SANDY LAKE AND ADJACENT BUSHLAND, ANKETELL

Boundary Definition: protected area/bushland taken to cadastre/conservation wetland boundary (Areas of bushland within the boundaries of the Site are not accurately mapped; Boundary proposed to be adjusted after vegetation survey and negotiations with the land owner(s) in response to a submission to draft *Perth's Bushplan.*)

SECTION 1: LOCATION INFORMATION

Bush Forever Site no. 270
Area (ha): bushland 201.4 (Site also includes open water; Proposed boundary circumscribes 181.3ha bushland.)
Map no. 65
Map sheet series ref. no. 2033–I SW
Other Names: Part Submission Area 13, part of Jandakot Regional Park
Local Authorities (Suburb): Town of Kwinana (Anketell)

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes
Bassendean Sands (Qpb: S8)
Bassendean Dunes/Pinjarra Plain
Bassendean Sands over Guildford Formation (Qpb/Qpa: S10)
Spearwood Dunes
Sands derived from Tamala Limestone (Qts: S7)
Wetlands (within the Spearwood/Bassendean Dunes interface and the Bassendean Dunes)
Holocene Swamp Deposits (Qhw: Cps, Ms5)

VEGETATION AND FLORA

Vegetation Complexes
Bassendean Dunes
Bassendean Complex — Central and South
Spearwood Dunes
Cottesloe Complex — Central and South
Floristic Community Types: *not sampled, types inferred
Supergroup 2: Seasonal Wetlands
*4 *Melaleuca preissiana* damplands
*5 Mixed shrub damplands
*11 Wet forests and woodlands
Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau
*21a Central *Banksia attenuata — Eucalyptus marginata* woodlands
*21c Low-lying *Banksia attenuata* woodlands or shrublands
*22 *Banksia ilicifolia* woodlands
*23a Central *Banksia attenuata — B. menziesii* woodlands
Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes
*28 Spearwood *Banksia attenuata* or *B. attenuata — Eucalyptus* woodlands

WETLANDS

Wetland Types: sumpland, dampland, artificial channel
Natural Wetland Groups
Bassendean Dunes
Jandakot (B.3)
Wetland Management Objectives: Conservation (127.6ha), Resource Enhancement
Swan Coastal Plain Lakes EPP: 5.4ha

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, vegetated uplands
Vegetation and Flora: limited survey (Dames and Moore 1988b, DEP 1998 (fenceline survey), Keighery, BJ, and Clarke 1999c, part Site — Bowman Bishaw Pty Ltd 1999, Hart Simpson and Associates 1989, Trudgen 1990)
Structural Units: mapping (Dames and Moore 1988b, part Site — Bowman Bishaw Pty Ltd 1999, Hart, Simpson and Associates 1989, Keighery, BJ, and Clarke 1999c, Trudgen 1990)
Uplands — Sands derived from Tamala Limestone: *Banksia attenuata* and *B. menziesii* Low Woodland to Low Open Forest, with scattered emergent *Eucalyptus gomphocephala* or *E. marginata*
Uplands — Bassendean Dunes: *Banksia attenuata* and *B. menziesii* Low Woodland to Low Open Forest, with scattered emergent *Eucalyptus marginata* and scattered *Allocasuarina fraseriana, Nuytsia floribunda* and, rarely, *Eucalyptus todtiana*; *Banksia ilicifolia, B. attenuata* and *B. menziesii* Low Woodland to Low Open Forest
Wetlands: *Melaleuca rhaphiophylla* and *Eucalyptus rudis* Low Forest to Woodland occasionally with scattered *Melaleuca preissiana* and *Banksia littoralis*; *Banksia ilicifolia* Low Woodland to Low Open Forest; *Melaleuca rhaphiophylla* Low Forest to Woodland; *Melaleuca preissiana* and *M. rhaphiophylla* Woodland with scattered *Banksia littoralis* and *Eucalyptus rudis*; Myrtaceous Closed Heaths dominated by *Pericalymma ellipticum* or *Kunzea glabrescens* and *Melaleuca thymoides*; Closed Sedgelands to Sedgelands dominated by *Baumea articulata* or *Lepidosperma longitudinale*

Scattered Native Plants: not assessed
Vegetation Condition: >80% Excellent to Very Good, <20% Good to Degraded, with areas of severe localised disturbance associated with localised clearing
Total Flora: 250 native taxa (estimated, Hart, Simpson and Associates 1989) (estimated <70% expected flora)
Significant Flora: *Aotus cordifolia* (3); *Dielsia stenostachya*
Fauna: limited survey for birds (29 species), native mammals (2 species), reptiles (7 species) and amphibians (1 species) (Hart, Simpson and Associates 1989). Significant bird species: category 3 (3) and category 4 (3). Significant mammal species: Quenda
Linkage: adjacent bushland to the south (across road), east and west (Site 269, across freeway); part of Greenway 97 (Tingay, Alan & Associates 1998a); part of a regionally significant fragmented bushland/wetland linkage (Part A, Map 7)
Other Special Attributes: part included in Jandakot Botanic Park Proposal (MfP 1995); one of the few bushland areas in the Perth Metropolitan Region spanning the Spearwood/ Bassendean Dune interface as well as including near–pristine wetlands associated with the Bassendean Dunes

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, Diversity, General criteria for the protection of wetland, streamline and estuarine fringing vegetation and coastal vegetation
Recommendation: Part A: Site with Some Existing Protection; the care, control and management of this portion of this Site for conservation purposes within Jandakot Regional Park is endorsed. Part B: Strategic Negotiated Planning Solution. Part C: Proposed Parks and Recreation Reservation (see Table 3, Volume 1).

SANDY LAKE AND ADJACENT BUSHLAND, ANKETELL

Boundary Definition: protected area/bushland taken to cadastre/conservation wetland boundary

SECTION 1: CADASTRAL INFORMATION

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

Bushplan Site no. 270 **Map no.** 81 **Map sheet series ref. no.** 2033–I SW

Other Names
Part Submission Area 13

Local Authorities (Suburb)
Town of Kwinana (Anketell)

Ownership Categories
Private (including commercial organisation), State Government

Area (ha): total 228.4 (includes open water); bushland 201.4

Zoning
MRS: Parks and Recreation, Rural, Rural-Water Protection, Important Regional Roads, Controlled Access Highways
TPS: Rural A, Park Recreation and Drainage, Landscape

Lot/Location/Reserve numbers (Purpose), Street name
5, 8, 9 Thomas Rd; 12, 13, 14, 100, 1190, 1191, 1192, 1193, 1194, 1195, 1196, 1197, 1198 Treeby Rd; 10 street not identified

SECTION 2: REGIONAL INFORMATION

LANDFORMS AND SOILS

Bassendean Dunes
Bassendean Sands (Qpb: S8)

Bassendean Dunes/Pinjarra Plain
Bassendean Sands over Guildford Formation (Qpb/Qpa:S10)

Spearwood Dunes
Sands derived from Tamala Limestone (Qts: S7)

Wetlands (within the Spearwood/Bassendean Dunes/Pinjarra Plain)
Holocene Swamp Deposits (Qhw: Cps, Ms5)

VEGETATION AND FLORA

Vegetation Complexes

Bassendean Dunes
Bassendean Complex — Central and South

Spearwood Dunes
Cottesloe Complex — Central and South

Floristic Community Types: *not sampled, types inferred

Supergroup 2: Seasonal Wetlands
*5 Mixed shrub damplands
*11 Wet forests and woodlands

Supergroup 3: Uplands centred on Bassendean Dunes and Dandaragan Plateau
*21a Central *Banksia attenuata* — *Eucalyptus marginata* woodlands
*23a Central *Banksia attenuata* — *B. menziesii* woodlands

Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes
*28 Spearwood *Banksia attenuata* or *B. attenuata* — *Eucalyptus* woodlands

WETLANDS

Wetland Types: sumpland, dampland, artificial channel

Natural Wetland Groups

Bassendean Dunes
Jandakot (B.3)

Wetland Management Objectives: Conservation (63.4ha)

Swan Coastal Plain Lakes EPP: 5.4ha

THREATENED ECOLOGICAL COMMUNITIES

Not assessed

SECTION 3: SPECIFIC SITE DETAIL

Landscape Features: open water, vegetated wetland, vegetated uplands

Vegetation and Flora: limited survey (Dames and Moore 1988b, DEP 1998 fenceline survey; part Bushplan Site — Hart Simpson and Associates 1989, Trudgen 1990)

Structural Units: mapping (Dames and Moore 1988b, part Bushplan Site — Hart Simpson and Associates 1989, Trudgen 1990)

Uplands — Sands derived from Tamala Limestone: *Banksia attenuata* and *B. menziesii* Low Woodland to Low Open Forest, with scattered emergent *Eucalyptus gomphocephala* or *E. marginata*.

Uplands — Bassendean Dunes: *Banksia attenuata* and *B. menziesii* Low Woodland to Low Open Forest, with scattered emergent *Eucalyptus marginata* and scattered *Allocasuarina fraseriana, Nuytsia floribunda* and rarely, *Eucalyptus todtiana*

Wetlands: *Melaleuca rhaphiophylla* and *Eucalyptus rudis* Low Forest to Woodland occasionally with scattered *Melaleuca preissiana* and *Banksia littoralis*; *Melaleuca preissiana* and *M. rhaphiophylla* Woodland with scattered *Banksia littoralis* and *Eucalyptus rudis*; Myrtaceous Closed Heaths dominated by *Kunzea ericifolia* and *Melaleuca thymoides*; Closed Sedgelands to Sedgelands dominated by *Baumea articulata* or *Lepidosperma longitudinale*

Scattered Native Plants: not assessed

Vegetation Condition: >80% Very Good to Excellent, <20% Good to Degraded, with areas of severe localised disturbance associated with localised clearing

Total Flora: 250 native taxa (estimated from Hart, Simpson and Associates 1989, expected to be >80% flora)

Significant Flora: none recorded

Fauna: limited survey by Hart, Simpson and Associates (1989) for birds (29), native mammals (2), reptiles (7) and amphibians (1). Significant bird species: category 3 (3) and category 4 (3). Significant mammal species: Quenda

Linkage: adjacent bushland to the south (across road), east and west (BS269, across freeway); part of proposed Greenway 110 (Tingay, Alan & Associates 1997a); part of a regionally significant fragmented bushland/wetland linkage (Volume 2A, Map 8)

Other Special Attributes: part included in Jandakot Botanic Park Proposal (MfP 1995)

SECTION 4: INTERNATIONAL AND NATIONAL SIGNIFICANCE

Not listed

SECTION 5: SELECTION CRITERIA AND RECOMMENDATIONS

Criteria: Representation of ecological communities, Rarity, General criteria for the protection of wetland, streamline and estuarine fringing and coastal vegetation

Opportunities and/or Constraints

Opportunities: Bushplan Site/part Bushplan Site subject to Swan Coastal Plain Lakes EPP, Peel-Harvey Estuary EPP/SPP; location of conservation category wetlands; under MRS Parks and Recreation Reservation and TPS Landscape Zoning

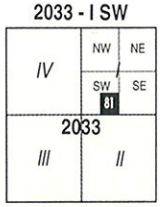
Constraints: private land; under MRD regional road requirements, General Mineral Resource Area (sand)

Recommendation: The care, control and management of this Bushplan Site for conservation purposes within Jandakot Regional Park is endorsed.

LEGEND

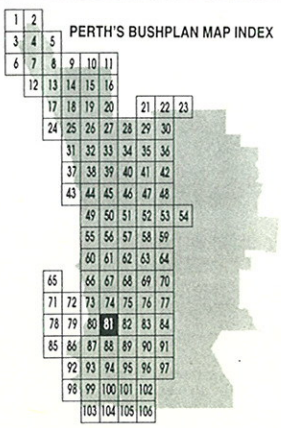
- **472** — Bushplan Sites With Regionally Significant Bushland
- Other Native Vegetation
- Conservation Category Wetlands
- Bushplan Sites With Some Existing Protection
- *696* — Lot Number, Location Number
- Channel Wetlands
- Local Government Boundary

2033 - I SW



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

PERTH'S BUSHPLAN MAP INDEX



N

SCALE

0 500 1000

Metres

Produced by Project Mapping Section Land Information Branch, Ministry for Planning, Perth W.A. November 1998

ntw-map9//environ/bushplan//bushv2_81.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

Bushplan Site Map

Map 81

BUSHPLAN SITES CORRECTED

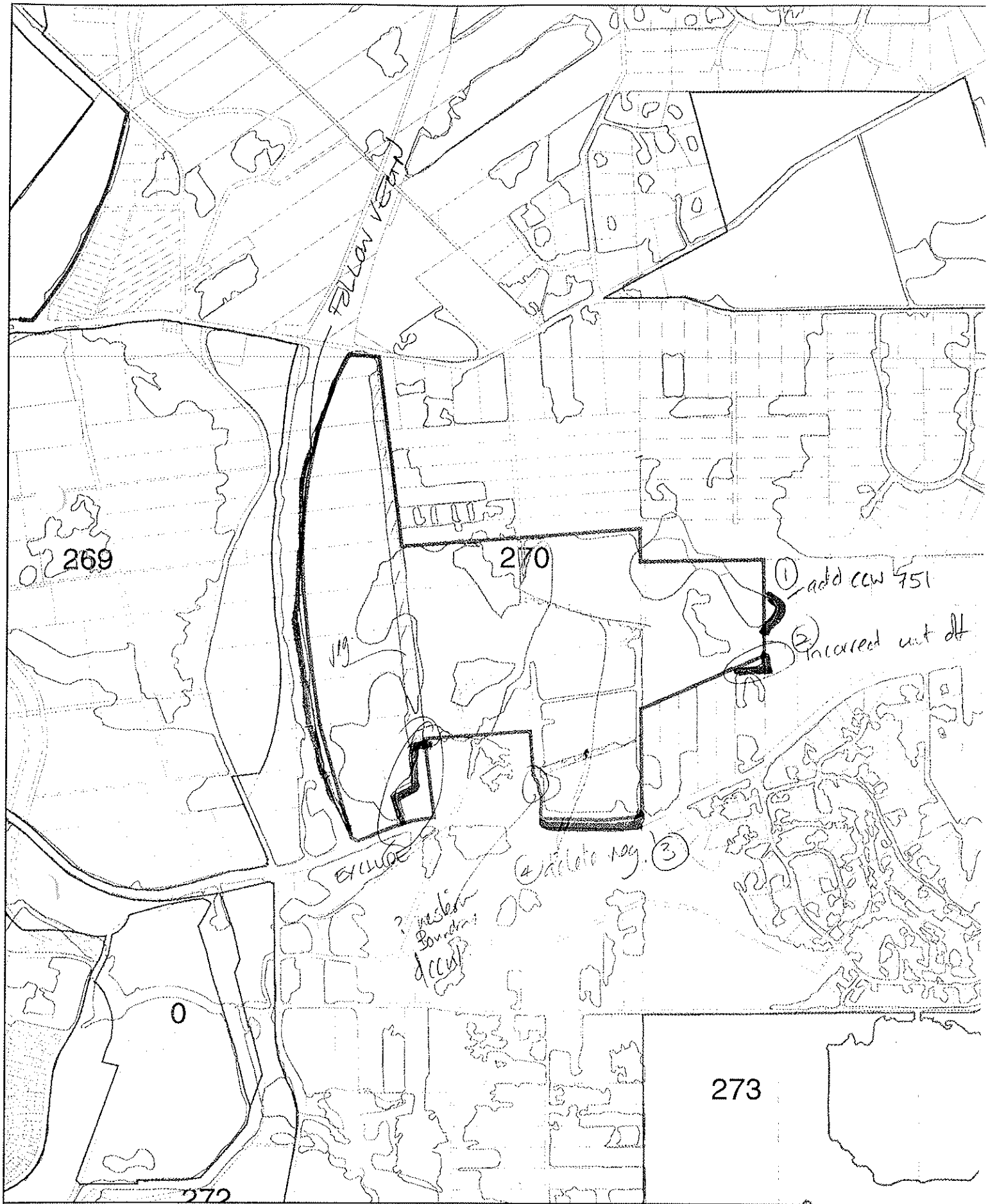
THE GOVERNMENT OF WESTERN AUSTRALIA

WESTERN AUSTRALIAN PLANNING COMMISSION

CUSTOMER FOCUS WESTERN AUSTRALIA

Follow Par. 6 Dec 28/

N



BUSHPLAN SITES CORRECTED

WESTERN AUSTRALIAN PLANNING COMMISSION

CUSTOMER FOCUS

CF/NT

① more W + S Boundary to include road reserve

② inc #751 easter lot

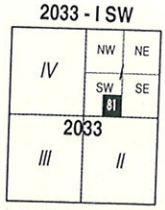
WA 3166(C) METRO REGIONAL AREA & EXT. RUN 10 (5001-5087) 1:20000 11-DEC-92 920676

