# GARDEN STREET, SOUTHERN RIVER

## LANDSCAPE MANAGEMENT PLAN

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pgv ENVIRONMENTAL

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# 1 INTRODUCTION

## 1.1 Background

The City of Gosnells proposes to extend Garden Street 0.8km from Harpenden Street to the intersection of Balfour and Holmes Streets (the site). Construction of the road is proposed to start in 2017–2018. The extension will connect with the section between Balfour Street and Southern River Road, which is currently under construction, to extend Garden Street to Southern River Road, enabling it to become a key arterial road serving both regional and local traffic in the Southern River area. Currently preliminary design is complete.

A Clearing Permit Application has been submitted for the works (Reference CPS 7038/1), which proposes the clearing of 4.35ha of native vegetation. The project is also being assessed by the Department of the Environment and Energy (DotEE) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (EPBC 2016/7735).

## 1.2 Scope of Works

This Landscape Management Plan has been prepared to guide landscaping on the constructed road median strip, verge and batters and weed control from the road into bushland up to 50m, as required following the construction of the road. The management plan also identifies opportunities such as planting of cockatoo foraging species to mitigate the loss of vegetation through clearing for the road and enhance the habitat values for other fauna, including conservation significant species.

## 1.3 Road Design

The Proposed Garden Street Extension will connect Harpenden Street in the north to Holmes Street in the south. The proposed road design includes a cycle way within the road area and a Dual Use Path on each side for pedestrians and recreational cycling (Appendix 1). The road level will be battered on both sides to the natural level of the surrounding bushland or adjoining property boundaries.

A Fauna fence will be installed at the limit of the earthworks to protect fauna species from entering the carriageway and to protect the bushland from unauthorised access. Drainage from the road will be through the vegetated filter drains between the cycleway and Dual Use Path (Appendix 1).

The batters on the northern 230m of the road reserve are minimal and slope up to property boundaries and in a small area to the natural surface in bushland (Figure 2a). Batters in the central part of the road reserve will slope down to the natural levels (Figure 2b). The southern 230m of the road will be battered up to natural levels (Figure 2c). The largest batters are in the southern end of the proposed road extension. All batters will have a 1 in 4 grade, extending up to 20m from the edge of the constructed road (Figure 2c).

Earthworks for the full road design will be undertaken in one operation, however initially only two lanes will be constructed for the initial carriageway. The batters and therefore the landscaped areas will be completed with the initial phase of construction.

A cleared, compacted, level area adjacent to the single-lane dual carriageway will remain in place until future circumstances and funding provide for the road's ultimate expansion to a two-lane dual carriageway.

## 1.4 Environmental Outcomes

The proposed road extension will result in the clearing of 4.35 hectares of native vegetation; of which 1.3 hectares is banksia woodland, providing foraging habitat for black cockatoos. The outcomes of the revegetation of the batters in the road reserve will be:

- Planting of 2,013m$^2$ of shrubland vegetation on the road batters adjacent to the Dual Use Path;
- Creation of a Habitat Zone that includes foraging plants for Black Cockatoos totalling 6,715m$^2$;
- Planting a Transition Zone to the wetland areas totalling 362m$^2$; and
- Establishing dense shrubland around fauna underpasses totalling 157m$^2$.

The total area to be planted is 0.92ha.

## 1.5 Relevant Criteria

The Landscape Management Plan has been prepared in accordance with the Environmental Guideline Revegetation Planning and Techniques (Document D12#157550) (Main Roads WA, 2004).

The designing principles are guided by the Environmental Guideline Vegetation Placement within the Road Reserve (Document D12#157580) (Main Roads WA, 2013). Specifications include:

