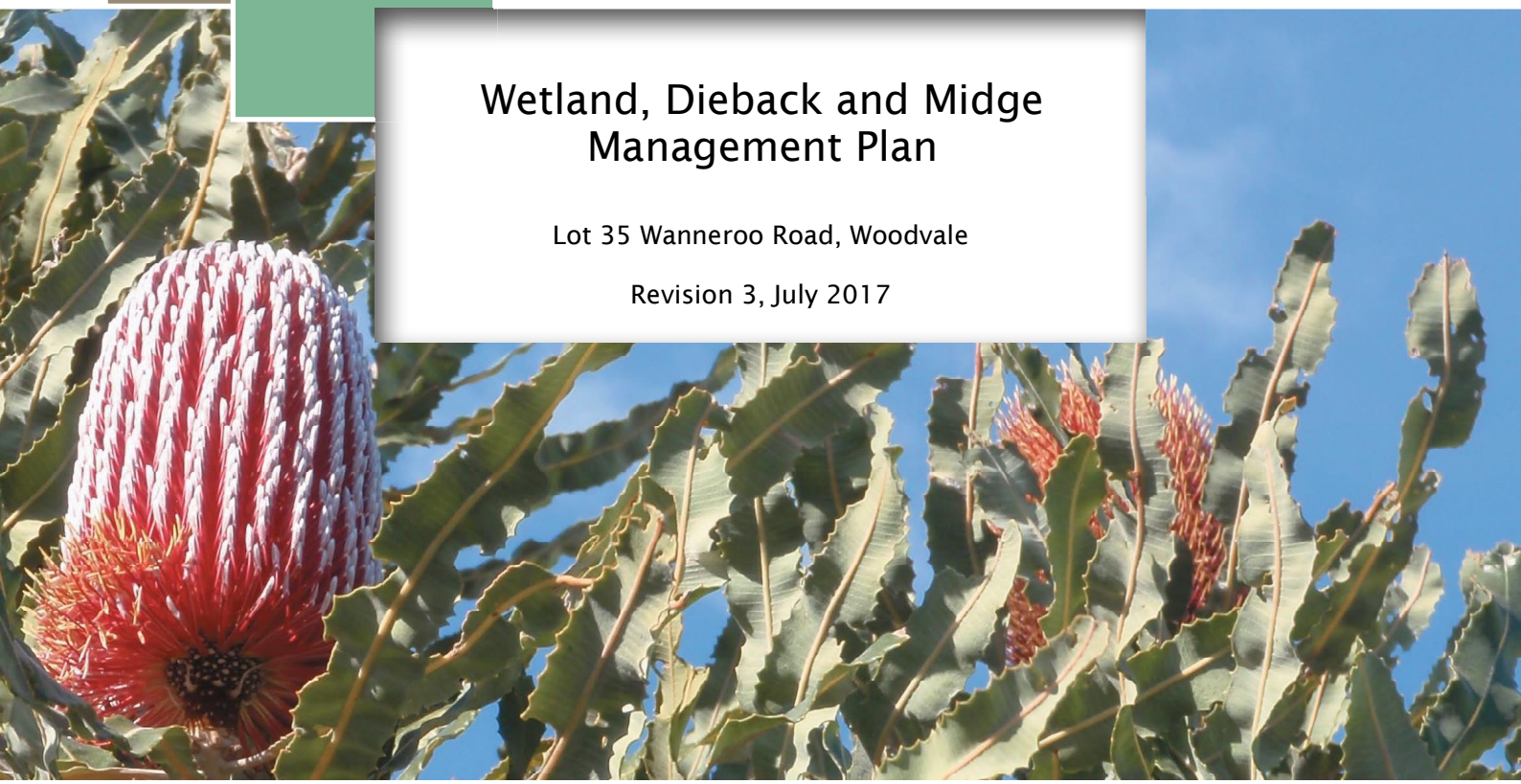
COTERRA ENVIRONMENT

Wetland, Dieback and Midge Management Plan

Lot 35 Wanneroo Road, Woodvale

Revision 3, July 2017



CALIBRE | COMMITMENT | COLLABORATION

Wetland, Dieback and Midge Management Plan

Lot 35 Wanneroo Road, Woodvale

Revision 3, July 2017

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This report was prepared for:

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EXECUTIVE SUMMARY

The proponent Endeavour Properties Pty Ltd proposes to subdivide Lot 35 (No. 533) Wanneroo Road Woodvale (the site). The site is located within the City of Wanneroo (CoW) and is zoned 'Urban' under the Metropolitan Region Scheme (MRS) and 'Urban Development' under the CoW District Planning Scheme No. 2.

The site is also located on the urban fringe with Yellagonga Regional Park to the north, and to Lake Goollelal in the south.

To address Western Australian Planning Commission (WAPC) subdivision conditions this Wetland, Dieback and Midge Management Plan has been prepared to ensure the conservation and protection of the wetland areas and associated buffer within the subject area. The intent of the plan's implementation is also to improve the condition of the wetland buffer area onsite and to facilitate active management to maintain and enhance the current wetland attributes. The risk of midge impacts and the potential management has also been discussed.

Since the mid-1950s, aerial photography indicates that the site has been cleared and used for market garden/orchard activities. A vegetation and flora survey was undertaken for the Wallubuenup Swamp by Cardno in 2006. At this time, exotic grassland dominated by Typha and Kikuyu (*Pennisetum clandestinum*) with intermittent exotic trees were recorded on site and the 'Degraded' condition. No declared rare or priority flora species or threatened ecological communities were identified in the wetland (Cardno, 2009). A preliminary site inspection was undertaken by Coterra Environment (2016), where several weed species were observed within the Conservation Category Wetland area. Condition of vegetation in the wetland area is 'Completely Degraded'.

The Local Biodiversity Project (2015) has indicated there is no remnant vegetation remaining on site.

A Landscape Concept Plan (EPCAD, 2016) has been developed for the Wetland and Associated buffer within the Public Open Space (POS) area within the site and for a rehabilitation zone within a 20m 'offset' buffer adjacent to Lot 35.

A Wetland and POS Rehabilitation program, Dieback Management Program and Midge Management Program and their implementation have been identified within this management plan.

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1.0 INTRODUCTION

1.1 Background

The proponent Endeavour Properties Pty Ltd proposes to subdivide Lot 35 (No. 533) Wanneroo Road Woodvale (the site) for residential development, which is approximately 19km north of the Perth Central Business District and 4km south of the Wanneroo District Centre (Figure 1). The site is also located on the urban fringe with Yellagonga Regional Park to the north, and to Lake Goollelal in the south.

The site is located within the City of Wanneroo (CoW) and is zoned 'Urban' under the Metropolitan Region Scheme (MRS) and 'Urban Development' under the CoW District Planning Scheme No. 2.

Since the mid-1950s, aerial photography indicates that the site has been cleared and used for market garden/orchard activities. The land the north and south of the subject site has recently been subdivided into residential lots. A winery is located immediately south of the site and is currently operational (Landgate, 2016).

1.2 Planning and Environmental Approval

1.2.1 Woodvale Local Structure Plan

The CoW District Planning Scheme No. 2 (DSP.2) identifies the site as suitable for urban development. The objective of the zoning is to "provide for the orderly planning of large areas of land for residential and associated purposes through a comprehensive structure planning process."

Clause 3.13.3 of DPS.2 generally requires that an Agreed Structure Plan be prepared and adopted by the Council and the Western Australian Planning Commission (WAPC) for land within an Urban Development zone. In conformity with this requirement an Agreed Structure Plan was prepared and adopted for the Woodvale area and the development is generally consistent with the provisions of this policy.

Under the provisions of the Woodvale Local Structure Plan (LSP), Agreed Structure Plan No.64 (SP 64) (Woodvale), the site is zoned 'Residential' with a variety of residential density codes ('R25 zone' and 'R30 zone'). The R30 zoned lots are subject to a 'Detail Area Plan Required' overlay. The western portion of the subject site is designated for the purpose of Public Open Space (POS). A 'Dual Use Path' and a 'Wetland Buffer' is shown as running across the rear portion of the lots.

The Woodvale LSP (SP 64) also stipulates how subdivision and development shall be undertaken within the precinct area including provision for urban water management, wetland rehabilitation (through a wetland management plan), midge management, fire management and dieback management (City of Wanneroo, 2011).

A Wetland Management and Rehabilitation Strategy (Cardno 2009) was developed and approved for the LSP area. This document provides a framework to coordinate the rehabilitation of the wetland located within the SP 64 development which includes benchmarks and standards for wetland management plans.

1.2.2 Western Australian Planning Commission Subdivision Approval

Subdivision approval (WAPC Ref: 152136) for the development of residential lots and POS was received in June 2015 (Figure 2 and Appendix A). The conditions relevant to this Wetland, Dieback and Midge Management Plan include the following:

8. *Prior to the commencement of subdivision works a Wetland Management Plan is to be prepared in consultation with the Department of Parks and Wildlife and approved to ensure the protection and management of the sites environmental assets with satisfactory arrangements being made for the implementation of the approved plan. (Local Government).*

9. *Prior to the commencement of subdivision works, a Midge Management Plan, including control measures and provisions for signage to be maintained during lot sales to warn of midge nuisance in the area, is to be prepared in consultation with the Department of Parks and Wildlife and approved to ensure the protection and management of the sites environmental assets with satisfactory arrangements being made for the implementation of the approved plan. (Local Government).*

10. *Prior to the commencement of subdivision works, a Dieback Management Plan is to be prepared in consultation with the Department of Parks and Wildlife and approved to ensure the protection and management of the sites environmental assets with satisfactory arrangements being made for the implementation of the approved plan. (Local Government).*

1.2.3 Stakeholder Consultation and Potential Conflict of Subdivision Conditions

Two versions of the Wetland, Dieback and Midge Management Plan have been submitted to the Department of Parks and Wildlife (DPaW) (Regional Park Swan Region) and the CoW in October 2016 and February 2017. Comments were received and addressed, with the final outstanding item relating to rehabilitation works offsite which were identified in the Woodvale SP 64 documentation (refer to Appendix B Figure 8 Revegetation)

It is noted that the current subdivision conditions and approved deposited plan does not make reference to rehabilitation requirements outside the cadastral boundary of Lot 35. Rather, Condition 18 of the subdivision approval specifically quotes:

18. *Measures being taken to ensure no vegetation within Bush Forever Site No. 299 is removed or disturbed during subdivisional works, including any secondary impacts from works to provide service infrastructure and drainage to implement the approved plan of subdivision. (Local Government)*

Under Section 219 of the *Planning and Development Act 2005* (PD Act) it stipulates that:

> *(1) A person who commences, continues or carries out works for the purpose of enabling the subdivision of land otherwise than —*
>
> *(a) as shown on a plan of subdivision approved by the Commission; or*

(b) as required by the Commission to be carried out as a condition of approval of the plan of subdivision,

commits an offence.

There is concern that should rehabilitation works occur within the 20m outside the cadastral boundary, this appears to constitute an offence under the PD Act.

The City of Wanneroo have confirmed (in email correspondence dated 17/02/2017) that when clearing the condition, the sign off can include a footnote referring to the requirements under the approved WRMS, and as such the rehabilitation of the 20 metre buffer in this instance would not constitute an offense under the PD Act.

It is on this basis that the rehabilitation program discussed in this management plan (Revision 2) covers Lot 35 and makes provision for the 20m 'offset' buffer.

1.3 Management Plan Commitments

As wetland, dieback and midge matters are interlinked during the pre, during and post construction phases of project, the three items have been combined within one management plan, this Wetland, Dieback and Midge Management Plan.

1.3.1 Wetland Buffer Objectives

To ensure that the development interface with this natural area is enhanced and managed a subdivision condition has been prescribed. Condition 8 requires the preparation of a Wetland Management Plan. This document is to be prepared with reference to the DPaW 'Guidelines Checklist for Preparing a Wetland Management Plan' (DPaW, 2008) and will also compliment the management principals presented in the Yellagonga Regional Park Management Plan (CALM 2003) and the Wetland Management and Rehabilitation Strategy (Carndo, 2009).

