

HOPKINS ROAD BUSHLAND, NOWERGUP

Boundary Definition: protected area/bushland (part taken to cadastre) boundary

SECTION 1: LOCATION INFORMATION

Bush Forever Site no. 290

Area (ha): bushland 406.9

Map no. 14, 20

Map sheet series ref. no. 2034-I NW, 2034-I SW

Other Names: not known

Local Authorities (Suburb): Shire of Wanneroo (Yanchep)

Includes CALM Managed Land: State Forest 65

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (Qtl: LS1)

VEGETATION AND FLORA

Vegetation Complexes

Spearwood Dunes

Karrakatta Complex — Central and South

Cottesloe Complex — Central and South

Floristic Community Types: *not sampled, types inferred

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes

*26b Woodlands and mallees on limestone

*28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

WETLANDS

No wetlands mapped

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: limestone ridge, vegetated uplands

Vegetation and Flora: limited survey (DEP 1999 (edge inspection), Mattiske Consulting Pty Ltd 1997, WAWA 1995)

Structural Units: limited mapping (WAWA 1995)

Uplands — Sands derived from Tamala Limestone: Woodlands dominated by *Eucalyptus marginata*, *Banksia attenuata* and *B. grandis*; *Banksia* species Woodland with emergent *Eucalyptus gomphocephala*; *Banksia* species Woodland with scattered *Eucalyptus todtiana* and *E. marginata*

Uplands — Tamala Limestone: Closed Heath dominated by *Xanthorrhoea preissii*, *Dryandra sessilis* var. *cygnorum*, *Melaleuca huegelii* and *M. systema*

Scattered Native Plants: not assessed

Vegetation Condition: Excellent (Mattiske Consulting Pty Ltd 1997)

Total Flora: not known

Significant Flora: *Eucalyptus argutifolia* (R); typical Tamala Limestone taxa — *Melaleuca huegelii*

Fauna: Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the south (to Site 293) and west

Other Special Attributes: included in Gnangara Park proposal (Bailey 1997); recommended for protection in study of City of Wanneroo bushland (Trudgen 1996)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Subject to protection under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity

Recommendation: Site with Some Existing Protection; the existing care, control and management of this Site is endorsed (proposed 'Gnangara Park' – Cabinet 1996; see Table 3, Volume 1).

HOPKINS ROAD BUSHLAND, NOWERGUP

Boundary Definition: protected area/bushland (part taken to cadastre) boundary

SECTION 1: CADASTRAL INFORMATION

(Lots, locations and derived information to be updated in the public submission period)

Bushplan Site no. 290 **Map no.** 19, 26 **Map sheet series ref. no.** 2034-I NW, 2034-I SW

Other Names: not known

Area (ha): total 437.6; bushland 406.9

Local Authorities (Suburb)

Zoning

Shire of Wanneroo (Yanchep)

MRS: State Forests

TPS: Landscape

Ownership Categories

Lot/Location/Reserve numbers (Purpose),

State Government

Street name

65, 3050 Wesco Rd

Crown Reserve

CALM Managed Land

State Forest 65

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Spearwood Dunes

Sands derived from Tamala Limestone (Qts: S7)

Tamala Limestone (Qtl: LS1)

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Cottesloe Complex — Central and South

Floristic Community Types: *not sampled, type inferred

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*28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

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THREATENED ECOLOGICAL COMMUNITIES

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SECTION 3: SPECIFIC SITE DETAIL

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Structural Units: limited mapping (WAWA 1995)

Uplands - Sands derived from Tamala Limestone: Woodlands dominated by *Eucalyptus marginata*, *Banksia attenuata* and *B. grandis*; *Banksia* species Woodland with emergent *Eucalyptus gomphocephala*; *Banksia* spp. Woodland with scattered *Eucalyptus tottiana* and *E. marginata*

Uplands - Tamala Limestone: Closed Heath dominated by *Xanthorrhoea preissii*, *Dryandra sessilis* var. *cygnorum*, *Melaleuca huegelii* and *M. acerosa*

Scattered Native Plants: not assessed

Vegetation Condition: Excellent (Mattiske Consulting Pty. Ltd. 1997)

Total Flora: not known

Significant Flora: *Eucalyptus argutifolia* (R); typical Tamala Limestone taxa - *Melaleuca huegelii*

Fauna: no systematic survey. Significant mammal species: Quenda (Friend 1996 D)

Linkage: adjacent bushland to the south (to BS293) and west; part of proposed Greenways 32, 17 (Tingay, Alan & Associates 1997a)

Other Special Attributes: included in Gngangara Park proposal (Bailey 1997); recommended for protection in the study of City of Wanneroo bushland (Trudgen 1996)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Gngangara Mound Crown Land EPP; location of Declared Rare Flora; under TPS Landscape Zoning, Crown Reserve

Constraints: under Priority and General Mineral Resource Area (limestone), mining tenements M70/126, M70/266 (Vigeo Pty Ltd) for limestone road base for building stone, M70/341 (Limestone Resources Aust Pty Ltd Carabooda Limestone) for limestone dimension stone, M70/339 (Limestone Building Block) for Limestone, M70/13 (Limestone Building Block Co. Pty Ltd) for limestone, M70/138 (Swan Portland Cement and Perth Limestone Resources) for limestone dimension stone

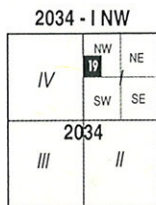
Recommendation: The existing care, control and management of this Bushplan Site is endorsed. This site lies within the proposed 'Gnangara Park' (concept announced by Cabinet in 1996) within which areas of remnant native vegetation, such as this Bushplan Site, should be managed in the future to retain and enhance their conservation values.





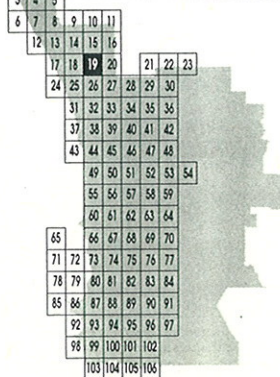
LEGEND

-  Bushplan Sites With Regionally Significant Bushland
-  Other Native Vegetation
-  Conservation Category Wetlands
-  Bushplan Sites With Some Existing Protection
-  Lot Number, Location Number
-  Channel Wetlands
-  Local Government Boundary

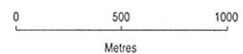


1 : 25 000 AMG Reference Grid showing Perth's Bushplan Map Sheet Breakdown

PERTH'S BUSHPLAN MAP INDEX



SCALE

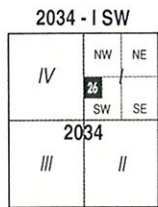


Produced by Project Mapping Section
Land Information Branch, Ministry for
Planning, Perth W.A. November 1998
ntw-map77/enviro/bushplan/bushv2_19.dgn
Cadastral Data supplied by Department
of Land Administration, W.A.
Wetlands Data supplied by
Water and Rivers Commission
Native Vegetation Extent for Study Area
supplied by Agriculture Western Australia



LEGEND

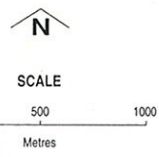
- 472 Bushplan Sites With Regionally Significant Bushland
- Other Native Vegetation
- Conservation Category Wetlands
- Bushplan Sites With Some Existing Protection
- 696 Lot Number, Location Number
- Channel Wetlands
- Local Government Boundary



1 : 25 000 AMG Reference Grid showing Perth's Bushplan Map Sheet Breakdown

PERTH'S BUSHPLAN MAP INDEX

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103	104	105	106								



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 Land Information Branch, Ministry for
 Planning, Perth W.A. November 1998
 ntw-map11/environ/bushplan/bushv2_26.dgn
 Cadastral Data supplied by Department
 of Land Administration, W.A.
 Wetlands Data supplied by
 Water and Rivers Commission
 Native Vegetation Extent for Study Area
 supplied by Agriculture Western Australia



