City of Cockburn | Commercial Lot Development |

# Good Design Guide

## Revisions

| Revision | Revision Date | Nature of Revision. | Revised by |
|---|---|---|---|
| B | 25/09/13 | Appendices added | Andy Jarman |
| C | 01/10/13 | Drainage detailing added to appendix B | Andy Jarman |
| D | 28/11/13 | Pawlonia illustrations added, shrub list updated, notes on perimeter fencing, appendices separated off. | Andy Jarman |
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## Introduction

This document is intended to provide guidance on what the City of Cockburn regards as good practice when planning commercial development sites within the City.  It is not intended that the City's officers should insist on compliance with the ideas contained within it.  Rather, it is provided to assist developers and their design consultants to arrive at the most cost effective and suitable design that will enable both the development and the approvals process.

Broad guidance on required site planning practice is given in the City of Cockburn's Town Planning Scheme 3 (TPS3), a limited number of locations within the City also have Detailed Area Plans which have been developed to ensure more detailed design considerations/requirements are integrated into Development Applications for those areas.

The application of the requirements of the various Planning Controls without further guidance can sometimes result in opportunities for an enhanced environment and cost savings to the developer being lost or overlooked.

Adopting a few simple techniques can often save money in both construction and maintenance of the outdoor areas around commercial buildings and enhance the efficiency and appearance of the development. This document provides a brief description of those principles with some examples and sample design solutions.

This guide is intended to complement TPS3 and the City's other policy requirements.  Conflicts between this guide and the City's statutory controls should be drawn to the attention of the City's planning officers.  This will assist with the improvement of the Good Practice Guides and avoid confusion arising with subsequent development proposals.

Good planning of external areas should involve more than the provision of the basic requirements of Town Planning Scheme 3.  The following can assist with improving both the quality and cost efficiency of the development proposal.

# 1.0 Pedestrian facilities

## 1.1 Width of Footpaths

### Widen footpaths at the ends of parking bays to allow for cars overhanging the kerb

This is a requirement of the 'Access to Premises' provisions of the Federal Discrimination and Disability Act, and the City of Cockburn's Town Planning Scheme 3. Refer to the following standards for detailed uidance:

- AS1428 parts 1 and 2 'Design for Access and Mobility' and
- AS2890 parts 1, 2 and 6 Off Street Parking Facilities.

### Widen footpaths around building entrances to allow for deliveries and customers entering and leaving

Illustration 1 above indicates that there is a minimum dimension permissible between the car park kerb and the front of the building. This dimension is determined by the Access Provisions contained in the federal Discrimination and Disability Act.

# 2.0 Vehicle Facilities.

## 2.1 Disabled Parking.

Disabled parking bays are required to be located in close proximity to entrances. This is a requirement of AS2890.6 *Off Street Parking for People with Disabilities*.

AS2890.6:2009 *Off Street Parking for People with Disabilities* has introduced enhanced disabled parking bay provisions to accommodate roof-rack stowed wheelchairs. Consider this when using a tree in place of the bollard specified in this standard, or when proposing a canopy over the main entrance to the building.

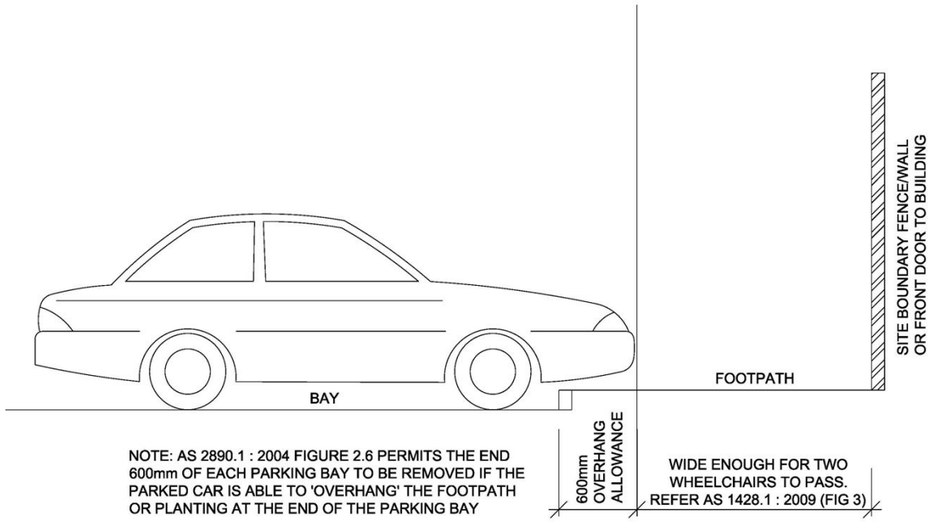



**Figure 1:** Widen footpaths at ends of parking bays

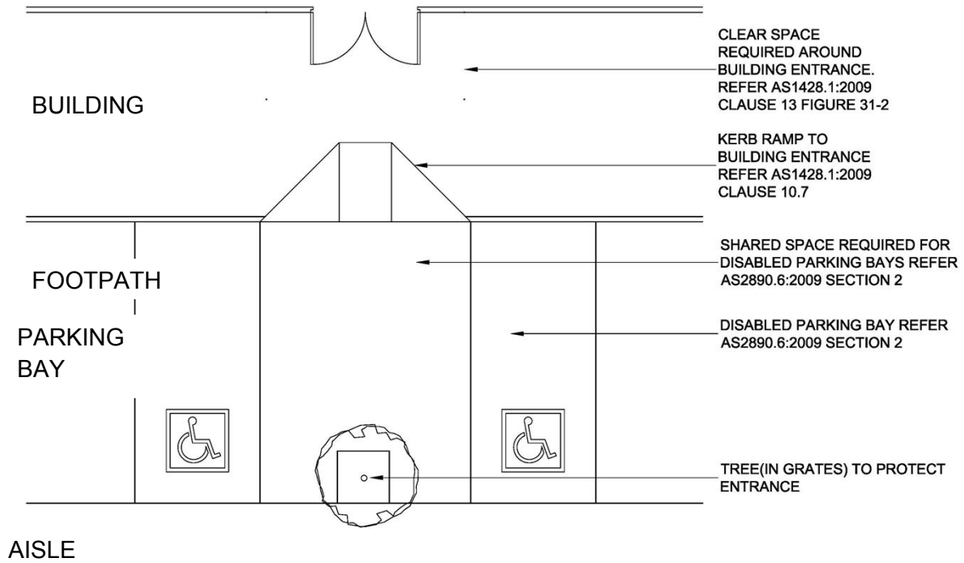



**Figure 2:** Disabled parking bays are required to be located in close proximity to entrances

## 2.2 Speed humps.

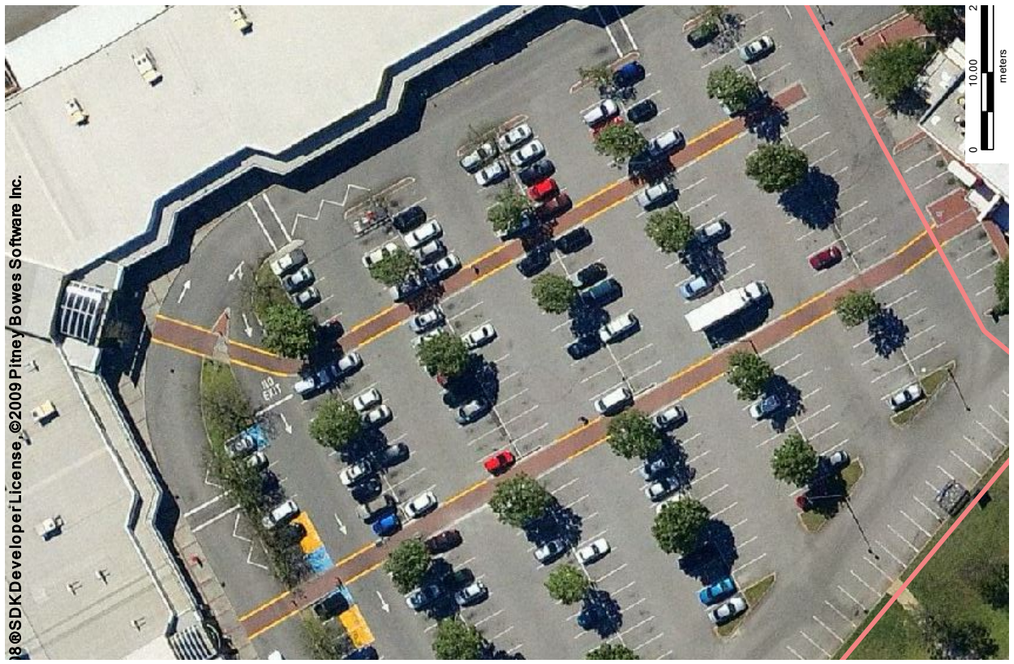
Consider speed humps or raised crossings at points where pedestrians are likely to cross vehicle circulation routes.

**Photograph 1** *The Lakes Shopping Centre, North Lake Road, South Lake. These raised pedestrian crossings allow pedestrians to walk across parking aisles without having to weave between traffic and parked cars. There is a possibility these would not be recognised as pedestrian priority routes, a zebra crossing would be less ambiguous.*

## 2.3 High profile paving finishes.

Consider using high profile paving finishes to differentiate pedestrian from vehicular paving. This helps delineate safe routes across car parks and delivery yards, see aerial 1 below and photograph 1.

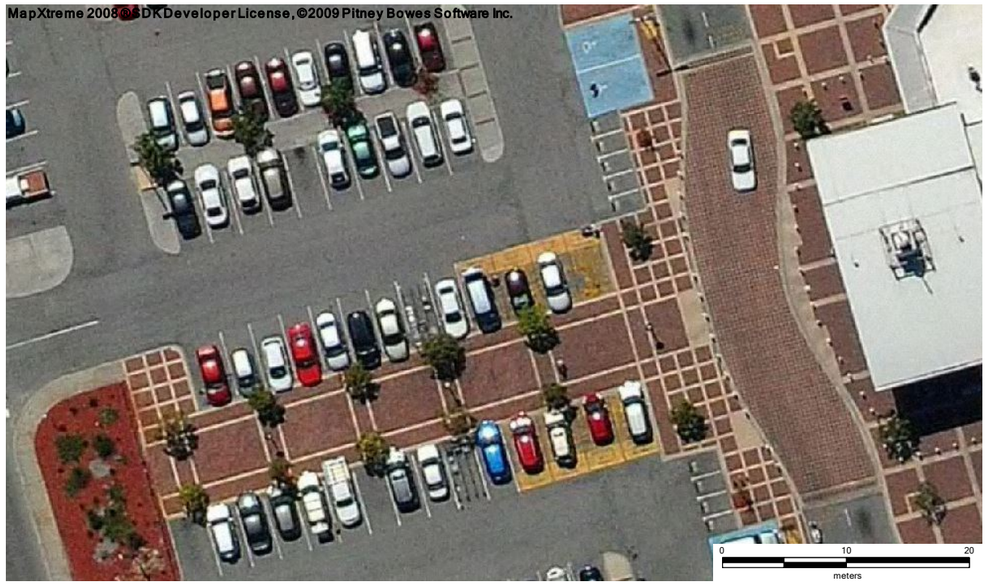
**1.**




**Aerial 1** *The Lakes Shopping Centre, on North Lake Road in South Lakes provides a safe and convenient route for shoppers to gain access to the building. Car drivers circulating about the car park are slowed by the prospect of shoppers appearing on these cross-walks in front of them.*

### 2.4 Orientation of car park aisles.

Orientate car park aisles so that pedestrians can walk along aisles (or preferably medians) to get to the building's main entrance.




**Aerial 2.** *This car park at Gateways Shopping Centre in Cockburn Central illustrates how car park aisles should be orientated so that the medians between nose-to-nose parking bays can serve as safe walkways for pedestrians. This is the most space efficient way of providing a footpath through a car park.*

### 2.5 Position drainage gullies.

Ensure that drainage gullies are positioned away from areas of high pedestrian use. When blocked, drainage gullies form the centre of large puddles. Gullies should not be located close to

- building entrances,
- parking bay car door/tailgate locations, or
- footpaths.

### 2.6 Coordination of trees/lights/gullies

Ensure that the location of tree planting, light columns, gullies and soak pits is coordinated. AutoCAD Xreffing (overlaying) of different design discipline's drawings ensures clashes and conflicts in the location of site elements above and below ground can be avoided. Tree canopies can obstruct street lights, and soak pits should be located where trees require an elevated soil moisture content, and not in the centre of paved areas far from the tree.

### 2.7 Lighting.

Ensure the surroundings are lit, and not the pedestrian. Commercial premises can be hazardous at night for staff working late. Customers and staff need to see out into the dark, to see what is on the path of travel ahead of them and to their sides. Bollard lights often produce glare and only light a small area around the bollard, flood lighting can blind people to what lies in the dark harsh shadows.

### 2.8 Use of paving colours to direct users.

By introducing contrasting bands of paving across parking aisles the speed of through traffic can be reduced and the need for line marking between bays is eliminated.

Paving graphics can often reduce the apparent size of large paved areas. The use of mottled coloured concrete blocks in parking bays served by asphalt aisles largely eliminates the need for line marking and disguises the presence of leaking sump oil stains on parking bays.

A change in paving material between the aisle and the parking bays also serves to create a smaller/less industrial scale, which is important in reception and presentation areas.


**Aerial 3**. *The broad paving stripes in this car park at the Memorial Hall, Rockingham Road, Hamilton Hill, create the sense that this car park is a pedestrian space. Had it been asphalt with white line markings the space would lose its identity and be indistinguishable for the streets and roads around it.*

**Photograph 3.** Using the dimensions of the parking bay to determine paving block colours no painted line marking (a maintenance item) is required to organise car parking in this car park.

## 2.9 Encourage use of outdoor areas

It is often advantageous to provide shaded tables and benches for use by staff taking breaks or having lunch.

**Photograph 4.** *Socialising at lunch time is often only possible when staff are provided with a sheltered place to sit outside, this also adds to car park security by creating the impression the outdoor areas could well be occupied by people taking a break.*

## 2.10 Limit the length of car parking aisles

This reduces vehicle speeds and maximises the ease with which vacant bays can be seen from cross aisles.