The objectives of the plan are:

- To ensure the conservation and protection of the wetland areas and associated buffers within the subject area.
- To improve the condition of the wetland buffer areas onsite.
- To facilitate active management to maintain and enhance the current wetland attributes.

1.3.2 Dieback Management Objectives

Dieback Management will also need to be addressed during the pre-construction, construction and post-construction phases of the project particularly within the POS area.

It does not appear that a Dieback Survey has been undertaken for the site within the past 5 years. From review of aerial photography and observations made during the site visit, it is confirmed that the site is cleared with no remnant vegetation present. Based on the current site characteristics i.e. lack of indicators including, key

vegetation species and organic substrate) a dieback survey undertaken now would likely be inconclusive.

Therefore the focus of the dieback management on site will be precautionary procedural measures i.e. include protocols and guidance to prevent construction works introducing dieback to the adjacent Yellagonga Regional Park. For further information refer to Section 5.0.

1.3.3 Midge Management Objectives

The POS and adjacent regional park is low lying and includes wetlands and areas susceptible to high groundwater and nutrient levels that can be conducive to mosquito and/or midge breeding. For further information refer to Section 6.0.

The objectives of the plan are:

- To identify times when midge risk may be increased.
- To identify proposed control measures to be implemented within the site.
- Make provisions for public education in relation to mosquito and midge risk.

2.0 EXISTING ENVIRONMENT OVERVIEW

2.1 Climate

The climate of the Woodvale/Wanneroo area is characteristic of the Swan Coastal Plain, with mild, cool winters and hot, dry summers. The average annual maximum temperature is 23.1˚C and the average annual minimum temperature is 15.6˚C (temperature data provided is sourced from the Bureau of Meteorology's Hillarys Boat Harbour weather station #9265).

Long term average annual rainfall (1905-2015) is 715.9 mm and approximately 90% of annual precipitation falls between April and October (rainfall data provided is sourced from the Bureau of Meteorology's Wanneroo weather station #9105). There is a general trend indicating decreasing average annual rainfall (BOM, 2012).

2.2 Topography, Geology and Soils

The existing topography on site is low-lying and relatively flat, with heights ranging from 33 m Australian Height Datum (AHD) along the eastern boundary to 21 m AHD at the south-western boundary. (Figure 3)

Regional geological mapping illustrates that the site to be underlain by the Tamala Formation, consisting of sands derived from the Tamala Limestone over calcarenite (limestone) at depth (Gozzard, 1986). There are two main soil types on site including (Figure 3):

- Sand (S7) which consists of pale and olive yellow, medium to coarse-grained, sub-angular to sub-rounded quartz, trace of feldspar, moderately sorted, of residual origin.
- Peaty Sand (Sp) which is characteristic of greyish brown, medium-grained quartz, moderately well sorted, variable organic content, of lacustrine origin (Gozzard, 1986).

Preliminary Geotechnical Investigations undertaken for the site concluded that "the topsoil was underlain by medium grained, orange brown, cohesionless sand to at least 2.5m depth. The relative density of the sands was medium dense, locally becoming dense below 1m. The sands contain low fines content, and laboratory gradings with in-situ permeability tests show drainage characteristic to be good. The sands are typical of the Tamala Formation. No peaty soils were encountered in test holes below the development area" (Brown Geotechnical, 2016:3).

2.3 Acid Sulphate Soils

The Department of Environment Regulation (DER) regional scale mapping identifies the western portion of the site as having a 'High' to 'Moderate' risk of encountering Acid Sulphate Soils (ASS) at depths of up to three metres below ground level (landgate, 2016) (Figure 4).

2.4 Hydrology

2.4.1 Groundwater

Groundwater within the local area flows in a westerly direction toward Wallaburnup Swamp (Figure 5).

Regional maximum groundwater contours indicate that groundwater ranges from approximately 20mAHD to 24mAHD. This equates to groundwater occurring approximately 9 meters below ground level (mbgl) in the eastern area through to 2mbgl near the western cadastral boundary (DoW, 2016) (Figure 5).

During the geotechnical investigation (completed in April 2016) no groundwater was encountered during the fieldworks. Each borehole was terminated at 2.5mbgl (Brown Geotechnical, 2016).

2.4.2 Surface Water and Wetlands

The western portion of the site is low lying and due to high soil permeability in the area it is unlikely that there would be overland flow of surface water leaving the site. There is a surface water drain located outside the sites cadastral boundary near the existing path/access way (refer to Plate 1).

Plate 1: Open drain with limestone located outside of Lot 35 (within 20m 'offset' buffer area).

Wallubuenup Swamp is part of a wetland chain including, from north to south, Lake Joondalup, Beenyup Swamp, Walluburnup Swamp and Lake Goollelal. This wetland chain is part of the Yellagonga Regional Park. Regional DPaW mapping indicates that a portion of the wetland extends into the western portion of the site (Figure 6).

Wallubuenup Swamp (Unique Feature Identifier (UFI) 154588) is a Conservation Category Wetland (CCW). CCW are those considered to support a high level of

attributes and functions. No development or clearing within Conservation category wetlands or their buffers is considered appropriate (WRC, 2001and EPA, 2008).

A POS area has been strategically planned for the CCW and associated buffer and is reflected in the subdivision design (Ref: 152136) (Figure 2). This area is subject to management measures further discussed in this management plan in Section 4.0.

2.4.3 Drainage and Water Management

A Local Water Management Strategy (LWMS) report was prepared over the site by Development Engineering Consultants (DEC) in 2015 and in accordance with this LWMS report, drainage swales are to be provided within the POS (wetland buffer) area.

An Urban Water Management Plan (UWMP) has been produced by DEC (November 2016) which included the engineering design of the drainage features. This was submitted to CoW in November 2016. The UWMP provided commitments as follows:

- Swale batters will be a maximum of 1 in 3, with approval of the final swale design being obtained from the CoW prior to construction commencing.
- All storm water run-off from the proposed development will first be directed in to verge swales to achieve disposal / infiltration “as close to source as possible”.
- All drainage systems designed to accommodate at least the 1 in 5 year storm event.
- Extreme event flows (in excess of the 1 in 5 year event) that by-pass each verge swale will be directed into the infiltration swales on the eastern edge of the proposed POS area.
- All POS infiltration areas will be capable of accommodating at least the 1 in 100 year storm so that there will be no direct discharge of storm water into Yellagonga wetlands.

The CoW approved the UWMP on 12 February 2017.

2.5 Vegetation and Flora

2.5.1 Overview

Aerial photography indicates that since the mid-1950s the site has been cleared and used for market garden/orchard activities (Landgate, 2016).

Regional vegetation complex mapping undertaken by Heddle et al (1980), correspondent to soil types and landform, maps the site as occurring within the Karrakatta Complex-Central and South (Aeolian): predominantly open forest of *Eucalyptus gomphocephala – Eucalyptus marginata- Eucalyptus calophylla* and woodland of *Eucalyptus marginata – Banksia spp.* Due to historical clearing and previous land uses there is no native vegetation remaining on site (refer to Plate 2).

Plate 2: North west corner of the site (view south east)

The site is adjacent to Bush forever site 299- Yellagonga Regional Park, Wanneroo/ Woodvale/Kingsley. The vegetation communities within Yellagonga Regional Park have been identified as nine wetland communities (consisting of sedgelands, woodlands, open and closed forests) and five dryland communities (consisting of open and closed forest as well as woodlands). Much of the remnant vegetation has been altered with only a small area identified as in pristine condition in the northern-most section of the Regional Park (Regeneration Technology, 2002).

Weed invasion is also evident in the understorey, such as the highly invasive introduced grasses Kikuyu (*Pennisetum clandestinum*), Buffalo (*Stenotaphrum secundatum*) and Couch (*Cynodon dactylon*). (CALM et.al 2003).

Plant communities recorded adjacent to the site within the regional park area were exotic grasses in 'Degraded' condition (Refer to Appendix B).

2.5.2 Site Assessment

A vegetation and flora survey was undertaken for the Wallubuenup Swamp by Cardno in 2006. At this time, exotic grassland dominated by Typha and Kikuyu (*Pennisetum clandestinum*) with intermittent exotic trees were recorded on site and the 'Degraded' condition. No declared rare or priority flora species or threatened ecological communities were identified in the wetland (Cardno, 2009).

A preliminary site inspection was undertaken by Coterra Environment in June 2016, * *Cenchrus clandestinus (*kikuyu) and **Paspalum distichum* (Water Couch) were noted. Other species observed included **Arundo donax* (Giant Reed/False Bamboo) and *Prickly pear were in the south western corner of the site. Several young **Gomphocarpus fruticosus* (Narrowleaf Cottonbush) plants were observed along the cadastral boundary along the existing pathway. Condition of vegetation is using the Keighery (1994) scale used in Bush Forever (2000) is 'Completely Degraded'.

The Local Biodiversity Project (2015) has indicated there is no remnant vegetation remaining on site.

2.5.3 Phytophthora Dieback

It does not appear that a Dieback Survey has been undertaken for the site within the past 5 years. From review of aerial photography and observations made during the site visit, it is confirmed that the site is cleared with no remnant vegetation present. Based on the current site characteristics i.e. lack of indicators including, key

vegetation species and organic substrate) a dieback survey undertaken now would likely be inconclusive.

2.6 Fauna and Habitat

2.6.1 General

Within the adjacent regional park over 122 avian fauna species including Blue-billed Duck, Musk Duck, Hardhead, Splendid and Variegated fairy-wrens and have been recorded within the vicinity. Priority faunal species including the Western Brush Wallaby, Quenda and Echidna have also been recorded within the regional park/Bush Forever site (State of Western Australia, 2000)

In 2009, a reconnaissance fauna survey was completed by Cardno, the assessment concluded that the range and diversity of potential fauna habitats within the LSP area (including the site) is very low. There is limited habitat available for native fauna (Cardno, 2009).

Given the cleared and degraded nature of the site and the lack of vegetation structure and the dominance of weed species kikuyu, Giant Reed/False Bamboo and Prickly pear, fauna habitat potential is limited on site.

2.6.2 Midges

Midges (insect family *Chironomidae*) are small black non-biting flies, which when in large proportion can form dense swarms and are often a nuisance in residential areas near wetlands. Large midge populations are closely associated with high disturbed wetlands with elevation nutrient levels within the wetlands catchment i.e. Wallaburnp Swamp and other wetlands within Yellagonga Regional Park (City of Wanneroo, 2014).

There are four minimum stages within the midge life cycle (egg, larva, pupae and adult) the latter the only terrestrial life cycle stage.

2.7 Ecological Linkages

Regional ecological linkages link protected regionally significant natural areas by retaining the best condition local natural areas available between them that can act as stepping stones for flora and fauna (Del Marco *et al*., 2004) Local ecological linkages aim to link protected natural areas to other regionally significant natural areas and regional ecological linkages. Local ecological linkages are an important part of improving the viability of natural areas that may be vulnerable (i.e. too small, low vegetation condition and/or isolated) on their own (WALGA, 2007).

A regional linkage is located on the western boundary of the site and is associated with Walluburnup Swamp and Yellagonga Regional Park. The rehabilitation of the wetland/POS area on site may provide an additional buffer to the ecological linkage.

2.8 Cultural Heritage

2.8.1 Aboriginal Heritage

A search of the Department of Aboriginal Affairs (DAA) (2016) Aboriginal Heritage Enquiry System (Western Australia) revealed that there are currently no registered sites or other heritage site within or adjacent to the site.

2.8.2 European Heritage

A search was undertaken of the State Heritage database, administered by the State Heritage Office of Western Australia (2016). No areas of heritage significance have been recorded within or adjacent to site (Heritage Council and City of Wanneroo).