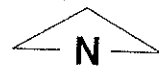
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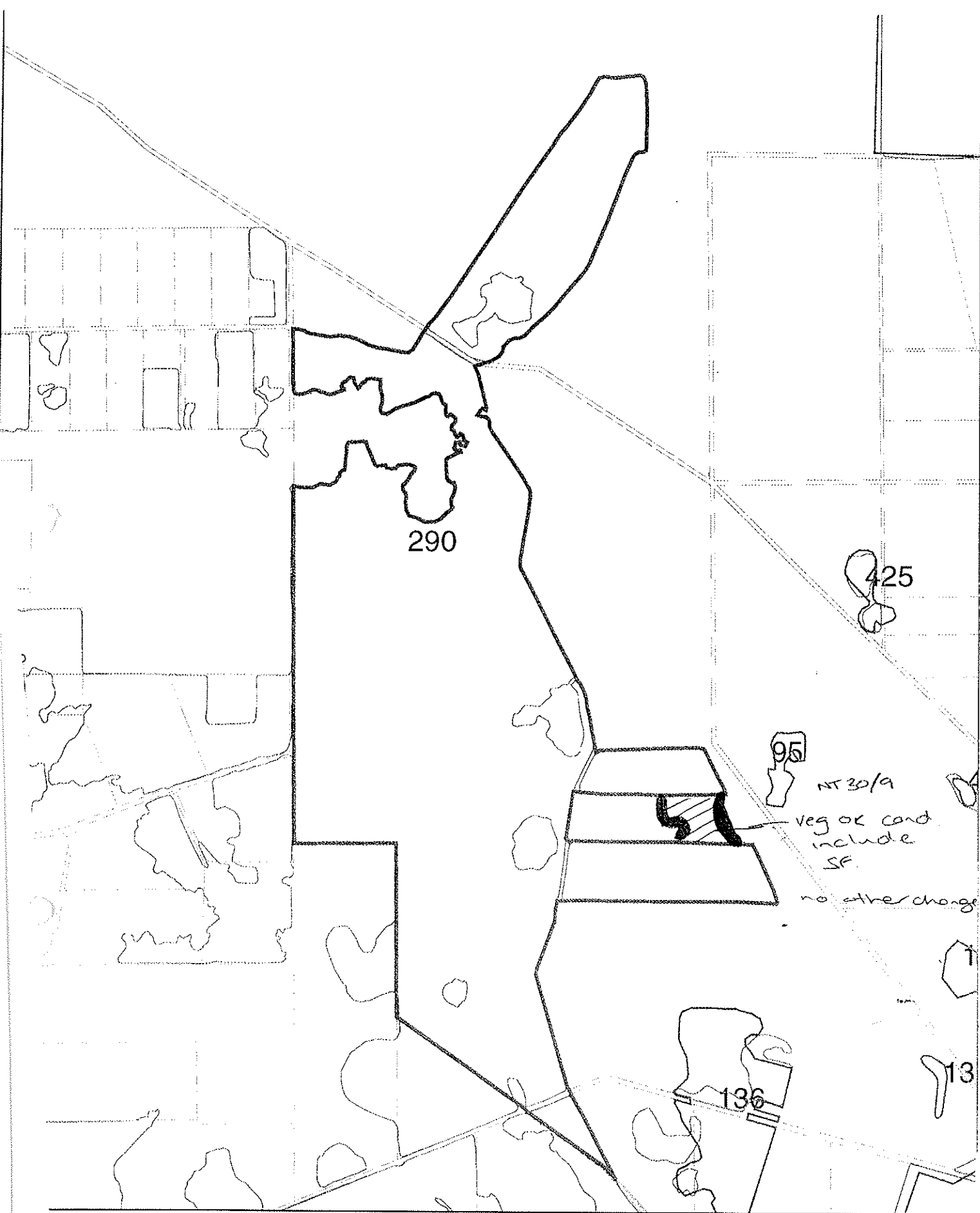


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COMMISSION**



B. BK/AC 22/10/98





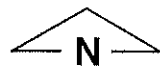
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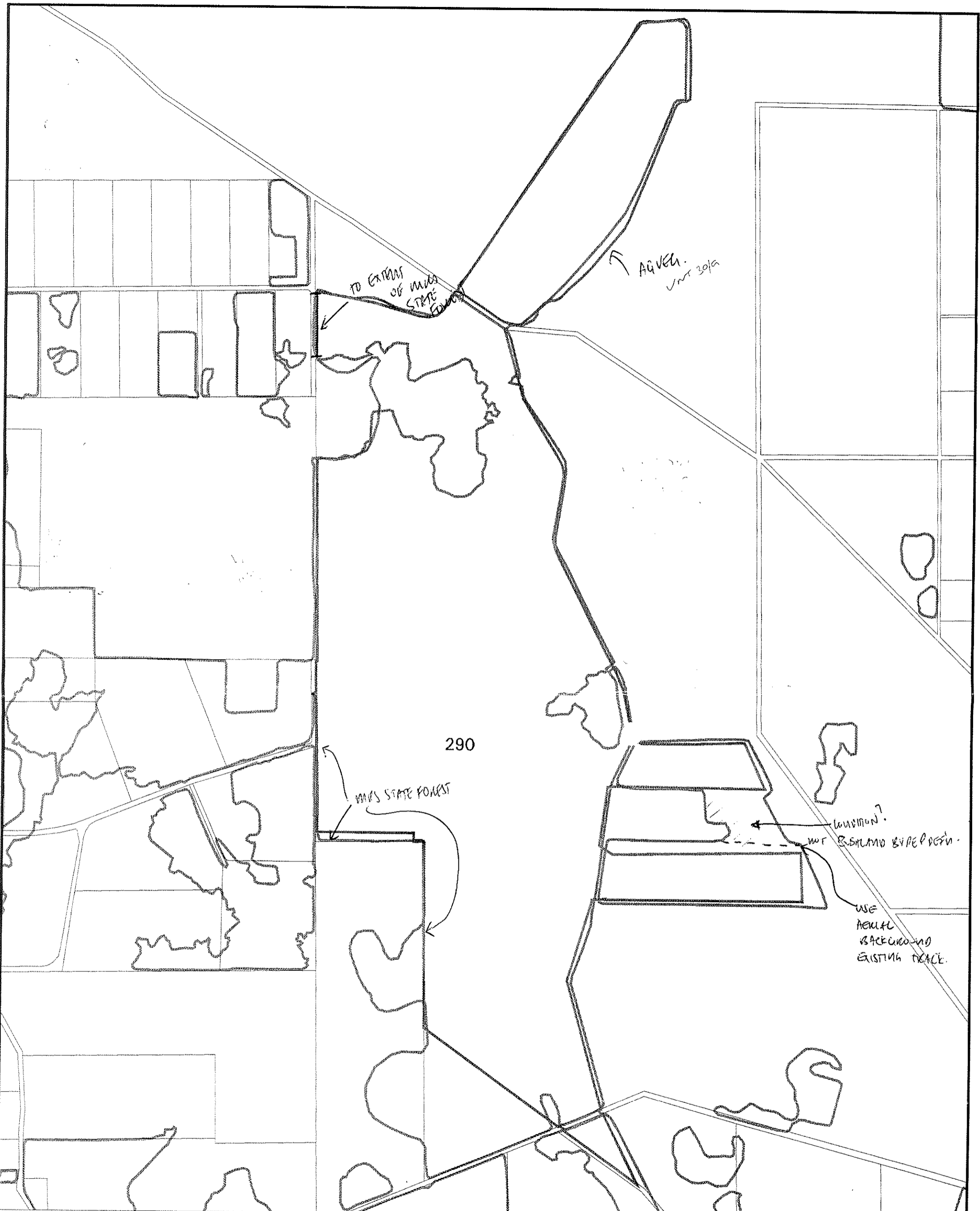


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PLANNING
COMMISSION






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FOCUS
WESTERN AUSTRALIA





bp 290

-  AG VEG 1998 BOUNDARY THEME
-  Cadastre
-  Bushplan sites refno 1-500 SCP BOUNDARY THEME

Map Ident: plot980527_1	DATE: 27 May 98
Prepared By: Andrea Zappacosta	Prepared For:
Scale 1:AUTO	MFP INTERNAL USE ONLY

* NEED TO CHECK DIA → THERE ARE SEVERAL

LIMESTONE.



Handwritten notes in the bottom right corner, including 'LIMESTONE?' and 'USE ACTUAL BACKGROUND EXISTING DEACE.' with arrows pointing to the map.

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LIMESTONE BUILDING BLOCK CO. PTY. LTD.

Suppliers of quality natural and manufactured limestone blocks

BS 290

PB106

29 April 1999

Perth's Bushplan
Ministry for Planning
Albert Facey House
469 Wellington Street
PERTH WA 6000

Dear Sir,

Bushplan Site Number 290

Please find enclosed a short report supporting our proposal to exclude mining leases M70/339, M70/13 and M70/141 from Bushplan.

All of the above leases are valid, granted and operational sites. Limestone Building Block Co. Pty Ltd requests the Ministry for Planning to exclude the area of these leases from Bushplan

It would be inappropriate to have valid mining leases within a Bushplan area and if resources are diminished by Bushplan the Limestone Building Block Company Pty Ltd would have rights to compensation in a similar manner to the owners of private property.

Included with this submission is....

1. Short Report: WA Limestone - Bushplan Site No 290
2. A plan indicating the location of ML 70/141, 70/13 and 70/339.

If you need to discuss this proposal please contact the writer on 9434 2299.