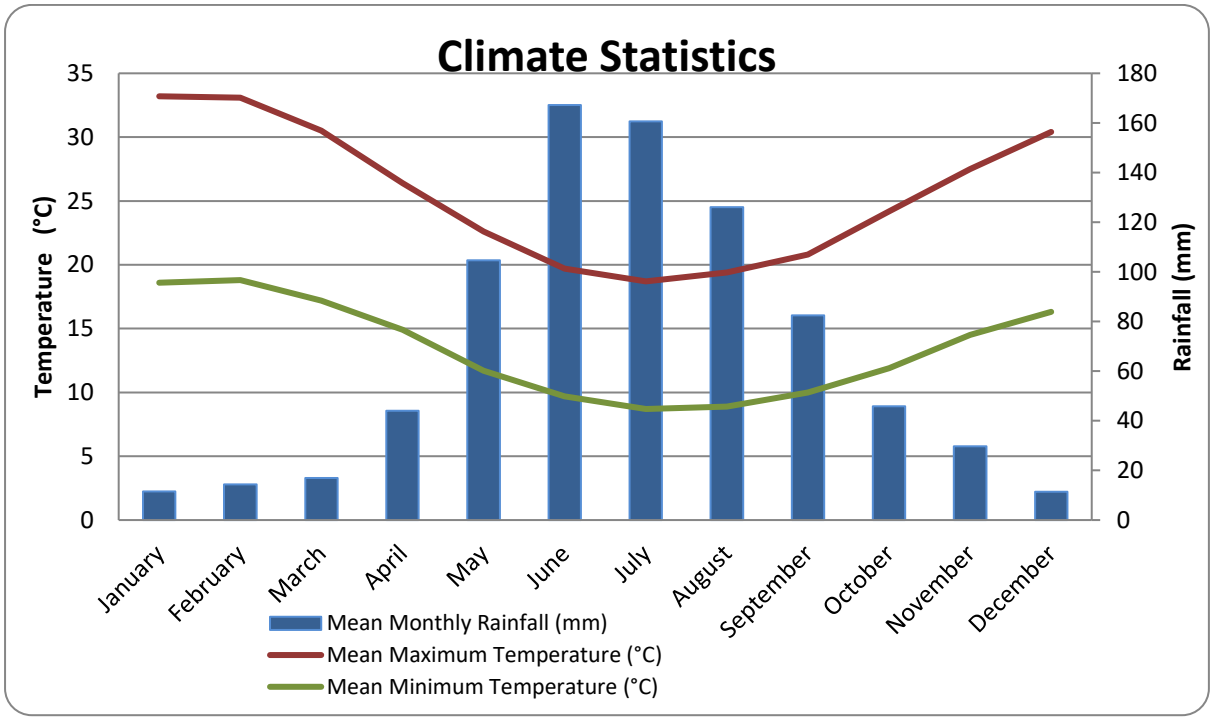
- Plants < 200 mm in height allowed within 1.5 m from the kerb;
- Plants with stems/trunks <100 mm allowed within 4.5 m of the kerb on $\leq$ 60 km/hr roads; and
- Plants of any size may be used further than 4.5 m from the kerb.

# 2 EXISTING ENVIRONMENT

## 2.1 Climate

Climate statistics from the Bureau of Meteorology (BOM, 2016) can be used to compare seasonal conditions for surveys (Graph 1). The statistics have been collected from Gosnells City (BOM Site Number 009106) which has been collecting data from 1961.

**Graph 1: Climate Statistics for Gosnells Site (Site Number: 009106)**




The highest average maximum temperature is 33.2°C and highest average minimum temperature is 18.8°C, in January and February respectively. July records the lowest temperatures with the lowest average maximum and minimum of 18.7°C and 8.7°C. Rainfall is mainly from April to October with 685.2m of the total rainfall of 814.9mm (approximately 85% of the total), with 129.7mm falling in the summer months (November to March).

## 2.2 Topography

The proposed Garden Street Extension site ranges from 21 to 26m Australian Height Datum (AHD).

## 2.3 Geology and Soils

The site is mapped as part of the Bassendean System, the oldest of the three dune systems on the Swan Coastal Plain (Bolland, 1998) and the Pinjarra Plain System. The major soils are naturally poorly drained, and many swamps occur (DAFWA, 2017). Therefore, imported fill is likely to be required and the batters to be landscaped are likely to be sandy yellow soils.

## 2.4 Hydrology

### 2.4.1 Groundwater

The groundwater has been grouped into three distinct aquifers:

- Superficial Swan Aquifer (unconfined);
- Leederville Aquifer (confined); and
- Yarragadee north (confined) (DoW, 2017a)

The Superficial Aquifer is part of the Jandakot Mound and the Kardinya Shale Member of the Osborne Formation separates this from the Leederville Aquifer (DoW, 2017a).

The Garden Road extension site has groundwater at approximately 18mAHD (DoW, 2017b).

### 2.4.2 Surface Water

The proposed road extension site has low-lying areas to which surface water drains. There are no watercourses passing through the site. An area of winter inundation exists in the centre of the Garden Street site, coinciding with a 'sumpland' wetland.

### 2.4.3 Wetlands

The proposed Garden Street Garden Street extension will pass through a section of wetland which includes a Conservation Category Sumpland (Unique Feature Identifier (UFI) 15423) and an area that is inundated up to 300mm in winter/spring. The road will require fill where it passes through the wetland. Therefore, all landscaping in the central portion of the site will be done in fill soils.

## 2.5 Vegetation

### 2.5.1 Vegetation Description

The vegetation in the Garden Street Road Reserve consists of:

- *Banksia attenuata*, *Kunzea glabrescens*, *Melaleuca preissiana* Low open woodland in the northern 230m of the site;
- *Melaleuca preissiana* woodland over *Astartea affinis* in the central part of the site;
- *Banksia attenuata* and *Eucalyptus todtiana* Low Open Woodland, also in the central part of the site;
- *Melaleuca preissiana* Low Open Woodland and *Regelia* Shrubland in the wetland part of the site;
- *Melaleuca viminea* closed tall scrub in the core wetland area;
- *Phlebocarya ciliata* and *Dasypogon bromeliifolius* closed Sedgeland on the wetland boundary; and
- *Banksia*, *Allocasuarina fraseriana* Woodland in the southern 230m of the site (Appendix 2).

### 2.5.2 Vegetation Condition

The vegetation condition of the road reserve and the surrounding Bush Forever site 125 are in predominately Good to Excellent condition, according to the condition scale of Keighery (1994) published in Bush Forever (Government of Western Australia, 2000) (NAC, 2016).