3.0 WETLAND AND POS LANDSCAPE DESIGN

3.1 Adjacent Wetland and POS Area

The POS area is located within the western portion of the site (Figure 2). There is an established POS area along the site's northern cadastral boundary, which was completed by ABN Developments (for previous Lots 1, 200 and 300 Wanneroo Road Woodvale). The Wetland Management Plan prepared for this area (Strategen, 2010), which includes the Landscape Master Plan and revegetation plan, included the following:

- Establishment of three (revegetation) community types (rehabilitation area).
- Drainage swale (basin).
- Turf area within play space and equipment.

The interface of the established adjacent POS and POS within the site has been considered within the Landscape Master Plan for the site with the aim of achieving consistency between the two POS areas.

3.2 Landscape Concept Plan

A Landscape Concept Plan (EPCAD, 2016) has been developed for the Wetland and Associated buffer within the POS area (Appendix C) and 20m 'offset' buffer. The following attributes are included within the plan:

Lot 35

- Provision and establishment of *Melaleuca rhaphiophylla* Open Forest Vegetation Community and *Melaleuca rhaphiophylla/ Eucalyptus rudis* Open Forest Vegetation Community.
- Shrub planting zone adjacent to the controlled access path.
- Provision for a picnic/outlook space and seating node (landscape infrastructure).
- Drainage swale with gravel, trees and littoral planting.

20m 'offset' buffer

- Provision and initial establishment of *Baumea articulata/Schoenoplectis* Vegetation Community

4.0 WETLAND AND POS REHABILITATION PROGRAM

4.1 Area Proposed for Revegetation

The wetland/POS has been divided into vegetation community areas to reflect the existing topography of the site and the revegetation recommendations as presented in the LSP Wetland Management and Rehabilitation Strategy (Cardno, 2009). The approximate revegetation area includes:

- *Melaleuca rhaphiophylla* open forest community (transitional)- 3,255m^2
- *Melaleuca rhaphiophylla/Eucalyptus rudis* forest community (dry land)- 1,735m^2.
- Baumea *articulata/Schoenoplectis validus* Vegetation Community: 3,321m^2 (west of the existing path within the 20m 'offset' buffer.)

There is an area consisting of low groundcovers between the *Melaleuca rhaphiophylla/Eucalyptus rudis* forest community and the recreation node and Cosimo Drive. The Landscape Concept is provided in Appendix C. No grass has been proposed with the POS area.

4.2 Weed control and Site Preparation

Weed control onsite will occur in accordance with Table 1, and commence 12 months before site works or rehabilitation works (Cardno, 2009) particularly for the Declared Pest (DP) **Arundo donax* (Giant Reed/False Bamboo) and **Gomphocarpus fruticosus* (Narrowleaf Cottonbush). Weeds manually removed on site will be disposed off-site by appropriate methods.

4.2.1 Lot 35

Weeds which are prevalent across much of the degraded areas of the site including *kikuyu, *couch, **Arundo donax* (Giant Reed/False Bamboo) and *Prickly pear. **Gomphocarpus fruticosus* (Narrowleaf Cottonbush) were observed along the cadastral boundary along the pathway.

On site weed control will occur in accordance with Table 1, and commence 12 months before site works or rehabilitation works (Cardno, 2009) particularly for the **Arundo donax* (Giant Reed/False Bamboo) and **Gomphocarpus fruticosus* (Narrowleaf Cottonbush). Weeds manually removed on site will be disposed off-site by appropriate methods.

As there is no native vegetation within the wetland/POS (Lot 35) area the revegetation planting areas will be ripped to a depth of 200mm to 400mm prior to planting to enhance water infiltration and promote faster plant establishment.

4.2.2 20m 'Offset' Buffer

Exotic grass species and Typha are prevalent within this area. The key element of site preparation in this area is weed control as the eradication of typha is difficult due to prolific seed production and extensive rhizomatous roots. Site preparation may also include ripping (as per section 4.2.1) however, the need for this will be assessed by the rehabilitation contractor.

Table 1: Introduced species (weeds) located on site

Botanical and Common Name	Photograph[1]	Degree of Infestation	Dept Ag and Food WAOL	Method of Control[2]	Ecological Impact Rating[3]	Invasive-ness Rating[4]	Timing of Control[5]	Weed Removal Technique	Comments
Arundo donax (Giant Reed/False Bamboo)		High	Permitted S11	Growth can be suppressed by repeated mowing or tillage and removal of material from site, however the key to eradicating infestations is killing the root and rhizome mass. In larger infestations, use foliar or cut-stump applications of aquatic approved herbicide (Round-up Biactive®). Careful timing of mechanical control and treatment of cut material can minimise or inhibit sprouting. A single 3% to 5% glyphosate foliar application late in the season has been effective at killing stems and stopping production of new stems the following spring. As spread tends to occur downstream, the best control approach is to start upstream and work downwards.	H	S	Late summer/early autumn	Cut stump herbicide application	An aggressive competitor with rapid growth rates. Provides poor habitat for terrestrial insects and wildlife.
Gomphocarpus fruticosus (Narrowleaf Cottonbush)		Medium	DP S22(2) (C3)	Hand pull small plants, ensuring removal of as much root material as possible. Hand removing plants with mature fruits can lead to release and rapid spread of wind dispersed seed. Foliar spray with 1.5% glyphosate or try cut and paint using 50% glyphosate	H	R	Hand removal September to December	Physical removal of plants	

[1] Photographs sources from Flora Base (DPaW) https://florabase.dpaw.wa.gov.au/search/advanced)
[2] DPaW Swan Region Management Notes(Flora Base) https://florabase.dpaw.wa.gov.au/search/advanced)
[3] Draft DPaW Swan Region Ecological Impact Rating 2012)
[4] Draft DPaW Swan Region Invasiveness Rating 2012
[5] Recommendations from Flora Base (DPaW) https://florabase.dpaw.wa.gov.au/search/advanced

Botanical and Common Name	Photograph[1]	Degree of Infestation	Dept Ag and Food WAOL	Method of Control[2]	Ecological Impact Rating[3]	Invasive-ness Rating[4]	Timing of Control[5]	Weed Removal Technique	Comments
Paspalum distichum (Water Couch)		High – Dominant understorey species	Permitted (S11)	Avoid removing manually or mechanically as there is a risk of spreading plants from resprouting root fragments. Spray with 1% glyphosate 2-3 times over single growing season	H	R	November to April	Herbicide application in retained vegetation areas	
Typha sp.		Medium	S11	Apply Roundup Biactive® (360 g/L) at 13 ml/L when actively growing through wiping, backpack/handheld spray or high volume spray.	H	R	December to February	Herbicide application	
Cenchrus clandestinus (Kikuyu Grass)			S11	Difficult to manually control as all rhizomes must be removed. Spray with 1% glyphosate or Fusilade® Forte at 16 ml/L + wetting agent or for generic fluazifop-p (212g/L active ingredient) 10ml/L + wetting agent. 2-3 sprays over a single growing season are often required	H	R	February-April	Herbicide application	
Opuntia stricta (Prickly Pear)		-	DP S22(2) (C3 restricted)	Basal bark/cut stump Apply herbicide as an overall spray, wetting all areas of plant to ground level	-	-	All year	Physical or herbicide application	

4.3 Species Selection

The following species have been selected for use in the rehabilitation based on their natural presence in the local area, and their habitat. An approved species list for rehabilitation (Strategen, 2010) was prepared for the northern connecting wetland/POS area. For consistency within the wetland buffer area, the same species list has been proposed, including some modifications recommended by DPaW, refer to Table 2:

Table 2: Recommended Revegetation Species List

Species	Growth Form	*Baumea articulata/ Schoenoplectis validus* Vegetation Community	*Melaleuca rhaphiophylla* open forest community	*Melaleuca rhaphiophylla / Eucalyptus rudis* forest community
Acacia pulchella var. *glaberrima*	Shrub		-	✓
Acacia saligna	Tree		-	✓
Banksia attenuata	Tree		-	✓
Banksia ilicifolia	Tree		-	✓
Banksia littoralis	Tree		✓	✓
Baumea articulata	Sedge	✓	✓	-
Baumea preissii	Sedge		✓	-
Baumea juncea	Herb		✓	-
Bolboschoenus caldwellii	Sedge		✓	-
Dianella revoluta	Herb		-	✓
Centella asiatica	Herb		✓	-
Eucalyptus rudis subsp. *rudis*	Tree		✓	✓
Jacksonia furcellata	Shrub		-	✓
Juncus pallidus	Rush / sedge		✓	-
Kennedia prostrata	Shrub		-	✓
Kunzea glabrescens	Shrub		✓	-
Lepidosperma longitudinale	Sedge		✓	-
Lobelia anceps	Herb		✓	✓
Melaleuca preissiana	Tree		✓	✓
Melaleuca rhaphiophylla	Tree		✓	✓
Melaleuca teretifolia	Shrub		✓	-
Melaleuca thymoides	Shurb		-	✓
Myoporum caprarioides	Shrub		-	✓
Schoenoplectus validus	Sedge	✓		
Viminaria juncea	Shrub		-	✓

Source: Adapted from Strategen (2010: Appendix 1) and DPaW (2016)

Planting of a combination of species (presented in Table 2) of tubestock size will be undertaken. Where possible tubestock will be locally sourced (i.e. Friends of Yellagonga) from accredited nurseries.

4.4 Planting Requirements

The following requirements for the POS revegetation areas are noted in the City of Wanneroo (2016) Public Open Space Landscape Design Specification Policy (WD13A) and will be provided for at this site:

- Planting shall comprise of water-wise, robust species with good longevity.

- Planting shall be mulched with a 75mm thick bark/wood mulch layer.

In regards to planting densities the following has been proposed as a guide for the site based on the Wetland Management and Rehabilitation Strategy (Cardno, 2009) and advice from DPaW:

- *Melaleuca rhaphiophylla/Eucalyptus rudis* Forest community: 1 plant per m²
- *Melaleuca rhaphiophylla* Open Forest community: 4-6 plants per 10m² for shrub and tree species (i.e. *Melaleuca rhaphiophylla*) and 5 to 8 plants per m² for rush and sedge species.
- *Baumea articulata/Schoenoplectus validus* Sedgeland community: of 6 to 8 plants per m²

4.5 Planting Establishment

To facilitate planting establishment, planting will take place in late autumn/early winter and supplementary infill planting (if required) will be undertaken the following year in late autumn/early winter (CoW, 2016:7). Tubestock will also be watered before transport to the site, to reduce the risk of mortality during/after planting.

It is has been advised (EPCAD, 2016) that some shrub vegetation will require irrigation (scheme water) during the establishment period over the summer period.

4.6 Monitoring and Assessment

Assessments into planting success will be undertaken in mid-winter and the end of summer during the three year monitoring upon planting completion in two areas within the POS buffer area (Lot 35) and two within the 20m 'offset' buffer. The following indicators will be assessed:

- Range of species present in revegetation area and health of planted vegetation.
- Presence of weeds in the revegetation area (including an estimated density / percentage cover).
- Comments on estimated mortality for planted vegetation to allow for survival rate to be estimated to ensure planting density is achieved.
- Collection of photographs from designated locations to build up a photographic record of progress for the site. A 5m x 5m quadrat within the swale area will be established using wooden stakes. Quadrat location will be GPS and recorded for future reference is needed.

This assessment will determine whether any infill planting is required to achieve the Key Performance Indicators (Section 4.8).

4.7 Performance Targets

The following performance targets have been set for the revegetation program.