Yours faithfully,

Peter Bulloch
for Limestone Building Block Co. Pty Ltd

SUBMISSION NO. 1876

MINISTRY FOR PLANNING
03 MAY 1999
FILE 805-2-1-328.12

Proposed Inclusion in Bushplan Mining Leases, Wesco Road and Adjacent Bushland Nowergup

LIMESTONE BUILDING BLOCK CO. PTY LTD

Part Bushplan Site Number 290

Introductory Comments

Bushplan site number 290 covers much of a ridge of Tamala Limestone in State Forest No. 65.

Bushplan has apparently taken little notice of the rights of Mineral Tenement Leaseholders in its selection of sites to be included in Perth's Bushplan, even though the tenement holders have legal rights to the resources in a similar manner to owners of private property. Mining tenement holders were not even notified.

History of the Mining Leases

ML 70/339 and ML 70/13 have been held by the Building Block Company since 1990 and worked continuously since that time, through Notices of Intent and Extractive Industries Licences through the City of Wanneroo.

ML 70/141 was granted to Swan Cement in 1985 and are due to expire on 30 September 2006. ML 70/141 was subleased to the Limestone Building Block Company in 1995 and excavation commenced in 1995.

All leases are held for the extraction of limestone.

The Department of Conservation and Land Management and the Department of Environmental protection have been involved during the approval processes for all leases and have approved not only the excavation, but the methods of rehabilitation, including the protection of *Eucalyptus argutifolia*.

The then Department of Planning and Urban Development classified the limestone resources as "Limestone Resource Areas" and these are the subject of the current review of Basic Raw Materials by the Ministry for Planning.

Documentation by the Chamber of Commerce and Industry, Managing the Basic Raw Materials, April 1995/96, and a more recent summary document of 1999 for submission to Bushplan, showed that although apparently abundant limestone resources are restricted when considered in the light of previous sterilisation by urban sprawl, increasing restrictions being placed on quarries in terms of buffers and community expectations, Crown Reservations and future demands by the projected growth in Perth's population.

The leases lie within the Cottesloe Complex North (Hedde et al 1980) of which Bushplan lists as being 70% represented in the proposed Perth's Bushplan for the Metropolitan area (Volume 2, Part B page 239). This figure does not include the area of extension of this vegetation complex along the coast to the north west to past Lancelin although it should be noted that parts of this have been cleared.

Revegetation is to local provenance indigenous vegetation.

Whilst there may be localised variations the vegetation found on the leases are thus represented in the Yanchep and Neerabup National Parks.

Limestone Resources

The Chamber of Commerce and Industry note that if Bushplan is allowed to sterilise the limestone resources that it covers, then the reserves of roadbase will decrease by 45% and cement quality by just under 27 % for the Wanneroo area and **all limestone resources in the Yanchep area will be lost**. This will only leave 58 % of the cement and 57 % of the road base limestone in the northern metropolitan region.

Whilst limestone resources do occur further to the north extending into the Gingin Shire these resources are already coming under severe pressure in some locations from the spread of small rural holdings and in recent time Extractive Industries have had increasing difficulty in obtaining approval within the Gingin Shire. This trend will only get worse and will force up the cost of limestone resources through additional transport costs.

On the other hand the leases held by Limestone Building Block Company are located on crown land, potentially well buffered from the spread of urbanisation and small rural holdings.

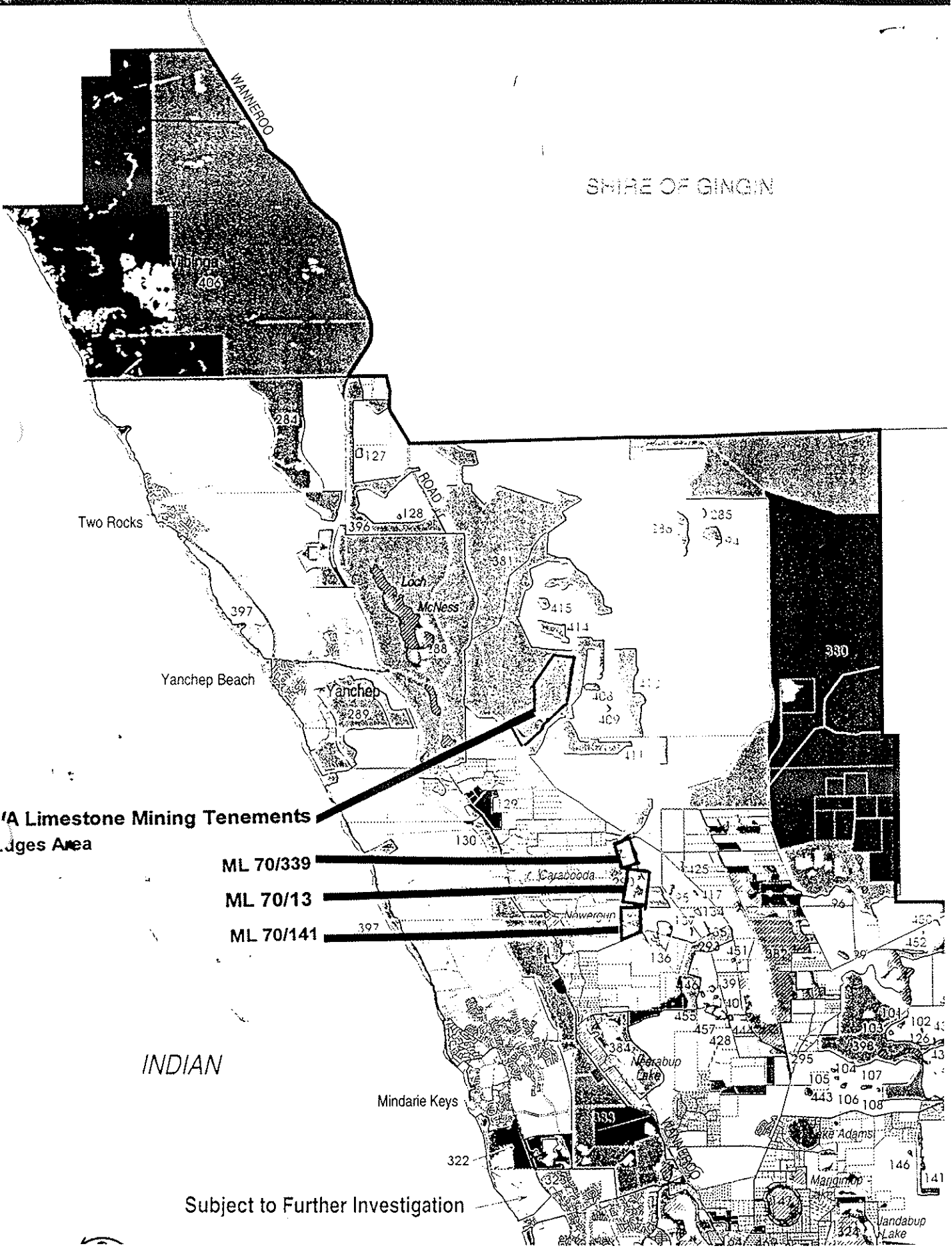
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Conclusions

The Building Block Company holds valid title to limestone resources in the Nowergup area within ML 70/141, ML 70/13 and ML 70/339.

Therefore the Limestone Building Block Company requests the Ministry for Planning to exclude their modified resource area from Bushplan, and support previous decisions made by the Department of Minerals and Energy, Department of Environmental Protection and Department of Conservation and Land Management in permitting excavation of limestone from ML 70/141 ML 70/13 and ML 70/339.

It would be inappropriate to have valid mining leases within a Bushplan area and if resources are diminished by Bushplan the Limestone Building Block Company would have rights to compensation in a similar manner to the owners of private property.



SHIRE OF GINGIN

WA Limestone Mining Tenements
Judges Area

- ML 70/339
- ML 70/13
- ML 70/141

INDIAN

Subject to Further Investigation

gwhin 7/12

HOPKINS ROAD BUSHLAND, NOWERGUP

Bushplan Site no. 290 Map no. 19, 262034-I SW

Background

This Bushplan Site had been subject to limited on the ground survey prior to the release of draft Perth's Bushplan.

A field inspection of Road Bushplan Site 290 was made by Bronwen Keighery (DEP) and Valerie Thompson (MfP) on 6/8/99. Approximately half an hour was spent traversing the bushland perimeter of the Site by vehicle.

Site Comments/Adjustment

General Comment: Condition of Site is Excellent from edge inspection. As much of this area should be retained as possible through the negotiation of tenements. As this is CALM land and it is included in the Gnangara Park, CALM has a key role in this Site.