BJK 11/2/2000

LEGEND

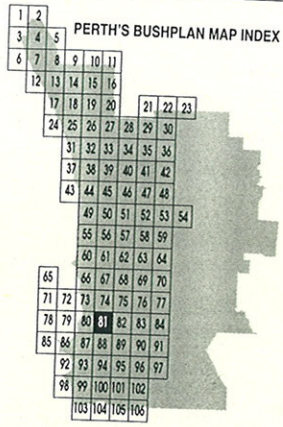
- 472 — Bushplan Sites With Regionally Significant Bushland
- Other Native Vegetation
- Conservation Category Wetlands
- Bushplan Sites With Some Existing Protection
- 696 — Lot Number, Location Number
- Channel Wetlands
- Local Government Boundary

2033 - I SW



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

PERTH'S BUSHPLAN MAP INDEX



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SCALE

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Metres

Produced by Project Mapping Section Land Information Branch, Ministry for Planning, Perth W.A. November 1998

ntw-map9//environ/bushplan//bushv2_81.dgn

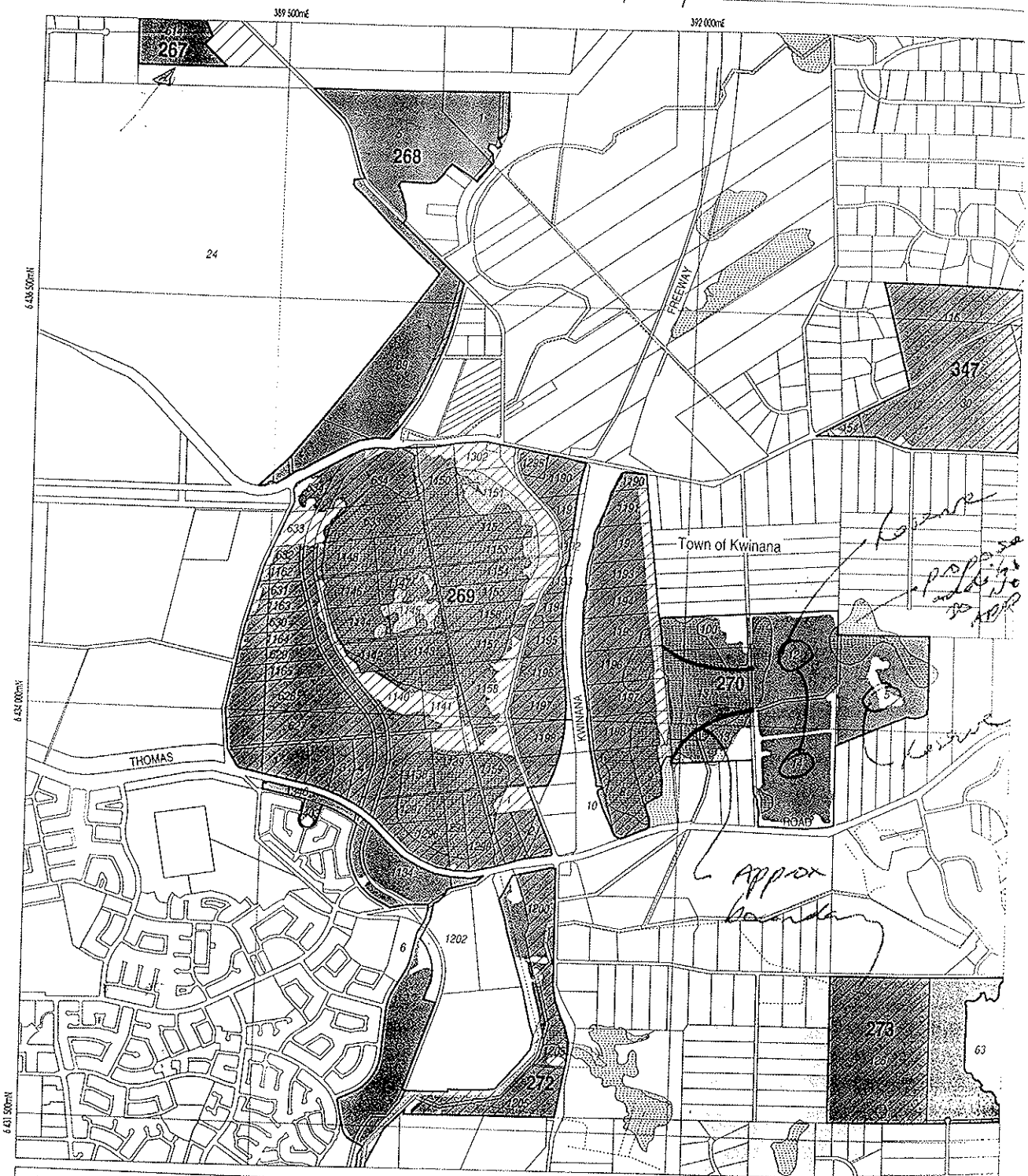
Cadastral Data supplied by Department of Land Administration, W.A.

Wetlands Data supplied by Water and Rivers Commission

Native Vegetation Extent for Study Area supplied by Agriculture Western Australia

Bushplan Site Map

BJK 11/2/2000



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

2033 - I SW

IV	NW / NE	
	SW (81) / SE	
III	2033	II

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

PERTH'S BUSHPLAN MAP INDEX

N

SCALE

0 500 1000

Metres

Produced by Project Mapping Section
Land Information Branch, Ministry for Planning, Perth W.A. November 1998

nlw-map9//environ/bushplan//bushv2_81.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

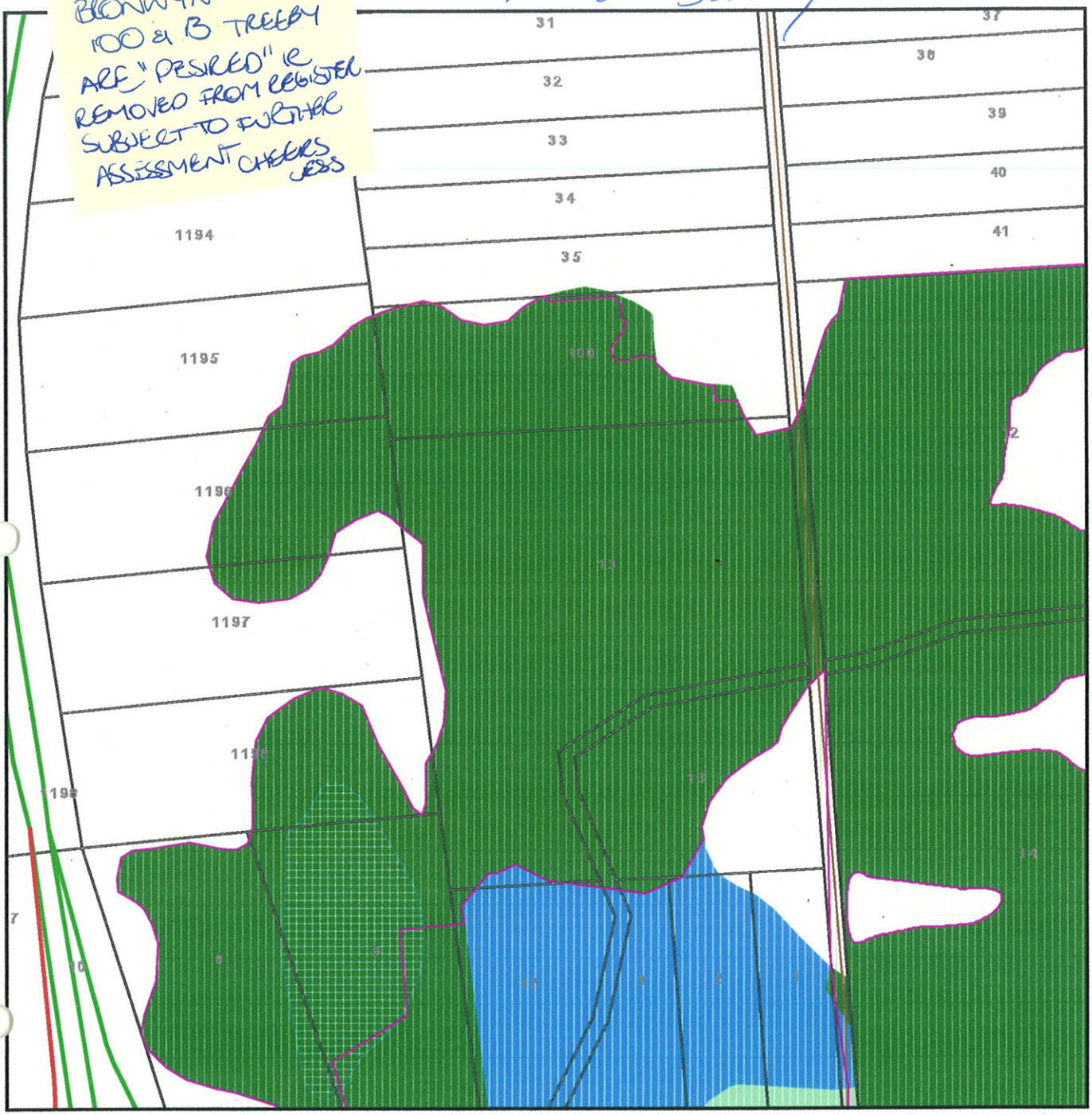
Bushplan Site Map

3166(C) METRO REGIONAL AREA & EXT. RUN 10 (5001-5087) 1:20000 11-DEC-92 920676

area could.
be continued to
be left out

Enquiry to Jessica about current state and EPP at Sandy Lake

BRONWYN - LOTS 100 & 13 TREEBY ARE "DESIRED" IE REMOVED FROM REGISTER SUBJECT TO FURTHER ASSESSMENT CHEERS JESS



LEGEND

- Desired Revised Register
- Freeway
- Local Rd - Sealed
- Main Road
- Cadastre - DLI 1/09/04
- Cadastre, Land Tenure - DLI 1/9/04
- - Freehold
- - Public Roads
- - Lot No Annotation
- - Other Annotation
- EPP, Lakes - DEP 28/07/03
- Conservation
- Multiple Use
- Resource Enhancement

N

0 ~250 m

Scale 1:8,447
(Approximate when reproduced at A4)

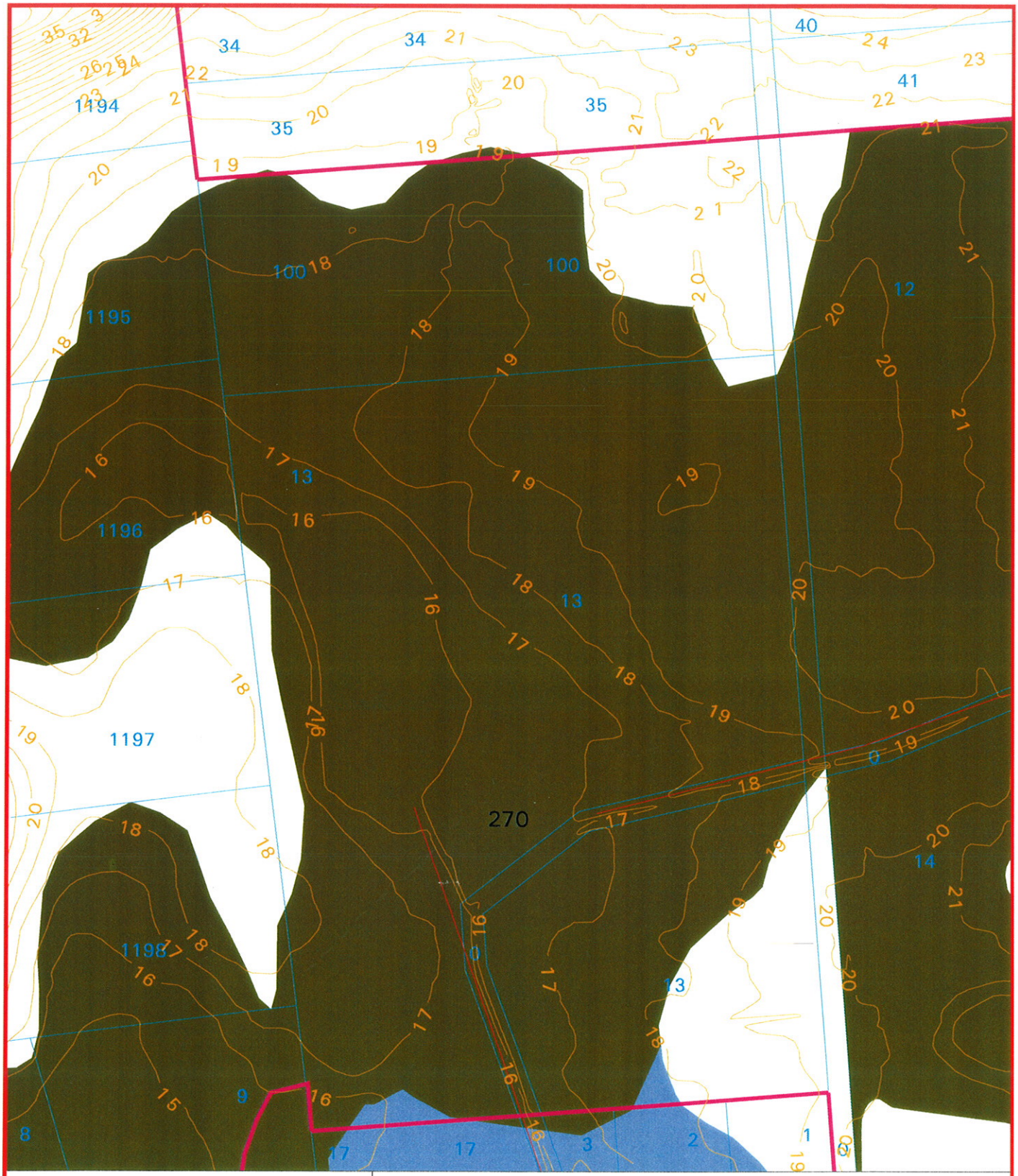
Geocentric Datum of Australia 1994

Note: the data in this map have not been projected. This may result in geometric distortion or measurement inaccuracies.

Prepared by: DorricJ
Prepared for:
Date: Wednesday, 24 November 2004 15:44

Information derived from this map should be confirmed with the data custodian acknowledged by the agency acronym in the legend.

