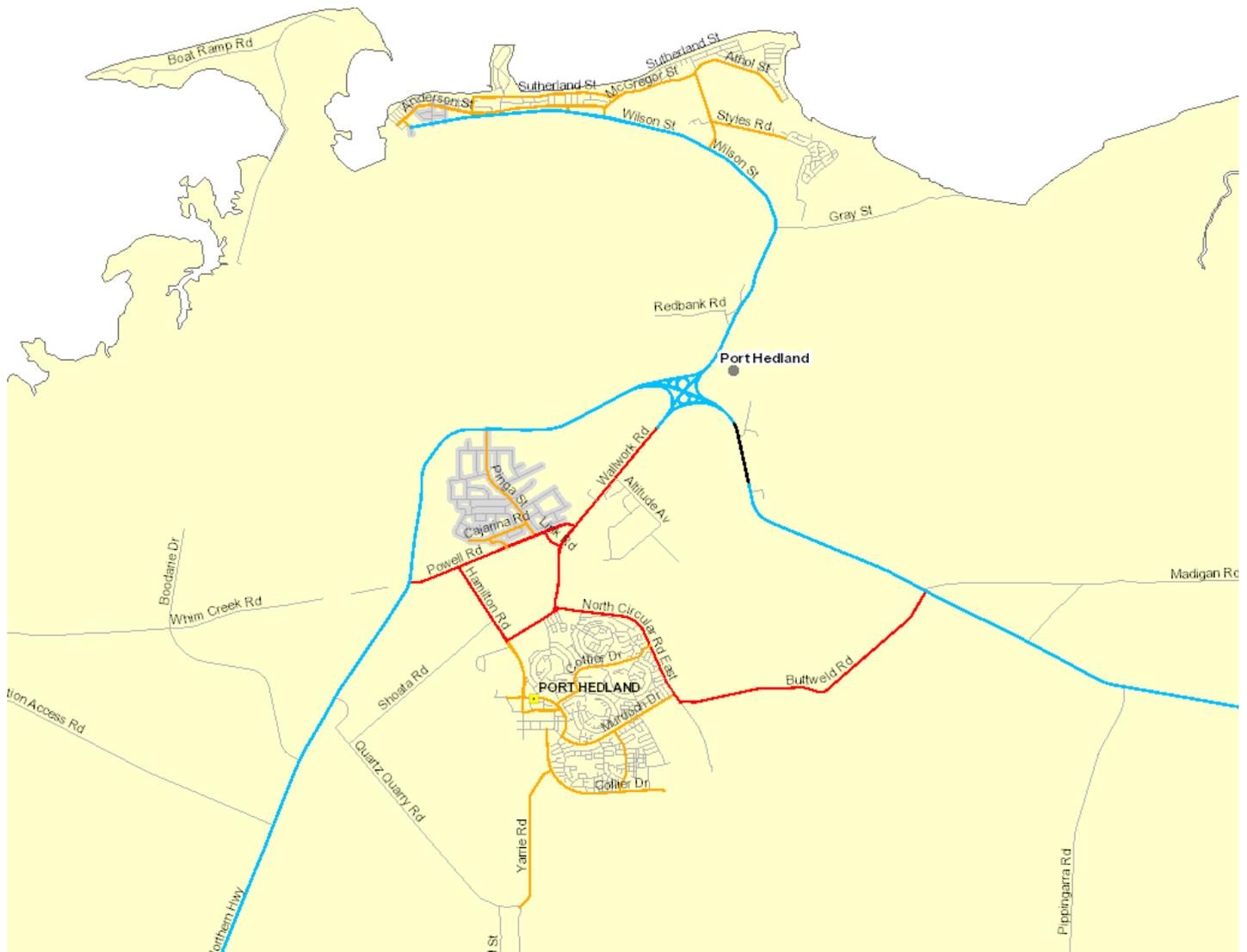
**Botanical name:** *Chloris virgata*

**Growth form:** Annual grass

**Recommended control:** Targeted herbicide for annual grass , pre-emergent herbicides, hand weeding when small population



**APPENDIX C - ROAD HIEGHRACHY**



- Road Hierarchy
- Hierarchy
  - Primary Distributor
  - Regional Distributor
  - Distributor A
  - Distributor B
  - Local Distributor
  - Access Road