Table 3 Performance Targets for Replanting Areas

Characteristic	Location	Minimum Target / KPI	Timeframe
Lot 35			
Plant density and structure*	*Melaleuca rhaphiophylla/Eucalyptus rudis* Forest community	Plants installed at a rate of 0.75 per m^2 and have a diversity of at least 4 species per $10m^2$	At planting
	Melaleuca rhaphiophylla Open Forest community	Rush/sedge species are installed with an average projective foliage cover of 50% and/or at a rate of 5 plants per m^2 and have a diversity of at least 4 species per 10 m^2. *Melaleuca rhaphiophylla* plants are established at a rate of 4 per 10 m^2	At planting
Survival rate	Revegetation area	70%	After 3 years from initial planting (refer to Chart 1)
Weed cover	Revegetation area	20% of ground cover	After 3 years from initial planting (refer to Chart 1)
20m 'offset' buffer**			
Plant density and structure*	*Baumea articulata/Schoenoplectus validus* Sedgeland community	Plants are installed to an average projective foliage cover of 75% and/or at a minimum rate of 6 plants per m^2 and both species are present;	At planting
Survival rate	Revegetation area	70%	After 3 years from initial planting (refer to Chart 1)
Weed cover	Revegetation area	20% of ground cover	After 3 years from initial planting (refer to Chart 1)

Notes:
* At the detailed landscape design stage depending on what species are proposed in with revegetation areas, plant spacing will be confirmed with council.

As presented in Section 4.7, adherence to these performance targets will be assessed during each annual monitoring event. Should the performance targets not be met in revegetation area at the end of the first year maintenance period after planting, remedial works which may be implemented include:

- Additional revegetation works to increase plant densities and species representation
- Weed management
- Rubbish removal
- Fauna control
- Continuing/maintaining plant protection measures (e.g. tree guards) and removing when no longer required.

If remedial works are implemented, performance targets would be further assessed for these areas in next annual monitoring event.

Monitoring reports outlining the progress against the performance targets will be issued to the City of Wanneroo by the 1st April. This will allow each years mid-winter and late summer monitoring events to be include in the annual report.

4.8 Implementation

4.8.1 Responsibility for Work

The proponent will implement the management and monitoring works within the property boundary in accordance with this management plan. For works with the 20m offset area, the proponent commits to either undertaking the works themselves so long as legal advice can be received/provided confirming that this action is lawful in consideration of subdivision Condition 18. If this cannot be determined the proponent commits to providing funding to DPaW and/or CoW for these works to be completed.

4.8.2 Term of Management Plan

This management plan will remain valid for four years including a period of 3 years for the post-planting maintenance program for the rehabilitation works onsite. After the 3rd year of monitoring/maintenance handover of Lot 35 to the CoW will occur (see Chart 1 for timeframe details). The 20m 'offsite' buffer is within an existing Bush Forever site/Regional Park and is currently managed by DPaW. Therefore, there will be no formal handover between the proponent and DPaW.

Chart 1: Rehabilitation Management Timeframe

Task	Year 1 (2017/18)				Year 2 (2018/19)				Year 3 (2019/20)				Year 4 (2020/21)			
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Initial Weed Control																
Planting of Tube Stock																
First Year post-planting weed control, monitoring/maintenance																
Second year post-planting weed control, monitoring/maintenance																
Third year post-planting weed control, monitoring/maintenance																

4.8.3 Management Schedule

Roles and responsibilities for implementation of the management plan are summarised on Table 4.

Note there is a site construction environmental management plan, which covers operational control processes and management strategies for the proposes construction works on site i.e. dust, air pollution, noise and vibration management

Table 4 Implementation Summary

Subdivision Condition No.	Issue	Action	Recommended Timing	Responsibility
10	Dieback	Refer to Table 5	Refer to Table 5	Refer to Table 5
8	Site Preparation	Survey and install a star picket (with tape) to designate the POS are boundary in accordance with Figure 2.	Prior to earthworks commencing. [once]	Site contractor
		Survey area and peg replanting areas in accordance with Landscape Concept Plan (Appendix C)	Prior to earthworks commencing. [once]	Site contractor
		Ensure that all site contractors are aware of POS area and adjacent Bush Forever site (across the existing walkway) along the western cadastral boundary	Prior and during site works. [ongoing]	Project Manager/ site contractor
		Survey the fence line to ensure that the fence has been maintained between the Bush Forever site and the site. Repair fence if required.	During site works. [weekly]	Site contractor/ Lot owner
	Weed Control	Targeted weed control in POS/wetland area (Lot 35). In accordance with Table 1. Due regard should be given to the LSP 64 Wetland Management and Rehabilitation Strategy (Cardno, 2009) measures for weed control.	1 year prior to earthworks commencing.	Rehabilitation consultant/ licenced contractor
		Targeted weed control within the 20m'offset' buffer. In accordance with Table 1. Due regard should be given to the LSP 64 Wetland Management and Rehabilitation Strategy (Cardno, 2009) measures for weed control.	1 year prior to earthworks commencing.	Rehabilitation consultant/ licenced contractor OR DPaW/CoW (see Section 4.9.1)
		Undertake weed maintenance control (where required) within the POS area (Lot 35) (Appendix C during the post planting monitoring/maintenance.	3 years (refer to Chart 1)	Rehabilitation consultant/ licenced contractor
		Undertake weed maintenance control (where required) within the 20m'offset' buffer (Appendix C) during the post planting monitoring/maintenance.	3 years (refer to Chart 1)	Rehabilitation consultant/ licenced contractor OR DPaW/CoW (see Section 4.9.1)
	Revegetation	Source tubestock from an accredited nursery or if viable from the Friends of Yellagonga (nursery)	Prior to commencement of planting events	Rehabilitation consultant/land developer
		Planting of sedges and trees within the replanting areas (Lot 35) in accordance with Appendix C.	Once first priority weeds have been removed. Planting in Autumn/Winter	Rehabilitation consultant/land developer.
		Planting of sedges and trees within the replanting areas (20m 'offset' buffer) in accordance with Appendix C.	Once first priority weeds have been removed.	Rehabilitation consultant/

Subdivision Condition No.	Issue	Action	Recommended Timing	Responsibility
			Planting in Autumn/Winter	licenced contractor OR DPaW/CoW (see Section 4.9.1)
		Subject to monitoring and assessment outcomes, undertake infill planting in Lot 35 (as required to achieved KPI)	Spring for 3 years	Rehabilitation consultant/land developer
		Subject to monitoring and assessment outcomes, undertake infill planting in 20m 'offset' buffer (as required to achieved KPI)	Spring for 3 years	Rehabilitation consultant/ licenced contractor OR DPaW/CoW (see Section 4.9.1)
	Monitoring and Assessment	Establishment of monitoring quadrats in POS area (Lot 35) (refer to Section 4.7)	After initial planting	Rehabilitation Consultant
		Establishment of monitoring quadrats within 20m 'offset' area (refer to Section 4.7)	After initial planting	Rehabilitation consultant/ licenced contractor OR DPaW/CoW (see Section 4.9.1)
		Onsite monitoring: Maintenance monitoring against Key Performance Targets. This will determine whether any infill planting is required.	Spring for 3 years	Rehabilitation consultant
-	Partnerships	Liaise with the City of Wanneroo and/or DPaW and/or Friend of Yellagonga to discuss opportunities for a collaborated approach of weed control and revegetation for the adjoining lots and or assistance with the rehabilitation on site.	As soon as possible (ideally prior to the commencement of rehabilitation	Land owner/ developer

5.0 DIEBACK MANAGEMENT PROGRAM

5.1 Overview

As previous noted the focus on Dieback Management will be on precautionary measures to reduce the risk of dieback introduction and on site management. The following actions are proposed in relation to construction and revegetation phases of the project.

5.2 General Procedures and Implementation

The following table summarises the risks, management actions, timing and responsibilities.

Table 5 Dieback Risk and Management

Subdivision Condition No.	Action / Risk	Management	Timing	Responsibility
10	Dieback pathogen to be brought into the site.	Prior to entering the site any construction equipment and construction materials (i.e. pipes, bricks etc.) must be clean and free of any adhered soil/mud or vegetation matter.	Prior to and during construction	Construction contractor under supervision of project engineer and site owner.
		Should any off-site fill or mulch be required for use within the site this material is to be obtained from a dieback free source.	During construction	Construction contractor under supervision of project engineer and site owner.
		Prior to entering the site any revegetation program equipment and materials must be clean and free of any adhered soil/mud or vegetation matter.	Prior to and during revegetation works	Revegetation contractor under supervision of environmental consultant and site owner.
		Plants or mulch used in the revegetation works onsite are to be from a dieback free source.	During revegetation works	Revegetation contractor under supervision of environmental consultant and site owner.
	Spread of any dieback present onsite into revegetation areas and off site (prior to exit)	Construction equipment and materials to stay within the construction zone and avoid moving into bushland areas.	During construction	Construction contractor under supervision of project engineer and site owner.
		Visual inspection of vehicles and machinery will be undertaken. If soil is observed, it will be removed by brush down and or 'high pressure air' blower.	During construction	Construction contractor under supervision of project engineer and site owner.
		Restrict uncontrolled vehicle access to revegetation areas.	During and post construction	Site owner
		Visitors to the revegetation areas are to ensure that their equipment (including footwear) is free of mud and soil.	During and post construction	Site Owner

Subdivision Condition No.	Action / Risk	Management	Timing	Responsibility
	Lack of awareness results in dieback spread	Information to be included in all construction and revegetation induction meetings regarding the risk of dieback spread and responsibilities of all parties involved.	During construction and revegetation work	Site owner and environmental consultant
		Dieback requirements to be included in construction contracts	Prior to construction	Site owner and project engineer

6.0 MIDGE MANAGEMENT PROGRAM

6.1 Overview

There is a Midge (Chironomidae) Management Strategy Partnership Agreement (2010-2015) between the DPaW, CoW and City of Joondalup which is designed to encourage an effective and sustainable partnership for the purpose of managing nuisance midge within the wetland system of the Yellagonga Regional Park. The midge management strategy includes larval monitoring, nuisance reduction (chemical treatment of the Yellagonga Regional Park), research and public information and education.

6.2 Drainage design, POS Swale and Water Quality

Storm water flows which exceeded the 1 in 5 year ARI event will be directed to drainage swale(s). These areas will be planted to treatment storm water which will assist in reducing nutrient levels and other pollutants. No discharge is permitted directly into the CCW area (DEC, 2016).

Based on Brown Geotechnical (2016) the lowest measured infiltration rate of 5x10-4m/s (or approx. 43.2m/day) has been assumed for all proposed swales (using a 50% clogging factor) –the effective long-term infiltration is assumed to be approx. 21.6m/day. With the assumption that there is 30cm of free draining soil between the base of the swale and the maximum groundwater levels, there will be no standing water within the swale after a major rainfall event (i.e. 1:100 year ARI). There are no permanent water bodies proposed within the POS area, therefore, therefore is no significant increase in breeding habitat for Midges in site.

6.3 General Procedures and Implementation

The following table summarises the risks, management actions, timing and responsibilities.