RCG PTY LTD

LOT 5607 OLD YANCHEP ROAD,
PINJAR
FLORA AND VEGETATION SURVEY

Recd 4/7/05
Malcolm

VERSION 1

FEBRUARY 2005

REPORT NO: 2005/25

DOIR - NOT NUMBER 5055
PART 2


Environmental
environmental scientists

RCG PTY LTD

**LOT 5607 OLD YANCHEP ROAD,
PINJAR
FLORA AND VEGETATION SURVEY**

VERSION 1

FEBRUARY 2005

REPORT NO: 2005/25

DISCLAIMER

This document is published in accordance with and subject to an agreement between ATA Environmental ("ATA") and the client for whom it has been prepared RCG Pty Ltd ("Client") and is restricted to those issues that have been raised by the client in its engagement of ATA and prepared using the standard of skill and care ordinarily exercised by Environmental Scientists in the preparation of such Documents.

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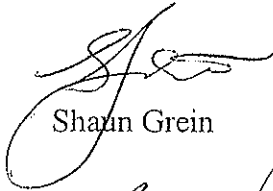
ATA Environmental has implemented a comprehensive range of quality control measures on all aspects of the company's operation and has Quality Assurance certification to ISO 9001.

An internal quality review process has been applied to each project task undertaken by us. Each document is carefully reviewed by core members of the consultancy team and signed off at Director level prior to issue to the client. Draft documents are submitted to the client for comment and acceptance prior to final production.

Document No: RCP-2004-003-FAS_004_sg_V1


Report No: 2005/25

Checked by: Signed:

Name:  Shaun Grein

Date: 8 February 2005

Approved by: Signed:

Name:  Paul van der Moezel

Date: 8 February 2005

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2. Vegetation Types and Condition

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2. Quadrat Flora Data

1. INTRODUCTION

This survey report has been prepared to meet the City of Wanneroo's Development Approval conditions for the renewal of a limestone extraction licence to operate on Mine Leases 70/126 and 70/266 (Lot 5607) Old Yanchep Road, Pinjar. Lot 5607 coincides with the northern portion of Bush Forever Site No. 290 (Hopkins Road Bushland, Nowergup). The Department of Conservation and Land Management, the Department of Environment and the City of Wanneroo have no objection to limestone extraction being conducted on the site provided that a spring flora survey of the area is conducted.

ATA Environmental was engaged by the Koltasz Smith Pty Ltd on behalf of RCG Pty Ltd to conduct a flora and vegetation survey of the site to identify whether the area to be cleared for limestone extraction contains significant flora or Threatened Ecological Communities (TECs). The total area of the mining leases is approximately 59ha.

The original mining leases were granted in 1983 and 1986 respectively and very little excavation has been undertaken to date.

The objectives of this flora and vegetation survey are to:

- provide a description of the vegetation types, floristic community types and vegetation condition and presence of any Threatened Ecological Community occurring on the site;
- listing all native and non-native plant species recorded from 10m x 10m quadrats located within representative vegetation types identified from the area;
- a list of significant species recorded on CALM's database occurring in the vicinity of each site; and
- an assessment of the potential impact of clearing on flora and vegetation.

2. STUDY AREA DESCRIPTION

2.1 Location

Lot 5607 Old Yanchep Road, Pinjar is located within the northern portion of Bush Forever Site No. 290 (Hopkins Road Bushland, Nowergup) on Old Yanchep Road Pinjar approximately 20km north-east of Wanneroo in the City of Wanneroo. The study area is bounded by the proposed Sintra Road to the southeast, Aqua Road to the northwest and Old Yanchep Road to the southwest (Figure 1).

The study area, which is vested in the Conservation Commission of Western Australia, is currently reserved "State Forest" under both the Metropolitan Region Scheme (MRS) and the City of Wanneroo Town Planning Scheme No. 1.

2.2 Soils and Landforms

Lot 5607 Old Yanchep Road, Pinjar is associated with Spearwood Dunes, which consists of a core of limestone overlain by yellow sand with two vastly different landscapes produced by wind erosion. The majority of the western portion of the Lot 5607 is associated with the Cottesloe units which consists of shallow yellow-brown sands and exposed limestone, while a very small portion along the northeast and eastern margins of the lot is associated with the Karrakatta unit which consists of deep yellow/brown sands (Churchward and McArthur, 1980).

3. FLORA AND VEGETATION

3.1 Survey Methodology

A qualified botanist (Shaun Grein) from ATA Environmental conducted a flora and vegetation survey of Lot 5607 Old Yanchep Road, Pinjar on 12 October 2004. The survey was undertaken to determine whether any of the significant species or TECs actually occur or are likely to occur on the site. This was based on floristic sampling within temporary quadrats of 10m x 10m dimension located in representative vegetation types within the study area as well as a thorough site walkover to record all plant species present at the time of the survey. This method complies with the Environmental Protection Authorities (EPA's) guidelines for flora surveys as outlined in Guidance Statement No. 51 *Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia* (EPA, 2004).

Apart from a perimeter and a few internal access tracks, vehicle access was limited and the majority of the survey was conducted by traversing the study area by foot. Aerial photography was used to delineate and provisionally map major vegetation types prior to undertaking the field survey. All vegetation and associated flora were surveyed and vegetation types was defined further using floristic data collected from 10m x 10m quadrats. The vegetation of the study area was described and mapped according to the structure and species composition of the dominant stratum using the system adopted in Bush Forever (Government of WA, 2000). A total of eight hours was spent conducting the survey of the site. This is considered an adequate survey period considering the size of the study area, relative homogeneity of the vegetation types on the site and the number of quadrats sampled.

A search of the Department of Conservation and Land Management (CALM) Threatened Ecological Communities (TECs) database was conducted for the area prior to undertaking the field assessment. No TECs have been recorded as occurring in the immediate vicinity of the study area although the 'critically endangered' – 'Aquatic root mat community number 1 of caves of the Swan Coastal Plain' has been recorded within 10km of the study area.

A search of CALM's Declared Rare and Priority Flora database was also conducted by ATA Environmental on 11 October 2004. The database search found that one Declared Rare Flora and six Priority taxa had been previously recorded from the vicinity of the study area but not from the study area itself (Table 1).

TABLE 1
CALM LIST OF DECLARED RARE AND PRIORITY LISTED FLORA
POTENTIALLY OCCURRING ON THE SITE

Species	Conservation Code	Distribution	Flowering Period
<i>Acacia benthamii</i>	P2	Wanneroo, Kings park	Aug-Sep
<i>Eucalyptus argutifolia</i>	R	Nowergup, Pinjar	Mar-Apr
<i>Jacksonia sericea</i>	P4	Wanneroo, Trigg, Mandurah, Neerabup	Dec-Feb
<i>Sarcozona bicarinata</i>	P3	Hepburn Heights, Yanchep, Wanneroo, Seabird	Aug
<i>Stachystemon axillaris</i>	P4	Wanneroo, Mogumber, Mt Lesueur	Jul-Sep
<i>Stylidium maritimum</i>	P3	Carabooda	Sept-Oct

3.2 Vegetation Complexes

The study area is comprised of vegetation representative of two vegetation complexes, the Karrakatta Vegetation Complex – Central and South and the Cottesloe Vegetation Complex – Central and South (Heddle *et al.*, 1980).

The Karrakatta Vegetation Complex – Central and South is associated with vegetation consisting predominantly of an Open Forest of Tuart (*Eucalyptus gomphocephala*)-Jarrah (*Eucalyptus marginata*)-Marri (*Corymbia calophylla*) and Woodland of Jarrah and *Banksia* species (Heddle *et al.*, 1980). The complex is associated with a small area along the east edge of the study area. Approximately 18% of the original extent of the Karrakatta Complex – Central and South remains in the Perth Metropolitan Area with 8% proposed for protection through the implementation of Bush Forever (Western Australian Planning Commission, 1998).

The Cottesloe Vegetation Complex – Central and South is associated with a mosaic of Tuart Woodland and Open Forest of Tuart-Jarrah-Marri over Closed Heath on Limestone outcrops (Heddle *et al.*, 1980). This Complex is associated with the majority of the study area. Approximately 36% of the original extent of the Cottesloe Vegetation Complex – Central and South remains in the Perth Metropolitan Area with 19% proposed for protection through the implementation of Bush Forever (Western Australian Planning Commission, 1998).