## 2.6 Phytophthora Dieback

A Dieback Survey undertaken as part of the environmental studies of the site was undertaken by Glevan (2016). The survey concluded that:

- The majority of the Garden Street Road Reserve was assessed as infested;
- Infested areas were generally associated with low lying wetland areas;
- One area of Banksia Woodland on higher ground to the southern end of the site had no observable signs of Phytophthora Dieback present; and
- One sample taken towards the north of the site tested positive for Phytophthora Dieback.

## 2.7 Fauna

The Level 2 fauna survey undertaken by Natural Area Consulting (2016) within Garden Street Road Reserve concluded:

- There were six mammal, 23 bird, nine reptile, two amphibian and 56 invertebrate species recorded; and
- Significant fauna species included the Southern Brown Bandicoot (*Isoodon obesulus fusciventer*), Carnaby's Cockatoo (*Calyptorhynchus latirostris*) and the Rainbow Bee-eater (*Merops ornatus*).

Fauna underpasses have been incorporated into the road design for Southern Brown Bandicoot (*Isoodon obesulus fusciventer*) and other vertebrates.

# 3 LANDSCAPE MANAGEMENT PLAN

## 3.1 Environmental Management Plan

An Environmental Management Plan has been prepared for the project (PGV, 2017) and outlines the site preparation including:

- Access;
- Clearing;
- Mulching;
- Soil Management;
- Fencing;
- Weed management during construction; and
- Dieback Management.

Construction of the road, including batters to be landscaped will be undertaken in accordance with the Environmental Management Plan (PGV, 2017).

## 3.2 Weed Management

Open batters and areas to be landscaped can be prone to becoming infested with weeds. To avoid any infestations, open and completed batters will be mulched and inspected monthly for weeds until landscaping is complete. Thereafter the weeds will be managed in accordance with the City of Gosnells procedures. Any significant environmental weeds that are observed will be managed by a suitably qualified contractor.

The cleared compacted area proposed for future expansion of the road will be treated with crushed limestone and managed weed control will be undertaken. The weed management will extend 50m into the Bush Forever site where appropriate.

Weed management, once earthworks for the batters are complete will seek to prevent the establishment or seeding of any colonising exotic species in the construction footprint. Target species will include, but not be limited to:

- Weeds declared under the Biosecurity Agriculture Management Act, 2007 (BAM Act);
- Weeds listed in the in the top 30 priority environmental weeds in the Swan Coastal Plain NRM Region Environmental Weeds census and prioritisation (Bettink and Keighery, 2008) as recommended by the Department of Parks and Wildlife (DPaW); and
- Weeds considered to be local priority species by the City of Gosnells, such as Love Grass and Paddy Melons.

Weed management will be specifically targeted to avoid damage to native seedlings that are expected to arise from the endemic mulch used. Weed management should be undertaken by a suitably qualified and experienced bushland weed manager, who can readily identify native species and weeds.

## 3.3 Dieback

Dieback hygiene will be managed in accordance with the principles outlined in the Environmental Management Plan (PGV, 2017) and the Construction Environmental Management Plan that will be prepared prior to commencement.

## 3.4 Stabilisation

Mulch or jute planting mat will be installed to stabilise the batters prior to planting. Mulch will be produced and sourced from native vegetation cleared from the site.

## 3.5 Planting

### 3.5.1 Propagule Collection

Seed and cutting material to be used for growing tubestock will be sourced locally or within nearby bushland. Reconnaissance visits will be made to nearby bushland and the road reserve, where possible, prior to clearing to harvest seed to determine the species diversity and seed quantity that can be sourced in time for orders to be placed with local seed merchants or nurseries as required.

### 3.5.2 Planting Tubestock

Tubestock will be planted as soon as possible once construction is complete. Plants will be placed in a random fashion to create a natural look. Infill planting will occur in subsequent years where necessary to ensure the completion criteria are met.

### 3.5.3 Species Selection

The planting plan includes the following specifications:

- Species to be used will be native and endemic to the area;
- Species selection will take into account the final depth to groundwater; and
- Species that provide foraging habitat for Black Cockatoos will be used where possible.

Species selection will also take into account the specifications in Environmental Guideline Vegetation Placement within the Road Reserve (Main Roads, 2013) as follows:

- only plants < 200 mm in height at maturity allowed within 1.5 m from the kerb;
- only plants with stems/trunks <100 mm allowed within 4.5 m of the kerb on $\leq$60 km/hr roads; and
- plants of any size may be used further than 4.5 m from the kerb.

The location of the Dual Use Path, drainage and fencing means that the minimum distance from the kerb before the landscaped areas is 3.25m. Therefore, there is a minimum batter distance (to reach the 4.5m for no restrictions on planting) of 1.25m on either side of the road that will require planting of smaller shrubs and plants with stems/trunks <100mm in diameter.

### 3.5.4 Planting Plan

The batters have been divided into four planting zones based on the distance from the road verge and proximity to the wetland vegetation:

- Shrub Zone (including median strip);
- Habitat Zone;
- Wetland Transition Zone; and
- Culvert Zone.