Table 6 Midge Risk and Management

Subdivision Condition No.	Action / Risk	Management	Timing	Responsibility
9	Potential Midge Habitat	Based on current data and swale design there will be no standing water within the swales during the summer months.	Post construction	Project engineer.
		Low growing grass/sedge species to be planted in POS drainage swale.	Post Construction	Project landscape consultant
		Weed removal undertaken in accordance with revegetation plan (Section 4.0)	Post Construction	Project landscape consultant/weed contractor
		Provide an information pamphlet in-line with the City of Wanneroo (no date) Advice note for residents (Appendix D)	Post construction	Project Manager/Developer
	Public Education	Educational sign installed at a strategic location within the POS/along access point.	Post construction	Project Manager/Developer

Subdivision Condition No.	Action / Risk	Management	Timing	Responsibility
		Numbers and locations of the midges on site will be determined by a record of public complaints	Post construction until hand over to the CoW.	Project Manager/Developer

7.0 REFERENCES

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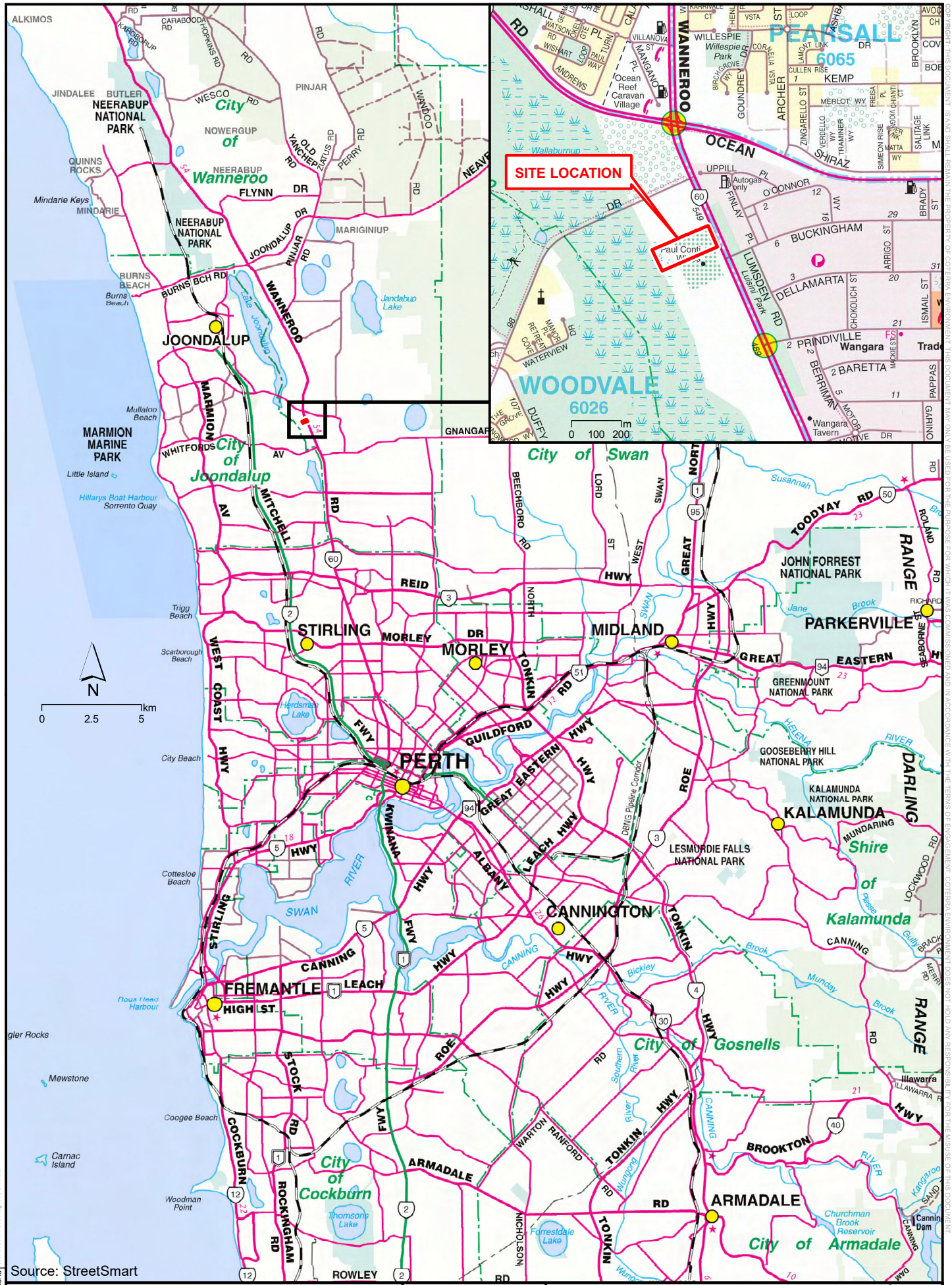
FIGURES



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WETLAND AND MIDGE MANAGEMENT PLAN
LOT 35 WANNEROO ROAD, WOODVALE

SITE LOCATION

Figure 1

LOTS 14 & 15 'A' TO 'B' NO VEHICLE ACCESS TO & FROM WANNEROO ROAD
LOTS 26 TO 29 'C' TO 'G' NO VEHICLE ACCESS TO & FROM COSIMO DRIVE & ROAD 'A'

EXISTING 5.5 METRE WIDE WESTERN POWER EASEMENT

PROPOSED 4.5 METRE WIDE WESTERN POWER EASEMENT

WANNEROO ROAD

RESTRICTED VEHICLE ACCESS 'A' TO 'B'

PANZANO CIRCUIT

COSIMO DRIVE

ROAD 'A'

LANE

RESTRICTED VEHICLE ACCESS 'C' TO 'D'

RESTRICTED VEHICLE ACCESS 'E' TO 'F'

RESTRICTED VEHICLE ACCESS 'F' TO 'G'

957 DP 69603

958 DP 69603

959 DP

960

961

962

963

964

965

966

967

968

969

970 69603

3000 RESERVE 50955 DP 69603

PUBLIC OPEN SPACE
30
6886 m²

808 DP 50215

36 D 30525

1 306 m²
2 309 m²
3 321 m²
4 300 m²
5 474 m²
6 474 m²
7 474 m²
8 474 m²
9 474 m²
10 474 m²
11 472 m²
12 459 m²
13 459 m²
14 414 m²
15 516 m²
16 314 m²
17 314 m²
18 314 m²
19 325 m²
20 476 m²
21 476 m²
22 476 m²
23 476 m²
24 476 m²
25 472 m²
26 283 m²
27 293 m²
28 293 m²
29 294 m²

ALL AREAS AND DIMENSIONS ARE SUBJECT TO SURVEY AND WAPC APPROVAL

N

SCALE 1 : 750

0 10 20 30 40 50

Source: Subdivision - Brown McAllister Surveyors, 01.06.16

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WETLAND AND MIDGE MANAGEMENT PLAN
LOT 35 WANNEROO ROAD, WOODVALE

SUBDIVISION LAYOUT

Figure 2

LEGEND

Site Boundary

Cadastre

Geology

S7: SAND - pale and olive yellow, medium to coarse-grained, sub-angular to sub-rounded quartz, trace of feldspar, moderately sorted, of residual origin

Sp: PEATY SAND - greyish brown, medium-grained quartz, moderately well sorted, variable organic content, of lacustrine origin

N

0 12.5 25 50 75 100 m

Scale: 1:2,000 @ A3

GDA 1994 MGA Zone 50

LOT 35

WOODVALE DR

BUCKINGHAM DR

WANNEROO RD

LUMSDEN RD

MEDICI WY

Wallaburnup Swamp

Yellagonga Regional Park

Source: Cadastre - Landgate, 2016
Orthophoto - Landgate, Feb 2016
Geology - DoIR: Geological Survey of W.A., 1999

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WETLAND AND MIDGE MANAGEMENT PLAN
LOT 35 WANNEROO ROAD, WOODVALE

GEOLOGY

Figure 3

LEGEND

- Site Boundary
- Cadastre

Acid Sulfate Soils

- High to Moderate Risk

N

0 12.5 25 50 75 100 m

Scale: 1:2,000 @ A3
GDA 1994 MGA Zone 50

LOT 35

WOODVALE DR

BUCKINGHAM DR

WANNEROO RD

WANNEROO RD

LUMSDEN RD

MEDICI WY

Wallaburnup Swamp

Yellagonga Regional Park

Source: Cadastre - Landgate, 2016
Orthophoto - Landgate, Feb 2016
ASS - DER, 22.09.14

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WETLAND AND MIDGE MANAGEMENT PLAN
LOT 35 WANNEROO ROAD, WOODVALE

ACID SULFATE SOILS

Figure 4

LEGEND
- Site Boundary
- Cadastre
- Maximum Groundwater Contour (mAHD)
- Contour (mAHD)

N

0 12.5 25 50 75 100 m

Scale: 1:2,000 @ A3
GDA 1994 MGA Zone 50

LOT 35

WOODVALE DR
WANNEROO RD
BUCKINGHAM DR
LUMSDEN RD
MEDICI WY
Wallaburnup Swamp
Yellagonga Regional Park

Source: Cadastre - Landgate, 2016
Orthophoto - Landgate, Feb 2016
Groundwater Contour - DoW, 2010
Contour - DoW, 2013

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WETLAND AND MIDGE MANAGEMENT PLAN
LOT 35 WANNEROO ROAD, WOODVALE

GROUNDWATER

Figure 5

Source: Cadastre - Landgate, 2016
Orthophoto - Landgate, Feb 2016
Wetlands - DPaW, 14.01.16

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WETLAND AND MIDGE MANAGEMENT PLAN
LOT 35 WANNEROO ROAD, WOODVALE

WETLANDS

Figure 6

LEGEND
- Site Boundary
- Cadastre
- Heddle Vegetation Complexes

N

0 12.5 25 50 75 100 m

Scale: 1:2,000 @ A3
GDA 1994 MGA Zone 50

LOT 35

Karrakatta Complex-Central And South

Herdsman Complex

Wallaburnup Swamp

Yellagonga Regional Park

WOODVALE DR

WANNEROO RD

BUCKINGHAM DR

LUMSDEN RD

MEDICI WY

Source: Cadastre - Landgate, 2016
Orthophoto - Landgate, Feb 2016
Vegetation Complexes - Heddle, 2002

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WETLAND AND MIDGE MANAGEMENT PLAN
LOT 35 WANNEROO ROAD, WOODVALE

VEGETATION COMPLEXES

Figure 7

APPENDIX A – WAPC SUBDIVISION CONDITION (REF: 152136)

Western Australian Planning Commission

Your Ref :
Enquiries : Elisabeth Tamouridou (Ph 6551 9729)

John Chapman Town Planning Consultant
P O Box 1130
SUBIACO WA 6904

Approval Subject To Condition(s)
Freehold (Green Title) Subdivision
(Amended Plan)

Application No : 152136

Planning and Development Act 2005

Applicant	:	John Chapman Town Planning Consultant P O Box 1130 SUBIACO WA 6904
Owner	:	Endeavour Properties Pty Ltd 12 Duncraig Road APPLECROSS WA 6153
Application Receipt	:	22 June 2015

Lot Number	:	35
Diagram / Plan	:	Diagram 30525
Location	:	-
C/T Volume/Folio	:	1644/698
Street Address	:	Wanneroo Road, Woodvale
Local Government	:	City of Wanneroo

The Western Australian Planning Commission has considered the application referred to and is prepared to endorse a deposited plan in accordance with the amended plan date-stamped 15 December 2015 once the condition(s) set out have been fulfilled.

This decision is valid for four years from the date of this advice, which includes the lodgement of the deposited plan within this period.

The deposited plan for this approval and all required written advice confirming that the requirement(s) outlined in the condition(s) have been fulfilled must be submitted by 18 March 2020 or this approval no longer will remain valid.

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ABN 35 482 341 493

Western Australian Planning Commission

Reconsideration - 28 days

Under section 151(1) of the *Planning and Development Act 2005*, the applicant/owner may, within 28 days from the date of this decision, make a written request to the WAPC to reconsider any condition(s) imposed in its decision. One of the matters to which the WAPC will have regard in reconsideration of its decision is whether there is compelling evidence by way of additional information or justification from the applicant/owner to warrant a reconsideration of the decision. A request for reconsideration is to be submitted to the WAPC on a Form 3A with appropriate fees. An application for reconsideration may be submitted to the WAPC prior to submission of an application for review. Form 3A and a schedule of fees are available on the WAPC website: http://www.planning.wa.gov.au

Right to apply for a review - 28 days

Should the applicant/owner be aggrieved by this decision, there is a right to apply for a review under Part 14 of the *Planning and Development Act 2005*. The application for review must be submitted in accordance with part 2 of the *State Administrative Tribunal Rules 2004* and should be lodged within 28 days of the date of this decision to: the State Administrative Tribunal, Level 6, State Administrative Tribunal Building, 565 Hay Street, PERTH, WA 6000. It is recommended that you contact the tribunal for further details: telephone 9219 3111 or go to its website: http://www.sat.justice.wa.gov.au

Deposited plan

The deposited plan is to be submitted to the Western Australian Land Information Authority (Landgate) for certification. Once certified, Landgate will forward it to the WAPC. In addition, the applicant/owner is responsible for submission of a Form 1C with appropriate fees to the WAPC requesting endorsement of the deposited plan. A copy of the deposited plan with confirmation of submission to Landgate is to be submitted with all required written advice confirming compliance with any condition(s) from the nominated agency/authority or local government. Form 1C and a schedule of fees are available on the WAPC website: http://www.planning.wa.gov.au

Condition(s)

The WAPC is prepared to endorse a deposited plan in accordance with the plan submitted once the condition(s) set out have been fulfilled.