**Photograph 5**. *This parking aisle at Gateways in Central Cockburn contains 39 bays. Chapter 2.3.3 Parking Aisle Length of AS2890.1 Off Street Parking facilities allows up to 40spaces in an aisle. Aisles any longer than this encourage circulating traffic to idle in the aisles waiting for spaces to appear, rather than circulate from aisle to aisle. This makes the car park much less efficient and less attractive for visitors*.

## 2.11 Layout of parking bays.

Consider vehicle turning movements in the layout of parking bays

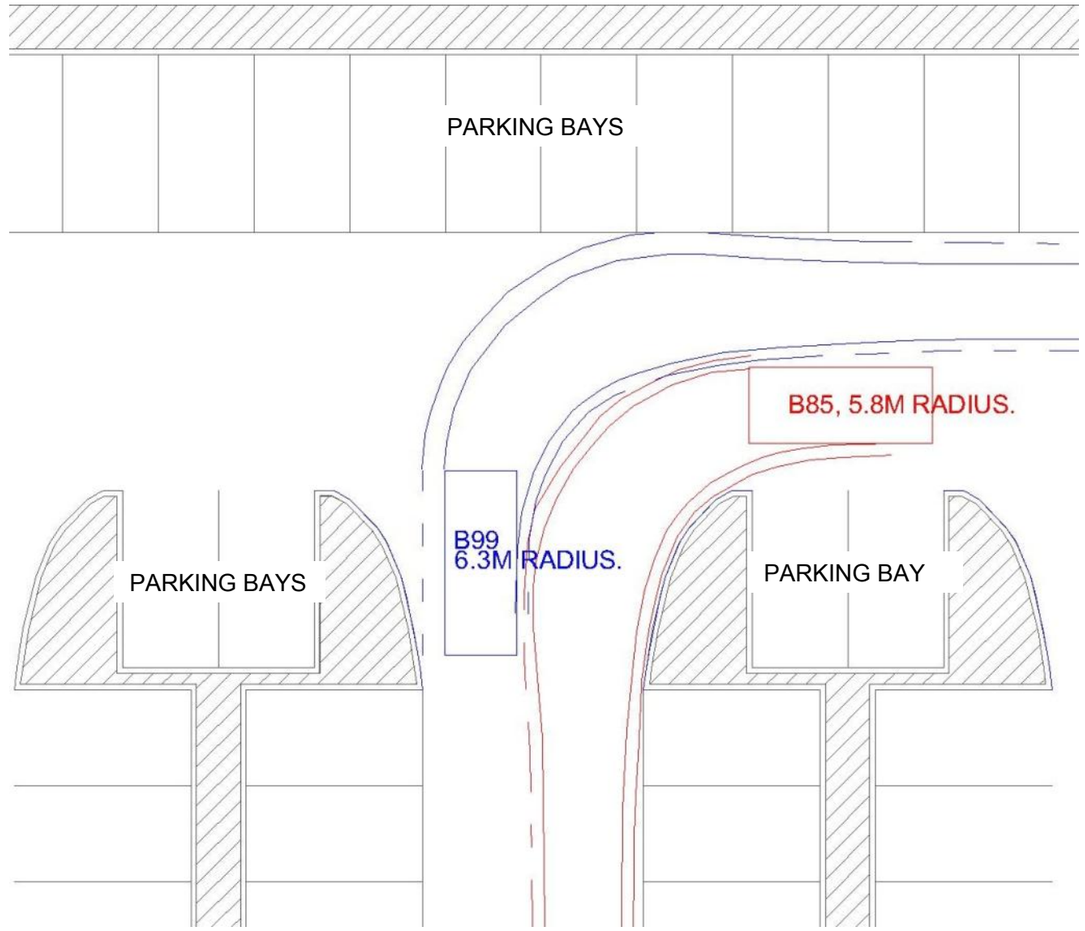



**Figure 3** *AS2890.1:2004, 2.5.2 (c) Intersections requires junctions between circulating aisles within car parks to allow two vehicles (a B99 and a B85) to pass freely. Due consideration of the implications of this requirement on the design of aisle ends should be made to ensure car park designs are efficient and effective in their layout.*

**2.12 Consider carefully what is the most appropriate size of bay for the car park**

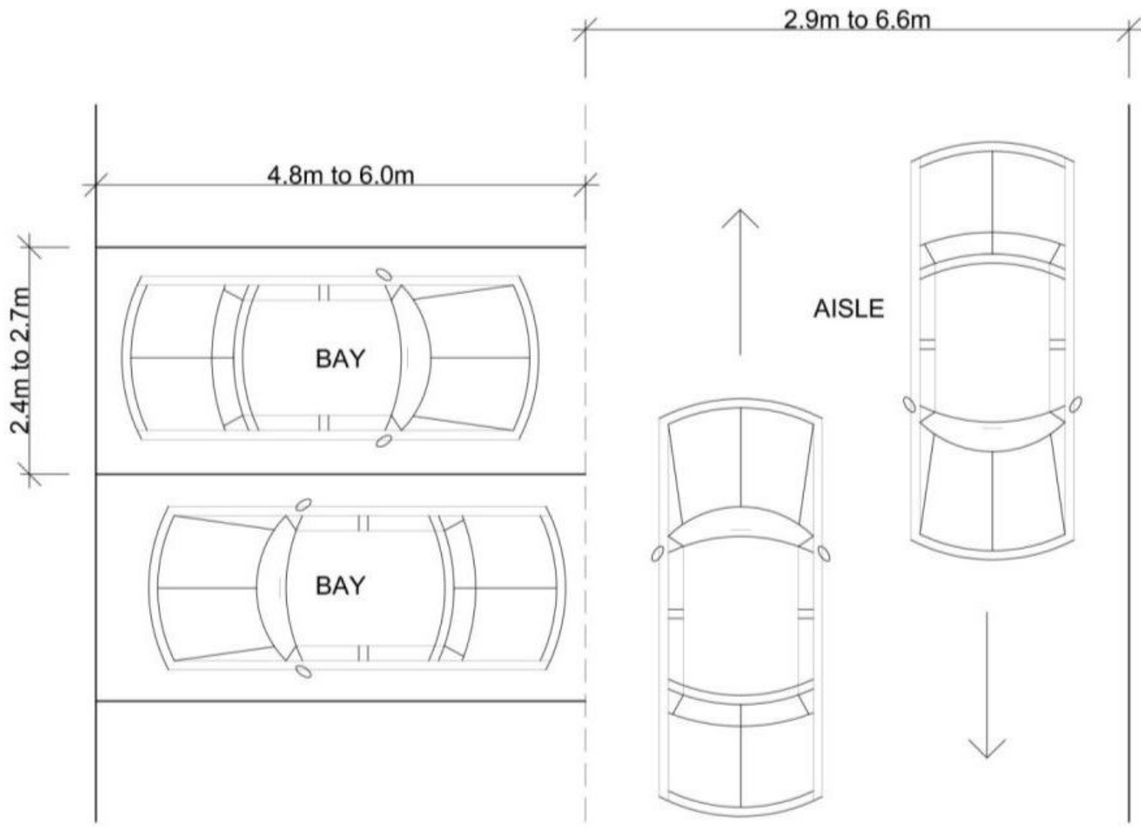


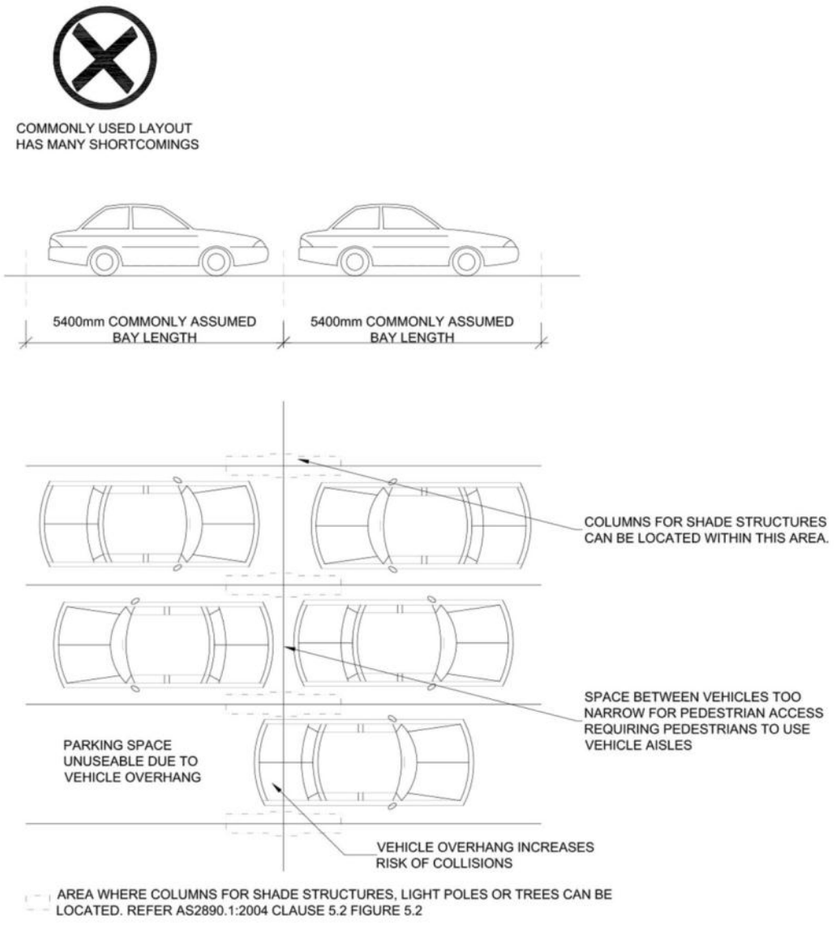

**Figure 4.** *Figure 2.2 on page 14 of AS2890.1:2004 Off-Street Parking describes a wide range of permitted car parking bay sizes and layouts. Bays can vary in size, with a series of standard bay dimensions ranging from 2.1 x 4.8m to 2.6 x 6.0m, refer to AS2890,1:2004 table 1.1 to ensure the most appropriate dimensions are chosen for the correct user classes. The cumulative cost of oversized bays in materials and land-take can have considerable implications for the profitability of a commercial development.*

## 2.13 The overhang zone.

Consider the cumulative cost in site area and building materials of not exploiting the parking bay end overhang zone

This overhang area can be exploited to perform a number of roles, such as;

- Reduce the total area of asphalt and road base required per vehicle
- Keep vehicles from driving into and damaging buildings walls and fences
- Forming part of the 10% of the commercial site area required to be planted as ‘Landscaping’ by the City’s Town Planning Scheme 3 (note TPS3 requires Landscaping to be a minimum 1.5m wide)
- Remove the need for additional wheel stops
- Can provide storm water infiltration areas, reducing need for soak pits and pipe work
- Reduces need for tree grates or complicated kerb layouts.
- Provides an ideal area within the car park for establishing larger healthier shade trees



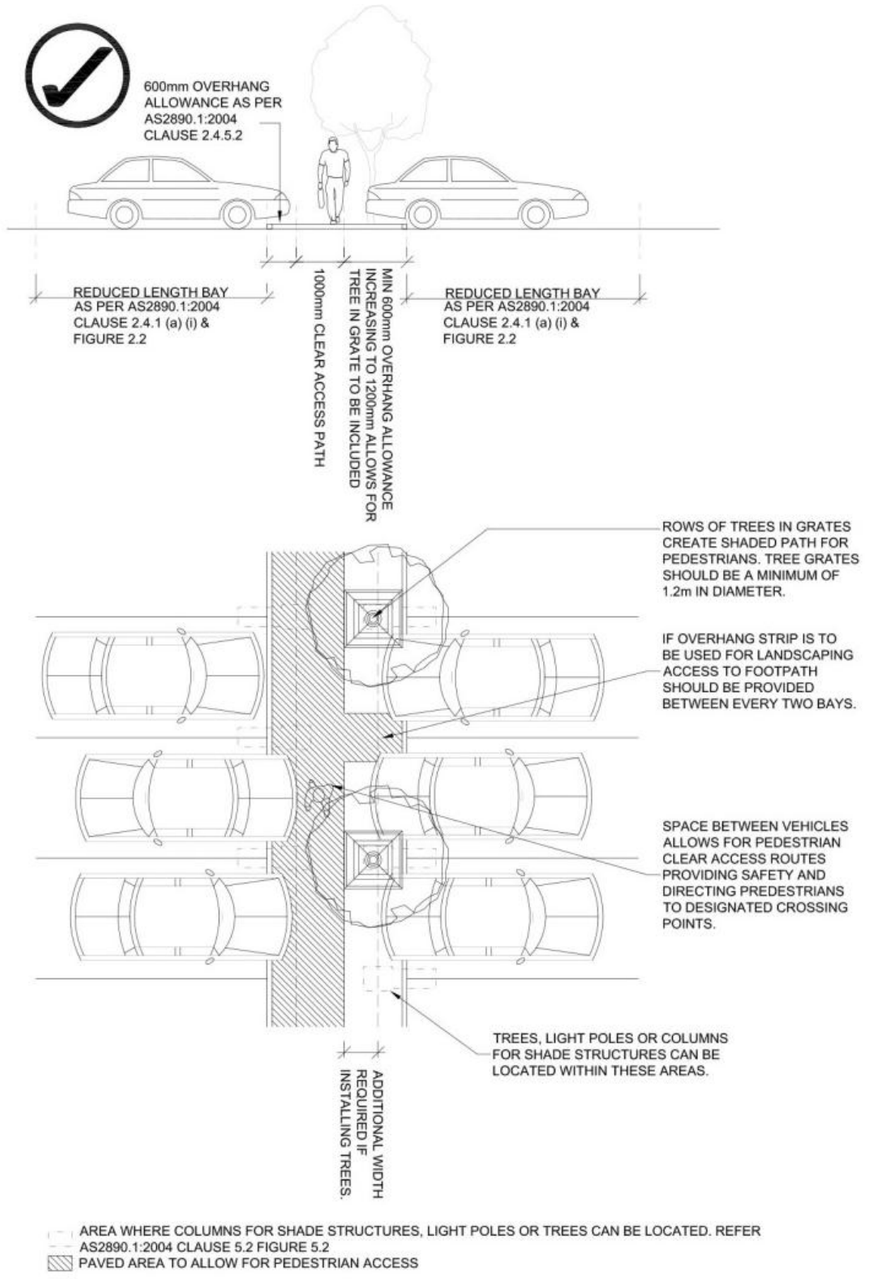




**FIGURE 5**. *Thorough consideration of the opportunities for locating facilities inside parking bays should be investigated. Shrub planting, footpaths, trees, light columns and shade structures can all be included in the area between cars that is commonly left as bare asphalt.*

**Photograph 6 and 7(above 6 and right 7)** - *Poor exploitation of the potential offered to the designer by AS2890.1 often leads to expensive, wasteful design outcomes and low quality environments. 10 years after construction the trees in the Gateways Shopping Centre, Cockburn Central have not grown, many have died and large areas of asphalt are never driven on.*


*Currambine Shopping Centre – see Appendix B for design detailing (provided by Emerge Landscape Architects).*

**Photograph 8 and 9** (above and right)– *Adoption of sound design practices creates shadier more sheltered environments using fewer resources. These car parks are cheaper to build and cheaper to maintain and create more shelter from the wind and sun. Note that in the IGA car park, Rockingham Road, Hamilton Hill (above) large trees are planted every three or four bays, much more than required by Town Planning Scheme 3.*

## 3.0 Planting

**Photograph 10**. *Cast iron tree grates and steel guards protect the tree, provide a well for irrigation water to collect in, reduce the likelihood of the tree's roots damaging the paving, and prevent pedestrians tripping over the tree pit. The grate should be supported beneath with a steel frame, and the paving edges must be thickened or precast units must be haunched to provide a strong edge beam to the pit (example on right shows consequence of a failure to adequately haunch).*

### 3.1 Trees.

It is important that the needs and characteristics of trees planted within a car park are understood in order that the economic and environmental gains of good layout design are not wasted.