3.3 Vegetation Types

The detailed flora and vegetation survey of Lot 5607 Old Yanchep Road was conducted on 12 October 2004. Six principle vegetation types were identified and mapped (Figure 2) from the site. These are:

EmBmLOW	Low Open Woodland of <i>Eucalyptus marginata</i> , <i>Banksia attenuata</i> <i>Banksia menziesii</i> (to 5m in height) over a Low Shrubland of <i>Hibbertia hypericoides</i> and <i>Xanthorrhoea preissii</i> .
EgTOW	Tall Open Woodland of <i>Eucalyptus gomphocephala</i> (to 30m in height) over Open Low Heath of <i>Xanthorrhoea preissii</i> and <i>Hibbertia hypericoides</i> .
AcGvCH	Closed Heath of <i>Acacia cyclops</i> and <i>Grevillea vestita</i> (to 2m in height) over Low Open Shrubland of <i>Hibbertia hypericoides</i> and <i>Phyllanthus calycinus</i> .
BaLOW	Low Open Woodland of <i>Banksia attenuata</i> (to 5m in height) over a Low Shrubland of <i>Xanthorrhoea preissii</i> , <i>Hibbertia hypericoides</i> , <i>Macrozamia fraseri</i> and <i>Phyllanthus calycinus</i> over a grassland dominated by <i>Briza maxima</i> .
BaBmAfLOW	Low Open Woodland of <i>Banksia attenuata</i> , <i>Banksia menziesii</i> and <i>Allocasuarina fraseriana</i> (to 10m in height) with scattered <i>Eucalyptus gomphocephala</i> over an Open Shrubland dominated by <i>Xanthorrhoea preissii</i> and <i>Hibbertia hypericoides</i> .
EgW	Woodland of <i>Eucalyptus gomphocephala</i> (to 20m in height) over a Tall Open Scrub dominated by <i>Xanthorrhoea preissii</i> , <i>Hibbertia hypericoides</i> and <i>Jacksonia sericea</i> .

3.4 Vegetation Condition

The condition of the vegetation associated with Lot 5607 Old Yanchep Road, Pinjar has been classified as ranging from Good to Very Good according to the Bush Forever condition rating scale (Government of Western Australia, 2000) (Figure 2). According to the rating scale, vegetation described as 'Good' or 'Very Good' condition meets the following criteria:

Very Good	Vegetation structure altered, obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbance. Retains basic vegetation structure or ability to regenerate. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.

3.5 Flora

A total of 90 plant species were recorded from the study area during the October 2004 survey. The total includes 1 Cycad, 27 Monocotyledons and 62 Dicotyledons. The flora assessment was undertaken on 12 October 2004, a time when the majority of ephemeral species such as lilies and orchids would be recorded if present. As such the flora list is considered to represent at least 90% of the species likely to occur on the site. A full list of flora species recorded from the study area is provided in Appendix 1, while a list of all plant species recorded from each of the six quadrats (10m x 10m), as well as the height and percentage foliage cover of each, are provided in Appendix 2.

Of the 90 plant species recorded 76 (84%) were native and 14 (16%) were introduced or non-endemic species. Families with the highest representation of taxa were the Proteaceae (*Banksia* family- 17 taxa, all native) and the Papilionaceae (Pea family - 13 taxa; 11 native, 2 introduced) families.

No Declared Rare Flora or Commonwealth Listed species were recorded from the study area. However, large numbers (100+) of the Priority 4 listed *Jacksonia sericea* were recorded from five of the six flora quadrats sampled during the survey (Figure 2). While *Jacksonia sericea* isn't afforded statutory protection under the *Wildlife Conservation Act, 1950*, it is considered to be significant under Bush Forever (Government of Western Australia, 2000). The taxa has been recorded from several other secure, protected conservation reserves in the immediate area including Neerabup National Park.

3.6 Floristic Community Types

The Floristic Community Type (FCT) assessment of vegetation on the Swan Coastal Plain was developed by Gibson *et al.* (1994) and is based on an underlying concept that flora species occur in groups as a response to environmental factors. In general, floristic community types comprise groups of flora that consistently occur together (Trudgen, 1995).

Based on the floristic data collected from each the six quadrats in the study area the vegetation of the study area corresponds most closely with two FCTs: FCT 26b (Woodlands and mallees on limestone) and FCT 28 (Spearwood *Banksia attenuata* or *Banksia attenuata-Eucalyptus* woodlands).

FCT 26b is virtually restricted exclusively to the Cottesloe Vegetation Complex -- Central and South and is comprised of species common to limestone heaths including *Hibbertia hypericoides*, *Caladenia flava*, *Sowerbaea laxiflora*, *Schoenus clandestinus* and *Mesomelaena pseudostygia*. FCT 28 is comprised of *Banksia attenuata* woodlands, *Corymbia calophylla*–*Banksia attenuata* woodlands or *Eucalyptus marginata*–*Banksia attenuata* woodlands. This FCT is recorded from Thomsons Lake in the south to Seabird in the north. Neither FCT 26b nor 28 is listed as Threatened Ecological Communities at the State level or under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. Additionally, there was no

evidence, or likelihood of occurrence, of the 'critically endangered' –'Aquatic root mat community number 1 of caves of the Swan Coastal Plain' from the site.

4. CONCLUSIONS

The flora and vegetation survey of the Lot 5607 Old Yanchep Road, Pinjar resulted in the following findings:

- Six distinct vegetation types or associations were recorded from the area.
- The condition of the vegetation ranged from Good to Very Good according to the condition rating scale adopted from Bush Forever.
- A total of 90 plant species were recorded from the study area comprised of 76 native and 14 non-native species.
- No Declared Rare Flora were recorded from the area.
- One CALM listed Priority taxa, the Priority 4 listed *Jacksonia sericea*, was recorded from the study area. Numerous plants of this taxa (100+) were recorded from all but one of the six flora quadrats sampled during the survey. While *Jacksonia sericea* does not have statutory protection under the *Wildlife Conservation Act, 1950*, it is considered to be significant under Bush Forever (Government of Western Australia, 2000). *Jacksonia sericea* has been recorded from several other secure, protected conservation reserves in the immediate area including Neerabup National Park.
- No Threatened Ecological Communities were recorded from the area.
- As required by CALM, a Rehabilitation Plan will be prepared and implemented to rehabilitate areas of vegetation disturbed by the proposed future limestone extraction activities to a standard consistent with the surrounding native vegetation.

Additionally, the assessment determined that approximately 18% of the original extent of the Karrakatta Vegetation Complex – Central and South remains on the Perth Metropolitan Area, of which approximately 8% respectively is currently protected. Approximately 36% of the original extent of the Cottesloe Vegetation Complex – Central and South remains in the Perth Metropolitan of which approximately 19% is currently protected.

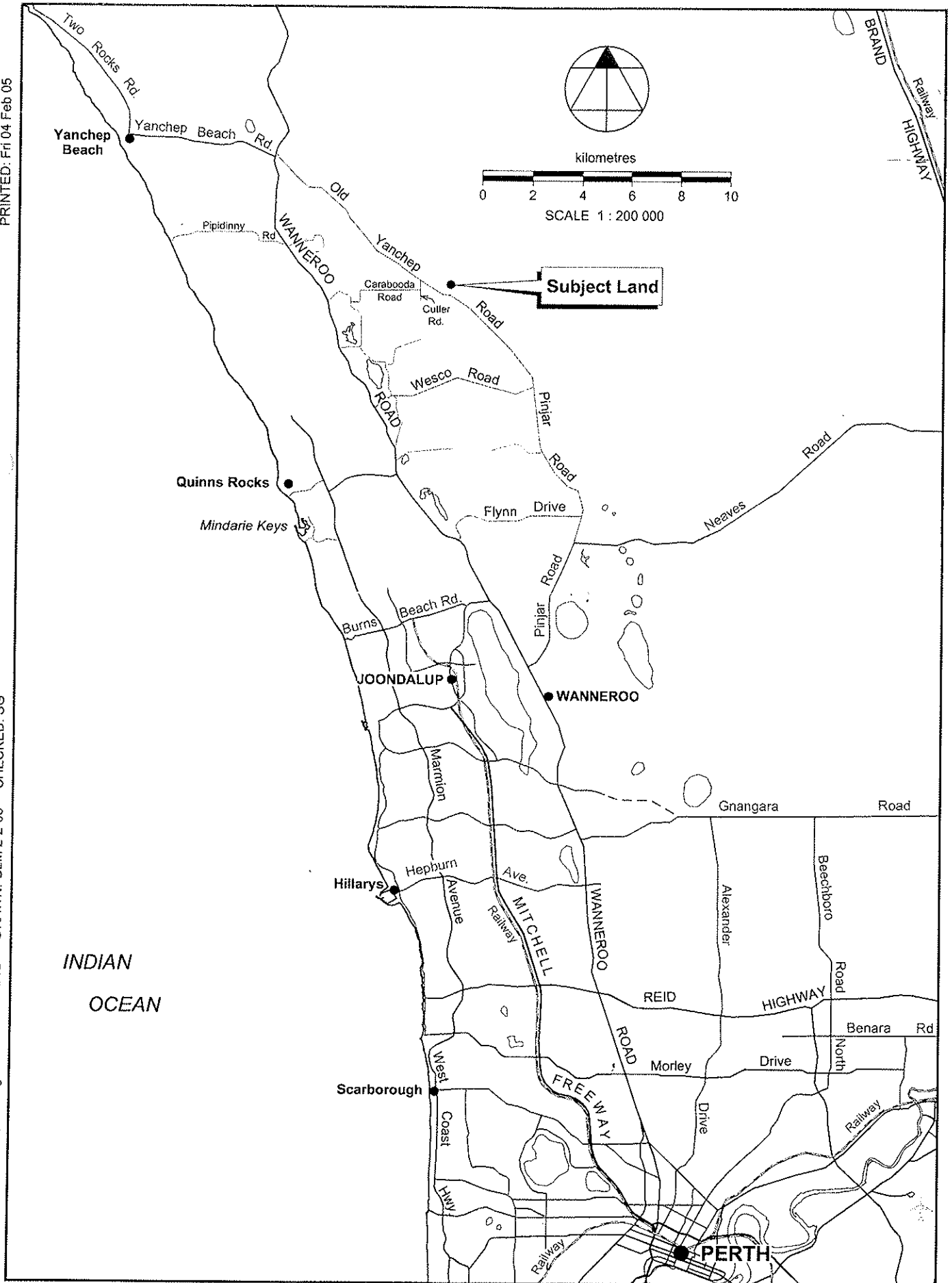
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FIGURES