The Shrub Zone is the area within 4.5m of the road that will require the use of species <100mm in stems/trunks diameter. The Habitat Zone will be planted with species dominated by plants that are used as foraging habitat by Black Cockatoos. The Culvert Zone is a 5m diameter area around the outlets for the fauna underpasses to provide dense cover and protection for species utilising the underpasses. In wetland areas, 1m to the toe of the batter is the Wetland Transition Zone. Vegetation planted will be specialist transition zone species to mirror the natural transition into the wetland habitat.

The zones occur along the alignment as shown in Figures 2a, 2b and 2c and described as:

- Shrub Zone and the Habitat Zone occur in northern part of the road reserve (Figure 2a);
- The central part of the road reserve contains the Shrub Zone, Habitat zone and Culvert Zones (Figure 2b); and
- The southern part of the road reserve contains the Shrub Zone and the Habitat Zone (Figure 2c).

The planting plan has been designed to select appropriate species, dependent on the distance to groundwater levels to provide fauna habitat values on the batters of the constructed road.

The species and densities for planting in the Shrub Zone are outlined in Table 1.

**Table 1: Species list for the Shrub Zone**

| Strata | Species | Density |
|---|---|---|
| Shrub | *Acacia pulchella* var. *glaberrima* | 2 per 3m$^2$ |
| | *Adenanthos obovatus* | |
| | *Allocasuarina humilis* | |
| | *Bossiaea eriocarpa* | |
| | *Eremaea pauciflora* var. *pauciflora* | |
| | *Gompholobium tomentosum* | |
| | *Hovea trisperma* | |
| | *Melaleuca thymoides* | |
| | *Petrophile linearis* | |
| | *Scholtzia involucrata* | |
| Other (sedge, herb, climber) | *Anigozanthos manglesii* | 1 per 2m$^2$ |
| | *Dasypogon bromeliifolius* | |
| | *Patersonia occidentalis* var. *occidentalis* | |

The Habitat zone will focus on providing adequate strata and species variety to be consistent with the surrounding bushland ecosystem. The surrounding bushland in dryland areas contains foraging species for Black Cockatoos therefore the Habitat Zone will include species that provide foraging habitat for Black Cockatoos. The species for this zone are outlined in Table 2.

**Table 2: Species list for the Habitat Zone**

| Strata | Species | Density |
|---|---|---|
| Tree | *Allocasuarina fraseriana* | 1 per 10m$^2$ |
| | *Banksia attenuata* | |
| | *Banksia ilicifolia* | |
| | *Banksia menziesii* | |
| | *Nuytsia floribunda* | |
| Shrub | *Acacia pulchella* var. *glaberrima* | 1 per 1m$^2$ |
| | *Adenanthos obovatus* | |
| | *Allocasuarina humilis* | |
| | *Bossiaea eriocarpa* | |
| | *Eremaea pauciflora* var. *pauciflora* | |
| | *Gompholobium tomentosum* | |
| | *Hovea trisperma* | |
| | *Jacksonia furcellata* | |
| | *Melaleuca thymoides* | |
| | *Petrophile linearis* | |
| | *Scholtzia involucrata* | |
| Other (sedge, herb, climber) | *Anigozanthos manglesii* | 1 per 1m$^2$ |
| | *Dasypogon bromeliifolius* | |
| | *Patersonia occidentalis* var. *occidentalis* | |

The Wetland Transition Zone will be vegetated with species found locally in the transition from dryland to wetland. The species are outlined in Table 3.

**Table 3: Species list for the Wetland Transition Zone**

| Strata | Species | Density |
|---|---|---|
| Tree | *Banksia attenuata* | 1 per 10m$^2$ |
| | *Banksia ilicifolia* | |
| Shrub | *Adenanthos obovatus* | 1 per 1m$^2$ |
| | *Hakea varia* | |
| | *Hypocalymma angustifolium* subsp. SCP | |
| | *Melaleuca thymoides* | |
| | *Scholtzia involucrata* | |
| Other (sedge, herb, climber) | *Dasypogon bromeliifolius* | 1 per 1m$^2$ |
| | *Lepidosperma longitudinale* | |
| | *Phlebocarya ciliata* | |

The Culvert Zone will be planted with denser shrubs to allow for good cover to provide protection for fauna species using the underpass. The soils in the Culvert Zone are likely to be waterlogged in winter/spring, which has been taken into consideration. Species in the Culvert Zone are outlined in Table 4.

**Table 4: Species list for the Culvert Zone**

| Strata | Species | Density |
|---|---|---|
| Shrub | *Astartea affinis* | 2 per m$^2$ |
| | *Calothamnus lateralis* | |
| | *Melaleuca teretifolia* | |
| | *Regelia ciliata* | |

Planting in each area will be undertaken in a random fashion to represent natural vegetation look.

## 3.6 Watering

Irrigation can increase the survival of new seedlings by reducing water stress over the summer months. This can be achieved through periodic watering visits using a mobile watering vehicle which has the advantage of being a cost-effective method of delivering water, when needed, to required locations. To reduce the risk of mortality, watering should occur once every month during the first two summers (November - February) at a rate of 2 L per plant. However, if plants are suffering drought stress, additional watering may be required. Appropriate safety signage and traffic management must be implemented in these areas while undertaking watering from the road.

# 4 MONITORING AND COMPLETION CRITERIA

## 4.1 Monitoring

Monitoring will be undertaken to assess the success of weed control and establishment of tubestock.