The choice of large deciduous species for a commercial development is often more appropriate than choosing smaller evergreens. The following lists some of the advantages of using large exotic deciduous species.

- Deciduous species tend to be grown from a consistent stock of genetic material. Evergreen natives tend to be sourced from wild seeds of unpredictable quality. This is part of the reason for the reputation Eucalyptus trees have for shedding their limbs, the reputation has been proven to be a result of poor genetic stock (Stone, Leigh. !998. Sudden Limb Failure. International Society of Arboriculture Australia Chapter Conference Proceedings, Managing Tree Hazard, First National Conference, Melbourne 1998).
- Deciduous species often shed darker broader shade. The combined effect across a number of commercial developments can reduce the air temperature, reduce air conditioning bills and encourage higher productivity in personnel using the property (refer to "Urban Trees: Worth more than they cost" by Research Associate G M Moore, Burnley College, University of Melbourne, 2009) .
- Large deciduous species also provide winter sunshine, this assists in reducing heating bills (where trees are close to the building).
- Deciduous trees provide seasonal variation to the commercial environment, cool outdoor spaces in summer, autumn colour, winter sunshine, and spring blossom.

Because of the positive role of trees in commercial lots and their relative cheapness developers are encouraged to plant more than the minimum number of trees required in the City's town planning scheme. The value of a tree only increases with age.

Paving designs must accommodate the ultimate trunk diameter of the trees.

Root barriers should not be used in an attempt to contain trees. Root barriers should be used to protect structures such as walls and paved areas leaving roots to grow freely ensures the tree is stable and grows to its fullest potential. Containing roots in an encircling root barrier may lead to, heat stressed and diseased trees liable to falling over in high winds.

Trees rock in the wind, this creates heaving of the soil around the base of the tree. An area at the base of the tree to allow for root heave is required (the tree pit).

Modest sized trees will not disturb paving more than a metre from the tree, larger trees may need two or three metres, some species of native figs could require even more.

*An eight year old plantation of Pawlonia trees at Gin Gin.*

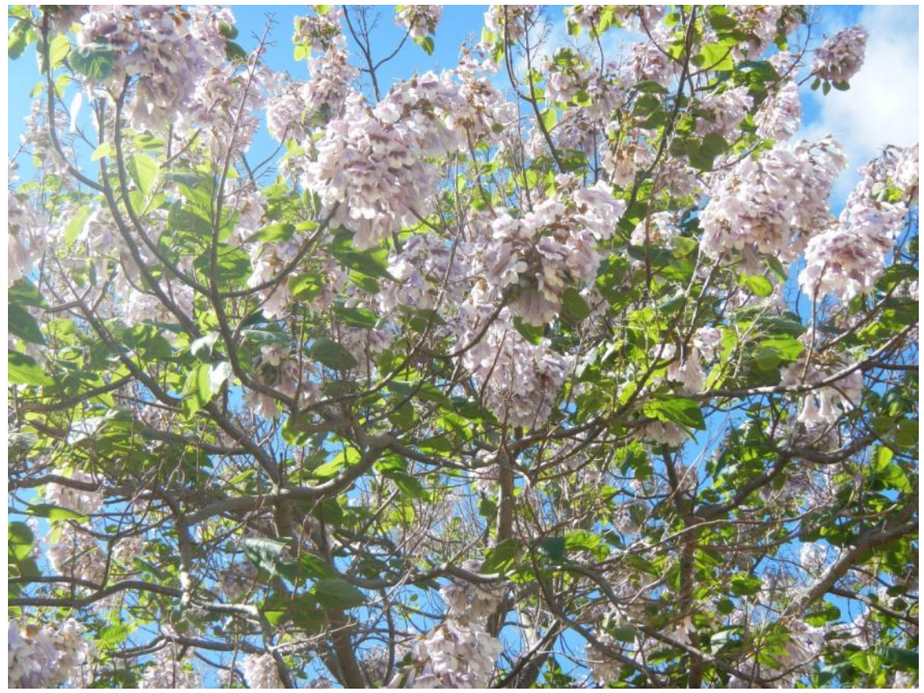
*Trees are planted on a 6m grid, a car park could be inserted in this woodland without loss of any trees or a reduction in parking bay numbers.*

*Such a car park would be cast in cool dense shade in summer, in winter it would allow the sunshine through.*

*These trees provide excellent shelter from hot dry sea breezes and strong winds.*

*In spring the blossom produces a honeysuckle like fragrance and the air is alive with the hum of honey bees.*

*Each tree costs a few dollars.*



### 3.2 Shrubs

Planted areas in commercial developments wider than 1.5m located between the building and the front lot boundary are defined as ‘landscaping’ in the City’s Town Planning Scheme. The Scheme requires ‘landscaping’ to occupy a minimum of 10% of the site.

Planting is an opportunity for increasing the value of the property and the activities carried out on the site. Planting should be set out to draw the eye to entrances and signs and to distract attention from refuse and storage facilities.

Consider the height of shrub planting between the building and the road. Using dense waist high shrubs promotes the impression of a spacious green environment by reducing the visual dominance of paving and parked cars. Low ground cover planting, or sparse planting will not be noticed from the road and can give the impression the development is cluttered and poorly maintained.

Tree planting will not automatically obstruct views of the building or corporate signage. Lower branches (up to 3m above ground level) can be pruned off as the tree grows.

The appendix to this guide describes a list of plant species that have proven to be useful on Commercial Development sites, the plant species list gives recommended sizes for plants and the density at which they should be planted.

### 3.3 Maintenance of planting and security

The City's planning compliance officer is engaged to ensure that the maintenance of developments is carried out to reasonable standard.  Inadequate consideration of the practicalities of maintaining a site at design stage may create problems for the owner, the tenant and the City in the years following the development's establishment.

### 3.4 At development application stage, the City's officers will consider

- whether the plant species proposed will have a long life expectancy,
- what the ultimate height and appearance of the vegetation will be,
- whether it will survive if maintenance and watering is poor.
-

### 3.5 Drought tolerant, long lived species are preferable

Drought tolerant, long lived species are preferable in most commercial premises where the tenant may have little interest in maintaining the corporate gardens supplied by the owner.  Speculative developments are particularly vulnerable to neglect by tenants and subsequent owners.

### 3.6 Consider the method to be used when irrigating the site

- Bores may be appropriate in larger developments with extensive lawns, they will give the owner/tenant the opportunity to irrigate more frequently giving a higher quality presentation of the site.
- Scheme water may be appropriate where small areas of planting have been used.
- Reliance on truck watering is ill advised except for establishment of larger species, its success relies upon dedicated grounds maintenance staff/contractors.  Truck or hand watering will usually be required for two summers following planting.

### 3.7 Extensive lawns will require an irrigation system

Extensive lawns will require an irrigation system if only during the two year establishment period. Hand watering lawns is rarely an economical or practical option. Established lawns can be left dry during summer months, the grass will yellow and dry but grass species such as **Kikuyu** and **Couch** will start to grow again when the winter rains return. Some species (such as Buffalo grass) do not survive this treatment.

### 3.8 Consider employing water wise planting techniques

Species selection/hydrozoning/mulching and so on as a contingency against future irrigation restrictions and as a responsible response to Perth's ground water conservation.

### 3.9 Lighting vegetation and building facades can create very prestigious impression for a relatively low cost.

Such lighting techniques are good for the security of staff. Up lighting tree canopies, and wash lighting building facades creates a low level ambient 'glow' that reduces the prevalence of dark impenetrable shadows that floodlighting and 'area' lighting can create.

### 3.10 Tree canopies can often block lighting mounted on high columns (area lighting)

The City's officers will review development proposals to consider whether the lighting has been considered with proper regard to planting characteristics, and whether the lighting design will remain effective as the planting matures

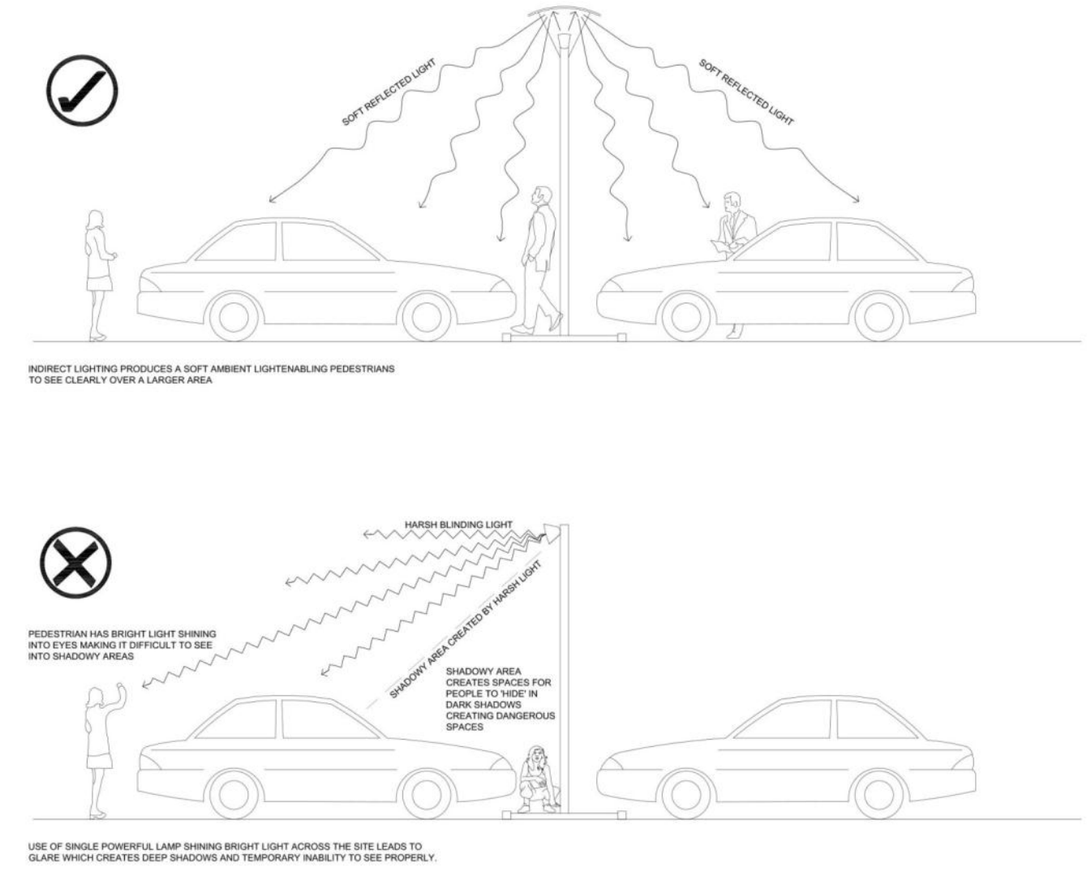
### 3.11 Site security should be considered during the design of planting

It is often better to 'filter' views of private areas (such as to the rear of the site), than screen them of entirely. Hidden corners harbour vandals and thieves, exposure to view by passing traffic is one of the simplest ways to increase site security.

## 4.0 Lighting strategies.

**Photograph 11 (right)**. *'Indirect' or reflected light fittings like these do not shine the lamp directly into people's eyes (glare), shadows are softer, lamps are protected from being smashed, light can be directed to where it is needed and the fittings can add flare and style to the site.*

**Figure 6**



## 5.0 The verge and boundary treatments

The City requires the occupants of adjacent lots to maintain the road verge. Good design outcomes for verges will be the subject of a dedicated Design Guide at a later date, the following is intended as an interim recommendation to assist with the current state of play.

### 5.1 In industrial areas the verge is often used to accommodate staff and visitor parking in an informal manner

Parking bays can be utilised for storing materials and plant. It is difficult and undesirable for the City to police informal verge parking in such circumstances.

### 5.2 Verges should be either paved or grassed and provided with ample shade trees

This is a consequence of the propensity for staff to park on the verge. Shading lawns reduces irrigation demands, reduces heat build up in the local area, and shades the cars parked beneath them.

### 5.3 Unmaintained or damaged grass verge is easily recovered through a regime of winter mowing

Whereas extensive shrub planting requires specialised maintenance regimes and greater investment from the owners of developments.