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RCP-2004-003/FAS/25_25f1.dgn DATUM: AMG DRAWN: LM 2-2-05 CHECKED: SG



LOT 5607 OLD YANCHEP ROAD, PINJAR
FLORA AND VEGETATION SURVEY
REGIONAL LOCATION

FIGURE 1

LEGEND

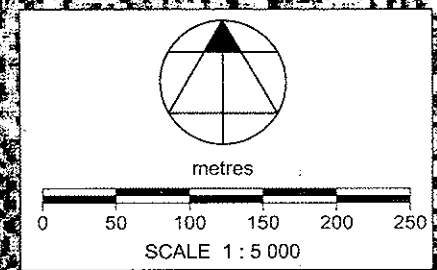
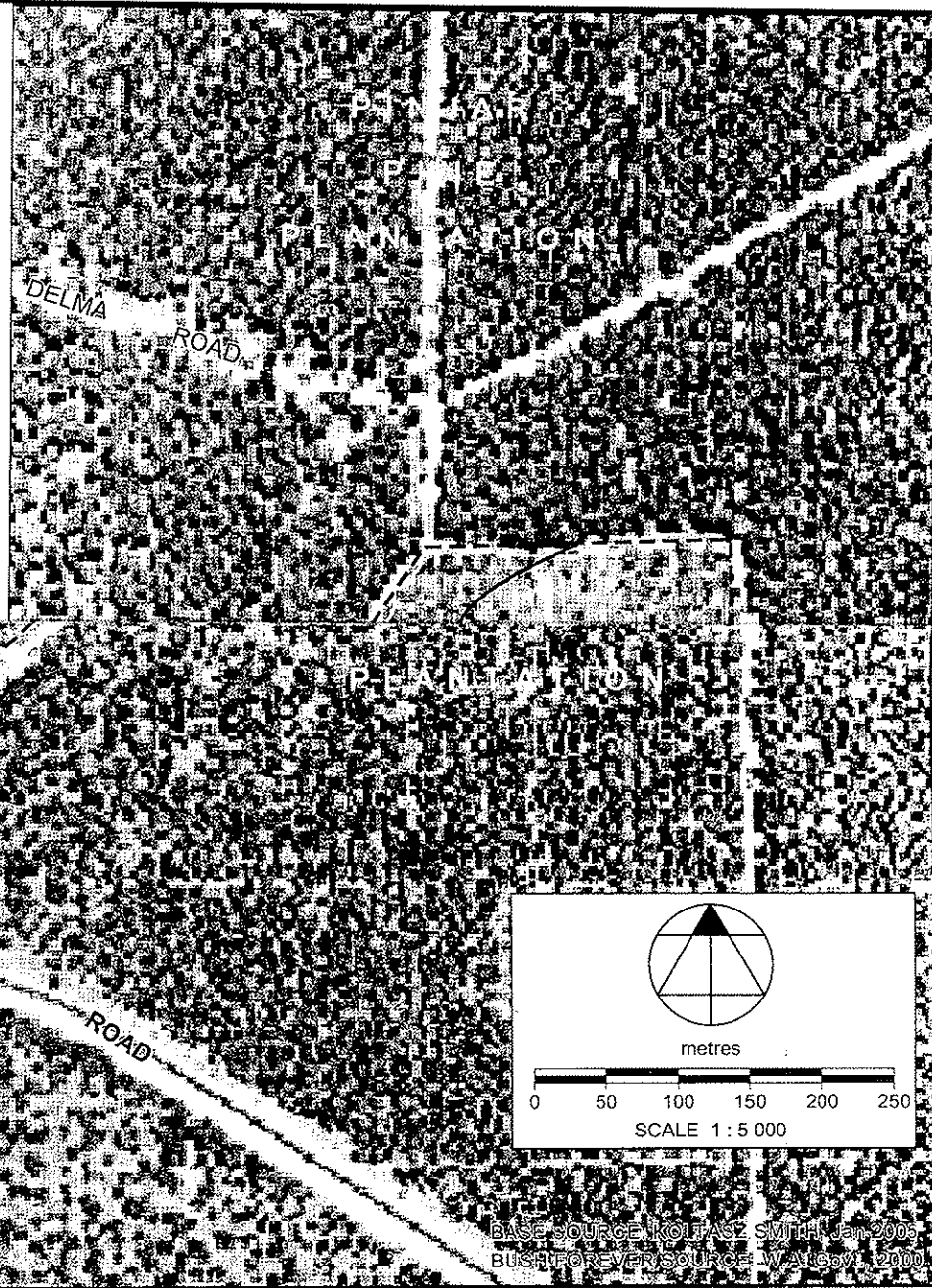
- Subject Land Boundary
- 290 Bush Forever Boundary and Site Number
- Vegetation Type Boundary
- 06 Flora Quadrat Location, 10x10m
- × *Jacksonia sericea*, Priority 4

VEGETATION TYPES

EmBmLOW Low Open Woodland of *Eucalyptus marginata*, *Banksia attenuata*, *Banksia menziesii* (to 5m in height) over a Low Shrubland *Hibbertia hypericoides* and *Xanthorrhoea preissii*

EgTOW Tall Open Woodland of *Eucalyptus gomphocephala* (to 30m in height) over Open Low Heath *Xanthorrhoea preissii* and *Hibbertia hypericoides*

AcGvCH Closed Heath of *Acacia cyclops* and *Grevillea vestita* (to 2m in height) over



BASE SOURCE: KOLTASZ SMITH Jan 2005
 BUSH FOREVER SOURCE: WATSON 2000

LOT 5607 OLD YANCHEP ROAD
 PINJAR
 FLORA AND VEGETATION SURVEY
 VEGETATION TYPES AND CONDITION
 FIGURE 2



APPENDICES

APPENDIX 1

FLORA LIST

APPENDIX 1
LOT 5607 OLD YANCHEP ROAD FLORA LIST

Family	Genus/Species
GYMNOSPERMAE	
ZAMIACEAE	<i>Macrozamia fraseri</i>
MONOCOTYLEDONS	
ANTHERICACEAE	<i>Sowerbaea laxiflora</i> <i>Thysanotus manglesianus</i>
ASPHODELACEAE	* <i>Asphodelus fistulosus</i>
COLCHICACEAE	<i>Burchardia umbellata</i>
CYPERACEAE	<i>Lepidosperma squamatum</i> <i>Mesomelaena pseudostygia</i> <i>Mesomelaena tetragona</i>
DASYPOGONACEAE	<i>Acanthocarpus preissii</i>
HAEMODORACEAE	<i>Anigozanthos humilis</i> <i>Anigozanthos manglesii</i> <i>Conostylis aculeata</i> <i>Conostylis candicans</i>
IRIDACEAE	* <i>Moraea flaccida</i> <i>Patersonia occidentalis</i> * <i>Romulea rosea</i> * <i>Watsonia meriana</i> var. <i>bulbillifera</i>
PHORMIACEAE	<i>Dianella revoluta</i> <i>Stypandra glauca</i>
POACEAE	* <i>Avena fatua</i> * <i>Briza maxima</i> * <i>Ehrharta calycina</i>
RESTIONACEAE	<i>Desmodcladus flexuosus</i> <i>Schoenus clandestinus</i>
ORCHIDACEAE	<i>Caladenia flava</i> <i>Elythranthera brunonis</i>
XANTHORRHOEACEAE	<i>Xanthorrhoea preissii</i>
DICOTYLEDONS	
AIZOACEAE	* <i>Carpobrotus edulis</i>
AMARANTHACEAE	<i>Ptilotus sericostachyus</i>
APIACEAE	<i>Eryngium pinnatifidum</i>