Department of Environment



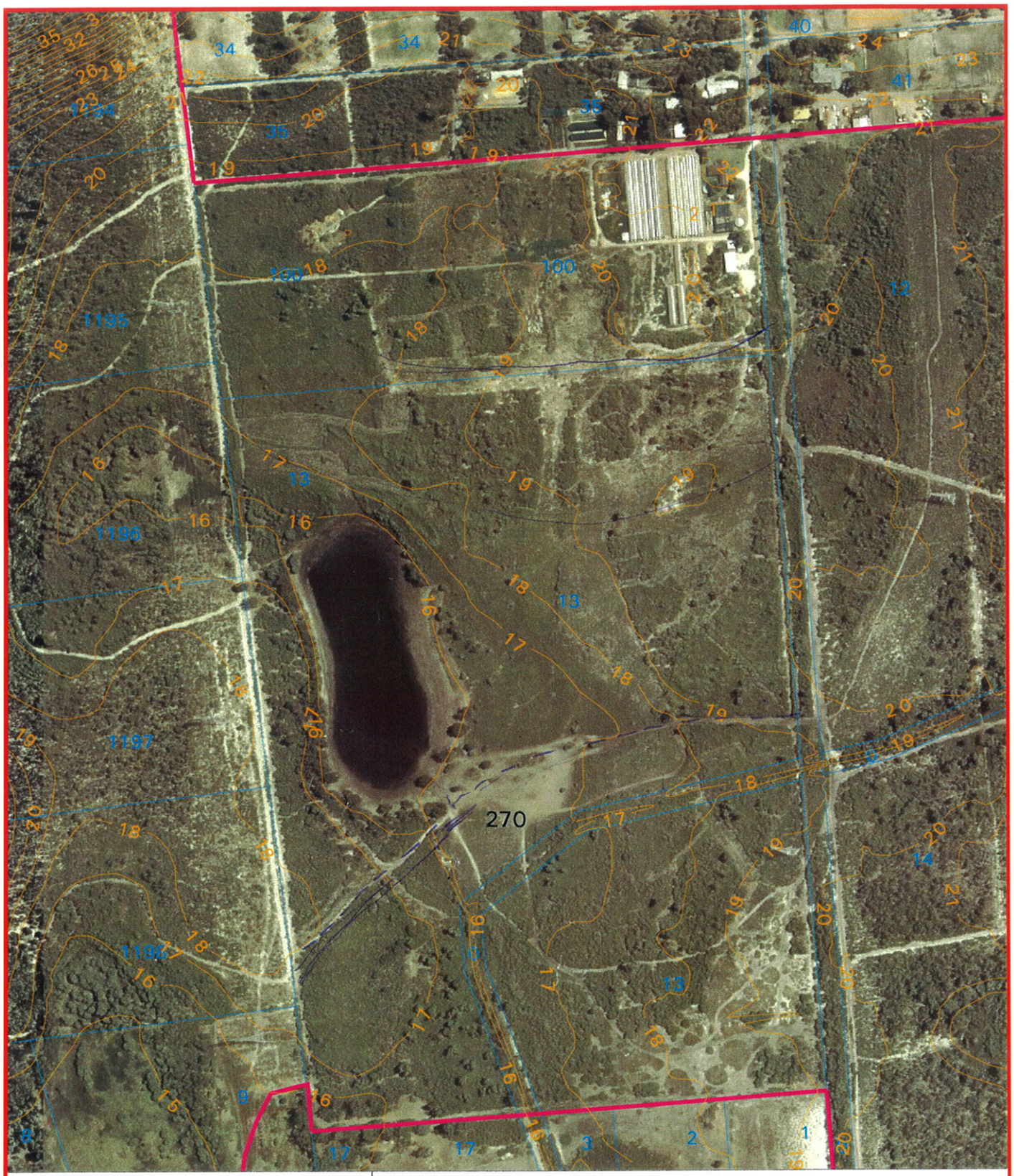
BS 270

Lots 13 & 100
Treeby Rd, Anketell
Wetland Mapping

MFP INTERNAL USE ONLY
Prepared By: Sean Collingwood
Prepared For: SPC
Map Ident: plot010510_2
Date: 10 May 2001
Scale 1:5000

- Cadastre with Lot Numbers Blue - Overlay Images
- Contours - 1m (DOLA)
- ARTIFICIAL CHANNELS
- Bush Forever 2000 - Site Boundaries
- Conservation
- Multiple Use

5273 WA 3169(C) METRO REGIONAL AREA & EXT. RUN 11 (5233-5311) 1:20000 15-DEC-



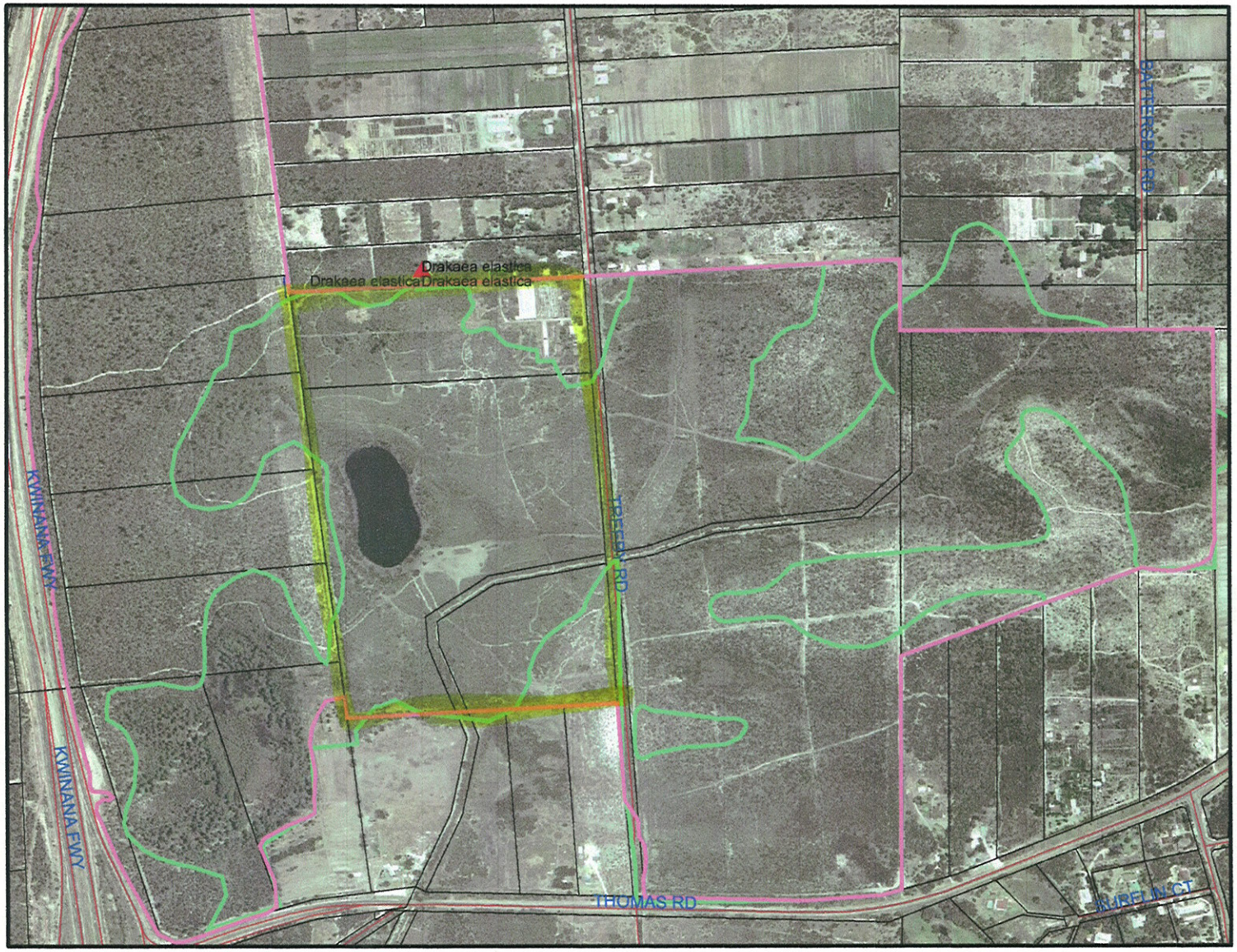
BS 270
Lots 13 & 100
Treeby Rd, Anketell
Aerial 2000

MFP INTERNAL USE ONLY
Prepared By: Sean Collingwood
Prepared For: SPC
Map Ident: plot010510_1
Date: 10 May 2001
Scale 1:5000

Cadastre with Lot Numbers Blue - Overlay Images

Contours - 1m (DOLA)

Bush Forever 2000 - Site Boundaries



LEGEND

- Road Centrelines - DLI 1/5/04
- Cadastre - DLI 1/09/04
- Swan Coastal Plain North 1m Orthomosaic DLI 01/04
- Declared Rare and Priority Flora List - CALM 13/08/03
  - 1
  - 2
  - 3
  - 4
  - R
  - X
- Threatened Ecological Communities - CALM 15/7/03
- EPP, Wetlands 2004 (DRAFT) - DOE 21/7/04
- Bushforever - MFP 07/01

N

0 ~300 m

Scale 1:11679
(Approximate when reproduced at A4)

Geocentric Datum Australia 1994

Note: the data in this map have not been projected. This may result in geometric distortion or measurement inaccuracies.

Prepared by: brundrm
Prepared for:
Date: 25/02/2005 3:41:46 PM

Information derived from this map should be confirmed with the data custodian acknowleged by the agency acronym in the legend.

Department of Environment

9 Site visit 28-2-05

BS 270
Aerial 2000

Cadastre with Lot Numbers Blue - Overlay Imag

Contours - 1m (DOLA)

Bush Forever 2000 - Site Boundaries

HOPE VALLEY RD

ANKETELL RD

BATTERSBY RD

TREEBY RD

THOMAS RD

ROCKINGHAM-ARMADALE RD

HENSON PDE

269

270

272

Map Ident:	plot010510_2
Prepared By:	Sean Collingwood
Prepared For:	SPC
Date:	10 May 2001
Scale	1:10000
0	250 m

MFP INTERNAL USE ONLY

BS 270
Wetland Mapping

Cadastre with Lot Numbers Blue - Overlay Imag
Contours - 1m (DOLA)
ARTIFICIAL CHANNELS
Bush Forever 2000 - Site Boundaries
Conservation
Multiple Use
Resource Enhanced

HOPE VALLEY RD
ANKETELL RD
TREEBY RD
BATTERSBY RD
JOHNSON RD
THOMAS RD
ROCKINGHAM-ARMADALE RD
269
270
272

Map Ident: plot010510_3
Prepared By: Sean Collingwood
Prepared For: SPC
Date: 10 May 2001
Scale 1:10000
0 250 m

bp site 270

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

0 — 500 m

- AG VEG 1998 BOUNDARY THEME
- Cadastre
- Bushplan sites refno 1-500 SCP BOUNDARY THEME
- cons category wetlands
- Verified CCWs

CCWs. – 750 ok. vegetated inclusion
– 749 partial inclusion (+)
– 751 - included (part of strip) note not mapped as vegetation by AgWA or bushland by MFP.

BS 270 Lots 12, 14 edge 5

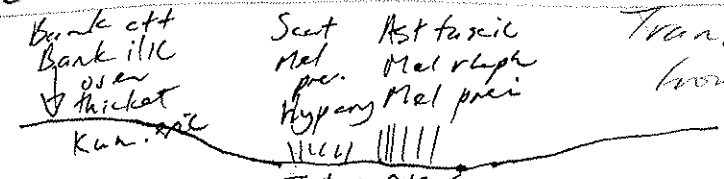
12/10/79

(5) Bank il >70% over > 70% Peri elip.

(6) Mel prei scat over > 70% Peri elip
1-2m over Trit. neesii 10-20%
· Rest. skeu

Lot 100/13

(7)