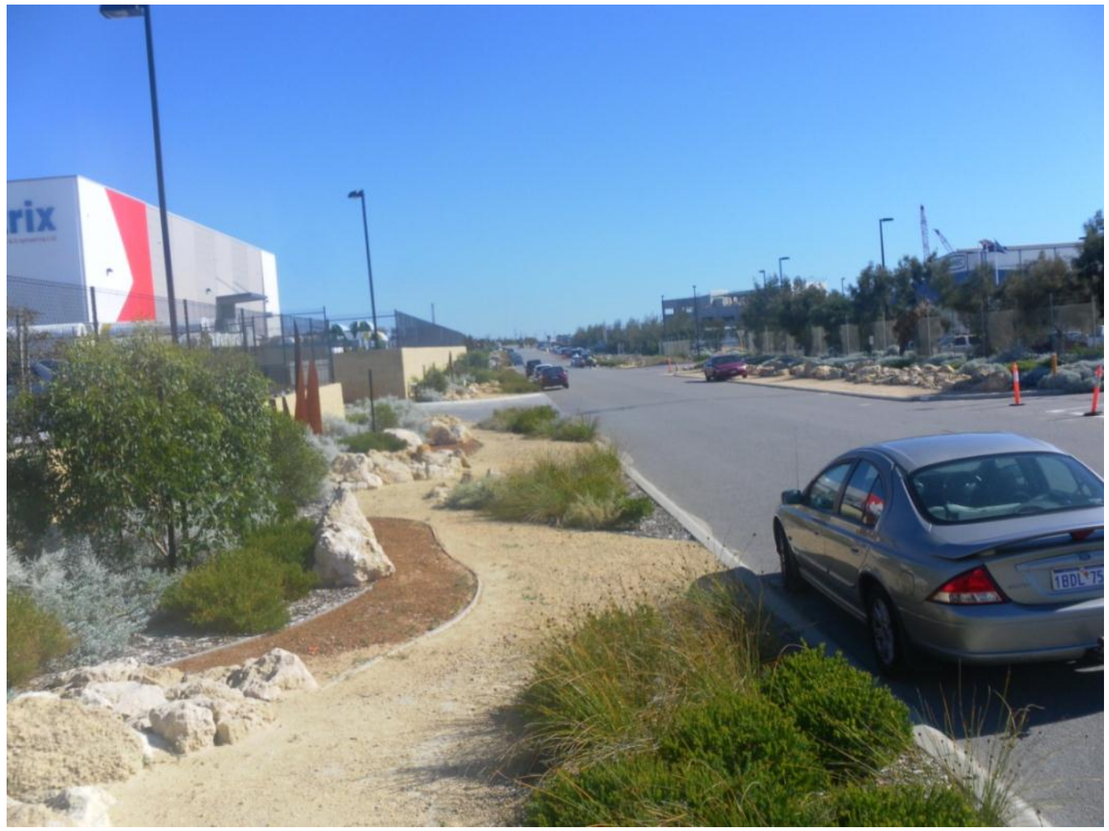
### 5.4 Tree planting on road verges must be located in the position specified by the Utilities Providers Code of Practice

Proposals for verge planting must be accompanied by a cross section through the verge indicating the location of the underground utilities in the verge is known and that trees are located on the correct alignment. *(http://standards.mainroads.wa.gov.au/nr/rdonlyres/0b774c88- 78a5-44f6-850b-f012e9a1f265/O/utility.pdf).* Note that narrow verges and lots will require special consideration of the the knock on effect on the amount of on street parking and the positioning of trees on the verge. Refer to the City's Narrow Lots Narrow Verge Guide (located on the City's website alongside its subdivision engineering details).

### 5.5 It may be possible to introduce shrub planting onto the verge

Shrub planting on verges is usually only appropriate where the owner or agent of the commercial premises will be occupying the site. Large Supermarket chains and fast food franchises are examples of where the property owner commonly provides contract maintenance of shrub on verges. In these cases access to the verge for car parking is stopped through barriers. As stated above, verge planting must not obstruct site lines.

**Photograph 12** *Henderson industrial estate's verges were developed by the managing body for the estate Landcorp. The verges maintain a presentable impression even though there is an obvious demand for additional car parking. The City permitted this design response on condition that Landcorp maintained and repaired the verges for 25years. As lots along this street are developed the demand for new underground utilities do not require the verge to be dug up because Landcorp's consultants arranged for special alignment with the utility providers.*



**5.6 Visibility splays overlain on proposal plans**

Commercial developments must describe visibility splays overlain on the proposal plans. Part 5 of Austroads Guide to Traffic Engineering Practice "Intersections at Grade" provides guidance on the visibility splay required by different road design speeds. Evidence that proposed tree and shrub planting, and existing infrastructure such as cabinets and power poles, do not obstruct views or present a potential traffic hazard.

**5.7 Work on underground verge utilities will necessitate the repair of verges by the utility provider**

The restoration and reinstatement of verges is limited to the requirements of the City's verge reinstatement specifications. This document specifies the level of reinstatement and the types and quality of materials to be used in reinstatement. Any materials or finishes not contained in this document will not be reinstated by the Utility Provider. Property developers should ensure their verges are developed so that they can be readily repaired by the utility provider.

**5.8 Level changes**

An item frequently overlooked by developers is the relative level of the development lot compared with the neighbouring lots and the adjacent road reserve.

**5.9 DA submissions should provide information regarding the elevation of the development lot and the adjacent lots and public road.**

**5.10 Where a large level change occurs**

a long section through the centreline of each crossover (the driveway that crosses the verge) with the Standards Australia ground clearance template contained in AS2890 will demonstrate that vehicles will not 'bottom out' entering and leaving the site.

**5.11 To establish the relative elevation of the surroundings**

a topographical and site features survey of the existing site, including indicative spot heights on the adjacent road crown and gutter and adjacent lots will be required. Proposed (development) levels will also be required.

**Photograph 13**. *How level changes across property boundaries are to be resolved requires early resolution in the design process. SES building Polleti Road, Cockburn Central. Note the steep entry ramp into the site was too steep to allow cars to use it due to bottoming out. The car park had to be redesigned after the contract was let.*

## 6.0 Perimeter fencing.

Popular choices for commercial property boundary fences include the chain mesh fence (the cheapest, but the least secure) and the steel palisade (see photograph 13 above). As photograph 13 illustrates the steel palisade projects a sense of strength and permenancy, unfortunately it is also used to protect utilities installations such as electricity sub stations and water treatment plants. The sense of security is misleading, closer inspection of these fence panels reveals they are often only held on with a few bolts.

A rarely exploited alternative boundary fence treatment is the folded welded mesh panel and post. These provide an enhanced level of security to the metal palisade fence by providing clear views into the site from acute angles. They are superior from a commercial point of view in that they do not project the same forboding image and allow the architecture of the building and any puiblicity signs erected on the buildings to remain the most prominent feature of the development when viewed from the street.

**Photograph 14**. *Christchirch Grammer School on Stirling Highway in Claremont illustrates how folded welded mesh fencing, combined with carefully considered detailing such as post selection and design, can project a superior image for a development, increased visibility from the street and enhanced security. Cost savings may also be available to the developer through consideration of the low maintenance requirements and by taking care in the design detailing. This material is used by the UK Prison Services for perimeter fencing to its high security prisons.*

## References

Institute of Public Works Engineering Australia (2002) *Utility Standards*.

AS2890 (2004) *Australian/New Zealand Standard Off-Street Parking*, Standards Australia.

Infrastructure, D. F. (2012). *City of Cockburn Town Planning Scheme No 3*. Perth: Department for Planning and Infrastructure.

Stone, L. (1998) Sudden Limb Failure.  In I.S. Conference (Ed.). Melbourne : Managing Tree Hazard First National Conference.

## Appendix.

Note the Appendix to this guide is provided as a separate document to assist with downloading.

# Appendices

# Appendix A - Guide to planting on commercial development lots.

# COMMERCIAL LOT SPECIES GUIDE

Revision A July 2013

The following four sheets indicate species of plants that have proven suitable for planting in commercial developments in the City of Cockburn. Each page indicates where the plant is best used and why.

1. **Screening** shrubs (eyeheight or taller)
2. **Ground cover** shrubs (waist height or lower)
3. **Shade** trees for car parks and close to buildings
4. **Trees** that should only be used away from car parking bays, structures or material storage areas.

An internet search under the scientific name will provide a more detailed description of the species listed, including numerous photographs to indicate the ultimate size and character of the material.

The City's Landscape Architect (Parks) and the City's Environment Team have compiled this list.
Please refer to the City's Landscape Architect (Parks Services) for further advice when reviewing DA submissions.

# **Screening Shrubs** (eye height or taller)

| Scientific Name | Local Name/s | Character | Min. Container Size | Min. Stock Height | Ultimate height in metres | Recomended planting centres (m) to achive full cover. | Recommended plants per square metre | Cultivation notes & typical uses |
|---|---|---|---|---|---|---|---|---|
| Acacia saligna | Wattle | Large sprawling green bush | Tube | 200mm | 5 | 1 | 1 | Native backdrop screen, low water, low fertilizer. |
| Adenanthos sericeus | Coastal or Albany Woolybush | Large sprawling upright green conifer-likebush | 150mm | 300mm | 4 | 3 | 2 | Fast growing, though short lived screening bush suited to coastal conditions. Foliage is soft to the touch, can be pruned but not hedged due to short lifespan. Instant shelter on a windy site. |
| Agonis flexuosa nana | Dwarf Peppermint | Compact tidy bush | 150mm | | 3 | 0.75 | 1.5 | Good for hedging, tidy, coastal. |
| Banksia burdettii | Burdett's Banksia | Large rounded banksia bush | 150mm | 200mm | 6 | 1 | 1 | Native backdrop screen, low water, native fertilizer only. |
| Banksia sceptrum | Sceptre Banksia | Large rounded banksia bush | 150mm | 200mm | 6 | 1 | 1 | Native backdrop screen, low water, native fertilizer only. |
| Callistemon 'Capt Cook' | Bottlebrush | Large straggly bush | 150mm | 200mm | 6 | 1 | 1 | Familiar garden plant, good for foreground locations. |
| Callistemon 'Kings Park Special' | Callistemon Kings Park | Large straggly bush | 150mm | 200mm | 6 | 1 | 1 | Small tree, spectacular flowers once a year. |
| Coleonema compactum | Diosma, Confetti bush | Compact, fine leaved, bright green bush | 150mm | 200mm | 3 | 1 | 1 | Native looking exotic, hedges well. |
| Coleonema pulcheum rubum | Diosma, Confetti bush | Compact, fine dull red leaved bush | 150mm | 200mm | 3 | 1 | 1 | Native looking exotic, hedges well. |
| Eucalyptus macrocarpa | Mottlecah | Dramatic native, large open sprawling grey bush. | 150mm | 200mm | 3 | 1 | 1 | Needs lots of room sprawls 3m in every direction, can be pruned hard to increase flowers. |
| Grevillia crithmifolia | Grevillea cultivar | Large green bush, fine needle leaves. | 150mm | 200mm | 4 | 1 | 1 | Large dense dark green native hedge or backdrop screen. |
| Grevillea jenkinsii | Grevillea cultivar | Open fine leafed bush. | 150mm | 200mm | 4 | 1 | 1 | Native hedge or backdrop screen. |
| Grevillea Olivacea | Olive Grevillea | Open fine leafed bush. | 150mm | 200mm | 4 | 1 | 1 | Native hedge or backdrop screen. |
| Grevillea Robyn Gordon | Grevillea cultivar | Open cut leafed bush | 150mm | 200mm | 4 | 1 | 1 | Native hedge or backdrop screen. |
| Grevillea superb | See Grevillea Robyn Gordon | Open cut leafed bush | 150mm | 200mm | 4 | 1 | 1 | Native hedge or backdrop screen. |
| Grevillea thelmaniana dark green fo | Spider net grevillea | Conifer like open green bush | 150mm | 200mm | 3 | 1 | 1 | Native hedge or backdrop screen. |
| Hakea laurina | in cushion hakea, emu bush, Kodj | Large rounded sprawling bush | 150mm | 200mm | 6 | 1 | 1 | Native backdrop screen. |
| Isopogon cuneatus | Coneflower | Large upright green bush | 150mm | 200mm | 4 | 1 | 1 | Native backdrop screen. |
| Isopogon dubius | Pincushion coneflower | Medium cut leafed bush | 150mm | 200mm | 4 | 1 | 1 | Native backdrop screen. |
| Kunzea baxteri | Scarlet kunzea | Medium needle leafed bush | 150mm | 200mm | 3 | 1 | 1 | Native backdrop screen. |
| Metrosideros collina tahiti | Tahitian Pohutukawa/Christmas T | Compact furry leaved grey bush. | 150mm | 200mm | 6 | 1 | 1 | Can mix with natives or exotics, foreground or backdrop screen, slow growing, coastal |
| Metrosideros Fiji | Red leaf form | Compact furry leaved purple grey bush. | 150mm | 200mm | 6 | 1 | 1 | Can mix with natives or exotics, foreground or backdrop screen, slow growing, coastal |
| Photinia glabra | Red tipped Photinia | Glossy leaved hedge | 150mm | 200mm | 6 | 1 | 1 | Smart glossy hedging plant. |
| Pittosporm tobira | Pittosporum | Glossy leaved hedge | Tube | 200mm | 6 | 1 | 1 | Smart glossy hedging plant. |
| Rhaphiolepsis indica alba | Indian Hawthorn | Shiney leaved compact bush | 150mm | 200mm | 3 | 1 | 1 | Smart glossy hedging plant. |
| Rhaphiolepsis indica pink | Indian Hawthorn | Shiney leaved compact bush | 150mm | 200mm | 3 | 1 | 1 | Smart glossy hedging plant. |
| Ricinocarpus pinifolius | Wedding bush | Large dark green fine leaved upright shrub. | 150mm | 200mm | 3 | 1 | 1 | Native backdrop screen |
| Syzgium australe | Lilly Pilly | Shiney leaved large hedge/tree | 150mm | 200mm | 10 | 1 | 1 | Smart glossy hedging plant. |