Weeds will be visually assessed every three months in Summer, Autumn, Winter and Spring by the bushland weed manager for the first three years following landscaping practical completion. This assessment will be undertaken by transects along each side of the new road to record emergence of native and exotic plants, to direct weed control works to areas and species that require maintenance.

The landscaping will be visually assessed every three months in Summer, Autumn Winter and Spring for the first three years. This assessment will be undertaken by traversing broad transects to record what is emerging and where to direct infill planting the following autumn.

## 4.2 Infill Planting

Infill planting will occur one year after initial planting and, as needed, in the subsequent year where monitoring identifies plant mortality is greater than 10% or where the density of plantings (plants/m2) is below the plant density completion criterion.

## 4.3 Completion Criteria

The following targets will be used to assess the performance of the landscaping:

- At least one plant per square metre by the end of the third year;
- A maximum of 5% weed coverage on the batters and central median strip; and
- A maximum of 5% weed cover in the vacant future two-lane carriageway space.

Additional planting and weed control will be undertaken if these criteria are not met.

# 5 SCHEDULE OF WORKS

This project is scheduled for three years with monitoring and works being undertaken for two years as per the schedule outlined in Table 5 and 8. Once the completion criteria are met the final years works schedule will be implemented (Table 7).

**Table 5: Implementation schedule: Preliminary Activities**

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Green stock procurement** | | | | | | | | | | | | |
| Cuttings collection | | | | | | | | | | | | |
| Seed collection | | | | | | | | | | | | |
| Plant propagation | | | | | | | | | | | | |
| **Weed control – 50m into Bush Forever site** | | | | | | | | | | | | |
| Glyphosate | | | | | | | | | | | | |
| Selective grass | | | | | | | | | | | | |
| Manual | | | | | | | | | | | | |

**Table 6: Implementation Schedule Year 1 and 2 (actual revegetation)**

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Weed control** | | | | | | | | | | | | |
| Glyphosate | | | | | | | | | | | | |
| Selective grass | | | | | | | | | | | | |
| Manual | | | | | | | | | | | | |
| **Revegetation** | | | | | | | | | | | | |
| Planting | | | | | | | | | | | | |
| **Watering** | | | | | | | | | | | | |
| All revegetation areas except Wetland Transition | | | | | | | | | | | | |
| Wetland Transition (If required) | | | | | | | | | | | | |
| **Monitoring** | | | | | | | | | | | | |
| All revegetation areas | | | | | | | | | | | | |
| **Maintenance** | | | | | | | | | | | | |
| All revegetation areas | | | | | | | | | | | | |
| **Green Stock Procurement - infill planting for Year 2 and if required 3** | | | | | | | | | | | | |
| Cuttings collection | | | | | | | | | | | | |
| Seed collection | | | | | | | | | | | | |
| Plant propagation | | | | | | | | | | | | |
| Tubestock procurement | | | | | | | | | | | | |

**Table 7: Implementation Schedule – Final Year**

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Weed control** | | | | | | | | | | | | |
| Glyphosate | | | | | | | | | | | | |
| Selective grass | | | | | | | | | | | | |
| Manual | | | | | | | | | | | | |
| **Monitoring** | | | | | | | | | | | | |
| All revegetation areas | | | | | | | | | | | | |
| **Maintenance** | | | | | | | | | | | | |
| All revegetation areas | | | | | | | | | | | | |

# 6 COST SCHEDULE

Cost estimates for the revegetation of the batters are outlined in Table 8. Costs do not include any GST and are indicative only. Seasonal conditions and other variables have the ability to, impact significantly on the costs of the project.

**Table 8: Cost estimates**

| Task | Year 1 | Year 2 | Year 3 - If required | Final year |
|---|---|---|---|---|
| Green stock procurement | $67,500.00 | $13,500.00 | $2,700.00 | |
| Weed control | $8,000.00 | $22,500.00 | $12,500.00 | $8,000.00 |
| Planting (Year 1) and Infill planting all areas | $22,500.00 | $4,500.00 | $900.00 | |
| Fertiliser tablet supply and install | $11,250.00 | $2,250.00 | $450.00 | |
| Tree Guards | $5,175.00 | $1,035.00 | $207.00 | |
| Watering | $10,000.00 | $10,000.00 | $10,000.00 | |
| Monitoring | $5,000.00 | $5,000.00 | $5,000.00 | $5,000.00 |
| Maintenance | $20,000.00 | $20,000.00 | $20,000.00 | $20,000.00 |
| Total | $149,425.00 | $78,785.00 | $51,757.00 | $33,000.00 |
| **TOTAL** | | | | **$312,967.00** |

# 7 FUNDING, REPORTING AND REVIEW

## 7.1 Funding

Funding for the implementation of the Landscape Management Plan is the responsibility of the City of Gosnells.

Results from all monitoring will be recorded and compared to the completion criteria in Section 4. Results will be reviewed on an annual basis.

## 7.2 Review

The Landscape Management Plan has been prepared for the first 3 years of management. If after this period of time the completion criteria are not met the management plan will be reviewed to include any remedial activities required.