All veg rolled
Hyp. Les.
· patches of weeds not Lotus, cyper Weed,

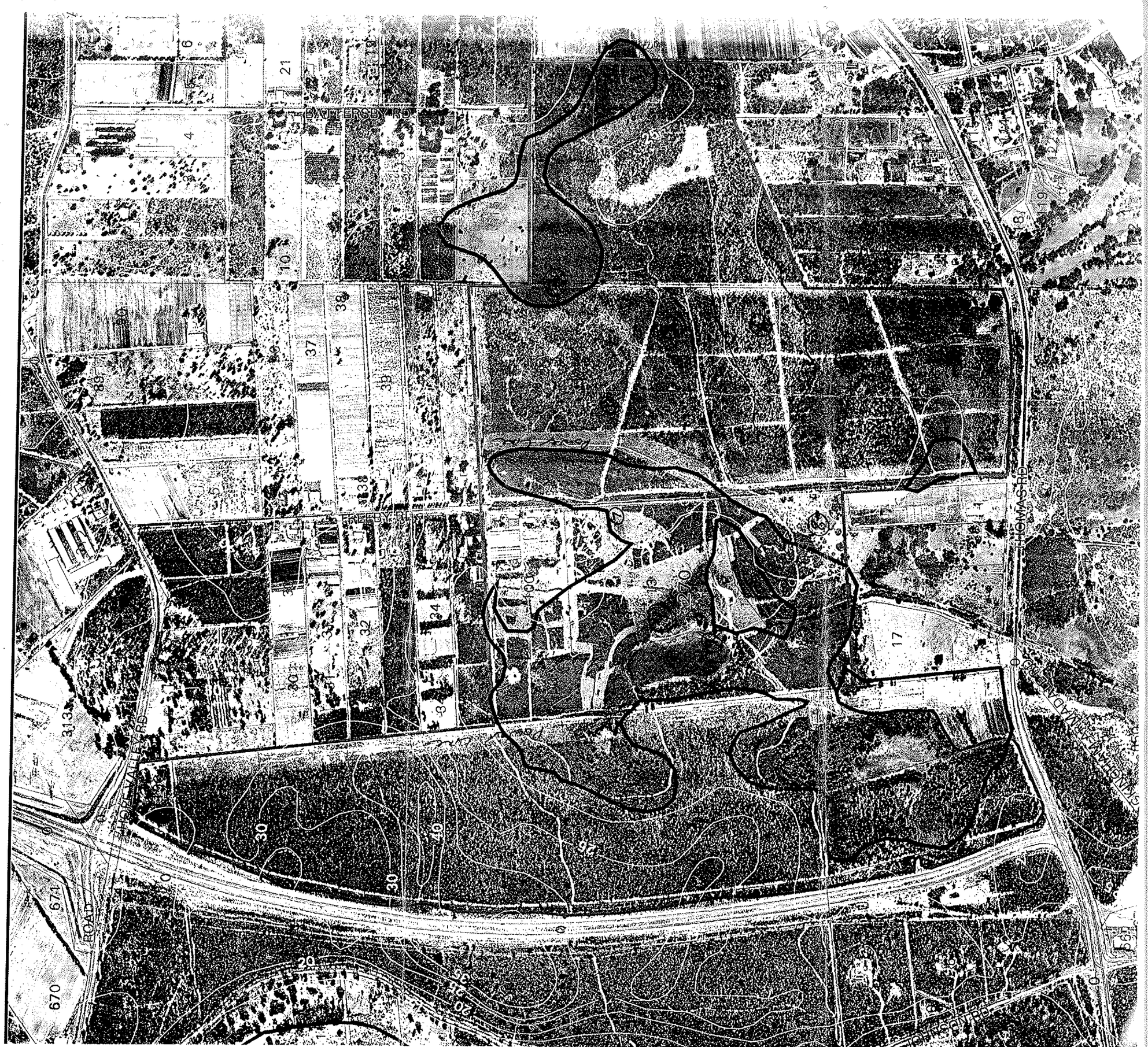
(8) Kunzea over pasture
ericifolia

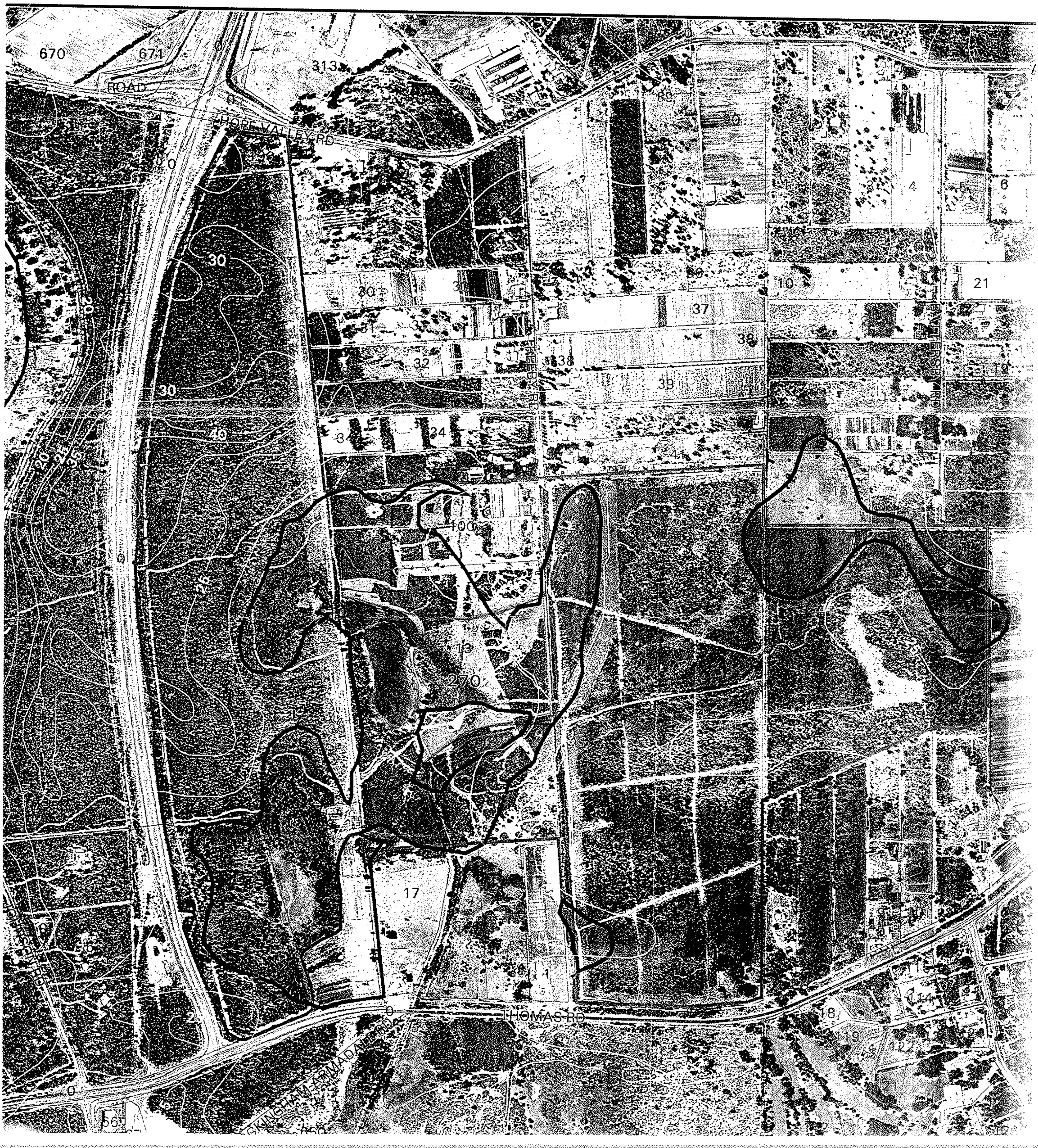
(9) Paral Lake Eun nees / Mel prei
side = (7) patches much weedier.

12/10/99

Issues

- vegetation gaps




HOPE VALLEY RD
ROAD
BATTERSBY RD
FREEBY RD
THOMAS RD
JOHNSON RD
670
671
313
17
30
40
20
26
270

Subm 225

BS 270

93

PBO 93

Bushplan Site [redacted]:

I recommend extension of this site to include Part Lot 21 and Part Lot 60 on the Norman Road Bushland.

Bushplan Site [redacted]:

Wetland type bushland on the adjoining Lot 4 is threatened and should be included in that site.

Bushplan Site [redacted]:

This site includes the Modong Nature Reserve at Oakford and I recommend that it be extended to include good quality bush on Lots 22 and 23.

Bushplan Site [redacted]:

This site includes Sandy Lake and Bushland at Anketell. I particularly suggest inclusion of Lots 5, 12, 13 & 14 adjacent to this site (good quality Banksia Woodland).

Bushplan Site [redacted]:

I recommend the inclusion of the vegetated north east corner of part lot 40 Taylor Road, Forrestdale (near the corner of Armadale and Taylor Roads).

I thank you for the opportunity to comment on the Bushplan strategy.

Yours faithfully

JEFF A SPENCER.

DEP SYSTEM 6 UPDATE SUBMISSION SURVEY SHEET B.J. KEIGHERY 2/96

BUSHLAND AREA BS 270 Lots 12k **SITES** 4, edge 5 YES/NO

DATE 12/10/99 **RECORDERS** BJK

Observations edge (transects)

Geographic Location	Latitude	S Longitude	E

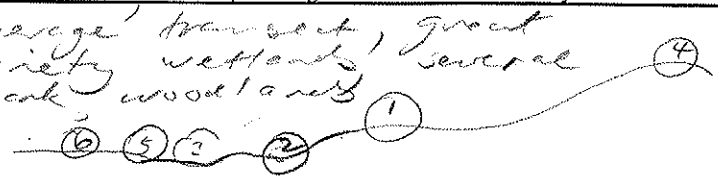
Reference Map

Photograph	Photographer's Name BJK	Photo No

Transect of landscape units (draw in transect incorporating features listed and any other relevant unit)

dunes
dry/wet flats
sumplands
uplands
type

(Average transect) Great Variety wetlands / several Bank woodlands



Soil - surface			**sub -soil**
Exposed rock	type	% area	

FLORA/VEGETATION (list dominant and significant plants below, see over for vege association descriptions)

Eucalypts	*E. calophylla*	*E. wandoo*	*E. marginata*	*E. todtianna*	*E. rudis*	
	E. decipiens	*E. drummondii*	*E. haematoxylon*	*E. lanepoolei*	*E. gomphocephala*	
	E. accedens	*E. patens*	*E. laeliae*	*E. megacarpa*		
Sheoaks	*Allocasuarina fraserana*		*Casuarina obesa*			
Banksia	*B.attenuata*	*B. menziesii*	*B. prionotes*	*B. illicifolia*	*B. grandis*	*B. littoralis*
Melaleuca	*M. preissii*	*M. rhaphiophylla*	*M. lanceolata*		*M. cuticularis*	
Others	*Callitris preissii.*					
Mallees	Eucalypts	*E. argutifolia*	*E. petrensis*	*E. decurva*	*E. foecunda*	*E. latens*
SIGNIFICANT SPECIES						
Acacia cochlearis						
						(see over for vegetaion descriptions)

Vegetation Condition - Keighery 1994 (Trudgen 1993) (show range and indicate predominant class)

1 = 'Pristine' (Excellent)
2 = Excellent (Very Good) Mostly excellent some patches
3 = Very Good (Good)
4 = Good (Poor)
5 = Degraded (Very Poor)
6 = Completely Degraded

Specific aspects of disturbance

partial clearing tracks, electricity line

weeds (list):

selective removal of species: timber cutting mowing fire grazing dieback %area

fire frequency: apparently frequent < 5yrs

'enrichment plantings' (list) NA

animal impact: horse foxes rabbits cats dogs goats pigs overgrazing by native mammals

soil movement: mining dumping rubbish dumping roadworks

changes in water regimes: flooding drainage watering nutrient influx

Tracks: fire breaks walk trails off road vehicle use animal tracks

Service corridors: SEC Main Roads Water Authority. Telecom

Other very old drain revegetated, blocked and does not flow.

Sites 1 – 6

Same Sheet (1, 2, 3, 4) } See data sheets

Lot 14 5. Banksia ilicifolia > 70% over
> 70% Peri. ellip. (1-2M) Excellent cond
Humus rich black/grey sand.

Lot 14 6. Satur. Mel pnei over > 70%
Peri ellip (1-2m) over Trit. neesii
10 – 30% Excellent Cond.
Humus rich black/grey Sand.
Patches Restio Stenostachyus.

Lots 100/13

(7) (8) (9) } see notes back of map.

VOL 2 DESCRIPT: (updated)

DEP SYSTEM 6 UPDATE SUBMISSION SURVEY SHEET B.J. KEIGHERY 2/96

BUSHLAND AREA SANDY LAKE BS270 **SITES** YES/NO (NO circled)

DATE 9.1.98 **RECORDERS** CO... BRONWEN K

Observations edge transects

Geographic Location Latitude	S Longitude	E
Reference Map		(A) = TRACK E+N = 5+6
Photograph Photographer's Name	Photo No	(B) 7

Transect of landscape units (draw in transect incorporating features listed and any other relevant unit)

dunes
dry/wet flats
sumplands
uplands
type

N (A) (B) (D) (C) S

Soil - surface	**sub -soil**
Exposed rock type	% area

FLORA/VEGETATION (list dominant and significant plants below, see over for vege association descriptions)

Eucalypts	*E. calophylla*	*E. wandoo*	*E. marginata*	*E. todtianna*	*E. rudis*	
	E. decipiens	*E. drummondii*	*E. haematoxylon*	*E. lanepoolei*	*E. gomphocephala*	
	E. accedens	*E. patens*	*E. laeliae*	*E. megacarpa*		
Sheoaks	*Allocasuarina fraserana*		*Casuarina obesa*			
Banksia	*B.attenuata*	*B. menziesii*	*B. prionotes*	*B. illicifolia*	*B. grandis*	*B. littoralis*
Melaleuca	*M. preissii*	*M. rhaphiophylla*	*M. lanceolata*		*M. cuticularis*	
Others	*Callitris preissii.*					
Mallees	Eucalypts	*E. argutifolia*	*E. petrensis*	*E. decurva*	*E. foecunda*	*E. latens*
SIGNIFICANT SPECIES						
Lepidosperma longitudinale						
Some lovely tall Mel. preissiana						
(see over for vegetaion descriptions)						

Vegetation Condition - Keighery 1994 (Trudgen 1993) (show range and indicate predominant class)

1 = 'Pristine' (Excellent)
2 = Excellent (Very Good)
3 = Very Good (Good) — EXCELLENT to VG with some local
4 = Good (Poor) — disturbance
5 = Degraded (Very Poor) — 85%
6 = Completely Degraded

Specific aspects of disturbance

partial clearing

weeds (list):

@ (C) + (D)

selective removal of species: timber cutting mowing fire grazing dieback %area

fire frequency:

'enrichment plantings' (list)

animal impact: horse foxes rabbits cats dogs goats pigs overgrazing by native mammals

soil movement: mining dumping rubbish dumping roadworks

changes in water regimes: flooding drainage watering nutrient influx

Tracks: fire breaks walk trails off road vehicle use animal tracks

Service corridors: SEC Main Roads Water Authority. Telecom

Other

LOOK UP TRANSMISSION LINE REPORT

LIFE FORM/HEIGHT CLASS	CANOPY COVER			
	DENSE 70-100%	MID-DENSE 30-70%	SPARSE 10-30%	VERY SPARSE 2-10%
Trees >30m Trees 15-30m Trees 5-15m Trees <5m	Dense Tall Forest Dense Forest Dense Low Forest A Dense Low Forest B	Tall Forest Forest Low Forest A Low Forest B	Tall Woodland Woodland Low Woodland A Low Woodland B	Open Tall Woodland Open Woodland Open Low Woodland A Open Low Woodland B
Mallee tree form Mallee shrub form	Dense Tree Mallee Dense Shrub Mallee	Tree Mallee Shrub Mallee	Open Tree Mallee Open Shrub Mallee	Very Open Tree Mallee Very Open Shrub Mallee
Shrubs >2m Shrubs 1.5-2.0m Shrubs 1.0-1.5m Shrubs 0.5-1.0m Shrubs 0.0-0.5m	Dense Thicket Dense Heath A Dense Heath B Dense Low Heath C Dense Low Heath D	Thicket Heath A Heath B Low Heath C Low Heath D	Scrub Low Scrub A Low Scrub B Dwarf Scrub C Dwarf Scrub D	Open Scrub Open Low Scrub A Open Low Scrub B Open Dwarf Scrub C Open Dwarf Scrub D
Mat plants Hummock Grass Bunch grass >0.5m Bunch grass <0.5m Herbaceous spp.	Dense Mat Plants Dense Hummock Grass Dense Tall Grass Dense Low Grass Dense Herbs	Mat Plants Mid-Dense Hummock Grass Tall Grass Low Grass Herbs	Open Mat Plants Hummock Grass Open Tall Grass Open Low Grass Open Herbs	Very Open Mat Plants Open Hummock Grass Very Open Tall Grass Very Open Low Grass Very Open Herbs
Sedges >0.5m Sedges <0.5m	Dense Tall Sedges Dense Low Sedges	Tall Sedges Low Sedges	Open Tall Sedges Open Low Sedges	Very Open Tall Sedges Very Open Low Sedges
Ferns Mosses, liverwort	Dense Ferns Dense Mosses	Ferns Mosses	Open Ferns Open Mosses	Very Open Ferns Very Open Mosses

VEGETATION (describe each unit of vegetation using dominants and life form/height class and canopy cover according to the Muir codes above)

(A) Lepidosperma longitudinale (60 – 1·1m) 90% in dense [illegible]

Melaleuca ericifolia (6-10m) 2-5%

Astroloma ciliatum (60 – 100) 15% patchy.

Euc. todtiana – occ

Nuyt. floribunda – occ

Xanthorrhoea preissii (5m) 10% patchy

→ Occasional patches of Banksia attenuata 6m

→ Jarrah > – 10m = Woodland CONDN: VG

(B) Patches of Eucalyptus rudis (10m)

Euc. marginata.

B. ilic.

Melaleuca preissiana

Allocasuarina fraseriana

CONDN: EXCEL to V. GOOD

– dense understorey of Banksia sp. >70%

Melaleuca lateritia

Melaleuca teretifolia

Lepidosperma longitudinale (1·1m) 15%-70% patchy

(D) Banksia attenuata (10m) }

B. ilicifolia (6-7m) } = 30%

B. menziesii (6-7m) }

v occ scattered Euc. todtiana

and sedgeland dominated by Lepidosperma longitudinale, Hypocalymma robustum, Verticordia plumosa

CONDITION = EXCELLENT

Fauna comments noisy Phebalium squamulosum

(C) = BANKSIA WOODLAND

Adjacent bushland (refer to aerial photograph)

(C) Xanthorrhoea preissii, Melaleuca thymoides & Banksia ilicifolia

CONDN: EXCELLENT

BUSHLAND PLANT SURVEY RECORDING SHEET 1- use pencil only

BUSHLAND AREA GS 270 SITE NUMBER Lot 12-1

DATE TRIP 12/10/1999 RECORDERS BJK Lot 12/5-3

DATE TRIP _____ RECORDERS _____

DATE TRIP _____ RECORDERS _____

BOTANIST _____

From '*Bushland Plant Survey*' written by B. Keighery (1994) and published by the Wildflower Society of WA (Inc.), PO Box 64 Nedlands WA 6008.