# **Ground Cover Shrubs** (below waist height)

| Scientific Name | Local Name/s | Character | Min. Container Size | Min. Stock Height | Ultimate height in metres | Recomended planting centres (m) to achive full cover. | Recommended plants per square metre | Cultivation notes & typical uses |
|---|---|---|---|---|---|---|---|---|
| Adenanthus cuneatus | Coastal jugflower | Tough grey broadleaf with subtle tough pink tips. | 150mm | 200mm | 0.2 | 0.5 | 4 | Very hardy native, mass plant with similar sized natives to form tough long lasting carpet of vegetation. |
| Anigozanthus flavidus, dark red | Tall Kangaroo Paw, Evergreen Kangaroo Paw | Strapped leafed, tough evergreen. | 150mm | 200mm | 0.75 | 0.5 | 4 | Suffers fungal infections from overhead irrigation (use drippers). Flower stalks require removing annually. Short lived. |
| Anigozanthus manglesii | Red & Green Kangaroo Paw | Strapped leafed, tough evergreen. | 150mm | 200mm | 0.75 | 0.5 | 4 | Suffers fungal infections from overhead irrigation (use drippers). Flower stalks require removing annually. Short lived. |
| Anigozanthus 'Big Red' | Kangaroo Paw | Strapped leafed, tough evergreen. | 150mm | 200mm | 0.75 | 0.5 | 4 | Suffers fungal infections from overhead irrigation (use drippers). Flower stalks require removing annually. Short lived. |
| Anigozanthus 'Yellow Gem' | Kangaroo Paw | Strapped leafed, tough evergreen. | 150mm | 200mm | 0.75 | 0.5 | 4 | Suffers fungal infections from overhead irrigation (use drippers). Flower stalks require removing annually. Short lived. |
| Callistemon Little John | Dwarf Bottlebrush | Compact needle leafed shrub, red bottle brush flowers. | 150mm | 200mm | 0.5 | 0.5 | 4 | Long lived but slow growing native. Plant at close centres to counter losses over time. |
| Calothamnus quadrifidus | One-sided bottlebrush | Weeping, open needle leafed, grey green. | 150mm | 200mm | 0.5 | 0.5 | 4 | Hardy native, usually mass planted. |
| Carex petriei | Sedge, rusty sedge, rusty carex | Rusty strap leafed grassy. | 150mm | 200mm | 0.5 | 0.5 | 4 | NZ native, usually mass planted. |
| Conostylus candicans | Grey cotton head | Short tufted grey grass, yellow button flowers spring. | Tube | 100mm | 300mm | 0.3 | 5 | Hardy native, usually mass planted, good when mixed withother native ground covers in groups of 5 or 7 of each species.. |
| Dianella Revoluta Little Rev | Dianella | Strap leafed dense carpet. | 150mm | 200mm | 0.5 | 0.5 | 4 | Requires sheltered well irrigated conditions in full sun to thrive. |
| Eremophila glabra prostate | Common Emu Bush, Tar bush | Carpet of small grey furry leaves. | 150mm | 200mm | 0.3 | 0.5 | 4 | Very hardy native, mass plant with similar sized natives to form tough long lasting carpet of vegetation. |
| Grevillia crithmifolia 'Nana' | Grevillea cultivar | Dense dark green small leafed. | 150mm | 200mm | 0.5 | 0.5 | 4 | Low maintenance native ground cover. Often used for formal boarders or mixed with similar sized natives in mass plantings. |
| Grevillea Gilt Dragon | Grevillea cultivar | Open, grey leafed, weeping shrub. | 150mm | 200mm | 0.5 | 0.5 | 4 | Low maintenance native ground cover. Often mixed with similar sized natives in mass plantings. |
| Grevillea Sea Spray | Grevillea cultivar | Open, grey leafed, weeping shrub. | 150mm | 200mm | 0.5 | 0.5 | 4 | Low maintenance native ground cover. Often mixed with similar sized natives in mass plantings. |
| Grevillea thelmaniana Obtusifolia | Dwarf spider net grevillea | Open, bright green, upright shrub. | 150mm | 200mm | 0.5 | 0.5 | 4 | Low maintenance native ground cover. Often mixed with similar sized natives in mass plantings. |
| Hakea laurina 'Mini Pini' | Dwarf Pin cushion hakea | Dark green mid leafed rounded bush. | 150mm | 200mm | 0.3 | 0.5 | 4 | Low maintenance native ground cover. Often mixed with similar sized natives in mass plantings. |
| Hemiandra pungens | Snakebush | Dense fine carpet of prickly leaves, profusion of white or pale pink flowers. | 150mm | 200mm | 0.1 | 0.5 | 4 | Thrives in hot dry conditions. Usefull for covering walls, boulders and for creating large uniform areas of vegetation. Prickly under barefeet. |
| Juniperus conferta | Silver mist shore juniper | Dense formal carpet of tiny pine needles. | 150mm | 200mm | 0.3 | 0.5 | 4 | Thrives in hot dry conditions. Usefull for covering walls, boulders and for creating large uniform areas of vegetation. Long lived hardy conifer. |
| Lavender angustifolia | Lavender | Lavender | 150mm | 200mm | 0.5-1.2 | 0.5 | 4 | Thrives in hot conditions. Short life span extended by regular watering. |
| Leucophyta brownii | Cushion bush | Rounded green bush, mid sized leaves, showy pink flowers on stalks. | 150mm | 200mm | 1.5 | 0.5 | 4 | |
| Metrosideros excelsa dwarf | Dwarf pohutukawa | Furry grey green small rounded leaves on a small compact bush. | 150mm | 200mm | 1 | 0.5 | 4 | Slow growing long lived formal looking shrub from coastal New Zealand. |
| Phormium tenax 'Purpurea' | Purple NZ flax | Striking broad strap leafed large rush. | 150mm | 200mm | 1.2 | 0.5 | 4 | Varieties may be bronze through to purple in colour. Tough coastal dune plant from New Zealand. |
| Photinia x fraseri 'Nana Select' | Dwarf Photinia | Glossy large leafed low bush. | 150mm | 200mm | 0.75 | 0.5 | 4 | Showy hedging plant, large glossy leaves used in formal areas. |
| Scaevola Fan Fare | Fan flower | Open carpet of small green fleshy leaves, showy small purple flowers. | 150mm | 200mm | 0.1 | 0.5 | 4 | Short lived plant. Usefull for interplanting between other coastal natives whilst they grow to fill gaps. Very showy bright purple or blue flowers. |
| Syzgium Tiny Trev | Dwarf Lilly Pilly | Compact small shiney leafed bush. | 150mm | 200mm | 0.5 | 0.5 | 4 | Showy hedging plant, small glossy leaves used in formal areas. |
| Trachlosperum jasminodies | Star Jasmine | Carpet of bright green glossy leaves on long tendral stalks. | 150mm | 200mm | 0.2 | 0.5 | 4 | Fragrant Jasmine flowers will tolerate heat if provided with adequate water. Tends to ramble across open ground. |
| Westringea fruiticosa | Coastal rosemary | Needle leaved small compact rounded shrub. | 150mm | 200mm | 0.5 | 0.5 | 4 | Low maintenance native ground cover. Often mixed with similar sized natives in mass plantings. |
| Westringea White Rambler | Prostrate native rosemary | Needle leaved small compact rounded shrub. | 150mm | 200mm | 0.5 | 0.5 | 4 | Low maintenance native ground cover. Often mixed with similar sized natives in mass plantings. |
| Xanthorrhoea preissii | Balga, Blackboy, Grass Tree | Black thick prickly trunk up to 3m. Terminal head of long needle like leaves growing from single point at top of trunk. | 45L | NA | 5 | 1 | 1 | Instant mature appearance on new sites can enhance the marketability of developments. Eye catching and higher quality presentation. Long lived low maintenance. |

C

# Trees for all areas. (Refer to City of Cockburn Good Design Guide for Commercial Developments).

ces

| Scientific Name | Local Name/s | Character | Min. Container Size | Min. Stock Height | Ultimate height in metres | Recomended planting centres (m) to achive full cover. | Recommended plants per square metre | Cultivation notes & typical uses |
|---|---|---|---|---|---|---|---|---|
| Agonis flexuosa | Peppermint tree. | Native weeping willow like tree. | 45L | 1.5 | 8 | 8 | not applicable | Coastal native tree that can tolerate sea breezes. |
| Brachychiton acerifolius | Illawarra Flame Tree | Small compact tree with large glossy leaves and green bark. | 45L | 1.5 | 6 | 5 | not applicable | Rainforest tree that is stunted in hot exposed hard paved areas. |
| Callitris preisii | Rottnest Pine | Upright, compact, native conifer. | 300mm | 1 | 6 | 4 | not applicable | Not a shade tree, the branches come from the trunk down to ground level. Mixed with large rounded shrubs, these tall narrow bright green trees add interest to a backdrop or a screening belt. |
| Catalpa bignonoides | Indian bean tree | Small rounded tree. Spectacularly large bright green leaves and candelabras of showy white flowers. | 45L | 1 | 8 | 8 | not applicable | Cool temperate tree, leaves are damaged and scalded by sea breezes. Excellent in sheltered corners or courtyards. Casts uniform but light shade |
| Delonix regia | Royal poinciana | Short tree, but very wide canopy of dark emarald fern like leaves. Spectacular trusses of large crimson orchid like flowers. Deciduous. Good in coastal conditions. | 45L | 1.5 | 8 | 10 | not applicable | Tropical deciduous tree,branches prone to drooping down to ground level. Requires pruning to achieve good shape. Short lived (30years) but spectacular. Tolerates sea breezes well, frost tender. |
| Eucalyptus platypus | Moort, Round-leaved moort | Small umbrella shaped Eucalyptus tree. | 45L | 1 | 6 | 6 | not applicable | Native coastal tree, too small for providing effective shade canopy in industrial or commercial environments. Sculptural umbrella shaped coastal native. |
| Eucalyptus torquata | Coral gum | Small umbrella shaped gum tree. From the Kalgoorlie goldfields, this is a small decorative tree with attractive pink flowers. | 45L | 1 | 6 | 6 | not applicable | This tree's attractive appearance makes it usefull for planting in high profile areas, near entrances or outdoor seating areas where it will attract wildlife. Too small for all but the most modest of car parks, Eucalyptus trees do not cast a very dense shade. |
| Fraxinus raywoodi | Claret ash, Raywood ash | Medium sized deciduous tree with small leaves. Turn dark burgundy red in Autumn. | 45L | 1.5 | 10 | 7 | not applicable | Reliable regular shaped tree, suitable for car parks. |
| Gleditsia triacanthus 'Inermis' | Honey locust | Umbrella shaped small deciduous tree. | 45L | 1.5 | 15 | 7 | not applicable | Tough deciduous shade tree, the variety *Inermis* is a thornless variety - thorns may be a problem for pedestrians and maintenance crew. |
| Jacaranda mimosaefolia | Jacaranda | Medium sized deciduous trees with fern like yellow green leaves. | 45L | 1.5 | 8 | 8 | not applicable | Reliable regular shaped tree, suitable for car parks. Slow growing. |
| Liquidamber stryaciflua | Liquidamber, sweet gum | Large deciduous tree, like a plane tree with smaller leaves. Spectacular orange to burgundy red autumn foliage. | 45L | 1.5 | 10 | 8 | not applicable | Reliable regular shaped tree, suitable for car parks. Slow growing. Leaves can scorch in summer, minor drawback. |
| Lophostemon confertus | Brush Box, Qld box tree | Familiar large lolly pop shaped evergreen with large glossy green leaves and small woody gumnuts which carpet the ground. | 45L | 1 | 8 | 8 | not applicable | From the rain forests of the east coast of Australia this rainforest tree is usually heavily stunted in Perth. Ball bearing like gum nuts can be a slip hazard over paved areas. |
| Paulownia tomentosa | Paulownia, Empress tree | Deciduous tree with dark green enormous round leaves. Dense cool shade. Spectacular spring display of massed purple candelabras. | 45L | 1 | 10 | 7 | not applicable | Very rapid growing. Usefull for shading both permanent and temporary/interim car parks. |
| Plantanus acerifolia | London Plane Tree | Familiar deciduous tree. | 45L | 1.5 | 12 | 10 | not applicable | Often stunted by extreme heat but can reach massive proportions in shletered cooler positions. Roots can damage paving in cramped sites. |
| Platanus digitata | Cut leafed Plane | Smaller decorative version of the familiar London Plane | 45L | 1.5 | 10 | 8 | not applicable | Autumn leaf fall does not form the deep drifts of dry leaves that the London Plane does. Tree less vigorous more suited to smaller areas than London Plane. |
| Prunus nigra | Red flowering plum | Small erect purple leafed deciduous plum tree. Fruit are small and few, not a problem in car parks, very limited shade provided though. | 45L | 0.75 | 5 | 2 | not applicable | Does not cast usefull shade. Can be planted very close to buildings. |
| Pyrus calleryana red spire | Pear | Small very erect pear tree. Fruit very small not a problem in car parks. Leaves turn spectacular oranges and reds in autumn, white spring blossom. | 45L | 0.75 | 5 | 2 | not applicable | Does not cast useful shade. Can be planted very close to buildings. |
| Pyrus usserensis | Pear | Medium sized rounded pear tree. Fruit very small not a problem in car parks. Leaves turn spectacular oranges and reds in autumn, white spring blossom. | 45L | 0.75 | 5 | 6 | not applicable | Seek advice from nursery, varieties may be prone to dropping branches. Not a safety issue but can produce insightly canopy. |
| Sapium sebiferum | Chinese tallow tree | Small glossy leaved deciduous tree with heart shaped leaves. Autumn colour. | 45L | 0.75 | 6 | 5 | not applicable | Slow growing tree that requires shelter from high winds. |
| Tipuana tipu | Pride of Bolivia | Short tree, but very wide weeping canopy of small grey green leaves. Trusses of yellow pea like flowers. | 45L | 0.75 | 7 | 10 | not applicable | Shallow roots have been a problem in paved areas/lawns. |
| Ulmas parvifiolium | Chinese elm | Large deciduous tree, weeping habit, small leaves. Yellow autumn foliage. | 45L | 1.5 | 7 | 10 | not applicable | Aphid infestation can drip sticky sap onto parked cars below. |

# Trees for commercial road verges (not suitable for planting over car parking, material storage areas, or close to buildings).