# 8 REFERENCES


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# FIGURES

PINPOINT CARTOGRAPHICS (08) 9562 7136 2017-321-f01.dgn

N

0 20 40 60 80 100m

SCALE 1 : 2 250 at A3 (MGA)

**Legend**

- Site Boundary
- Cadastral Boundary
- Easement Boundary
- Proposed Road
- Proposed Kerb
- Proposed Earthworks
- Proposed Fence

HARPENDEN STREET

GARDEN STREET

HOLMES STREET

BALFOUR STREET

Fauna Culvert

Fauna Culvert

6 449 250mN

6 449 000mN

6 448 750mN

401 500mE

401 750mE

R 46361 4526

R 47575 5037

R 47575 8000

CADASTRAL SOURCE: Landgate, March 2017.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown February 2017.

pgv ENVIRONMENTAL

City of Gosnells
LANDSCAPE MANAGEMENT PLAN
GARDEN STREET, SOUTHERN RIVER

Drawn: J. Cabot | Date: 23 Nov 2017

Job: 10266 Rpt: 2017-321 | Revision: A

**SITE LOCATION AND FOOTPRINT**

Figure 1

PINPOINT CARTOGRAPHICS (08) 9562 7136 2017-321-f02a.dgn

N

0 5 10 15 20 25m

SCALE 1 : 700 at A3 (MGA)

**Legend**

- Site Boundary
- Cadastral Boundary
- Easement Boundary
- Proposed Road
- Proposed Kerb
- Proposed Earthworks
- Proposed Fence

**Landscaping Zones**

- Shrub Zone
- Habitat Zone
- Wetland Transition Zone
- Culvert Zone

HARPENDEN STREET

GARDEN STREET

Batter Transition

6 449 400mN

6 449 300mN

6 449 200mN

401 300mE

401 400mE

20 21 22 23 24 25 26 954 952 951 949 948 947 946 945 944 936 937 938 939 940 941 942 943 163 164 165 169 170 171 162 161 160 159 158 157 156 155 468 469

R 47575
5037

CADASTRAL SOURCE: Landgate, March 2017.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown February 2017.

pgv ENVIRONMENTAL

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**PLANTING PLAN - NORTH**

Figure 2a

PINPOINT CARTOGRAPHICS (08) 9562 7136 2017-321-f02b.dgn

Batter Transition

Fauna Culvert

Fauna Culvert

Wetland Boundary

GARDEN STREET

Fauna Culvert

Wetland Boundary

Batter Transition

459 458 942 941 989 990 991 626 1 3

R 46361 4526

R 47575 8000

6 449 200mN 6 449 100mN 6 449 000mN 6 448 900mN

401 500mE 401 600mE

N

0 10 20 30 40 50m

SCALE 1 : 1 000 at A3 (MGA)

**Legend**

- Site Boundary
- Cadastral Boundary
- Easement Boundary
- Proposed Road
- Proposed Kerb
- Proposed Earthworks
- Proposed Fence

**Landscaping Zones**

- Shrub Zone
- Habitat Zone
- Wetland Transition Zone
- Culvert Zone

CADASTRAL SOURCE: Landgate, March 2017.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown February 2017.