Family	Genus/Species
ASTERACEAE	<i>Podolepis canescens</i>
	* <i>Taraxacum officinale</i>
	* <i>Ursinia anthemoides</i>
CASUARINACEAE	<i>Allocasuarina fraseriana</i>
	<i>Allocasuarina humilis</i>
DILLENACEAE	<i>Hibbertia hypericoides</i>
EPACRIDACEAE	<i>Conostephium pendulum</i>
EUPHORBIACEAE	* <i>Euphorbia terracina</i>
	<i>Phyllanthus calycinus</i>
GERANIACEAE	* <i>Pelargonium capitatum</i>
GOODENIACEAE	<i>Scaevola canescens</i>
LAURACEAE	<i>Cassytha racemosa</i>
LOBELIACEAE	<i>Lobelia tenuior</i>
MIMOSACEAE	<i>Acacia cyclops</i>
	<i>Acacia lasiocarpa</i>
	<i>Acacia saligna</i>
MYRTACEAE	<i>Calothamnus quadrifidus</i>
	<i>Eucalyptus gomphocephala</i>
	<i>Eucalyptus marginata</i>
	<i>Kunzea glabrescens</i>
	<i>Melaleuca systema</i>
PAPILIONACEAE	<i>Bossiaea eriocarpa</i>
	<i>Daviesia decurrens</i>
	<i>Daviesia divaricata</i>
	<i>Daviesia physodes</i>
	<i>Gastrolobium capitatum</i>
	<i>Gompholobium tomentosum</i>
	<i>Hardenbergia comptoniana</i>
	** <i>Jacksonia sericea</i> (Priority 4)
	<i>Jacksonia sternbergiana</i>
	<i>Kennedia prostrata</i>
	* <i>Lupinus cosentinii</i>
	<i>Isotropis cuneifolia</i>
* <i>Trifolium campestre</i>	
POLYGALACEAE	<i>Comesperma conferta</i>
	<i>Comesperma virgatum</i>
PRIMULACEAE	* <i>Anagallis arvensis</i>
PROTEACEAE	<i>Adenanthos cygnorum</i>
	<i>Banksia attenuata</i>

Family	Genus/Species
	<i>Banksia grandis</i>
	<i>Banksia menziesii</i>
	<i>Conospermum crassinervium</i>
	<i>Conospermum stoechadis</i>
	<i>Dryandra lindleyana</i>
	<i>Dryandra sessilis</i> ssp. <i>cygnorum</i>
	<i>Grevillea vestita</i>
	<i>Hakea amplexicaulis</i>
	<i>Hakea lissocarpa</i>
	<i>Hakea trifurcata</i>
	<i>Hakea ruscifolia</i>
	<i>Persoonia longifolia</i>
	<i>Petrophile linearis</i>
	<i>Stirlingia latifolia</i>
	<i>Synaphea petiolaris</i>
RUTACEAE	<i>Philotheca spicata</i>
STYLIDIACEAE	<i>Stylidium junceum</i>
	<i>Stylidium repens</i>
	<i>Stylidium schoenoides</i>
THYMELEACEAE	<i>Pimelea rosea</i>
	<i>Pimelea floribunda</i>
	<i>Pimelea leucantha</i>
TOTAL SPECIES	90
Native Species	76
Introduced/Non-endemic	14

- * Denotes Introduced species (weeds)
- ** Priority Listed taxa

APPENDIX 2

QUADRAT FLORA DATA

QUADRAT Q1

382394E 6502974N

Low Open Woodland of *Eucalyptus marginata*, *Banksia attenuata* *Banksia menziesii* (to 5m in height) over a Low Shrubland *Hibbertia hypericoides* and *Xanthorrhoea preissii*

Condition: Very Good



QUADRAT Q1 (10x10m)

SPECIES	% COVER	HEIGHT (M)
<i>Eucalyptus marginata</i>	30	5
<i>Banksia menziesii</i>	20	5
<i>Banksia grandis</i>	10	5
<i>Hibbertia hypericoides</i>	20	0.6
<i>Xanthorrhoea preissii</i>	10	1
<i>Phyllanthus calycinus</i>	<1	0.4
<i>Philothea spicata</i>	<1	0.3
<i>Burchardia umbellata</i>	<1	0.5
* <i>Briza maxima</i>	<1	0.3
<i>Elythranthera brunonis</i>	<1	0.2
<i>Mesomelaena pseudostygia</i>	<1	0.3
<i>Desmocladus flexuosus</i>	<1	0.2
<i>Lepidosperma squamatum</i>	<1	0.3
<i>Gompholobium tomentosum</i>	<1	0.6
<i>Sowerbaea laxiflora</i>	<1	0.4
<i>Stylidium repens</i>	<1	0.3
<i>Stylidium schoenoides</i>	<1	0.1

SPECIES	% COVER	HEIGHT (M)
<i>Conostylis aculeata</i>	<1	0.2
<i>Pimelea rosea</i>	<1	0.4
* <i>Watsonia meriana</i> var. <i>bulbillifera</i>	<1	1.2
<i>Hardenbergia comptoniana</i>	<1	climber
<i>Bossiaea eriocarpa</i>	<1	0.5
<i>Conostephium pendulum</i>	<1	0.6
<i>Stirlingia latifolia</i>	<1	1.2
<i>Thysanotus manglesianus</i>	<1	climber
<i>Patersonia occidentalis</i>	<1	0.7
<i>Macrozamia riedlei</i>	<1	0.5
<i>Synaphea petiolaris</i>	<1	0.4
<i>Dryandra sessilis</i> subsp. <i>cygnorum</i>	<1	1.3
<i>Ptilotus sericostachyus</i>	<1	0.3

* Denotes Introduced species (weeds)

** Priority Listed taxa

QUADRAT Q2
382576E 6503161N

Tall Open Woodland of *Eucalyptus gomphocephala* (to 30m in height) over Open
Low Heath *Xanthorrhoea preissii* and *Hibbertia hypericoides*
Condition: Good to Very Good



QUADRAT Q2 (10x10m)

SPECIES	% COVER	HEIGHT (M)
<i>Eucalyptus gomphocephala</i>	10	30
<i>Hibbertia hypericoides</i>	60	0.6
<i>Xanthorrhoea preissii</i>	10	3
<i>Calothamnus quadrifidus</i>	1	1
<i>Eryngium pinnatifidum</i>	<1	0.5
<i>Sowerbaea laxiflora</i>	<1	0.3
* <i>Watsonia meriana</i> var. <i>bulbillifera</i>	<1	1
* <i>Briza maxima</i>	<1	0.3
<i>Mesomelaena tetragona</i>	<1	0.4
<i>Gompholobium tomentosum</i>	<1	0.3
<i>Pimelea rosea</i>	<1	0.3
<i>Dianella revoluta</i>	<1	0.4
<i>Lobelia tenuior</i>	<1	0.1
<i>Burchardia umbellata</i>	<1	0.4
<i>Hakea amplexicaulis</i>	1	3
<i>Stylidium junceum</i>	<1	0.2
<i>Macrozamia riedlei</i>	<1	1
** <i>Jacksonia sericea</i>	<1	0.2

SPECIES	% COVER	HEIGHT (M)
* <i>Anagallis arvensis</i>	<1	0.02
<i>Jacksonia sternbergiana</i>	<1	1.3
* <i>Avena fatua</i>	<1	0.7

* Denotes Introduced species (weeds)
 ** Priority Listed taxa

QUADRAT Q3

382735E 6503101N

Closed Heath of *Acacia cyclops* and *Grevillea vestita* (to 2m in height) over Low
Open Shrubland of *Hibbertia hypericoides* and *Phyllanthus calycinus*

Condition: Very Good



QUADRAT Q3 (10x10m)

SPECIES	% COVER	HEIGHT (M)
<i>Acacia cyclops</i>	60	2
<i>Grevillea vestita</i>	20	2
<i>Hibbertia hypericoides</i>	5	0.3
<i>Phyllanthus calycinus</i>	2	0.5
* <i>Briza maxima</i>	<1	0.3
<i>Podolepis canescens</i>	<1	0.2
* <i>Anagallis arvensis</i>	<1	0.2
* <i>Romulea rosea</i>	<1	0.1
* <i>Burchardia umbellata</i>	<1	0.2
<i>Xanthorrhoea preissii</i>	1	3
<i>Jacksonia sericea</i>	1	0.2
<i>Acanthocarpus preissii</i>	<1	0.2
* <i>Pelargonium capitatum</i>	<1	0.4
* <i>Romulea rosea</i>	<1	0.3
<i>Banksia attenuata</i>	<1	2
<i>Hakea amplexicaulis</i>	<1	1.2
<i>Conostylis candicans</i>	<1	0.3