1. LOCATION of the QUADRAT

Mud Map Draw a sketch of the location of the site below.

N

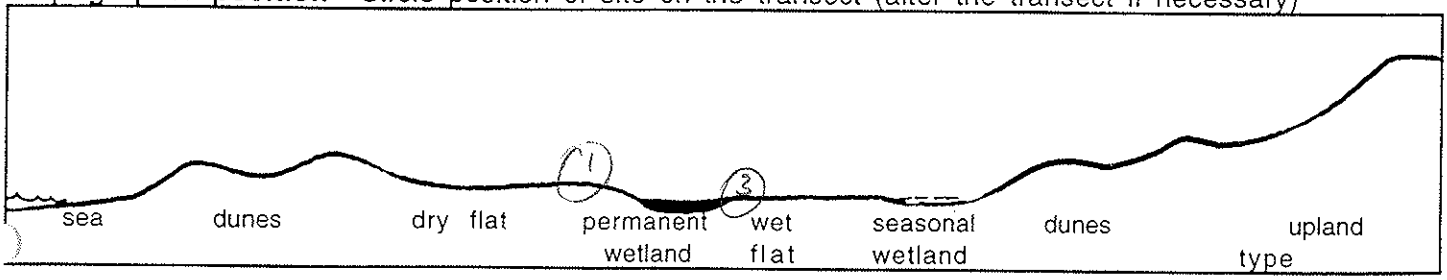
Road Location

Geographic Location Latitude S Longitude E Altitude

Reference Map

Photograph Photographer's Name BJK Photo No

Topographic position Circle position of site on the transect (alter the transect if necessary)



2. SITE DATA Circle the correct response.

Slope flat gentle steep ***Aspect*** N NE E SE S SW W NW

Surface Soil ***Colour***

Exposed rock ***type*** % surface

Sub-surface Soil ***Colour***

Rock ***type*** depth to rock

Drainage well mod poor depth water cm ***Wet*** all year winter/spring

Litter % cover

Depth cm

Bare Ground %cover

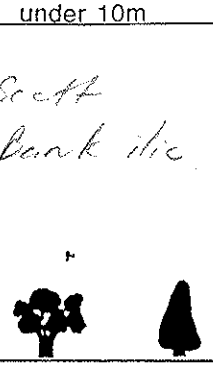
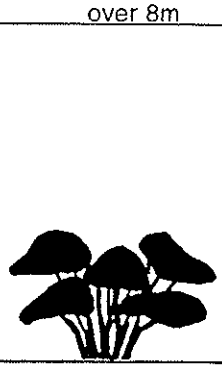
BUSHLAND PLANT SURVEY RECORDING SHEET 2 - use pencil only

3. VEGETATION STRUCTURE AND COVER

From '*Bushland Plant Survey*' written by B. Keighery (1994) and published by the Wildflower Society of WA (Inc.), PO Box 64 Nedlands WA 6008.

For each layer **record** - appropriate **life form**, **cover class** (see below).and **dominant species** in each layer.

Cover Class	2-10%	10-30%	30 - 70%	over 70%

	TREES			MALLEES	
	over 30m	10 - 30m	under 10m	over 8m	under 8m
LIFE FORM		Scat Jarrah 	Scatt Bank ilic 		30m 10m 
COVER CLASS (%)			10 - 30		
DOMINANT SPECIES			Bank ctt Bank mear		

	SHRUBS		SHRUBS
	over 2m	2m - 1m	under 1m
LIFE FORM	clear wetlands to increase. 	patchy 	Sig taxa - Jack, grevilleas 2m 1m 
COVER CLASS (%)	Patches to 70%	30 - 70%	
DOMINANT SPECIES	Kunz spec.	Mel. thymoides	Xanth. preissii Hib. racemosus Bos ono

	GRASSES	HERBS	SEDGES	OTHER
LIFE FORM				1m
COVER CLASS (%)		30-70%		
DOMINANT SPECIES		Dasy brom Patch cil		

4. VEGETATION CONDITION

1	'PRISTINE'	
2	EXCELLENT	✓
3	VERY GOOD	
4	GOOD	
5	DEGRADED	

COMMENTS

Fire ? 8 years previously
No weeds evident, fire impact, firewood cutting

Wetland (3), 70% Mel prei <10m over Bracken Acac grad, Mel rhaph over 70% Baum atric. Black humic rich sand
ADJ → 70% Mel rhaph over ... RG

BUSHLAND PLANT SURVEY RECORDING SHEET 1- use pencil only

BUSHLAND AREA BS 270 SITE NUMBER Lot 12 – 4

DATE TRIP 12/10/99 RECORDERS BJK

DATE TRIP _____ RECORDERS _____

DATE TRIP _____ RECORDERS _____

BOTANIST _____

From '*Bushland Plant Survey*' written by B. Keighery (1994) and published by the Wildflower Society of WA (Inc.), PO Box 64 Nedlands WA 6008.

1. LOCATION of the QUADRAT

Mud Map Draw a sketch of the location of the site below.

N

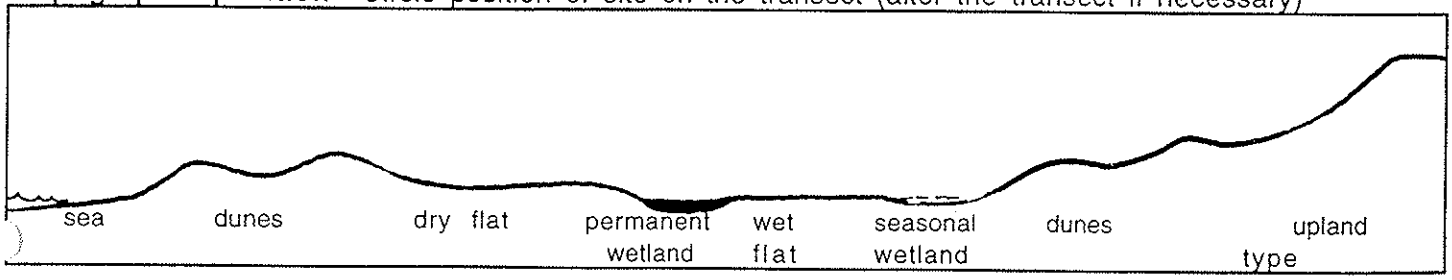
Road Location

Geographic Location **Latitude** . . **S Longitude** **E Altitude**

Reference Map

Photograph Photographer's Name Photo No

Topographic position Circle position of site on the transect (alter the transect if necessary)



2. SITE DATA Circle the correct response.

Slope flat gentle steep ***Aspect*** N NE E SE S SW W NW

Surface Soil ***Colour***

Exposed rock ***type*** % surface

Sub-surface Soil ***Colour***

Rock ***type*** depth to rock

Drainage well mod poor depth water cm ***Wet*** all year winter/spring

Litter	% cover	***Bare Ground***	%cover
Depth	cm		

(4)

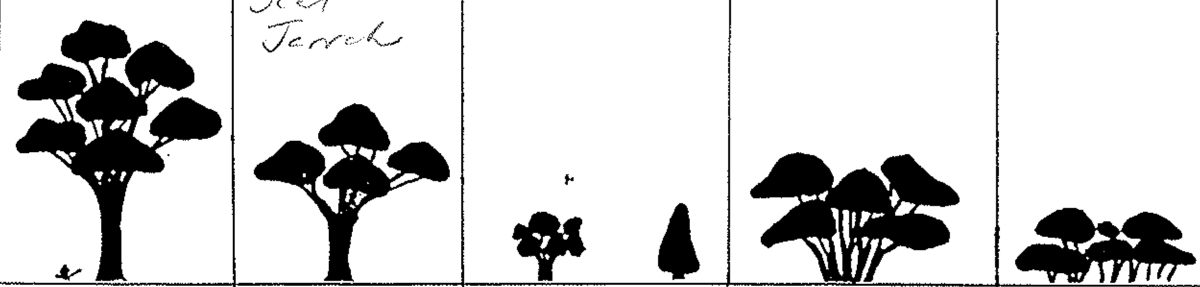
BUSHLAND PLANT SURVEY RECORDING SHEET 2 - use pencil only

3. VEGETATION STRUCTURE AND COVER

From '*Bushland Plant Survey*' written by B. Keighery (1994) and published by the Wildflower Society of WA (Inc.), PO Box 64 Nedlands WA 6008.

For each layer **record** - appropriate **life form, cover class** (see below).and **dominant species** in each layer.

Cover Class	2-10%	10-30%	30 - 70%	over 70%

	TREES			MALLEES	
	over 30m	10 - 30m	under 10m	over 8m	under 8m
LIFE FORM		Scat Jarrah			30m / 10m
COVER CLASS (%)			10 - 30%		
DOMINANT SPECIES			Bank att		
			Bank menz		
			Allo fras.		

	SHRUBS		SHRUBS
	over 2m	2m - 1m	under 1m
LIFE FORM	Scatt. Aden cyg. 		2m / 1m
COVER CLASS (%)			30 - 70%
DOMINANT SPECIES			Leuc cono
			Hib racc
			Xanth prei
			Stirling lat.

	GRASSES	HERBS	SEDGES	OTHER
LIFE FORM				1m
COVER CLASS (%)		2-10	2-10	
DOMINANT SPECIES		Pat occid	Lyg barb	
		Phlebocarya cil.		

4. VEGETATION CONDITION

1 'PRISTINE'		COMMENTS
2 EXCELLENT	)	Fires, wood cutting,
3 VERY GOOD	)	
4 GOOD		
5 DEGRADED		

Cono junc cil? cong, Anig hum, Burg ming vax. ses., Pet lin, Lax rac, Burch cong, Damp lin, Styl bro, S.pl.

BUSHLAND PLANT SURVEY RECORDING SHEET 1- use pencil only

BUSHLAND AREA BS 270 SITE NUMBER Lot 12 - 2

DATE TRIP 12/10/99 RECORDERS BJK

DATE TRIP _____ RECORDERS _____

DATE TRIP _____ RECORDERS _____

BOTANIST _____

From '*Bushland Plant Survey*' written by B. Keighery (1994) and published by the Wildflower Society of WA (Inc.), PO Box 64 Nedlands WA 6008.

1. LOCATION of the QUADRAT

Mud Map Draw a sketch of the location of the site below.

N

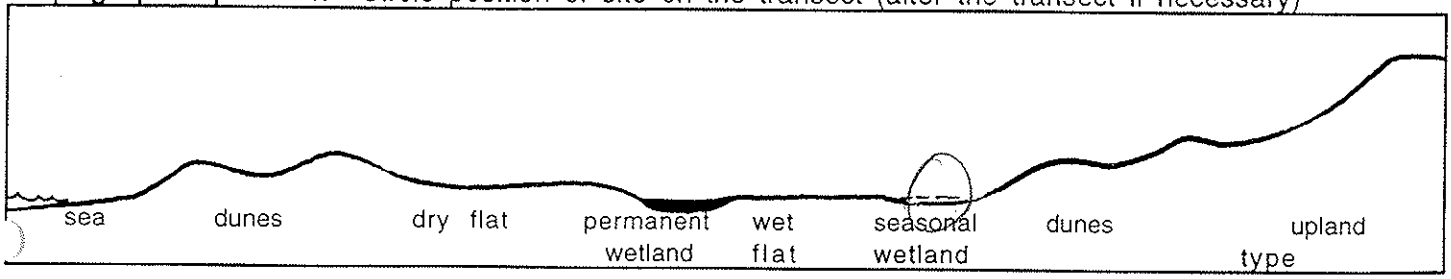
Road Location

Geographic Location **Latitude** **S** **Longitude** **E** **Altitude**

Reference Map

Photograph Photographer's Name BJK Photo No

Topographic position Circle position of site on the transect (alter the transect if necessary)



2. SITE DATA Circle the correct response.

Slope **flat gentle steep** ***Aspect*** **N NE E SE S SW W NW**

Surface Soil ***Colour***

Exposed rock ***type*** % surface

Sub-surface Soil ***Colour***

Rock ***type*** depth to rock

Drainage **well mod poor** depth water cm ***Wet*** **all year winter/spring**

Litter	% cover	***Bare Ground***	%cover
Depth	cm		

(2)

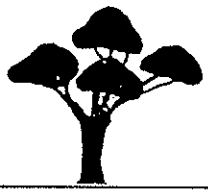
BUSHLAND PLANT SURVEY RECORDING SHEET 2 - use pencil only

3. VEGETATION STRUCTURE AND COVER

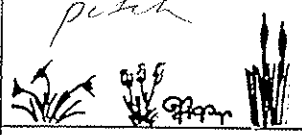
From '*Bushland Plant Survey*' written by B. Keighery (1994) and published by the Wildflower Society of WA (Inc.), PO Box 64 Nedlands WA 6008.

For each layer **record** - appropriate **life form**, **cover class** (see below).and **dominant species** in each layer.

Cover Class 2-10% 10-30% 30 - 70% over 70%

	TREES			MALLEES	
	over 30m	10 - 30m	under 10m	over 8m	under 8m
LIFE FORM					 30m 10m
COVER CLASS (%)		> 70 %			
DOMINANT SPECIES		Euc. wand.s			
		Mel. grei			
		bank lit			

	SHRUBS over 2m	SHRUBS 2m - 1m	SHRUBS under 1m
LIFE FORM			 2m 1m
COVER CLASS (%)		> 70%	
DOMINANT SPECIES		Actus gracilim	

	GRASSES	HERBS	SEDGES	OTHER
LIFE FORM			 patch	1m
COVER CLASS (%)			to > 70%	
DOMINANT SPECIES			lepid. long.	

4. VEGETATION CONDITION

1	'PRISTINE'	
2	EXCELLENT	X
3	VERY GOOD	
4	GOOD	
5	DEGRADED	

COMMENTS

Adj to drain, drain ≥ 50 yrs old
regrowth substantial, Woodcock

BANKSIA MRE 45 – combination – wet (1) / dry (4)

BUSHLAND PLANT SURVEY RECORDING SHEET 3 - use pencil only

5. SPECIES PRESCENCE

SITE No	
Date	12/10/95

Label each plant with plants number, site code, date and plant's name or working name if required

Record on Sheet

- Column 1 plant name-
- Column 2 plant number
- Column 3 flowering time- TICK if species flowering
- Column 4 identification check

From '*Bushland Plant Survey*' written by B. Keighery (1994) and published by the Wildflower Society of WA (Inc.), PO Box 64 Nedlands WA 6008.

TREES	No	Fl	ID
Bank ser			
Bank men			
Euc marg			
Bank ilic			
Allocas. fras			
MALLEES			
SHRUBS			
Mel thymi			
Xanth preiss			
Eri os spic			
Boronia ilicifolia			
Kos. ana			
Hyp coris			
Hibb. hyp			
Aden obt.			
Kunz ericoides			
Pet. lin			
Damp. linearis			
Hibb. racemosa			
Stir. lat.			
Calytrix angulata			
Kunzea ericoides			
Mel. thymoides			
Dos. sphaerocarpa			

SHRUBS (cont.)	No	Fl	ID
GRASSES			
HERBS			
Borch. umb.			
Dasy brom			
Phleb cil			
Stylid schoen			
Dros anyth.			
Stylid junc			
Drosera pilosa			
Cono. juncea			
Arig. humilis			
Anig. manglesii			
Lech. scoparia			
Hak ramosa			
Burchardia congesta			

HERBS (cont.)	No	Fl	ID
Stylid. brun.			
Stylid. pilosum			
Pat. occid			
Phleb. ciliata			
Dasy brom			
SEDGES			
Hyp exsulca			
Lygina barb			

WETLAND.