pgv ENVIRONMENTAL

City of Gosnells
LANDSCAPE MANAGEMENT PLAN
GARDEN STREET, SOUTHERN RIVER

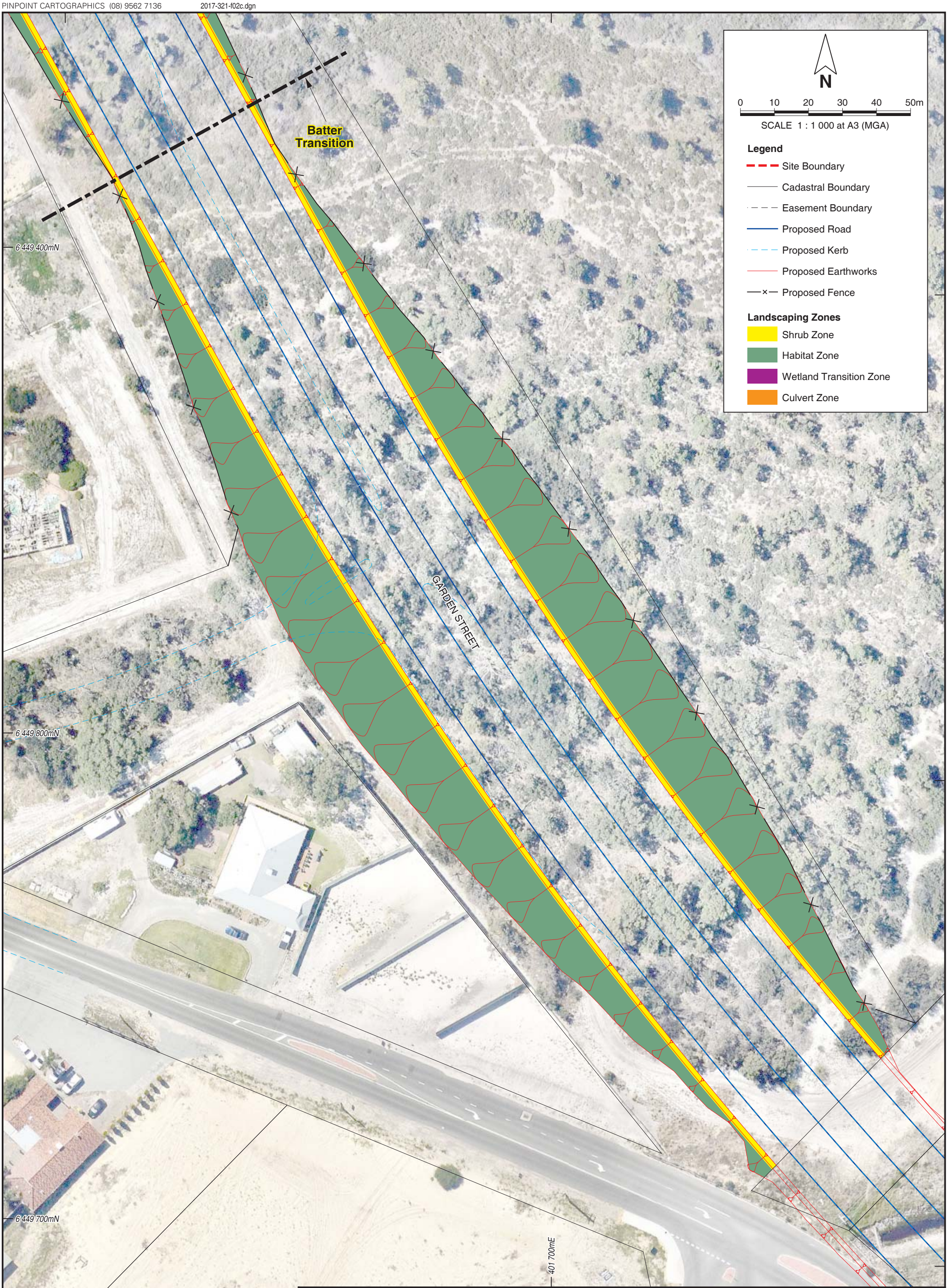
Drawn: J. Cabot | Date: 23 Nov 2017

Job: 10266 Rpt: 2017-321 | Revision: A

# PLANTING PLAN - CENTRAL

Figure 2b

PINPOINT CARTOGRAPHICS (08) 9562 7136 2017-321-f02c.dgn




CADASTRAL SOURCE: Landgate, March 2017.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown February 2017.

pgv ENVIRONMENTAL

City of Gosnells
LANDSCAPE MANAGEMENT PLAN
GARDEN STREET, SOUTHERN RIVER

Drawn: J. Cabot | Date: 23 Nov 2017

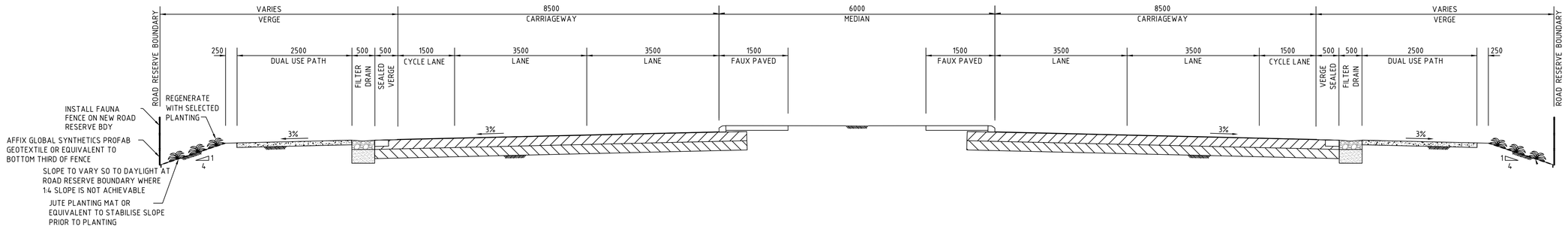
Job: 10266 Rpt: 2017-321 | Revision: A

**PLANTING PLAN - SOUTH**

Figure 2c

# APPENDIX 1

## Proposed Road Cross-Section




## TYPICAL CROSS SECTION

NTS

1:1000

0 10m 20 30 40 50 60 70 80 90 100 110 120 130 140 150

| AMENDMENTS | | | | | |
|---|---|---|---|---|---|
| 1 | 23/9/15 | EDGE BEAM ADDED | MJJ | | |
| REV | DATE | DESCRIPTION | BY | CHK'D | APP'D |

GENERAL NOTES

1. THIS DRAWING ALWAYS REMAINS THE PROPERTY OF THE CITY OF GOSNELLS AND MUST NOT BE RETAINED OR REPRODUCED WITHOUT PERMISSION.
2. IN THE ABSENCE OF THE APPROVED SIGNATURE (ie MANAGER TECHNICAL SERVICES) THIS DRAWING SHALL BE TREATED AS PRELIMINARY.
3. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
4. ANNOTATED DIMENSIONS SHALL ALWAYS TAKE PRECEDENCE OVER SCALED DISTANCES.