The condition(s) of this approval are to be fulfilled to the satisfaction of the WAPC.

The condition(s) must be fulfilled before submission of a copy of the deposited plan for endorsement.

The agency/authority or local government noted in brackets at the end of the condition(s) identify the body responsible for providing written advice confirming that the WAPC's requirement(s) outlined in the condition(s) have been fulfilled. The written advice of the agency/authority or local government is to be obtained by the applicant/owner. When the written advice of each identified agency/authority or local government has been obtained, it should be submitted to the WAPC with a Form 1C and appropriate fees and a copy of the deposited plan.

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ABN 35 482 341 493

Western Australian Planning Commission

If there is no agency/authority or local government noted in brackets at the end of the condition(s), a written request for confirmation that the requirement(s) outlined in the condition(s) have been fulfilled should be submitted to the WAPC, prior to lodgement of the deposited plan for endorsement.

Prior to the commencement of any subdivision works or the implementation of any condition(s) in any other way, the applicant/owner is to liaise with the nominated agency/authority or local government on the requirement(s) it considers necessary to fulfil the condition(s).

The applicant/owner is to make reasonable enquiry to the nominated agency/authority or local government to obtain confirmation that the requirement(s) of the condition(s) have been fulfilled. This may include the provision of supplementary information. In the event that the nominated agency/authority or local government will not provide its written confirmation following reasonable enquiry, the applicant/owner then may approach the WAPC for confirmation that the condition(s) have been fulfilled.

In approaching the WAPC, the applicant/owner is to provide all necessary information, including proof of reasonable enquiry to the nominated agency/authority or local government.

The condition(s) of this approval, with the accompanying advice, are:

CONDITIONS:

1. The landowner/applicant contributing towards development infrastructure provisions pursuant to the Woodvale Agreed Local Structure Plan No. 64. (Local Government)

2. Uniform fencing being constructed along the boundaries of all of the proposed lots abutting Wanneroo Road. (Local Government)

3. Other than buildings, outbuildings and/or structures shown on the approved plan for retention, all buildings, outbuildings and/or structures present on the application area at the time of subdivision approval being demolished and materials removed from the lot(s). (Local Government)

4. Engineering drawings and specifications are to be submitted, approved, and works undertaken in accordance with the approved engineering drawings, specifications and approved plan of subdivision, for grading and/or stabilisation of the site to ensure that:

   a) lots can accommodate their intended use; and

   b) finished ground levels at the boundaries of the lot(s) the subject of this approval match or otherwise coordinate with the existing and/or proposed finished ground levels of the land abutting.

   (Local Government)

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5. Prior to the commencement of subdivisional works, an Urban Water Management Plan is to be prepared and approved, in consultation with the Department of Water, consistent with any approved Local Water Management Strategy. (Local Government)

6. Engineering drawings and specifications are to be submitted and approved, and works undertaken in accordance with the approved engineering drawings and specifications and approved plan of subdivision, for the filling and/or draining of the land, including ensuring that stormwater is contained on-site, or appropriately treated and connected to the local drainage system. Engineering drawings and specifications are to be in accordance with an approved Urban Water Management Plan (UWMP) for the site, or where no UWMP exists, to the satisfaction of the Western Australian Planning Commission. (Local Government)

7. Drainage easements and reserves as may be required by the local government for drainage infrastructure being shown on the diagram or plan of survey (deposited plan) as such, granted free of cost, and vested in that local government under Sections 152 and 167 of the *Planning and Development Act 2005*. (Local Government)

8. Prior to the commencement of subdivision works a Wetland Management Plan is to be prepared in consultation with the Department of Parks and Wildlife and approved to ensure the protection and management of the sites environmental assets with satisfactory arrangements being made for the implementation of the approved plan. (Local Government)

9. Prior to the commencement of subdivision works, a Midge Management Plan, including control measures and provisions for signage to be maintained during lot sales to warn of midge nuisance in the area, is to be prepared in consultation with the Department of Parks and Wildlife and approved to ensure the protection and management of the sites environmental assets with satisfactory arrangements being made for the implementation of the approved plan. (Local Government)

10. Prior to the commencement of subdivision works, a Dieback Management Plan is to be prepared in consultation with the Department of Parks and Wildlife and approved to ensure the protection and management of the sites environmental assets with satisfactory arrangements being made for the implementation of the approved plan. (Local Government)

11. An acid sulphate soils self-assessment form and, if required as a result of the self-assessment, an acid sulphate soils report and an acid sulphate soils management plan shall be submitted to and approved by the Department of Environment Regulation before any subdivision works or development are commenced. Where an acid sulphate soils management plan is required to be submitted, all subdivision works shall be carried out in accordance with the approved management plan. (Department of Environment Regulation)

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12. Prior to the commencement of subdivisional works, the landowner/applicant is to provide a pre-works geotechnical report certifying that the land is physically capable of development or advising how the land is to be remediated and compacted to ensure it is capable of development; and

    In the event that remediation works are required, the landowner/applicant is to provide a post geotechnical report certifying that all subdivisional works have been carried out in accordance with the pre-works geotechnical report.

    (Local Government)

13. Prior to commencement of subdivision works, investigation for soil and groundwater contamination is to be carried out to determine if remediation is required.

    If required, remediation, including validation of remediation, of any contamination identified shall be completed prior to the issuing of titles to the satisfaction of the Western Australian Planning Commission on advice from the Department of Environment Regulation, to ensure that the lots created are suitable for the proposed use.

    Investigations and remediation are to be carried out in compliance with the *Contaminated Sites Act 2003* and current Department of Environment Regulation Contaminated Sites Guidelines.

    (Department of Environment Regulation)

14. A bushfire management plan being prepared, approved and relevant provisions implemented during subdivisional works, in accordance with the WAPC's *Guideline for Planning in Bushfire Prone Areas, December 2015* to the specifications of the local government and/or the Department of Fire and Emergency Services. (Local Government)

15. A Notification, pursuant to Section 165 of the *Planning and Development Act 2005* is to be placed on the certificate(s) of title of the proposed lot(s) with a Bushfire Attack Level (BAL) rating of 12.5 or above, advising of the existence of a hazard or other factor. Notice of this notification is to be included on the diagram or plan of survey (deposited plan). The notification to state as follows:

    'This land is within a bushfire prone area as designated by an Order made by the Fire and Emergency Services Commissioner and may be subject to a Bushfire Management Plan.'

    (Western Australian Planning Commission)

16. The proposed reserve(s) shown on the approved plan of subdivision being shown on the diagram or plan of survey (deposited plan) as reserve(s) for Recreation and vested in the Crown under Section 152 of the *Planning and Development Act 2005*, such land to be ceded free of cost and without any payment of compensation by the Crown. (Local Government)

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17. Arrangements being made for the proposed public open space to be developed by the landowner/applicant to a minimum standard and maintained for two summers through the implementation of an approved landscape plan providing for the development and maintenance of the proposed public open space in accordance with the requirements of Liveable Neighbourhoods and to the specifications of the local government. (Local Government)

18. Measures being taken to ensure no vegetation within Bush Forever Site No. 299 is removed or disturbed during subdivisional works, including any secondary impacts from works to provide service infrastructure and drainage to implement the approved plan of subdivision. (Local Government)

19. Engineering drawings and specifications are to be submitted, approved, and subdivisional works undertaken in accordance with the approved plan of subdivision, engineering drawings and specifications, to ensure that those lots not fronting an existing road are provided with frontage to a constructed road(s) connected by a constructed road(s) to the local road system and such road(s) are constructed and drained at the landowner/applicant's cost.

    As an alternative, and subject to the agreement of the Local Government the Western Australian Planning Commission (WAPC) is prepared to accept the landowner/applicant paying to the local government the cost of such road works as estimated by the local government and the local government providing formal assurance to the WAPC confirming that the works will be completed within a reasonable period as agreed by the WAPC.

    (Local Government)

20. All local streets within the subdivision being truncated in accordance with the Western Australian Planning Commission's *Liveable Neighbourhoods* policy. (Local Government)

21. Engineering drawings and specifications are to be submitted and approved, and subdivisional works undertaken in accordance with the approved plan of subdivision, engineering drawings and specifications to ensure that:

    a) roads that have been designed to connect with existing or proposed roads abutting the subject land are coordinated so the road reserve location and width connect seamlessly;

    b) temporary turning areas are provided to those subdivisional roads that are subject to future extension; and

    c) embayment parking is provided within the/abutting the proposed Public Open Space,

    to the satisfaction of the Western Australian Planning Commission.

    (Local Government)

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22. Engineering drawings and specifications are to be submitted, approved, and subdivisional works undertaken in accordance with the approved plan of subdivision, engineering drawings and specifications, for the provision of shared paths and footpaths through and connecting to the application area in accordance with the plan dated 1 March 2016 (attached). The approved shared paths and footpaths are to be constructed by the landowner/applicant. (Local Government)

23. A 1.8 metre high continuous noise barrier being provided in the locations as shown on the plan dated 1 March 2016 to the satisfaction of the Western Australian Planning Commission. (Local Government)

24. Local Development Plan(s) being prepared and approved to address the following:

    a) quiet house design for lots shown on the plan dated 1 March 2016 (attached)

    b) streetscape, setbacks, garage location and any subdivisional retaining walls for the proposed laneway lots

    to the satisfaction of the Western Australian Planning Commission.

    (Local Government)

25. The landowner/applicant shall make arrangements to ensure that prospective purchasers of lots subject of a Local Development Plan are advised in writing that Detailed Area Plan provisions apply (Local Government).

26. Pursuant to Section 150 of the *Planning and Development Act 2005* and Division 3 of the *Planning and Development Regulations 2009* a covenant preventing vehicular access onto Wanneroo Road being lodged on the certificate(s) of title of the proposed lot(s) at the full expense of the landowner/applicant. The covenant is to prevent access, to the benefit of the City of Wanneroo, in accordance with the plan dated 1 March 2016 (attached) and the covenant is to specify:

    "*No vehicular access is permitted from Wanneroo Road.*"

    (Local Government)

27. Pursuant to Section 150 of the *Planning and Development Act 2005* and Division 3 of the *Planning and Development Regulations 2009* a covenant preventing vehicular access onto the primary road being lodged on the certificate(s) of title of the proposed laneway lot(s) at the full expense of the landowner/applicant. The covenant is to prevent access, to the benefit of the City of Wanneroo, in accordance with the plan dated 1 March 2016 (attached) and the covenant is to specify:

    "*No vehicular access is permitted from the primary road.*"

    (Local Government)

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28. A notification, pursuant to Section 70A of the *Transfer of Land Act 1893* is to be placed on the certificate(s) of title of the lot(s) shown on the plan dated 1 March 2016 (attached). Notice of this notification is to be included on the diagram or plan of survey (deposited plan). The notification is to state as follows:

'The lot/s is/are situated in the vicinity of a transport corridor and is currently affected, or may in the future be affected by transport noise.'

(Local Government)

29. Notifications, pursuant to Section 165 of the *Planning and Development Act 2005* are to be placed on the certificates of title of the proposed lot(s) advising of the existence of a hazard or other factor. Notice of the notifications is to be included on the diagram or plan of survey (deposited plan). The notifications are to state as follows:

a) *'The amenity of this lot may be affected by the presence of midges from the adjoining wetlands.'*

b) *'This lot is in close proximity to known mosquito breeding areas. The predominant mosquito species is known to carry viruses and other diseases.'*

c) *'This lot is located within 300 metres of operating market garden/s and has the potential to be affected by odours, noise, spray drift and dust that are associated with the continued operation of a market garden.'*

d) *'There is a risk of peat fires on the lot.'*

(Western Australian Planning Commission)

30. A restrictive covenant, to the benefit of the local government pursuant to Section 129BA of the *Transfer of Land Act 1893* is to be placed on the certificate(s) of title of the proposed lot(s) advising of the existence of a restriction on the use of the land. Notice of this restriction is to be included on the diagram or plan of survey (deposited plan). The restrictive covenant is to state as follows:

'The sinking of domestic groundwater bores is prohibited.'