BUSHLAND PLANT SURVEY RECORDING SHEET 3 - use pencil only

5. SPECIES PRESCENCE

SITE No	
Date	

Label each plant with plants number, site code, date and plant's name or working name if required

Record on Sheet

- Column 1 plant name
- Column 2 plant number
- Column 3 flowering time- TICK if species flowering
- Column 4 identification check

From '*Bushland Plant Survey*' written by B. Keighery (1994) and published by the Wildflower Society of WA (Inc.), PO Box 64 Nedlands WA 6008.

TREES	No	Fl	ID
Mel rhap (patches)			
Mel preis			
Euc. rudis			
Bank. littoralis			
MALLEES			
SHRUBS			
Aotus grac.			
Hyp angust.			
Az pul			
Kun eric			
Agon lin			
Mel. teret.			
Lanc. australis			
Pult. radicta			
Comesp. pink			
Ast. aff lasic			
Aotus cordifolia (3)			

SHRUBS (cont.)	No	Fl	ID
GRASSES			
HERBS			
Bracken			
Cal. flava			
Lobel. alata			

HERBS (cont.)	No	Fl	ID
SEDGES			
Lepid. long			
Baume articulata.			
Restio sten.			

E000267

HSA
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KWINANA FREEWAY

YANGEBUP ROAD TO THOMAS ROAD

BIOLOGICAL SURVEY

Prepared for

Main Roads Department

by

Hart, Simpson and Associates Pty Ltd

November 1989

BS 27c

SPEARS

CONTENTS

VEGETATION AND RARE FLORA

(evaluation of general condition of vegetation and habitats and search for declared rare and priority flora and their habitats)

WANDI/ANKETELL PROPOSED URBAN DEVELOPMENT AREA

Town Of Kwinana

DRAFT

Prepared by

Arthur S Weston, PhD
Consulting Botanist

ABN: 54 924 460 919

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Ph/Fax: (08) 9458 9738
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28 January 2005

ABSTRACT and SUMMARY

Introduction

This report describes the remnant native vegetation of Wandi/Anketell Proposed Urban Development Area, and the results of searches for rare flora there. It is based upon reviews of literature and metadata and upon field work by botanists Dr. Arthur Weston and Martin Henson in September, October and November 2004.

Vegetation Units

Most of the upland, dry land mature native vegetation is *Banksia attenuate – B. menziesii* Low Woodland, with jarrah, *Eucalyptus todtiana, Banksia ilicifolia* and *Xanthorrhoea preissii* prominent in some of it. It is mainly in the northern two-thirds of the development area.

The principal tree dominants in the wetland vegetation are *Eucalyptus rudis, Melaleuca preissiana* and *M. rhaphiophylla*. This wetland vegetation is also mainly in the northern two-thirds of the development area.

Most of the remnant vegetation in the southern third of the development area, including the part that is in Bush Forever Site 270, is in a stage of regeneration after having been cleared a decade or more ago. It is now dominated by spearwood (*Kunzea glabrescens*), as thickets, often over 3 m tall and often with a cover of over 70%. The species present suggest that some of this vegetation is wetland vegetation, especially in the west, and that some of it is upland vegetation.

Vegetation Condition

The vegetation in best condition is in the northern half of the survey area. Some of it is upland *Banksia attentuata – B. menziesii* Low Woodland to Open Forest, with jarrah, and some of it is wetland *Eucalyptus rudis* Open Forest with *Melaleuca preissiana* and *M. rhaphiophylla* paperbark trees and a variety of native sedges, including the only stand of *Baumea articulata* found during the survey.

Most of the *Banksia* vegetation is in condition assessed as Degraded to Good, though some stands are rated Very Good while others are rated Completely Degraded. The two stands of BLW-OF(J), in Lots 678and 679 and the adjoining part of Lot 680, have unburnt vegetation in them that is in Excellent condition and with relatively few weeds.

In general, the condition of the wetland vegetation ranges from Degraded to Very Good, with a few, relatively small areas of Excellent and larger ones rated Completely Degraded. The best unburnt stand of wetland vegetation is west of the freeway in Lot 683. This is *Eucalyptus rudis* Open Forest with *Melaleuca preissiana* and *M. rhaphiophylla* paperbark trees and a variety of native sedges, including the only stand of *Baumea articulata* found during the survey. It is a spring or soak which is the head of a creek that flows westward.

Most of the spearwood (*Kunzea glabrescens*) thickets, which constitute most of the native vegetation in the southern third of the development area, are assessed, for the most part, as being in conditions of Degraded or Good to Degraded.

Vegetation Complexes

Most, if not all, of the vegetation of the survey area is in one vegetation complex, the Bassendean Vegetation Complex – Central and South (44). A relatively small area of the Cottesloe Complex – Central and South (52) may be in the part of the survey area south of Anketell Road.

Bush Forever (2000, Volume 1, Table 4) indicates that 24% of the original area of Bassendean Vegetation Complex – Central and South in the Perth Metropolitan Region remains, and that 2,818 ha of this remaining 10,919 ha is 'protected'. The same source indicates that 36% of the original area of Cottesloe Complex – Central and South in the Perth Metropolitan Region remains, and that 5,289 ha of this remaining 12,362 ha is 'protected'.

Floristic Community Types and Threatened Ecological Communities
It is inferred that two or more of Floristic Community Types 21a, 21c, 22 and 23a are the FCTs represented by most of the dry land vegetation in the survey area and that the wetland vegetation is probably FCT 4, FCT 5 and FCT 11. FCT 28 would probably be represented in any Cottesloe Complex vegetation that might be in the survey area.

None of the floristic community types inferred as possibly being represented in the survey area is listed in the Threatened Ecological Community database (English and Blyth 1997).

Significant Flora
None of the Declared Rare or Priority Flora taxa listed in Table A1 was found in the survey area, and it is unlikely that any of them is there However, one species listed in *Bush Forever* (2000, Volume 2, Table 13, p. 54), *Lysinema elegans*, was found in banksia (–jarrah) woodland west of Lyon Road. It was formerly Priority Flora and is listed in Table 13 as 'p, s, e' (a species endemic to the Swan Coastal Plain which is considered to be poorly reserved and significant).

TABLE OF CONTENTS

VEGETATION AND RARE FLORA
(evaluation of general condition of vegetation and habitats and search for declared rare and priority flora and their habitats)
WANDI/ANKETELL PROPOSED URBAN DEVELOPMENT AREA

1.0 INTRODUCTION

This report describes remnant native vegetation of the Wandi/Anketell Proposed Urban Development Area, and it presents results of searches for rare flora there. It is based upon reviews of literature and metadata and upon field work by botanists Dr. Arthur Weston and Martin Henson in September, October and November 2004.

1.1 LOCATION

The vegetation survey and rare flora search area is the Wandi/Anketell Proposed Urban Development Area, principally the parts that have native vegetation and plants. The development area is shown on Figure 1, with a solid red line outlining it.

The development area is between Rowley Road and Thomas Road and is mainly east of the Kwinana Freeway. Some of the development area between Rowley Road and Anketell Road is west of the freeway, and some of that area has remnant vegetation, especially adjacent to the freeway. Some of the development area between Anketell Road and Thomas Road is part of Bush Forever Site 270.

Most of the survey area is in Wandi, east of the freeway between Rowley and Anketell Roads. The part of the survey area west of the freeway is in Mandogalup, and the part south of Anketell Road is in Anketell.

1.2 OBJECTIVES

The principal objectives of this survey, as requested by Katrina Cooper, of RPS Bowman Bishaw Gorham, are:

- to evaluate general condition of vegetation and habitats as a basis for structure planning, and

- to conduct a spring search for Declared Rare and Priority Flora.

The evaluation of condition was to be based upon a preliminary survey, a lower level survey than the Level 1 Survey described on Page 39 of the EPA's Guidance No. 51 (Environmental Protection Authority 2004). The spring rare flora search was to be undertaken at the same time as the vegetation condition survey and as part of it.

Preliminary description and mapping of vegetation units (plant associations) were also included as objectives.

2.0 METHODS

The survey and search were undertaken in the following series of overlapping and interrelated stages:

- review of literature and metadata and preparation for field work, including consultations, the gathering and collation of available information from a range of sources, and interpretation of aerial photography,
- field work to determine parameters, distributions and condition of vegetation units and to search for rare flora,
- follow-up work, including identification and herbarium confirmations of plants recorded and collected during field work,
- preparation of the report.

2.1 PREPARATION FOR FIELD WORK

The literature reviewed included the Hart, Simpson and Associates (1999) report on the part of Bush Forever Site 270 that is in the Wandi/Anketell Proposed Urban Development Area and Bowman Bishaw Gorham (2002 xx check date), which has descriptions and maps of landforms and soils units, vegetation complexes, vegetation communities, floristic community types, significant flora, weeds and locations and conservation categories of wetlands some of which include part of the survey area.

Preparation for field work entailed provisional description, listing and mapping of vegetation units of the survey area and preparing a table of rare flora to be searched for during field work. Methods for field work were chosen during this preparation stage, which also included a preliminary visit to the Wandi/Anketell Proposed Urban Development Area.

2.1.1 Vegetation

Provisional description, mapping and understanding of vegetation of the survey area were based upon prior field work in the general area, aerial photography and various publications and maps.

Aerial photography examined was in the form of digital printouts at various scales. It was provided by RPS Bowman Bishaw Gorham.

Reports, publications and maps used in provisional description, listing, mapping and understanding of vegetation and habitats of the survey area include Hart, Simpson and Associates (1999), Beard (1979, 1981), Heddle *et al.* (1980), Churchward and McArthur (1980), Gozzard (1983) and Gibson *et al.* (1994).

2.1.2 Significant Flora

The first phase of the significant flora search was preparation of a table of taxa of Declared Rare and Priority Flora and with distributions and locations that may include the broad area. This table was compiled from results of searches of three databases carried out by the Wildlife Branch of Department of Conservation and Land Management in August and September 2004. These three Department of Conservation and Land Management (CALM) databases are *Threatened (Declared Rare) Flora* (Summary of Threatened Flora Data),

Declared Rare and Priority Flora List and *Western Australian Herbarium Specimen* (WAHERB). The searches were for Declared Rare and Priority Flora taxa recorded in the general vicinity of Wandi and Anketell. The parameters used for the searches are:

Coordinates:	32°09'00", 32°15'00", 115°49'00" and 115°55'00"
Names:	Anketell, Banganup, Banjup, Casuarina, Kwinana, Mandogalup, Modong, Oakford, Spectacles, Wandi, Wattleup

Table A1 in Appendix A lists taxa that are in the results of the rare flora database searches. The table also lists conservation codes, distributions, localities, growth forms, habitats and flowering times.

The second phase of the preparation for field work, determining which species and other taxa listed in Table A1 might occur in the survey area, was done by comparing information in Table A1 (and in supplementary sources), particularly about habitats, with vegetation and map information referred to in Section 2.1.1.

2.1.3 Significant Vegetation

There are no publications that provide information about conservation and reservation status of vegetation units in the general area, but Gibson *et al.* (1994), *Bush Forever* (2000) and English and Blyth (1997) do so for floristic community types. And *Bush Forever* (2000) does so for vegetation complexes.

Bush Forever tabulates the Gibson *et al.* and English and Blyth status information (Government of Western Australia 2000, Volume 2, Table 10) and also provides information about conservation and reservation status of vegetation complexes (Government of Western Australia 2000, Volume 1, Table 4), at least in the Perth Metropolitan Region. *Guidance No. 10* (Environmental Protection Authority 2003, pp. 54-56) provides similar information about vegetation complexes of the southern Swan Coastal Plain.

2.2 FIELD WORK

The field work component of the survey was carried out by Arthur Weston and Martin Henson on several days between early September and late November 2004. Spring searches for *Caladenia huegelii* were done in September and early October 2004.

Flora and vegetation units and condition were recorded, and provisional vegetation descriptions and map boundaries were confirmed and revised. Recording of vegetation types and condition used the systems in the tables in Appendix B.

Most plants were identified in the field, with help from keys and descriptions in Marchant *et al.* (1987), Hussey *et al.* (1997), other floras and articles in journals. Voucher specimens of uncommon and possibly significant plants and some plants not readily identifiable in the field were collected and pressed.

2.3 AFTER FIELD WORK

Pressed plant specimens were dried and fumigated in the Western Australian Herbarium in South Perth, then identified by comparing them with specimens in Herbarium collections, checking them against keys and descriptions in floras and taxonomic works and consulting other botanists.

The provisional vegetation boundaries and descriptions were refined and finalised.

3.0 RESULTS

3.1 VEGETATION

The vegetation of remnant native vegetation of the Wandi/Anketell Proposed Urban Development Area is described in this section in terms of vegetation units, vegetation complexes and floristic community types and in terms of condition.

3.1.1 Vegetation Units and Condition

Figure 1 shows the distribution of vegetation units (plant associations) in the Wandi/Anketell Proposed Urban Development Area and their condition. The legend that accompanies the figure's map lists descriptive names of more than 50 units. Each name in the legend has three components: dominant species, structure and condition (or range of condition). Definitions of terms used for describing vegetation structure and condition, and symbols for condition, are in tables in Appendix B.

The vegetation in best condition is in the northern half of the survey area. Some of it is upland *Banksia attentuata – B. menziesii* Low Woodland to Open Forest, with jarrah, and some of it is wetland *Eucalyptus rudis* Open Forest with *Melaleuca preissiana* and *M. rhaphiophylla* paperbark trees and a variety of native sedges, including the only stand of *Baumea articulata* found during the survey.

Most of the remaining upland, dry land mature native vegetation is *Banksia attentuata – B. menziesii* Low Woodland, with jarrah, *Eucalyptus todtiana, Banksia ilicifolia* and *Xanthorrhoea preissii* prominent in some of it. Most of the *Banksia* vegetation is in condition assessed as Degraded to Good, though some stands are rated Very Good while others are rated Completely Degraded. The two stands of BLW-OF(J), in Lots 678and 679 and the adjoining part of Lot 680, have unburnt vegetation in them that is in Excellent condition and with relatively few weeds.

The principal dominants in the wetland vegetation are *Eucalyptus rudis, Melaleuca preissiana* and *M. rhaphiophylla*. In general, the condition of the vegetation ranges from Degraded to Very Good, with a few, relatively small areas of Excellent and larger ones rated Completely Degraded. The best unburnt stand of wetland vegetation is west of the freeway in Lot 683. This is *Eucalyptus rudis* Open Forest with *Melaleuca preissiana* and *M. rhaphiophylla* paperbark trees and a variety of native sedges, including the only stand of *Baumea articulata* found during the survey. It is a spring or soak which is the head of a creek that flows westward.

Most of the remnant vegetation in the southern third of the development area, including the part that is in Bush Forever Site 270, is in a stage of regeneration after having been cleared a decade or more ago. It is now dominated by spearwood (*Kunzea glabrescens*), as thickets, often over 3 m tall and often with a cover of over 70%. Most of the thickets have few weeds and little understorey and are assessed, for the most part, as being in conditions of Degraded or Good to Degraded. There are scattered emergents of *Melaleuca preissiana, Banksia menziesii, B. ilicifolia* and *Allocasuarina fraseriana*. In a few places there are mosaics of the *Kunzea* and heath dominated by *Hypocalymma angustifolium* or *Astartea* sp. The species present suggest that some of this vegetation is wetland vegetation, especially in the west, and that some of it is upland vegetation.