CITY OF GOSNELLS

TECHNICAL SERVICES

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PO Box 662 Gosnells 6990
Western Australia

Telephone 08 9397 3000
Facsimile 08 9397 3333
Online www.gosnells.wa.gov.au


| | | | |
|---|---|---|---|
| DESIGN JW | DATE FEB 2016 | SCALE HORIZ. VERT. | |
| DRAWN JW | DATE FEB 2016 | DATUM | |
| CHECKED | | GRID SYSTEM | |
| SURVEY | | JOB NUMBER | |

PROJECT
GARDEN STREET
HUNTINGDALE

DRAWING TITLE
GARDEN STREET EXTENSION
CONCEPT DRAINAGE PLAN

PLAN No ES90-16-014 REV

PRELIMINARY | A1

MANAGER TECHNICAL SERVICES

M. BOTTE DATE

DIAL BEFORE YOU DIG www.1100.com.au

25/02/2016 9:44:27 AM S:\FORWARD PLANNING\GARDEN STREET HARPENDEN TO PASSMORE\DWG\TYPICAL CROSS SECTION.DWG

# APPENDIX 2

## Vegetation Mapping (NAC, 2016)

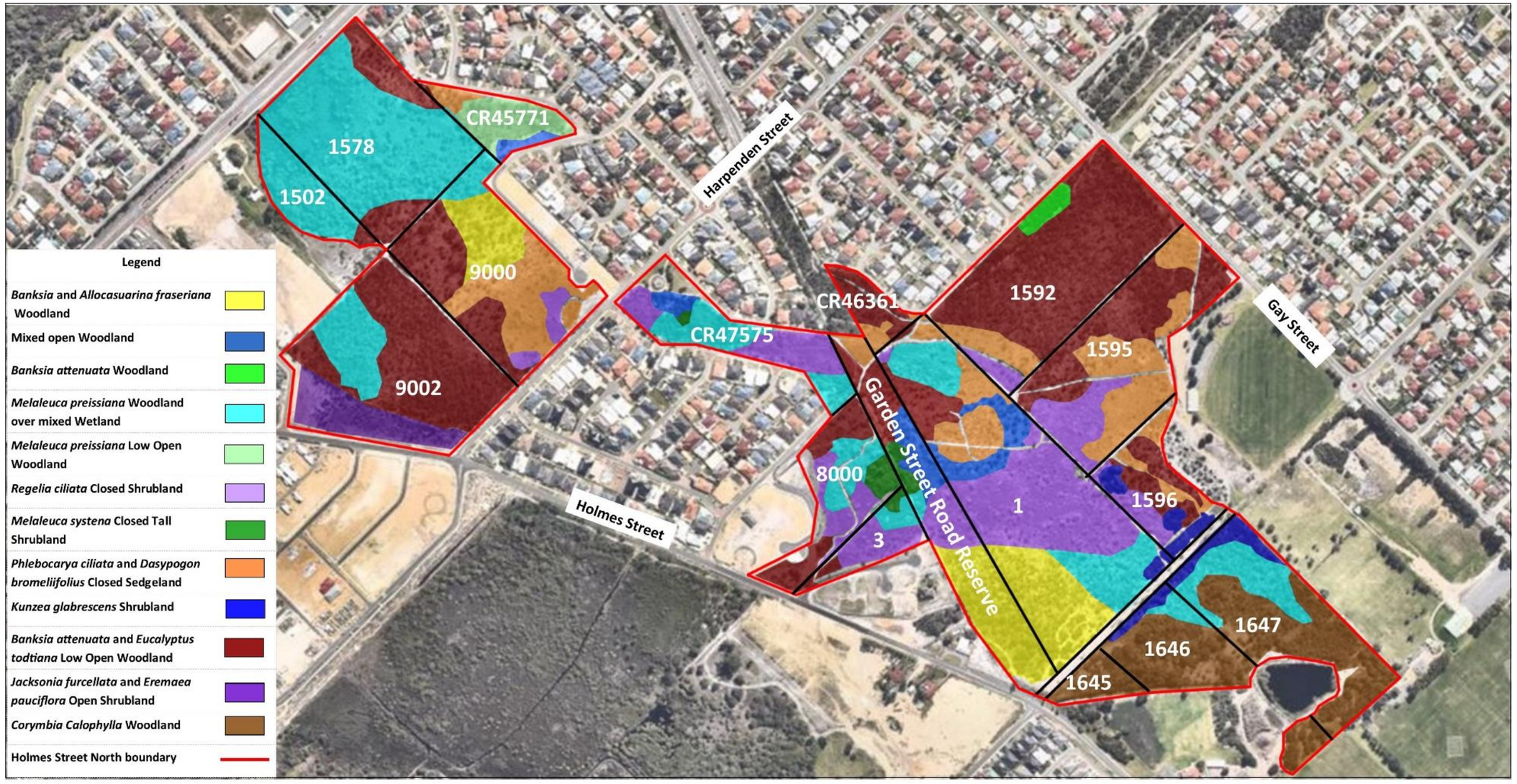



**Figure 7:**
**Vegetation Types**
**Holmes Street Bushland North**

N

**Client:** City of Gosnells
**Project:** Holmes Street Bushland North Management Plan
**Image Source:** NearMap, 2015
**Prepared by:** Sharon Hynes
**Datum:** GDA 94, Zone 50

0 200
Metres