SPECIES	% COVER	HEIGHT (M)
* <i>Watsonia meriana</i> var. <i>bulbillifera</i>	<1	1

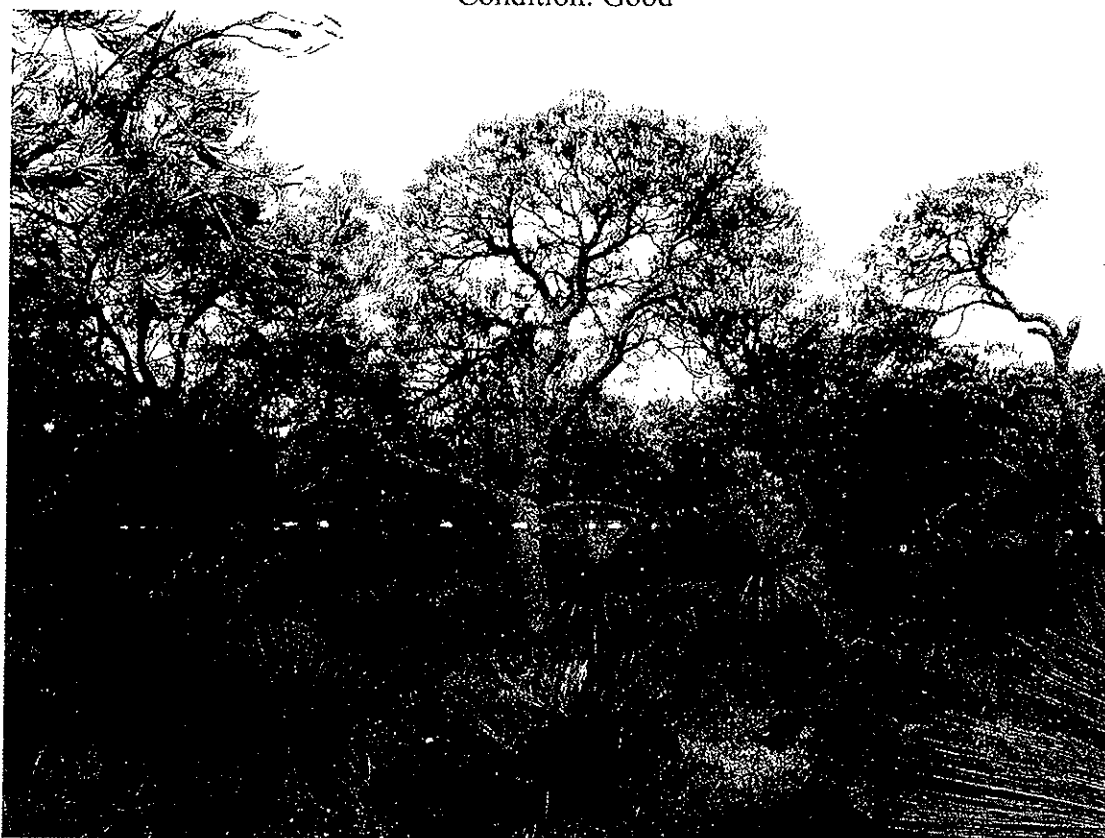
* Denotes Introduced species (weeds)

** Priority Listed taxa

QUADRAT Q4
382788E 6503071N

Low Open Woodland of *Banksia attenuata* over a Low Shrubland dominated by *Xanthorrhoea preissii*, *Hibbertia hypericoides*, *Macrozamia riedlei* and *Phyllanthus calycinus* over a grassland dominated by *Briza maxima*

Condition: Good



QUADRAT Q4 (10x10m)

SPECIES	% COVER	HEIGHT (M)
<i>Banksia attenuata</i>	50	5
<i>Jacksonia sterbergiana</i>	1	2.5
<i>Grevillea vestita</i>	1	1.5
<i>Xanthorrhoea preissii</i>	5	1.2
<i>Macrozamia riedlei</i>	2	1
<i>Hibbertia hypericoides</i>	10	1
<i>Sowerbaea laxiflora</i>	<1	0.6
<i>Phyllanthus calycinus</i>	5	0.6
<i>Podolepis canescens</i>	<1	0.5
* <i>Briza maxima</i>	10	0.3
** <i>Jacksonia sericea</i>	1	0.2
<i>Thysanotus manglesianus</i>	<1	Climber
* <i>Pelargonium capitatum</i>	<1	0.3
<i>Daviesia divaricata</i>	<1	0.4
* <i>Carpobrotus edulis</i>	<1	Prostrate

* Denotes Introduced species (weeds)

** Priority Listed taxa

QUADRAT Q5
383073E 6503475N

Low Open Woodland of *Banksia attenuata*, *Banksia menziesii* and *Allocasuarina fraseriana* (to 10m in height) with scattered *Eucalyptus gomphocephala* over a Open Shrubland dominated by *Xanthorrhoea preissii* and *Hibbertia hypericoides*

Condition: Very Good



QUADRAT Q5 (10x10m)

SPECIES	% COVER	HEIGHT (M)
<i>Banksia attenuata</i>	40	3
<i>Allocasuarina fraseriana</i>	10	10
<i>Banksia menziesii</i>	10	3
<i>Hibbertia hypericoides</i>	20	0.5
<i>Xanthorrhoea preissii</i>	10	3
<i>Jacksonia sternbergiana</i>	1	2
<i>Eucalyptus gomphocephala</i>	1	4
* <i>Avena fatua</i>	1	0.7
* <i>Ursinia anthemoides</i>	<1	0.3
<i>Podolepis canescens</i>	<1	0.2
* <i>Pelargonium capitatum</i>	<1	0.6
<i>Sowerbaea laxiflora</i>	<1	0.4
<i>Anigozanthos flavidus</i>	<1	0.2
<i>Stylidium schoenoides</i>	<1	0.3
<i>Hardenbergia comptoniana</i>	<1	Climber
<i>Petrophile linearis</i>	<1	0.3

SPECIES	% COVER	HEIGHT (M)
<i>Allocasuarina humilis</i>	<1	0.6
<i>Pimelea floribunda</i>	<1	0.5
<i>Cassytha racemosa</i>	<1	Creeper
** <i>Jacksonia sericea</i>	<1	0.2
* <i>Watsonia meriana</i> var. <i>bulbillifera</i>	<1	0.8
* <i>Briza maxima</i>	<1	0.2
<i>Daviesia decurrens</i>	<1	0.5
<i>Synaphea petiolaris</i>	<1	0.7
<i>Phyllanthus calycinus</i>	<1	0.6
<i>Lepidosperma squamatum</i>	<1	0.5

* Denotes Introduced species (weeds)

** Priority Listed taxa

QUADRAT Q6
383095E 6503937N

Woodland of *Eucalyptus gomphocephala* (to 20m in height) over a Tall Open Scrub dominated by *Xanthorrhoea preissii*, *Hibbertia hypericoides* and *Jacksonia sericea*

Condition: Very Good



QUADRAT Q6 (10x10m)

SPECIES	% COVER	HEIGHT (M)
<i>Eucalyptus gomphocephala</i>	20	20
<i>Xanthorrhoea preissii</i>	10	2.5
<i>Hibbertia hypericoides</i>	40	0.6
** <i>Jacksonia sericea</i>	5	0.3
* <i>Briza maxima</i>	<1	0.2
<i>Podolepis canescens</i>	<1	0.3
<i>Macrozamia fraseri</i>	1	0.7
<i>Hakea amplexicaulis</i>	1	1.2
* <i>Romulea rosea</i>	<1	0.02
<i>Patersonia occidentalis</i>	2	0.4
<i>Stylidium junceum</i>	1	0.3
<i>Mesomelaena pseudostygia</i>	2	0.5
<i>Thysanotus manglesianus</i>	<1	Climber
<i>Phyllanthus calycinus</i>	1	0.5
<i>Allocasuarina fraseriana</i>	1	5
<i>Desmocladus flexuosus</i>	<1	0.2
<i>Conostylis candicans</i>	<1	0.6

SPECIES	% COVER	HEIGHT (M)
<i>Stypandra glauca</i>	<1	0.3

* Denotes Introduced species (weeds)

** Priority Listed taxa

WILD 1574 UAGA
NR 13037 152.72

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WILD 1574 UAGA
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