3.1.2 Vegetation Complexes

According to the 1:250,000 scale vegetation map by Heddle *et al.* (1980) and the much smaller scale map in *Bush Forever* (2000) most, if not all, of the vegetation of the survey area is in one vegetation complex, the Bassendean Vegetation Complex – Central and South. Heddle *et al.* (1980) describe the vegetation of this complex (Vegetation Complex 44) as, basically, ranging from woodland of jarrah-sheoak-banksia to a low woodland of *Melaleuca* species, to sedgelands in low-lying depressions and swamps. A relatively small area of the Cottesloe Complex – Central and South (52) may be in the part of the survey area south of Anketell Road. Vegetation Complex 52 is, basically, closed heaths on limestone outcrops and a mosaic of tuart woodland and tuart-jarrah-marri open-forest on deeper sands.

Bush Forever (2000, Volume 1, Table 4) indicates that 24% of the original area of Bassendean Vegetation Complex – Central and South in the Perth Metropolitan Region remains, and that 2,818 ha of this remaining 10,919 ha is 'protected'. The same source indicates that 36% of the original area of Cottesloe Complex – Central and South in the Perth Metropolitan Region remains, and that 5,289 ha of this remaining 12,362 ha is 'protected'.

3.1.3 Floristic Community Types

The most accurate way to determine which floristic community types are in a metropolitan region Swan Coastal Plain survey area is to select, sample and analyse Gibson-type, 10m by 10m quadrats using the techniques described by Gibson *et al.* (1994) and Keighery (1994).

It should be possible, however, according to Neil Gibson (pers. comm.) and *Bush Forever* (Government of Western Australia 2000, Vol. 2, p. 487), to infer, at least tentatively, which floristic community types, at least of the original 43 described by Gibson *et al.* (1994), occur in a survey area. Inferences of which FCTs occur in particular Bush Forever sites have been made from "information on the floristics of the area and the area's geographic location" (Government of Western Australia 2000, Vol. 2, p. 487).

Floristic community types (FCTs) have not been mapped for the survey area, nor for anywhere nearby, but their representation in the survey area is tentatively inferred here from comparisons of the FCT species lists and distribution maps in Appendix 1 of Gibson *et al.* (1994) and the description in *Bush Forever* (2000, Volume, pp. 277-278) of Bush Forever Site 270.

It is inferred that two or more of Floristic Community Types 21a, 21c, 22 and 23a are the FCTs represented by most of the dry land vegetation in the survey area and that the wetland vegetation is probably FCT 4, FCT 5 and FCT 11. FCT 28 would probably be represented in any Cottesloe Complex vegetation that might be in the survey area.

3.1.4 Significant Vegetation

None of the floristic community types inferred as possibly being represented in the survey area is listed in the Threatened Ecological Community database (English and Blyth 1997).

3.2 SIGNIFICANT FLORA

None of the Declared Rare or Priority Flora taxa listed in Table A1 was found in the survey area, and it is unlikely that any of them is there, although some habitat did appear to be suitable for the DRF orchids *Caladenia huegelii* and *Drakaea elastica*. The occurrence there of these orchids is, however, unlikely as the detailed spring searches there in September and October 2004 found none.

One species listed in *Bush Forever* (2000, Volume 2, Table 13, p. 54) as significant was found in the southwestern corner of the banksia (-jarrah) woodland to open forest in Lot 678 west of Lyon Road and Bodeman Road. It is a former species of Priority Flora, *Lysinema elegans*. *Lysinema elegans* is listed in Table 13 as 'p, s, e' (a species endemic to the Swan Coastal Plain which is considered to be poorly reserved and significant).

4.0 LIMITATIONS OF THE SURVEY

Delimiting stands of vegetation and assigning names to them is much more arbitrary and subjective than identifying plants, because stands of vegetation often do not have clear boundaries or consistent features. Assessing condition is also more arbitrary and subjective.

Structure, dominance and condition of vegetation are best described and assessed when stands are in an advanced stage of succession, but much of the vegetation in the survey area, especially in the northern third, was in an early stage of succession at the time of the field work; it had been burnt within the last year or two.

Setting out and sampling sets of quadrats according to methods described by Keighery (1994) and subsequent analysis of the samples using the appropriate PATN program would be useful in validating the inferences made in this report about representation of floristic community types in the survey area.

A number of species of plants which were not in flower at the time of the surveys could not be identified. Identification of species that are very similar when they are vegetative, e.g. several species of Iridaceae, can be confirmed only when they are in flower, generally in early spring. And some herbaceous plants, such as many orchids, flower briefly, then disappear, and, furthermore, some do not appear every year.

No attempt was made to compile a list of species, nor would it have been possible to compile one for parts of the survey area, especially in the north, because they are in early stages of regeneration after having been burnt.

5.0 ACKNOWLEDGEMENTS

The assistance of Mike Hislop in helping to identify specimens is gratefully appreciated.

Access to the Western Australian Herbarium collections was essential for carrying out the survey and is also greatly appreciated.

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APPENDIX A

Rare Flora with Distributions and Habitats which may include the Wandi-Anketell Survey Area

Contents

APPENDIX A

Rare Flora with Distributions and Habitats which may include the Wandi-Anketell Survey Area

(compiled September 2004)

Introduction

Table A1 lists nine taxa (species, subspecies and varieties) of Declared Rare (DRF) and Priority (P) Flora recorded in the broader vicinity of the Wandi-Anketell area. The taxa listed in the table are the principal taxa searched for in the Wandi-Anketell survey area in September-November 2004. The table also provides information about conservation codes, distributions, locality records, growth forms, habitats and flowering times for these taxa. The information about distributions, localities, growth forms, habitats and flowering times is not always comprehensive, but information about habitat is at least indicative and should help in assessing how likely rare flora is to occur in the survey area.

The table lists four DRF (R) taxa (gazetted Declared Rare Flora), one P1 taxon, one P3 taxon and three P4 taxa.

The Table A1 list of taxa was compiled mainly from printouts of the results of searches of three databases carried out by the Wildlife Branch of Department of Conservation and Land Management in August and September 2004. These three Department of Conservation and Land Management (CALM) databases are *Threatened (Declared Rare) Flora* (Summary of Threatened Flora Data), *Declared Rare and Priority Flora List* and *Western Australian Herbarium Specimen* (WAHERB). The searches were for Declared Rare and Priority Flora taxa recorded in the broad vicinity of Wandi and Anketell.

The CALM databases were searched twice in August and once in September 2004, first at the request of RPS Bowman Bishaw Gorham and later at the request of Arthur Weston. All of the taxa in the results of the first set of searches were also in the second set.

The parameters requested for the first set of searches are the approximate latitudes and longitudes of the corners of the survey area (no location name was given in the request) are:

- North west corner: -32.18, 115.84
- North east corner: -32.18, 115.87
- South east corner -32.23, 115.87
- South west corner -32.23, 115.85

The parameters used for the second and third sets of searches are:

- Anketell-Oakford-Wandi:
  Coordinates: 32°09'00", 32°15'00", 115°49'00" and 115°55'00"
  Names: Anketell, Banganup, Casuarina, Kwinana, Mandogalup, Modong, Oakford, Spectacles, Wandi, Wattleup

- Wandi-Anketell:
  Coordinates: 32°09'00" - 32°15'00" and 115°49'00" - 115°55'00"
  Names: Anketell, Banganup, Banjup, Casuarina, Kwinana, Mandogalup, Modong, Oakford, Spectacles, Wandi, Wattleup

The printouts also provided some information about conservation codes, localities and distributions, habitats and flowering times. Additional information in the table was obtained from examination of herbarium specimens and their labels in the Western Australian Herbarium, consultations with other botanists, and information in Atkins (2004), Paczkowska and Chapman (2000), Marchant *et al.* (1987), Brown *et al.* (1998), Hoffman and Brown (1998) and relevant parts of the *Flora of Australia* and *How to Know Western Australian Wildflowers*. These references are listed in the report to which this is Appendix A.

Conservation Codes Definitions

Department of Conservation and Land Management definitions of the Conservation Codes (Atkins 2004) in Table A1 are:

R: Declared Rare Flora – Extant Taxa
Taxa which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such.

1: Priority One – Poorly Known Taxa
Taxa which are known from one or a few (generally <5) populations which are under threat, . . . Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.

2: Priority Two – Poorly Known Taxa
Taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.

3: Priority Three – Poorly Known Taxa
Taxa which are known from several populations, and the taxa are not believed to be under immediate threat (i.e. not currently endangered), . . . Such taxa are under consideration for declaration as 'rare flora', but are in need of further survey.

4: Priority Four – Rare Taxa
Taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5-10 years.

The need for further survey of poorly known taxa is prioritised into the Priority 1, 2 and 3 categories depending on the perceived urgency for determining the conservation status of those taxa, as indicated by the apparent degree of threat to the taxa based on current information.

Table A1
Declared Rare and Priority Flora Recorded in the Broad Vicinity of the Wandi-Anketell Survey Area[1]

Taxon Name	Cons. Code	Distribution	Flower Period	Fam. No.	Plant Form and Features and Habitat
Aotus cordifolia	P3	Witchcliffe - Upper Swan, Banjup	Aug-Dec	165	Erect to straggly glabrous shrub to > 1.5 m; lvs 3, whorled, sessile, ovate-cordate; fls small, standard yellow. Swamps; soil often peaty.
Aponogeton hexatepalus	P4	Nannup-Perth	Aug-Sep	025	Rooted aquatic herb with straplike leaves, the floating part of which is broader than the submerged part; Shallow winter pools on clayey soils, rivers, claypans.
Caladenia huegelii	R	Capel-Perth, Banjup	Aug-Oct	066	Large, few-flowered spider orchid with large labellum which is dark red and has long, often divided, usually white fringing hairs. Sandy soils in banksia and eucalypt woodlands and low open forests which are, usually, low in the landscape.
Diuris micrantha	R	Manjimup-Medina, Bowelling, Meelon	Aug-Sep	066	A dwarf bee orchid closely related to *Diuris laxiflora* but with much smaller, paler flowers. Small, winter wet, shallowly inundated, sandy clayey flats in short sedgeland, usually predominantly of *Lepidosperma longitudinale* at least nearby.
Diruis purdiei	R	Perth-Waroona-Busselton, Canning Vale, Mandurah?	Sep-Oct	066	Slender donkey orchid with 5-10 narrow, spirally twisted leaves. Seasonally wet, burnt, sand over clay, shrublands, usually of *Regelia* and *Pericalymma*.
Dodonaea hackettiana	P4	Gingin-Wattleup	Jul-Oct	207	Small tree or large shrub. Often on limestone or in margins of wetlands.
Drakaea elastica	R	Albany-Busselton-Gingin, Mandogalup	Oct-Nov	066	Hammer orchid w. a prominently hairy section in its upper labellum & a distinc-tively shiny, bright green, heart-shaped leaf which is flat on the ground. Deep sand low in landscape, usually under spearwood and banksias next to winter-wet swamp.
Tripterococcus paniculatus	P1	Armadale-Upper Swan, Jandakot	Nov	202	Glabrous, several-stemmed herb similar to *T. brunonis* but fls later and spikes have > 1 fl. Grey sand, winter damp flats; open patches in heath with *Mel. Preissiana*.
Verticordia lindleyi subsp. *lindleyi*	P4	Gillingarra-Forrestdale, near Serpentine	Nov-Jan	273	Shrub <1 m tall, often open, sometimes straggly; stem lvs narrowly obovate to elliptic, slightly concave, shortly mucronate & ciliate; fls in spike-like groups, pale to deep pink. Sandy, often clayey, winter wet flats.

[1] Table A1 lists all except six species in the results of searches of three databases by CALM on 18 August, 27 August and 28 September 2004 for the Wandi-Anketell-Oakford area. The databases searched are *Declared Rare and Priority Species List, Threatened (Declared Rare) Flora* and *Western Australian Herbarium Specimen*. The search parameters used for the third, most comprehensive search are:

- Coordinates: 32°09'00", 32°15'00", 115°49'00" and 115°55'00"
- Names: Anketell, Banganup, Banjup, Casuarina, Kwinana, Mandogalup, Modong, Oakford, Spectacles, Wandi, Wattleup

The six species that are in the results of the CALM but which are not in Table A1 are not in the broader Perth area or south of it. Each of the six was in the results because it has the location name 'Casuarina', 'Anketell' or 'Wandina'. The 'Casuarina' and 'Anketell' are not the same as the ones in the Perth Metropolitan Area. The six species are *Banksia scabrella, Grevillea stenostachya, Lechenaultia longiloba, Pityrodia canaliculata, Scholtzia* sp. Binnu and *Verticordia luteola* var. *luteola*.

The information about distributions, localities, growth forms, habitats and flowering times is not always comprehensive. For instance, the localities are often selections and do not always include all of the localities given for a listed species in the CALM printouts, which themselves are also often only selections. Information about growth form and habitat is at least indicative and should be useful in assessing how likely rare flora is to occur at particular locations.

Ideally, any search for rare flora should be undertaken at a time when rare orchids and most of the other species listed in Table A1 are in flower and identifiable. However, some plants flower erratically and some do not flower every year. For instance, plants of some species appear and flower rarely except after summer fires.

APPENDIX B

Vegetation Structure Classes and Condition Scale Tables

Vegetation Structure Classes (Layers)

These vegetation structure classes are the ones defined and used in Bush Forever (2000, Volume 2, Table 11 and p. 493) to describe vegetation in Bush Forever sites, (except that [1] a bracketed name refers to a dominant that has fewer plants and provides significantly less cover than others, and that [2] 'scattered' refers to trees, low trees, tall shrubs and low shrubs that have <2% cover).
'Sedges' are in Table 11 but not on p. 493.

Life Form/ Height Class	**Canopy Cover (percentage)**			
	100% - 70%	**70% - 30%**	**30% - 10%**	**10% - 2%**
Trees 10-30m Trees < 10m	Closed Forest Low Closed Forest	Open Forest Low Open Forest	Woodland Low Woodland	Open Woodland Low Open Woodland
Shrub Mallee	Closed Shrub Mallee	Shrub Mallee	Open Shrub Mallee	Very Open Shrub Mallee
Shrubs > 2m Shrubs 1-2m Shrubs <1m	Closed Tall Scrub Closed Heath Closed Low Heath	Tall Open Scrub Open Heath Open Low Heath	Tall Shrubland Shrubland Low Shrubland	Tall Open Shrubland Open Shrubland Low Open Shrubland
Grasses	Closed Grassland	Grassland	Open Grassland	Very Open Grassland
Herbs	Closed Herbland	Herbland	Open Herbland	Very Open Herbland
Sedges	Closed Sedgeland	Sedgeland	Open Sedgeland	Very Open Sedgeland

Vegetation Condition Scale

This condition scale is the one used in *Bush Forever* (2000, Volume 2, Table 12 and p. 494) to describe condition of vegetation in Bush Forever sites.
Assessment of condition is at least as much of understorey strata as of overstorey.

P	Pristine	No obvious signs of disturbance
E	Excellent	Vegetation structure intact, disturbance affecting individual species [plants?]; weeds are non-aggressive species
V, VG	Very Good	Vegetation structure altered; obvious signs of disturbance
G	Good	Vegetation structure significantly altered by very obvious signs of multiple disturbance; basic vegetation structure or ability to regenerate it is retained
D	Degraded	Basic vegetation structure severely impacted by disturbance; scope for regeneration but not to a state approaching good (sic) condition without intensive management
C, CD	Completely Degraded	Vegetation structure not intact; the area completely or almost completely without native species ('parkland cleared').