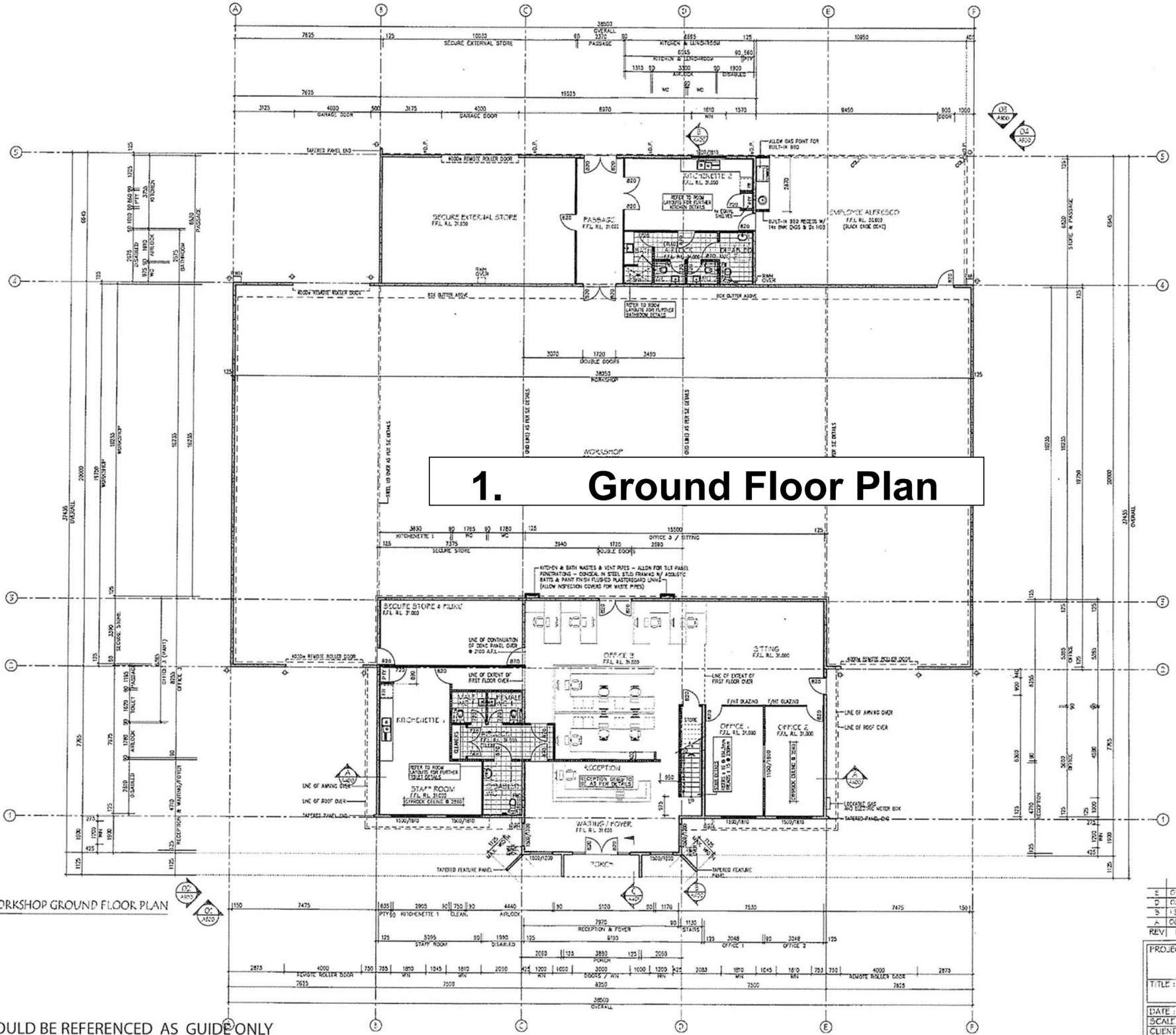
| Scientific Name | Local Name/s | Character | Min. Container Size | Min. Stock Height | Ultimate height in metres | Recomended planting centres (m) to achive full cover. | Recommended plants per square metre | Cultivation notes & typical uses |
|---|---|---|---|---|---|---|---|---|
| Corymbia calophylla | Marri | Large stately gum tree, most easily recognised by its large 'Honky Nut' gum nuts that can carpet the ground beneath it.. | 45L | 1 | 12 | 15 | not applicable | Not suitable for locations where honky nuts could be thrown by lawn mower blades. Consider using either shrub planting or mulch beneath tree. Parking vehicles or the storage of materials beneath this tree is not recommended due to risk of branch failure. |
| Eucalyptus rudis | Flooded gum | Medium sized gum tree | 45L | 1 | 8 | 10 | not applicable | This tree has evolved in damp river bank locations, usefull for drainage swales and around bubble-ups in low points or damp areas of commercial development sites. Parking vehicles or the storage of materials beneath this tree is not recommended due to risk of branch failure. |
| Eucalyptus gomphocephala | Tuart | Large, fast growing stately gum tree. | 45L | 1 | 12 | 15 | not applicable | This tree has evolved in coastal sand dunes and heathland. It can tolerate sea breezes and salt laden winds (eg Rockingham foreshore reserve). Parking vehicles or the storage of materials beneath this tree is not recommended due to risk of branch failure. |
| Eucalyptus todtiana | Coastal Blackbutt, Pricklybark | Medium sized, open branched gum tree, sometimes with branches arising the from the base (Malee form). | 45L | 1 | 8 | 10 | not applicable | Parking vehicles or the storage of materials beneath this tree is not recommended due to risk of branch failure. |

# Appendix B

## Typical DA Submission Example

1. Ground Floor Plan
2. Elevations
3. 4 Sections
4. Site Set Out Plan
5. Planting Plan
6. Drainage Layout
7. Drainage Detail

# 1. Ground Floor Plan




**NOTE:** THIS PLAN SHOULD BE REFERENCED AS GUIDE ONLY TO CONVEY THE LEVEL OF GRAPHICS REQUIRED BY COUNCIL

LEGEND

- NEW PRECAST CONCRETE TILT PANELS AS PER S.E. DWGS. A.S. 3600 AND BCA REQTS.
- NEW 76mm (U.N.O.) STEEL STUD FRAMING AS PER S.E. DWGS. A.S. 4600 AND BCA REQTS. W/ R2.0 ROCKWOOL ACOUSTIC INSULATION BATTS, AND FLUSHED & PAINTED 10mm PLASTERBOARD LINING U.N.O.
- NEW 90mm SINGLE LEAF BRICKWORK AS PER S.E. DWGS. A.S. 3700 AND BCA REQTS.
- OBS1532 NEW OBSCURE GLAZED WINDOWS
- NEW CLEAR GLAZED WINDOWS / DOORS
- (X) EXISTING OPENING – NO PROPOSED WORKS
- (FD) 30MR FIRE RATED SOLID CORE DOOR & FRAME WITH DOOR CLOSER.
- (S) HARD WIRED SMOKE DETECTOR TO A.S. 3786
- PAINT FINISH HARDWALL PLASTER TO U/SIDE OF CEILING. HARDWALL PLASTER TO CONTINUE, WHERE POSSIBLE, MIN. 100mm PAST CEILING LEVEL. TILE HEIGHTS IN WET AREAS T.B.C.
- PAINT FINISH TO 10mm PLASTERBOARD TO U/SIDE OF CEILING. PLASTERBOARD TO CONTINUE, WHERE POSSIBLE, MIN. 100mm PAST CEILING LEVEL. FAQUADRIX® (OR EQUIV.) TO WET AREAS).
- PAINT FINISH TO ALL VISIBLE SURFACES OF CONCRETE TILT PANEL.
- 'TROWEL ON' ACRYLIC RENDERED FINISH TO CONCRETE TILT PANELS / BRICKWORK.

| | |
|---|---|
| T.B.R. = | TO BE REMOVED |
| T.N.E. = | TO MATCH EXISTING |
| G.F. = | GROUND FLOOR |
| F.F. = | FIRST FLOOR |
| S.F. = | SECOND FLOOR |
| T.O.C. = | TOP OF CRATE LEVEL |
| F.P.L. = | FINISHED PAVING LEVEL |
| N.G.L. = | NATURAL GROUND LEVEL |
| A.F.L. = | ABOVE FLOOR LEVEL |
| C.O.S. = | CHECK/CONFIRM ON SITE |
| W.I.R. = | WALK IN ROBES – AS SPECIFIED |
| W.I.P. = | WALK IN PANTRY – AS SPECIFIED |
| B.I.R. = | BUILT IN ROBE – AS SPECIFIED |
| S/D = | SLIDING DOOR |
| C.S.D. = | CAVITY SLIDING DOOR |
| W = | WINDOW |
| D = | DOOR |
| CA. = | CARPET |
| B/F = | BI-FOLD DOOR |
| P.J. = | PANEL JOINT |
| A. = | AWNING WINDOW |
| SL. = | SLIDING WINDOW |
| C. = | CASEMENT WINDOW |
| H.L. = | HIGHLIGHT WINDOW |
| D.G. = | DOUBLE GLAZED |
| F.G. = | FIXED GLAZING |
| D.P. = | 150ø PVC DOWN PIPE U.N.O. |

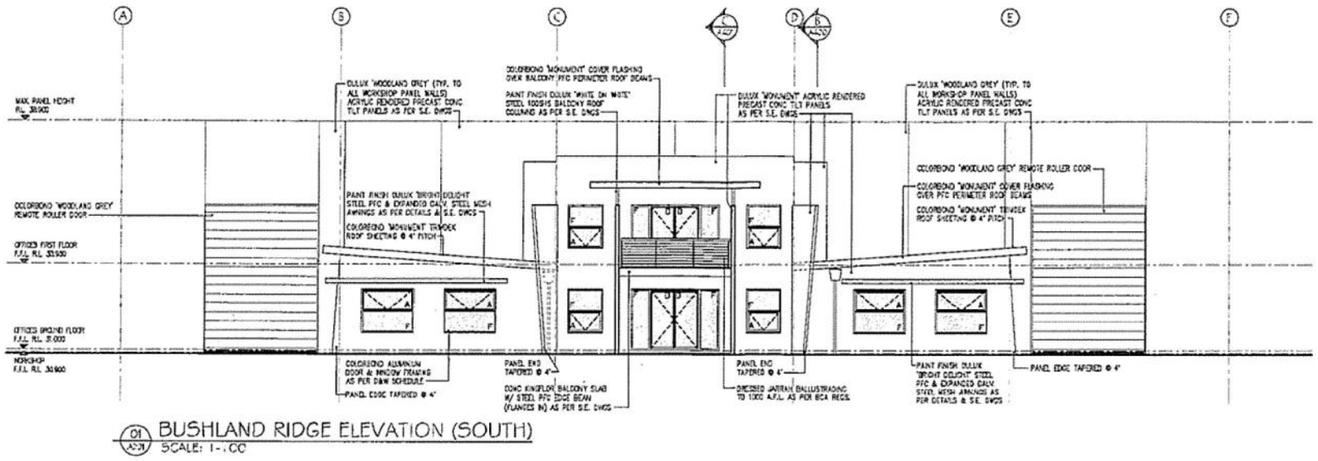
GENERAL NOTES:

- ONLY DRAWINGS ISSUED FOR CONSTRUCTION ARE PERMITTED TO BE USED FOR ANY CONSTRUCTION OR FABRICATION UNLESS OTHERWISE PERMITTED BY SAROTHAGOS DESIGN
- WRITTEN DIMENSIONS SHALL TAKE PRECEDENCE OVER SCALED DIMENSIONING.
- BUILDER IS TO VERIFY DRAWING IS TO SCALE BEFORE BEING USED TO SCALE OFF.
- THE BUILDER IS TO CHECK & VERIFY ALL DIMENSIONS ON SITE PRIOR TO COMMENCING CONSTRUCTION.
- ALL BUILDING WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH AUSTRALIAN STANDARDS, BUILDING CODE OF AUSTRALIA, LOCAL & REGULATORY AUTHORITIES.
- ARCHITECTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT CONSULTANTS DRAWINGS.
- DOWNPIPE LOCATIONS SHOWN ARE PREFERRED, IF THEY MUST VARY CONSULT WITH BUILDER & OWNER FIRST. QUANTS ARE INDICATIVE ONLY AND MAY VARY TO SUIT THE ROOF PLUMBERS REQUIREMENTS.
- UNLESS A BUILDING ELEMENT, MATERIAL, FITTING OR FIXTURE IS NOTED AS BEING EXISTING, IT IS TO BE ASSUMED AS BEING NEW.

PRELIMINARY ONLY

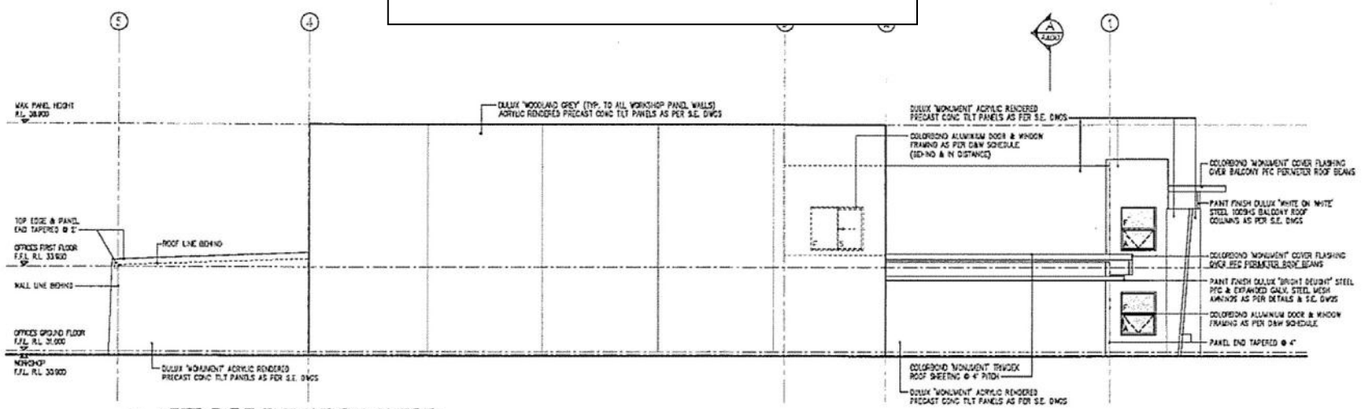
| REV | DATE | DESCRIPTION |
|---|---|---|
| E | 07/04/.. | DRAFT B, ISSUED TO ENGINEERING CONSULTANTS |
| D | 03/03/.. | ISSUED FOR COUNCIL PLANNING APPROVAL |
| B | 13/12/.. | ISSUED FOR LANDCORP PLANNING APPROVAL |
| A | 08/12/.. | ISSUED FOR CLIENT COMMENTS |

| | |
|---|---|
| PROJECT : | EXAMPLE PROJECT |
| TITLE : | OFFICE / WORKSHOP GROUND FLOOR PLAN |
| DATE : | 07/04/11 |
| SCALE : | 1:100 |
| CLIENT : | |
| DRAWN : | |
| JOB No. : | DRAWING No. : A201 |
| | REV. : E |