(Local Government)

31. The landowner/applicant shall provide a written undertaking to the satisfaction of the Western Australian Planning Commission to ensure that prospective purchasers of lots proposed within 300 metres of an operating market garden are notified on contracts of sale of the existence of the market garden operations and the potential to be affected by odours, noise, dust and spray drift that this land use may cause. (Local Government)

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Western Australian Planning Commission

32. Arrangements being made to the satisfaction of the Western Australian Planning Commission and to the specification of Western Power for the provision of an underground electricity supply to the lot(s) shown on the approved plan of subdivision. (Western Power)

33. Arrangements being made to the satisfaction of the Western Australian Planning Commission and to the specifications of Western Power for the provision of necessary electricity easement(s) to the lot(s) shown on the approved plan of subdivision/plan dated 1 March 2016 (attached). (Western Power)

34. The transfer of land as a Crown reserve free of cost to Western Power for the provision of electricity supply infrastructure. (Western Power)

35. Arrangements being made with the Water Corporation so that provision of a suitable water supply service will be available to the lots shown on the approved plan of subdivision. (Water Corporation)

36. Arrangements being made with the Water Corporation so that provision of a sewerage service will be available to the lots shown on the approved plan of subdivision. (Water Corporation)

ADVICE:

1. The applicant is advised that the existing boundary fence of the adjacent Yellagonga Regional park/Bush Forever Site 299 is to remain in place and intact at all times. There is to be no vegetation, earth spoil or any other debris disposed of within Yellagonga Regional Park.

2. In regard to Condition 3, planning approval and/or a demolition licence may be required to be obtained from the local government prior to the commencement of demolition works.

3. Conditions 5 and 6 have been imposed in accordance with *Better Urban Water Management Guidelines (WAPC 2008).* Further guidance on the contents of urban water management plans is provided in *'Urban Water Management Plans: Guidelines for preparing and complying with subdivision conditions' (Department of Water 2008).*

4. Condition 11 makes reference to an 'acid sulphate soils self-assessment form'. This form can be downloaded from the Western Australian Planning Commission's website at: www.planning.wa.gov.au

   The 'acid sulphate soils self-assessment form' makes reference to the Department of Environment Regulation's 'Identification and Investigation of Acid Sulphate Soils' guideline. This guideline can be obtained from the Department of Environment Regulation's website at: www.der.wa.gov.au

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5. With regard to Condition 17, the development is to include full earthworks, basic reticulation, grassing of key areas, and pathways that form part of the overall pedestrian and/or cycle network. Flora species known to be invasive or environmentally damaging shall not be used in any landscaping, where they may spread into the adjacent Bush Forever Site.

6. In regard to Condition 19, the landowner/applicant is advised that the road reserves, including the constructed carriageways, laneways, truncations, footpaths/dual use paths and car embayments, are to be generally consistent with the approved plan of subdivision.

7. In relation to Conditions 29(c) and 31, the landowner/applicant is advised that if evidence is provided that the market garden/s have ceased operating after conditional approval is granted then Conditions 29(c) and 31 will no longer need to be satisfied.

8. In regard to Condition 32, Western Power provides only one underground point of electricity supply per freehold lot.

9. In regard to Conditions 35 and 36, the landowner/applicant shall make arrangements with the Water Corporation for the provision of the necessary services. On receipt of a request from the landowner/applicant, a Land Development Agreement under Section 83 of the *Water Services Act 2012* will be prepared by the Water Corporation to document the specific requirements for the proposed subdivision.

10. Main Roads Western Australia advises the landowner/application with regard to the Wanneroo Road reserve:

    a) no earthworks are to encroach onto the road reserve;

    b) no stormwater drainage is to be discharged onto the road reserve; and

    c) the landowner/applicant shall make good any damage to the existing verge vegetation within the road reserve.

KM Blenkinsop

Kerrine Blenkinsop
Secretary
Western Australian Planning Commission
18 March 2016

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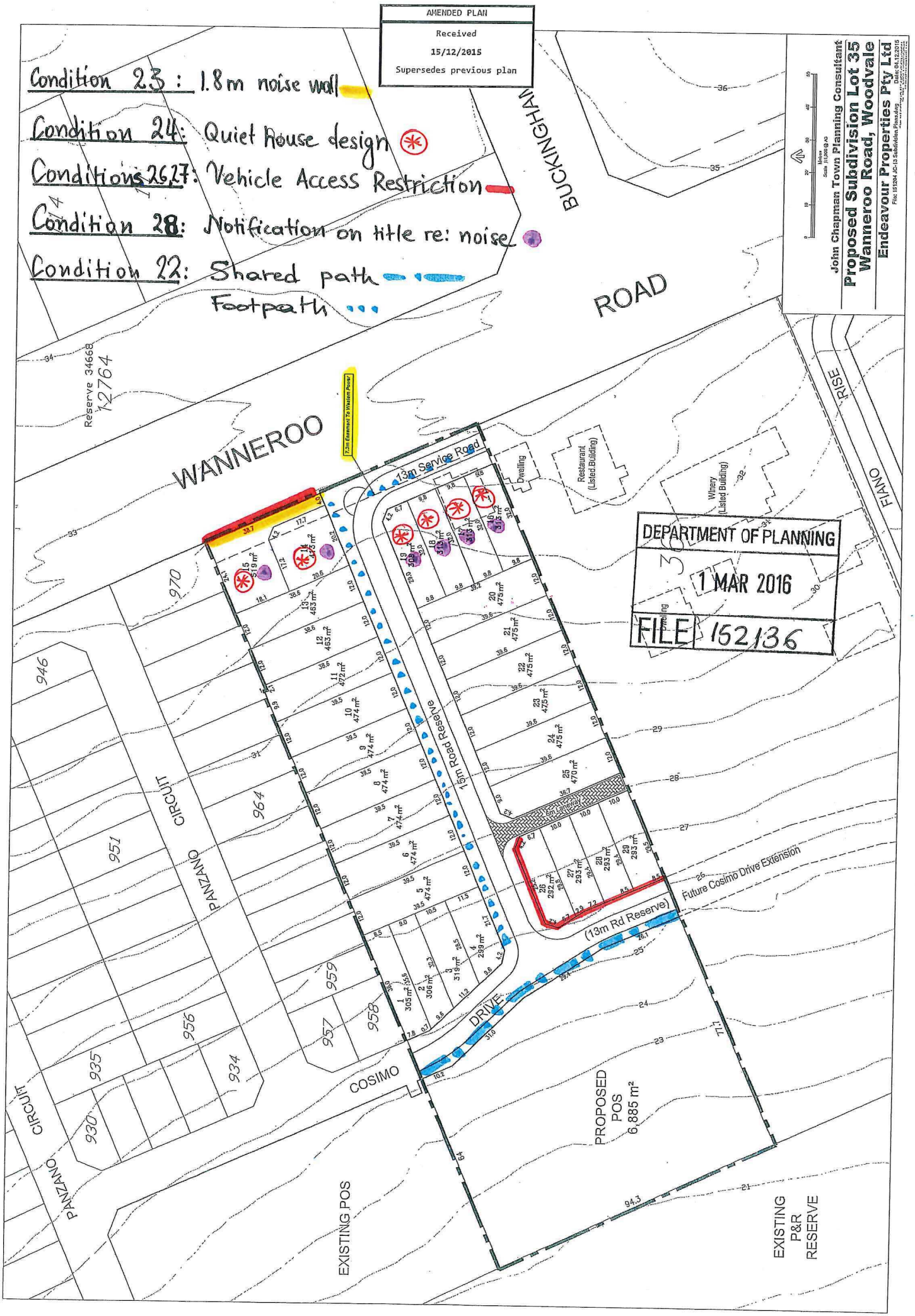

AMENDED PLAN
Received
15/12/2015
Supersedes previous plan
Condition 23 : 1.8m noise wall
Condition 24: Quiet House design
Conditions 26,27: Vehicle Access Restriction
Condition 28: Notification on title re: noise
Condition 22: Shared path
Footpath
John Chapman Town Planning Consultant
Proposed Subdivision Lot 35
Wanneroo Road, Woodvale
Endeavour Properties Pty Ltd
BUCKINGHAM
ROAD
WANNEROO
RISE
FIANO
Reserve 34668
12764
7.2m Easement To Western Power
13m Service Road
15m Road Reserve
(13m Rd Reserve)
Future Cosimo Drive Extension
DRIVE
COSIMO
CIRCUIT
PANZANO
PROPOSED POS 6,885 m²
EXISTING POS
EXISTING P&R RESERVE
Dwelling
Restaurant (Listed Building)
Winery (Listed Building)
DEPARTMENT OF PLANNING
1 MAR 2016
FILE 152136


PANZANO CIRCUIT
930
935
946
951
970
956
934
964
957
959
958
EXISTING POS
COSIMO
DRIVE
19m Road Reserve
13m Service Road
7.3m Easement To Western Power
WANNEROO ROAD
BUCKINGHAM
Reserve 34668
1-2764
114
115
2
1 305 m²
2 306 m²
3 319 m²
4 299 m²
5 474 m²
6 474 m²
7 474 m²
8 474 m²
9 474 m²
10 474 m²
11 472 m²
12 463 m²
13 463 m²
14 413 m²
15 519 m²
16 313 m²
17 313 m²
18 313 m²
19 308 m²
20 475 m²
21 475 m²
22 475 m²
23 475 m²
24 475 m²
25 470 m²
26 292 m²
27 293 m²
28 293 m²
29 293 m²
Dwelling
Restaurant (Listed Building)
Winery (Listed Building)
36
PROPOSED POS 6,885 m²
EXISTING P&R RESERVE
(13m Rd Reserve)
Future Cosimo Drive Extension
FIANO RISE
AMENDED PLAN
Received
15/12/2015
Supersedes previous plan
Metres
Scale 1:1,000 @ A3
John Chapman Town Planning Consultant
Proposed Subdivision Lot 35
Wanneroo Road, Woodvale
Endeavour Properties Pty Ltd
Date: 04.12.2015
File: 151204 JC-13 Subdivision Plans.dwg

APPENDIX B – WOODVALE WETLAND REVEGETATION MANAGEMENT PLAN (Carndo, 2009)