01 A301 BUSHLAND RIDGE ELEVATION (SOUTH)
SCALE: 1:100

# 2. Elevations




02 A301 LEFT SIDE ELEVATION (WEST)
SCALE: 1:100

**NOTE:** THIS PLAN SHOULD BE REFERENCED AS GUIDE ONLY TO CONVEY THE LEVEL OF GRAPHICS REQUIRED BY COUNCIL

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- NEW 90mm SINGLE LEAF BRICKWORK AS PER S.E. DWGS, A.S. 3700 AND BCA REQ'S.
- OBS NEW OBSCURE GLAZED WINDOWS
- NEW CLEAR GLAZED WINDOWS / DOORS
- EXISTING OPENING – NO PROPOSED WORKS
- 2HP FIRE RATED SOLID CORE DOOR & FRAME WITH DOOR CLOSER.
- HARD WIRED SMOKE DETECTOR TO A.S. 3786
- hwp PAINT FINISH HARDWALL PLASTER TO U/SIDE OF CEILING. HARDWALL PLASTER TO CONTINUE, WHERE POSSIBLE, MIN. 100mm PAST CEILING LEVEL. TILE HEIGHTS IN WET AREAS T.B.C.
- ppb PAINT FINISH TO 10mm PLASTERBOARD TO U/SIDE OF CEILING. PLASTERBOARD TO CONTINUE, WHERE POSSIBLE, MIN. 150mm PAST CEILING LEVEL. ('ARGUMENT' OR EQUIV.) TO WET AREAS).
- pcp PAINT FINISH TO ALL VISIBLE SURFACES OF CONCRETE TILT PANEL.
- crap 'CRIMEL ON' ACRYLIC RENDERED FINISH TO CONCRETE TILT PANELS / BRICKWORK.

| | |
|---|---|
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| W. = | WINDOW |
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| P.J. = | PANEL JOINT |
| A. = | AWNING WINDOW |
| SL. = | SLIDING WINDOW |
| C. = | CASEMENT WINDOW |
| H.L. = | HIGHLIGHT WINDOW |
| D.G. = | DOUBLE GLAZED |
| F. = | FIXED GLAZING |
| D.P. = | 150Ø PVC DOWN PIPE U.N.O. |

GENERAL NOTES:

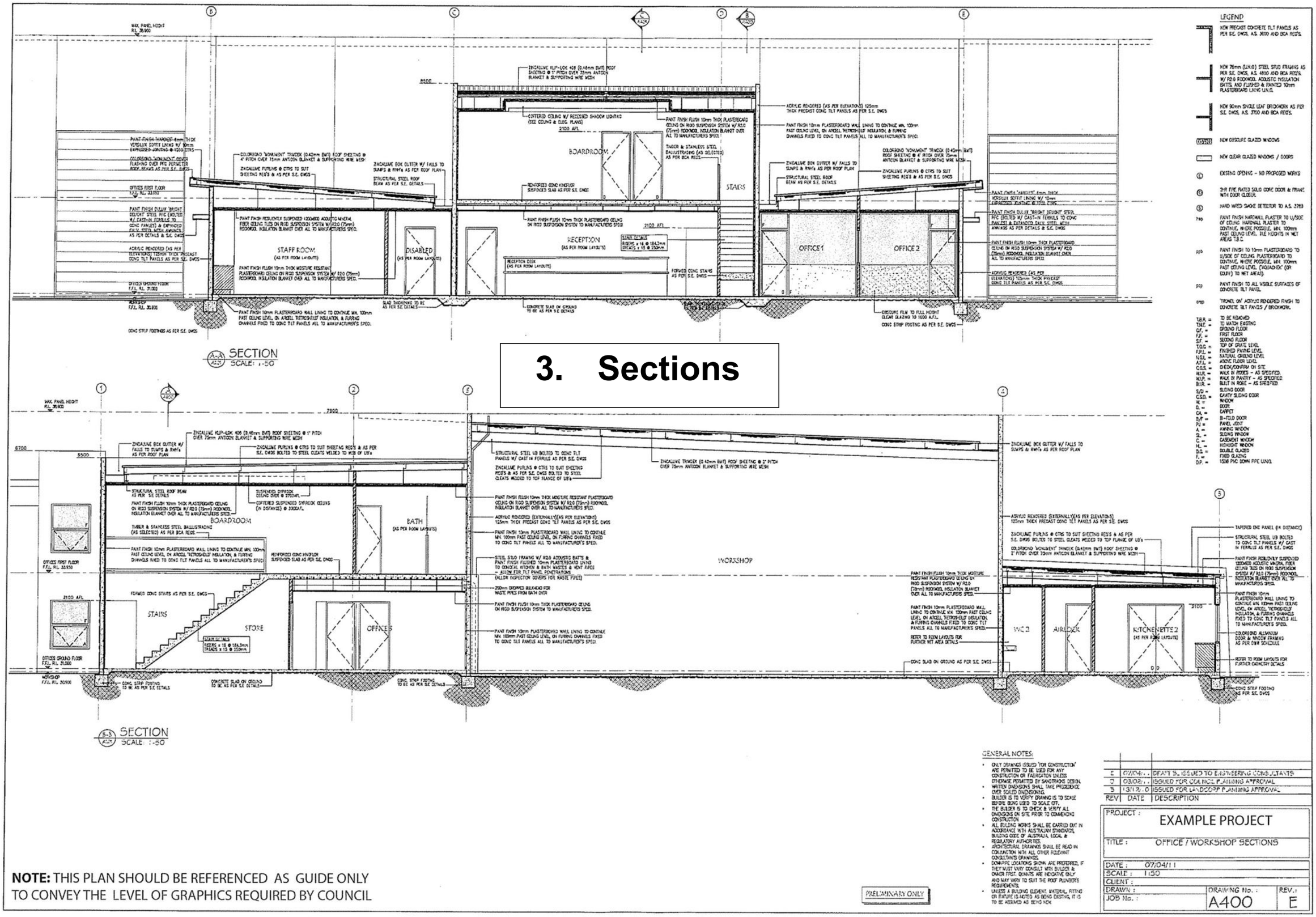
- ONLY DRAWINGS ISSUED 'FOR CONSTRUCTION' ARE PERMITTED TO BE USED FOR ANY CONSTRUCTION OR FABRICATION UNLESS OTHERWISE PERMITTED BY SANDTRACKS DESIGN
- WRITTEN DIMENSIONS SHALL TAKE PRECEDENCE OVER SCALED DIMENSIONING.
- BUILDER IS TO VERIFY DRAWING IS TO SCALE BEFORE BEING USED TO SCALE OFF.
- THE BUILDER IS TO CHECK & VERIFY ALL DIMENSIONS ON SITE PRIOR TO COMMENCING CONSTRUCTION.
- ALL BUILDING WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH AUSTRALIAN STANDARDS, BUILDING CODE OF AUSTRALIA, LOCAL & REGULATORY AUTHORITIES.
- ARCHITECTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT CONSULTANTS DRAWINGS.
- DOWNPIPE LOCATIONS SHOWN ARE PREFERRED, IF THEY MUST VARY CONSULT WITH BUILDER & OWNER FIRST. QUANTS ARE INDICATIVE ONLY AND MAY VARY TO SUIT THE ROOF PLUMBER'S REQUIREMENTS.
- UNLESS A BUILDING ELEMENT, MATERIAL, FITTING OR FIXTURE IS NOTED AS BEING EXISTING, IT IS TO BE ASSUMED AS BEING NEW.

PRELIMINARY ONLY

| REV | DATE | DESCRIPTION |
|---|---|---|
| E | 07/04/11 | DRAFT 3, ISSUED TO ENGINEERING CONSULTANTS |
| D | 03/02/11 | ISSUED FOR COUNCIL PLANNING APPROVAL |
| C | 13/12/10 | ISSUED FOR LANDCORP PLANNING APPROVAL |

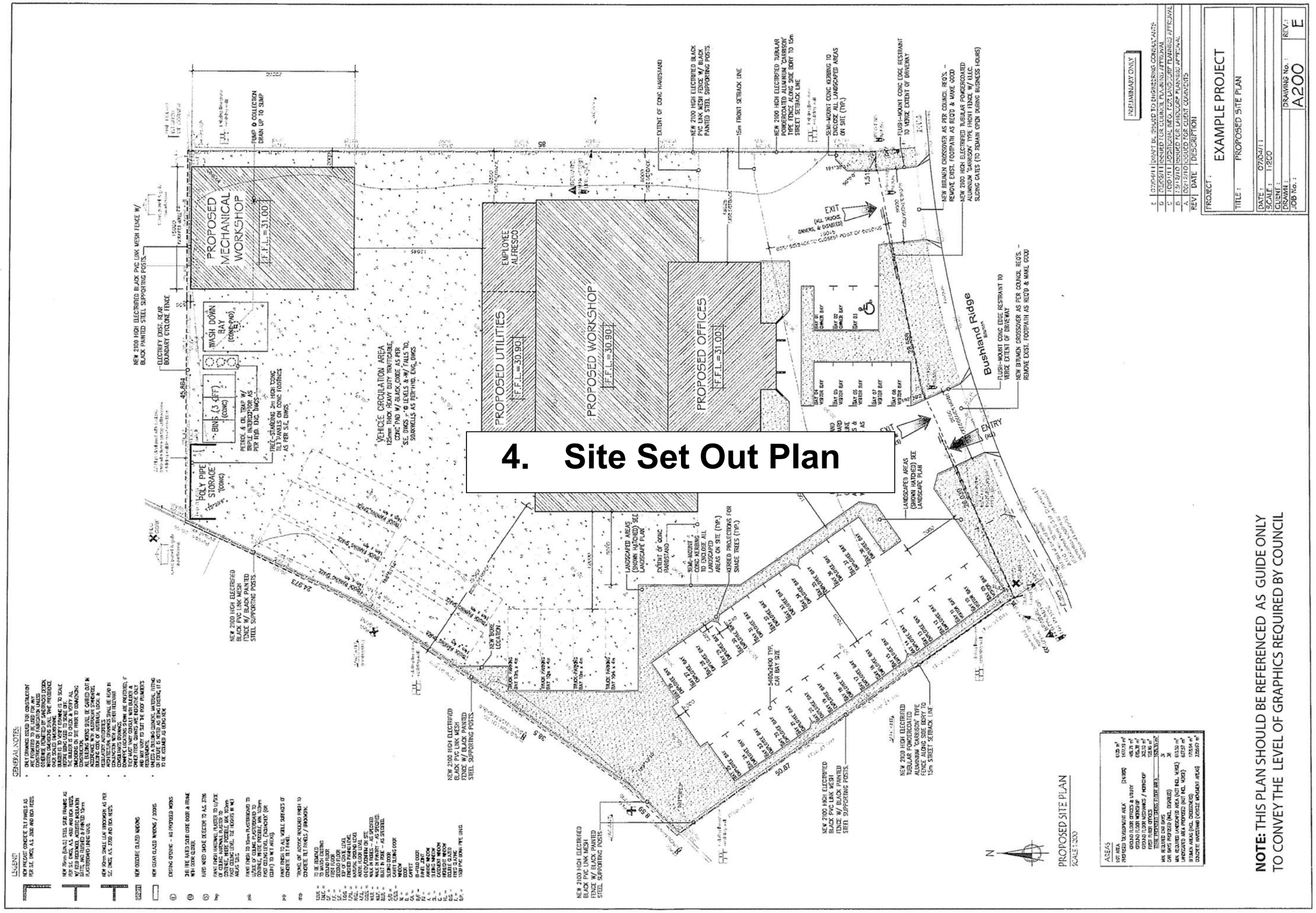
| | |
|---|---|
| PROJECT : | EXAMPLE PROJECT |
| TITLE : | OFFICE / WORKSHOP ELEVATIONS |
| DATE : | 07/04/11 |
| SCALE : | 1:100 |
| CLIENT : | |
| DRAWN : | |
| JOB No. : | DRAWING No. : A300 REV. : E |

# 3. Sections




**NOTE:** THIS PLAN SHOULD BE REFERENCED AS GUIDE ONLY TO CONVEY THE LEVEL OF GRAPHICS REQUIRED BY COUNCIL

# 4. Site Set Out Plan



# 5. Planting Plan

## PLANTING SCHEDULE:

| | Code | Botanical Name | Common Name | Density | Pot Size | Quantity |
|---|---|---|---|---|---|---|
| **PROPOSED TREES:** | | | | | | |
| | Pca | *Pyrus calleryana* | Chanticleer' Glensform Pear | 5m cts | 100LT | 27 |
| | Eto | *Eucalyptus torquata* | Coral Gum | 5m cts | 45LT | 7 |
| | Efo | *Eucalyptus foecunda* | Fremantle Mallee | 5m cts | 45LT | 6 |
| **PROPOSED SHRUBS:** | | | | | | |
| | Gol | *Grevillea olivacea* | Olive Leafed Grevillea | 300mm cts | 140mm | 258 |
| | Oax | *Oleria axilaris* | Coastal Daisy | 300mm cts | 140mm | 145 |
| | Cba | *Correa backhouseana* | Native Fuschia | 300mm cts | 140mm | 91 |
| | Afl | *Anigozanthos flavidus* | Tall Kangaroo Paw | 300mm cts | 140mm | 483 |
| | Bhe | *Billardiera heterophylla* | Australian Bluebell | 300mm cts | 140mm | 89 |
| **GROUNDCOVERS** | | | | | | |
| | Egl | *Eremophila glabra prostrata* | Kalbarri Carpet | 300mm cts | 140mm | 296 |
| | Bni | *Banksia nivea* | Couch Honeypot | 300mm cts | 140mm | 315 |
| | Kpr | *Kennedia prostrata* | Scarlet Runner | 300mm cts | 140mm | 174 |

**FOOTNOTE:** *Density indicates the distance the species should be planted apart eg. 300mm cts indicates that there should be 300mm distance between plants from the centre point of the plant*

GENERAL NOTES

- ONLY DRAWINGS ISSUED FOR CONSTRUCTION ARE PERMITTED TO BE USED FOR ANY CONSTRUCTION OR FABRICATION UNLESS OTHERWISE PERMITTED BY SANDRACKS DESIGN.
- WRITTEN DIMENSIONS SHALL TAKE PRECEDENCE OVER SCALED DIMENSIONING.
- BUILDER IS TO VERIFY DRAWING IS TO SCALE BEFORE BEING USED TO SCALE OFF.
- THE BUILDER IS TO CHECK & VERIFY ALL DIMENSIONS ON SITE PRIOR TO COMMENCING CONSTRUCTION.
- ALL BUILDING WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH AUSTRALIAN STANDARDS, BUILDING CODE OF AUSTRALIA, LOCAL & REGULATORY AUTHORITIES.
- ARCHITECTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT CONSULTANTS DRAWINGS.
- DOWNPIPE LOCATIONS SHOWN ARE PROPOSED. IF THEY MUST VARY CONSULT WITH OWNER & OWNER FIRST. QUANTS ARE INDICATIVE ONLY AND MAY VARY TO SUIT THE ROOF PLUMBER'S RECOMMENDATIONS.
- UNLESS A BUILDING ELEMENT, MATERIAL, FITTING OR FIXTURE IS NOTED AS BEING EXISTING, IT IS TO BE ASSUMED AS BEING NEW.

LANDSCAPING NOTES

- WHERE AVAILABLE TOPSOIL & MULCH FROM STOCKPILES ON THE ESTATE ARE TO BE USED.
- IMPORTED SOILS & SOIL IMPROVERS ARE TO BE FROM APPROVED NURSURIES OR LANDSCAPE SUPPLIERS.
- ALL LANDSCAPED AREAS TO BE RETICULATED WITH RAINWATER FROM TANKS HARVESTED FROM FRONT BUILDING ROOFS.

AREAS

| | | |
|---|---|---|
| LOT AREA | | 6135 m² |
| PROPOSED 'DEVELOPMENT AREA' | (24.08%) | 1477.19 m² |
| GROUND FLOOR OFFICES & UTILITY | | 489.71 m² |
| GROUND FLOOR WORKSHOP | | 685.38 m² |
| GROUND FLOOR MECHANICS / WORKSHOP | | 302.10 m² |
| FIRST FLOOR OFFICES | | 128.16 m² |
| TOTAL PROPOSED GROSS FLOOR AREA | | 1605.35 m² |
| MIN. REQUIRED CAR BAYS | | 31 |
| CAR BAYS PROPOSED (INCL. DISABLED) | | 38 |
| MIN. REQUIRED LANDSCAPED AREA (NOT INCL. VERGE) | | 613.50 m² |
| LANDSCAPED AREA PROPOSED (NOT INCL. VERGE) | | 627.97 m² |
| BITUMEN AREAS (INCL. CROSSOVERS) | | 1718.64 m² |
| CONCRETE HARDSTAND (VEHICLE MOVEMENT AREAS) | | 2358.67 m² |

**PLANTING PLAN**
DETAIL OF 1:200 @ A1 PLAN

**NOTE:** THIS PLAN SHOULD BE REFERENCED AS A GUIDE ONLY TO CONVEY THE LEVEL OF LANDSCAPE DESIGN REQUIRED BY COUNCIL

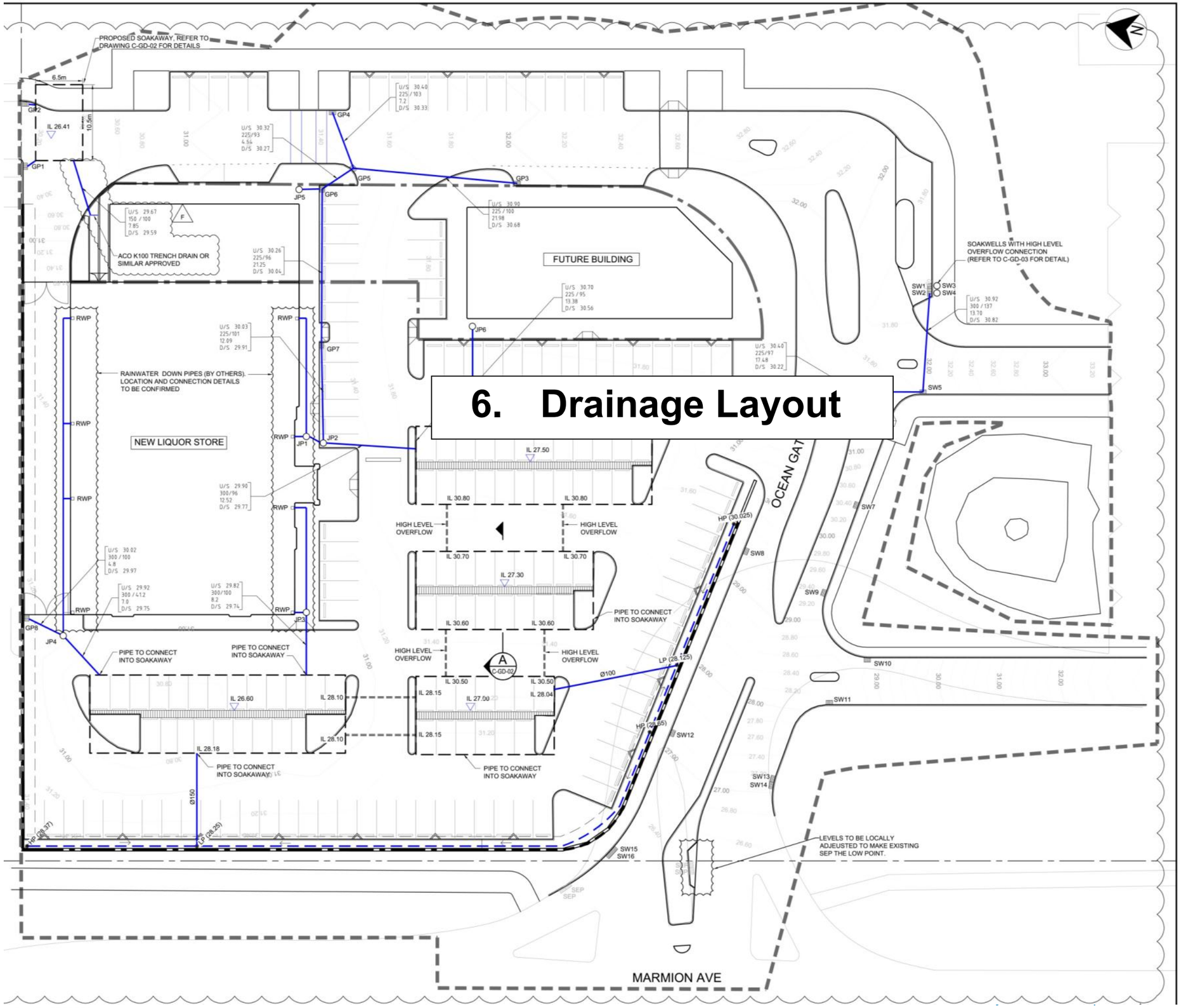
ALL VERGE AREAS TO BE LANDSCAPED BY OTHERS

| REV | DATE | DESCRIPTION |
|---|---|---|
| B | 07/04/11 | DRAFT B. ISSUED TO ENGINEERING CONSULTANTS |
| D | 08/06/11 | ISSUED FOR COUNCIL PLANNING APPROVAL |
| C | 10/01/11 | ADDITIONAL INFO. FOR LANDCORP PLANNING APPROVAL |
| B | 13/12/10 | ISSUED FOR LANDCORP PLANNING APPROVAL |
| A | 06/12/10 | ISSUED FOR CLIENT COMMENTS |

PROJECT : EXAMPLE PROJECT
TITLE : PROPOSED LANDSCAPING PLAN
DATE : 07/04/11
SCALE : 1:200 @A1
CLIENT :
DRAWN :
JOB No. :
DRAWING No. : A204
REV. : E

PRELIMINARY ONLY

# 6. Drainage Layout

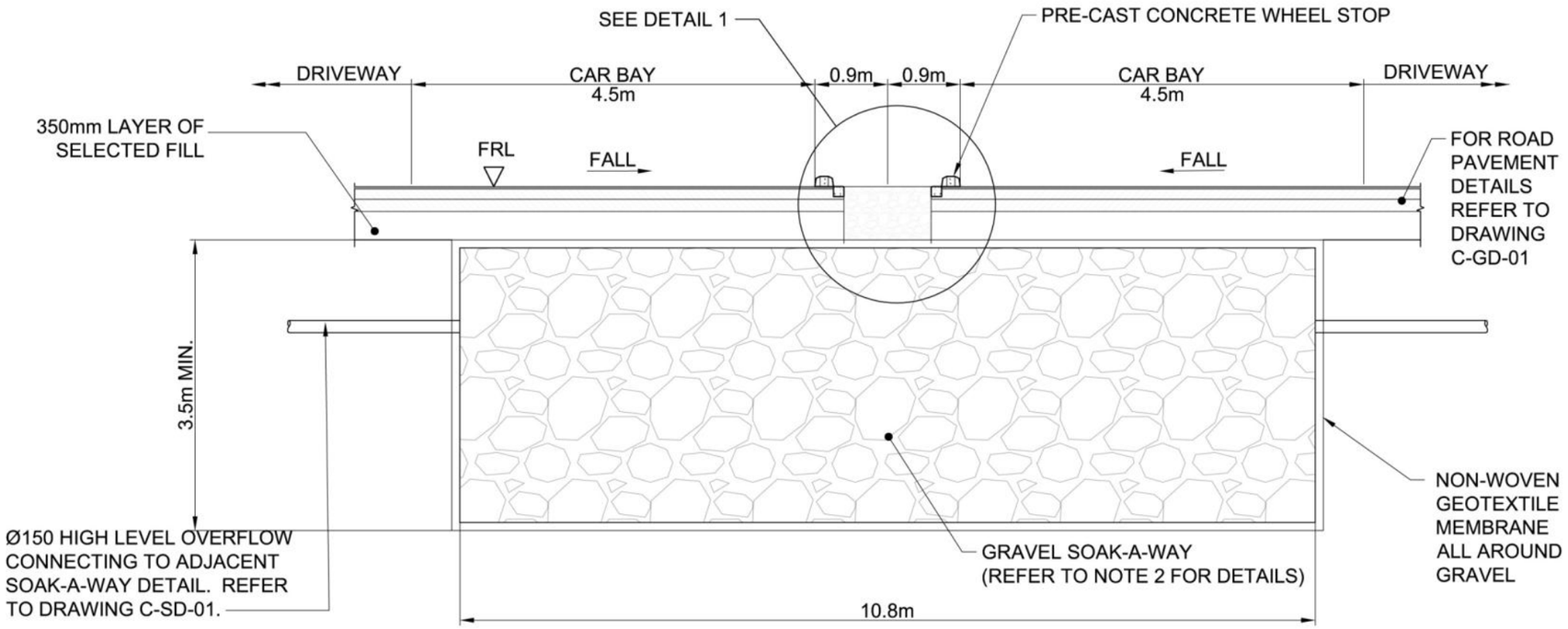



## LEGEND

- PRECINCT 1A SITE BOUNDARY
- PRECINCT 1B & 1C SITE BOUNDARY
- CADASTRAL BOUNDARY
- FINISHED CAR PARK LEVELS @ 0.2m INTERVALS
- RETAINING WALL 01
- RETAINING WALL 02
- RETAINING WALL 03
- JP — PROPOSED JUNCTION PIT, REFER TO DRAWING C-GD-02 FOR TYPICAL DETAIL
- GP — PROPOSED GULLY PIT
- SEP — EXISTING SIDE ENTRY PIT
- SW — PROPOSED SOAKWELL
- RWP — RAINWATER DOWN PIPE (BY OTHERS)
- PROPOSED DRAINAGE PIPE
- U/S 30.39 / 300 / 100 / 8.8 / D/S 30.302 — UPSTREAM INVERT LEVEL, PIPE DIAMETER / PIPE GRADE, PIPE LENGTH, DOWNSTREAM INVERT LEVEL
- SUBSOIL DRAINAGE AT BACK OF RETAINING WALLS. REFER TO NOTE 2
- IL 27.79 — INVERT LEVEL OF SOAK-A-WAY UNIT
- HP 28.20 / LP (28.12) — HIGH POINT (INVERT LEVEL), LOW POINT (INVERT LEVEL)
- OPEN GRAVEL FILTER DRAIN
- EXTENT OF INFILTRATION ZONE

## NOTES

1. FOR DETAILS OF PROPOSED DRAINAGE REFER TO DRAWING C-GD-02.
2. SUBSOIL DRAINAGE TO BE A MINIMUM GRADE OF 0.5%.
3. THE CONTRACTOR SHALL SAW-CUT EXISTING PAVEMENT IN A STRAIGHT LINE AND MAKE SMOOTH CONNECTION.
4. DRAINAGE PIPE SHALL BE CLASS 2 REINFORCED CONCRETE UNLESS OTHERWISE NOTED.
5. ALL TRENCHING, PIPE BEDDING AND BACKFILLING SHALL BE IN ACCORDANCE WITH AS3725.
6. ENTRY PIT LIDS SHALL BE SET TO SUIT THE VERGE SLOPE, NOMINALLY 2% UPWARDS FROM THE TOP OF BACK OF KERB.
7. WHERE A SEWER LINE INTERSECTS WITH STORMWATER DRAINAGE LINE AND THE SEWER PASSES OVER THE DRAIN THEN THE SEWER SHALL HAVE A TIMBER PILE AND KEEL PROVIDED FOR THE FULL EXTENT NECESSARY TO SUPPORT THE SEWER DURING EXCAVATION FOR THE DRAIN.
8. ALL DRAINAGE PITS TO BE SEALED DURING CONSTRUCTION TO PREVENT INGRESS OF SAND INTO DRAINAGE NETWORK.
9. STORMWATER DRAINAGE HAS BEEN DESIGNED WITH CAPACITY TO RETAIN A 100 YEAR ARI STORM WITHIN THE SITE BOUNDARY.
10. DRAINAGE SYSTEM DESIGNED IN CONJUNCTION WITH ARUP'S GEOTECHNICAL INTERPRETIVE REPORT FOR CURRAMBINE SHOPPING CENTRE DATED AUGUST 2010.




SECTION A (C-SD-01)
SCALE 1:50

TYPICAL SOAK-A-WAY DETAIL WITHIN CAR PARK

# 7. Drainage Detail