DATE	No.	ACTIVITY - REVISION DESCRIPTION	DES	DRN	CHK'D	APPD

DATE	No.	ACTIVITY - REVISION DESCRIPTION	DES	DRN	CHK'D	APPD

Cardno

CONSULTING ENGINEERS
TOWN PLANNERS
PROJECT MANAGERS
ENVIRONMENTAL CONSULTANTS

Cardno Centre 2 Bagot Road
P.O. Box 155 Subiaco
Western Australia 6904

Telephone (08) 9273 3888
Facsimile (08) 9388 3831

Scale: 1:3500

0 50 100 200 300 400 500 Metres

PROJECT Woodvale Wetland Revegetation Management Plan

DRAWING TITLE FIGURE 3: Plant Communities

PRINCIPAL Watson Property Group Northern Aspect Ltd

Project Number V7016

Original A3

Drawing Number SK03

Revision

Designed MF

Checked

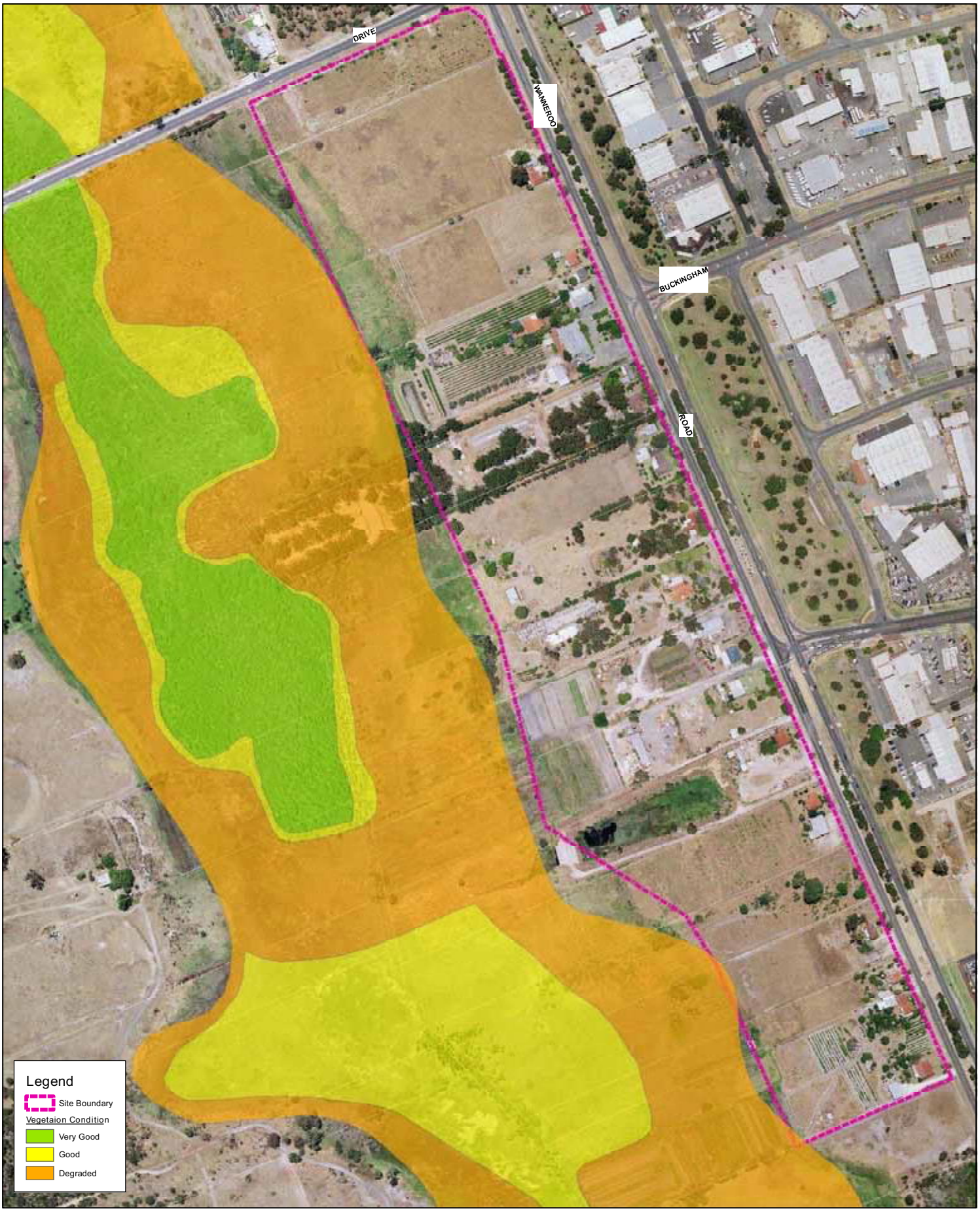
Drawn MGW

Approved

Local Authority City of Joondalup

Sheet 1 of 1

Date 26/02/09



DATE	No.	ACTIVITY - REVISION DESCRIPTION	DES	DRN	CHK'D	APPD

DATE	No.	ACTIVITY - REVISION DESCRIPTION	DES	DRN	CHK'D	APPD

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Telephone (08) 9273 3888
Facsimile (08) 9388 3831

Scale: 1:3500

0 50 100 200 300 400 500 Metres

PROJECT Woodvale Wetland Revegetation Management Plan

DRAWING TITLE FIGURE 4: Vegetation Condition

PRINCIPAL Watson Property Group Northern Aspect Ltd

Project Number V7016

Original A3

Drawing Number SK04

Revision

Designed MF

Checked

Drawn MGW

Approved

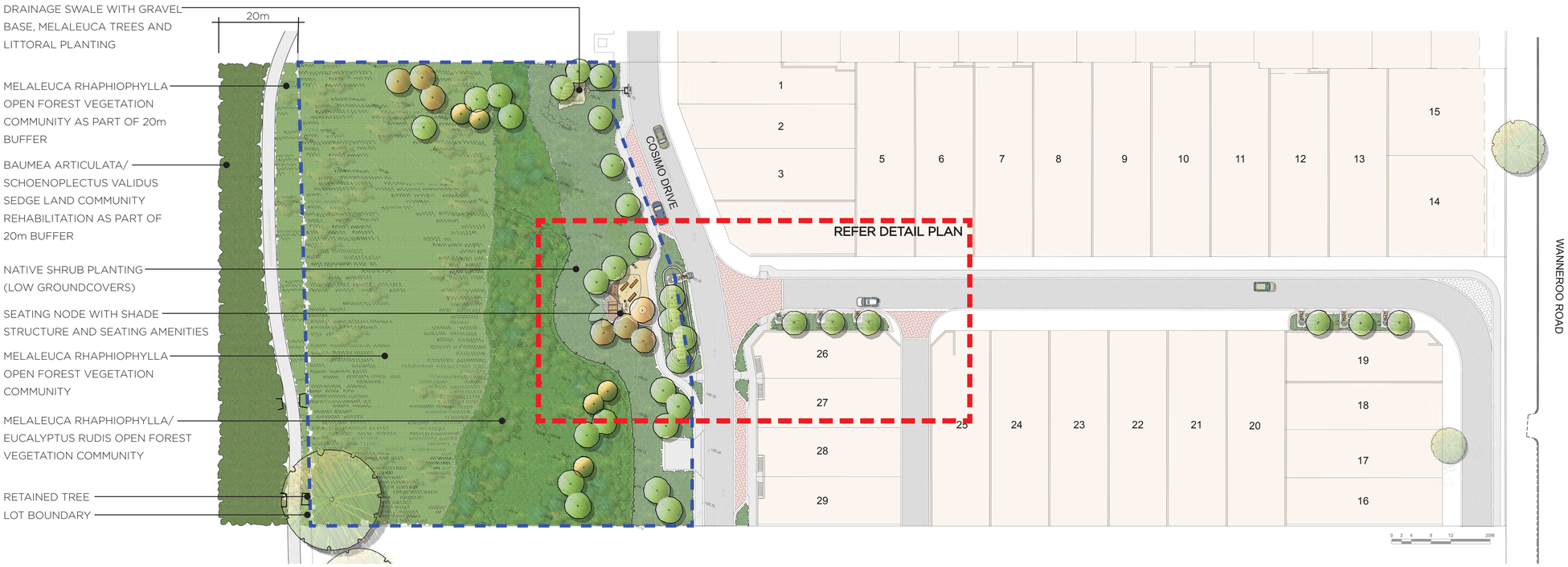
Local Authority City of Joondalup

Sheet 1 of 1

Date 17/04/09

COTERRA
ENVIRONMENT

APPENDIX C – LANDSCAPE CONCEPT PLAN (EPCAD, 2016)



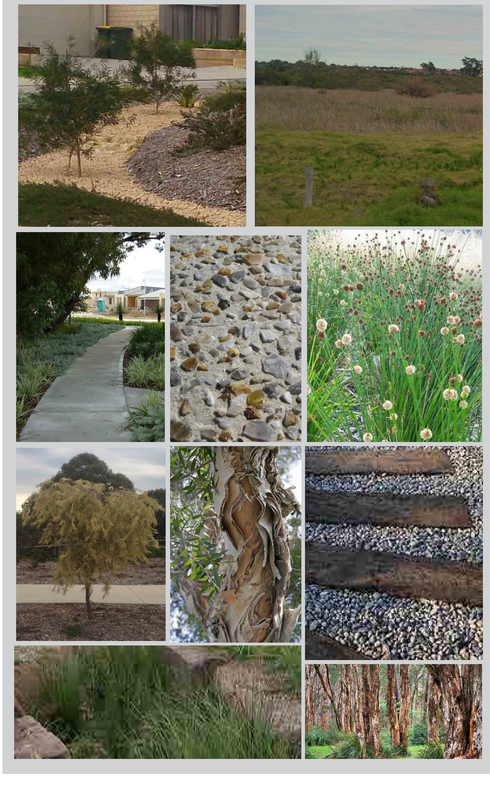
Master Landscape Plan

SCALE 1:500 M

Detail Plan : Lookout and Swales

SCALE 1:200 M

Images



Typical Seat Node

epcad.com.au

Lot 35 Woodvale — UWMP Landscape Concept - REV E

N

scale : AS SHOWN @ A1 date : November 2016

EPCAD Pty Ltd ACN 093 476 334 ABN 26 093 476 334
28-30 Mayfair Street, West Perth, WA 6005. PO Box 1233, West Perth WA
☎+61 8 9481 4410 ✉epcad@epcad.com.au

EPCAD

COTERRA
ENVIRONMENT

APPENDIX D – MIDGE ADVICE FOR RESIDENTS (CoW, 2014)

City of Wanneroo

Department of Environment and Conservation

City of Joondalup

Nuisance Midges

Midges Fast Facts

1. Midges belonging to the insect family Chironomidae are small non-biting insects that live and breed naturally in Perth's lakes and wetlands.
2. Midges are not vectors of disease like mosquito and are not considered a public health risk.
3. When water bodies become unhealthy, mainly due to high nutrient levels, midge breeding increases, resulting in a greater impact of nuisance adult midges on residents living in close proximity to lakes and wetlands.

Monitoring

1. The Cities of Joondalup (COJ) and Wanneroo (COW) in conjunction with the Department of Environment and Conservation (DEC) conduct regular monitoring and identification of midge larvae within Lake Joondalup and Lake Goollelal.
2. Nuisance adult midge swarms are monitored during periods of high level midge breeding to assess the impact on nearby residential areas.
3. Records are kept of customer enquiries/concerns in relation to the impact of nuisance midge swarms.

Control

1. Chemical spraying of the lakes is a short term control measure which can be carried out during periods where midge larvae counts are high and there is an increased impact of nuisance adult midges on nearby residents. The frequency of these treatments is limited by environmental restrictions and is dependent on the availability of approved chemicals.
2. Light traps have been positioned within and around the lake to reduce adult midge swarms impacting on residential areas.

Ongoing Management

COJ, COW and DEC are involved in the following midge management strategies:

1. Provision of funding for and management of research projects which investigate factors affecting water quality and elevated midge breeding. These studies provide valuable information for the creation and implementation of midge management and reduction initiatives.
2. Continued re-establishment of fringe vegetation surrounding wetlands to reduce nutrients entering the water bodies and to provide barriers between the wetland and residential areas.

What residents can do

In order to reduce the impact of nuisance midges around the home, residents living near lakes and wetlands can follow the suggestions listed below:

1. Use yellow, low wattage globes (25 or 30 Watt) around the home and reduce lighting to external areas.
2. Prevent midges from accessing your home by sealing gaps around doors, windows and skylights and installing fine mesh screens over your windows.
3. Plant local native plants in your garden which screen lighting from your property.

Residents can also help reduce run-off of nutrients into the environment by

1. Disposing of household waste appropriately, not down stormwater drains.
2. Washing cars on the lawn rather than the driveway or street.
3. Using nutrient free detergents.
4. Using slow-release fertilisers on lawns and gardens.
5. Where properties have been provided with sewer, but are still using septic tanks around the Wanneroo area, decommissioning these septic tanks and effluent disposal systems and connecting the property to the Water Corporation sewer.

Further Advice

For further advice relating to midge management or should you like to report nuisance midges in your local area please contact:

- The City of Joondalup Health and Environmental Services on **9400 4933.**
- The City of Wanneroo Health Services on **9405 5444.**
- The Department of Environment and Conservation on **9219 9290.**

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