ASW 27/01/05

58

WELL HOLDINGS PTY LTD

SUBMISSION ON PERTH'S BUSHPLAN – PART SITE NO. 270

(Lots 100 and 13 Treeby Road, Anketell)

May 1999

Prepared for:
Well Holdings Pty Ltd
PO Box 1015
OSBORNE PARK WA 6917

TABLE OF CONTENTS

LIST OF FIGURES

APPENDICES

INTRODUCTION

his submission refers to the central portion of Bushplan Site 270, notably Lots 100 and Treeby Road, Anketell. These allotments are freehold land in the ownership of Well oldings Pty Ltd. Map 81 from Perth's Bushplan is reproduced on page 2 with the levant lots highlighted.

ushplan Site 270 is referred to in the detailed description as "Sandy Lake and Adjacent ushland Anketell" (pp 217-219, Volume 2, Part B).

Well Holdings hereby objects to the Bushplan nomination of the vegetated area of its and holdings for the reasons outlined in Section 4.0. Relevant background information s presented in Sections 2.0 and 3.0 below in support of the subsequent grounds of bjection.

54

LANDOWNER'S PERSPECTIVE

The factors discussed below are important influences on Well Holdings' response to the Bushplan nomination.

2.1 Previous Application for Re-zoning

Well Holdings, in conjunction with some adjacent land-holders, has previously prepared a structure plan in support of a re-zoning application from Rural to Urban. The structure plan clearly outlined the manner in which residential development could be achieved across the site.

Importantly, the EPP wetland on the western side of the property was to be protected within the open space allocation of the development proposal. Additional environmental features were nominated for protection within drainage management corridors.

Well Holding's investment decisions and medium term financial planning is reliant upon realisation of the subdivision potential of this land. The delays in approval of the previous re-zoning application, submitted some four years ago, is having an economic impact upon the company. Further delays as a result of this Bushplan nomination will continue this economic penalty.

2.2 Jandakot Botanic Park is Sufficient for Conservation

The State Government has previously conducted investigations of the conservation requirements in this region through the initiative known as the Jandakot Botanic Park Proposal. This was formulated in 1995 at the same time as the structure planning exercise conducted by Well Holdings.

The Jandakot Botanic Park initiative (now the Jandakot Regional Park) was understood to have resolved the vegetation conservation requirements only a few years ago. The Botanic Park proposal excluded the Well Holdings land, which gave considerable security and certainty at the time that the re-zoning application would not be subject to

No specific exclusion from knowledge of documentation

532

ther conservation constraints. This security has been reversed with Bushplan and is viously a serious concern to the landowner.

Further Uncertainties with Bushplan

re are additional aspects in Bushplan which are of concern to Well Holdings as they ear to have future implications on the amount of developable land. These are nservation Category wetlands and greenways/linkages. It is apparent that these are ther potential constraints which may be placed on the land during the on-going shplan process.

shplan introduces further complexities into the planning process and indeed, there are nsiderable uncertainties in the manner and the timing within which this issue is to be solved. Well Holding's proposal has already been under consideration for at least four ars. It is unreasonable for the normal planning process for this specific site to be rther delayed by Perth's Bushplan, which requires issues to be resolved across the tire Metropolitan Region.

rthermore, there is considerable uncertainty that any outcome negotiated through the ushplan consultation phase will be binding on the Environmental Protection Authority EPA). Bushplan states that there will be a Memorandum of Understanding between the levant government departments and statutory authorities. Until this matter is resolved owever, there is little point in negotiating an outcome and an agreement if there is risk at the EPA could still undertake a separate formal environmental assessment of a lanning proposal and apply the original Bushplan nomination as a basis of its ssessment.

2.4 Lack of Community Equity

Perth's Bushplan is presented as being for the benefit of the whole community, but the burden of environmental protection is being placed on individual land owners who are affected by nominated areas. This is inequitable. A regional conservation initiative from which the broader community will derive benefit should also be funded by the community and not by a few individuals.

52

the broader community is not prepared to accept the financial implications of the erall Bushplan strategy, then the level of community support and therefore overnment mandate must be questioned.

is important to understand that Well Holdings is not a broad-acre land developer or operty speculator. The nomination of this land in Bushplan, with no clear intention for quisition or compensation, will result in financial hardship to Well Holdings.

5.

3.0 VEGETATION AND FLORA

This is not so, only mapped vegetation

All of Lots 100 and 13 are listed for total protection within Bushplan Site 270. This is despite the fact that portions of these lots are totally devoid of vegetation.

An appraisal of the remnant vegetation within the two allotments is conducted below for the purposes of on-going evaluation.

3.1 Bushplan Database

Lots 100 and 13, which comprise only part of Bushplan Site 270, are located on the western edge of the Bassendean Dune System. As such, the original vegetation of this land would be representative of the Bassendean Complex – Central and South. It is noted that full implementation of Bushplan would provide for protection of 13% of this complex, which marginally exceeds the 10% retention target for each vegetation complex which is implicit to Bushplan.

Typical & good rep.

The floristic community types (FCT's) have not been sampled and therefore are "inferred" for the whole of Site 270. The five FCT's which are nominated for the site are all considered to be well reserved on a regional basis and the conservation status of each is described as "low risk" in the Gibson Report.

The specific site details listed in Bushplan are based on only limited survey of vegetation and flora and importantly, these surveys only considered parts of the site. The apparent cursory nature of the database upon which Lots 100 and 13 are included in the Bushplan site is considered to be unreasonable. It places the onus on Well Holdings to prove that the remnants of vegetation on the land are not worthy of conservation, by conducting appropriate studies and incurring additional costs. This is a further example of the inequity of the Bushplan process (refer to Section 2.4).

SU 7

Summary of Botanical Survey Findings

ll Holdings had previously cleared these allotments of all native vegetation and eloped the site with pasture. In order to demonstrate that the regrowth vegetation s not have the values as claimed in Perth's Bushplan, Hart Simpson & Associates e engaged to conduct an appraisal of the existing vegetation and flora. Their report ncluded in Appendix A.

summary, Lots 100 and 13 have been severely disturbed and now comprise essentially egrowth mono-culture of the shrub *Kunzea ~~glabrescens~~ ericoides* on old pasture over a top soil t has been severely degraded. Whilst the *Kunzea* is a native species, from superficial amination the vegetation gives the appearance of a native vegetation community but it not.

is portion of Bushplan Site 270 does not fulfill the selection criteria for inclusion in rth's Bushplan. It is not native vegetation which is representative of the original ological community. Furthermore, the EPP wetland has little remaining fringing egetation and the preliminary classification of much of the adjoining dampland as onservation Category is doubtful.

bviously the Bushplan description which rates the vegetation condition of Site 270 as ore than 80% in very good to excellent condition, is incorrect with respect to Lots 100 nd 13. The majority of this portion of the Bushplan Site is in very poor condition.

No such category please to consider

69

GROUNDS OF OBJECTION

e recommendation for this site (page 219 of Volume 2 Part B) is: *"The care, control d management of this Bushplan Site for conservation purposes within Jandakot gional Park is endorsed"*. No approach has been made to Well Holdings for clusion of its land in the Jandakot Regional Park. There is no mention in the Bushplan cument of a strategy for acquisition of this land or compensation to the owner.

// This applies to section in JRP

this circumstance, and in view of the information presented in the previous sections, ell Holdings objects to the nomination of its land for protection in Bushplan. The ounds of objection are summarised below.

The regrowth vegetation on the site is essentially mono-specific vegetation and does not fulfill the appropriate criteria for inclusion in Bushplan.

The land does not have intrinsic flora values which warrant protection.

Whilst it is doubtful that the regrowth vegetation could be realistically assigned to a particular floristic type, the actual floristic types which are inferred to occur in this locality in the original state are well reserved on a regional basis and, from a conservation perspective, are considered "low risk".

Any important environmental characteristics on Lots 100 and 13 (for example the EPP Wetland) can be properly addressed and accommodated in the normal rezoning and subdivisional planning process.

The 1995 Jandakot Botanic Park proposal was understood to have resolved the vegetation conservation requirements in the region and Bushplan therefore represents an unusually harsh treatment of an individual landowner due to this additional conservation requirement.

Well Holdings has been seeking to initiate rezoning of the site for a minimum period of four years and the further delays which may occur whilst Bushplan is resolved place an unnecessary and harsh economic burden on the landowner.

48

the basis of the above, Well Holdings requests that Lots 100 and 13 be excluded om any further Bushplan processes and publications. Any important environmental aracteristics of the land can be adequately dealt with by the normal planning process, hich should be allowed to proceed.

(*) Well Holdings Pty Ltd, May 1999
"Submission on Perth's Bushplan - Part Site No. 270"
(Lots 100 & 13 Treeby Rd, Anketell)

APPENDIX A

Vegetation and Flora Survey
(Hart, Simpson and Associates Pty Ltd)

46

TABLE OF CONTENTS

45

SUMMARY

only lot 13

Lots 100 and 13 off Treeby Road Anketell have been nominated as part of Bushplan Site 270. As part of the assessment of the land a study has been carried out of the vegetation and flora.

The land is partly cleared for horticulture and partly regrowth on pasture. The site is part of the Bassendean Dune complex and has low lying areas which have been given a preliminary classification as Conservation Category. One bare area, which did not have surface water at the time of inspection, is an EPP wetland.

11 Dec ?

Lots 100 and 13 have been severely disturbed and now consist of two cleared areas and small areas of vegetation in the wettest part, but mainly regrowth of the shrub *Kunzea glabreseens* on old pasture with almost no other native species present. There appears to be no seedbank left in the soil and the topsoil has been severely degraded. This vegetation gives the superficial appearance of native vegetation but clearly does not meet the Bushplan definition of bushland. It could only be restored to native vegetation by intensive and artificial treatment at great cost. The preliminary classification of much of the sumpland as Conservation Category is doubtful. Only the wettest areas should clearly be preserved, and these require intensive revegetation. Much of this western part of the land is in poor condition but joins good vegetated areas to the east and west, and its status within the rest of the Bushplan site is not clear from only the vegetation and flora values. Further discussion with government is required.

INTRODUCTION

Lots 100 and 13 off Treeby Road Anketell have been nominated as part of Bushplan Site 70. As part of the assessment of the land a study has been carried out of the vegetation and flora.

Specifically the survey was carried out to:

Describe the landform and vegetation units present.

Record the condition of the vegetation.

Examine the flora briefly.

Make an opportunistic search for any rare flora species which might be present.

Assess the conservation values due to the vegetation and flora, in a local and regional context.

The results of the study are given here.

METHODS

listing of rare flora species known from the region was obtained from the Department f Conservation and Land Management rare flora database and other information, and e habitats of species which might be present were examined from collections in the /A Herbarium and other information.

he vegetation was examined by describing typical sites and making extensive traverses y vehicle and on foot. The vegetation was divided into blocks on the basis of egetation and condition. The landforms and vegetation were described within these locks. The vegetation was described in terms of structure, with study of the flora mited to recording the species encountered in nominal areas of approximately 400m^2. eeds were recorded only where they had invaded native vegetation but pasture species ere not recorded. The condition of the vegetation was recorded by looking at sturbance, the diversity of species, weeds, grazing, dieback and other factors, and rated the scale of Keighery (1994) which is a scale of 1 to 6:

1 Pristine or nearly so.

2 Vegetation structure intact, disturbance affecting individual species, and weeds are non-aggressive species.

3 Vegetation structure altered, obvious signs of disturbance.

4 Vegetation structure significantly altered by very obvious signs of multiple disturbance, retains basic vegetation structure or ability to regenerate it.

5 Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management.

6 The structure of the vegetation is no longer intact and the area is completely or almost without native species.

tudy of the flora was limited to the species recorded in the vegetation study, pportunistic observations and opportunistic searches for rare flora species. Species ere identified in the field or collected and identified from keys and reference to aterial in the WA Herbarium. Limited attention was given to weeds.

he field survey was carried out in autumn at a time when the vegetation was in a dry ondition and there was limited flowering. Most annual species were dead and were not corded. Poor time for condition.

RESULTS

Landforms and Soils

The site is off Treeby Road in Anketell, just east of the Kwinana Freeway. The site has grey sand soils in low old dunes with more humus in the low-lying areas, and slightly clayey sand in and around the one area with regular water. The site is a typical part of the Bassendean Dunes Complex.

Vegetation

The site is part of the Bassendean Dunes Complex which, in its original state, has a typical vegetation of a mosaic of Banksia woodland with some Jarrah, Sheoak and *Eucalyptus todtiana* on the uplands interspersed with low-lying areas with Melaleucas over shrubs and sedges.

The vegetation was divided into blocks on the basis of vegetation and condition. These are shown in Figure 1 (next page) and described here individually.

Block 1

The vegetation was formerly *Melaleuca preissiana* woodland over shrubs and sedges, on low-lying grey sand with black humus. It is now variable. It originally consisted of large trees to 12m or more but most have been knocked down some years ago leaving mainly younger regenerating trees. *Eucalyptus rudis* and *Banksia littoralis* may also be present. There is a variable shrub stratum depending on the degree of wetness, but species recorded were *Astartea fascicularis* (can be dominant), *Hypocalymma angustifolium, Eutaxia virgata, Pericalymma ellipticum, Calothamnus lateralis, Acacia pulchella, Cassytha racemosa, Daviesia physodes, Adenanthos obovatus, Platysace compressa, Leptomeria spinosa, Kunzea glabrescens, Euchilopsis linearis, Hakea varia* and the woody herb *Xanthorrhoea preissii*. Perennial herbs are prominent and species recorded were *Phlebocarya ciliata, Thysanotus multiflorus, Dampiera linearis, Dianella revoluta, Lepidosperma longitudinale, Hypolaena exsulca, Schoenus efoliatus, Schoenum subfasciculare, Dielsia stenostachya* and *Amphipogon debilis*.

This block was judged as condition 2 despite the extent of tree felling and other disturbances. It may have been extensively damaged in the past but has been left to regenerate. It does not appear to have been grazed, or at least not for a long time, and there is limited weed invasion. Small areas have been physically disturbed and part has been slashed down under a powerline on the eastern boundary.

Block 2

These areas were formerly pasture but after a fire and the removal of stock it regenerated to a dense thicket of *Kunzea glabrescens*. The original vegetation was Jarrah-Banksia woodland on grey sand, but the only remains of the original vegetation are now a few trees of Jarrah, *Allocasuarina fraseriana, Banksia attenuata* and *Banksia ilicifolia*, with

ery rare understorey individuals of *Scholtzia involucrata*. The trees are mainly on the igher areas, and appear to be continuing to die. Weeds are common. The ultimate fate f the *Kunzea* over time is not clear, and it may decline leaving the area to return to asture and weeds.

enclosed

his area is no longer native vegetation. Although *Kunzea glabrescens* was in the riginal vegetation it was a very minor component. The original seed store in the soil as been lost and the topsoil has probably been severely damaged. This block was dged as condition 5, and could only be restored to native vegetation by intensive and tificial treatment.

lock 3

his area was formerly pasture but after a fire and the removal of stock it regenerated to dense thicket of *Kunzea glabrescens* with the wettest areas regenerating to *Astartea scicularis*. The original vegetation was probably similar to Block 1 described above, ut there is almost nothing remaining of the original vegetation and it is difficult to map e original vegetation. The soil is grey sand but slightly more clayey in the most low-ing areas. There is a drain through this area, leading to the south. In places there are a w remnant native individuals including *Melaleuca preissiana, Melaleuca haphiophylla, Eucalyptus rudis, Astartea fascicularis, Melaleuca teretifolia, Melaleuca viminea, Lepidosperma longitudinale, Dielsia stenostachya*, and along the raised edge of e drain *Acacia saligna, Opercularia hispidula and Exocarpos sparteus*. Weeds are ommon. Again the ultimate fate of the *Kunzea* is not clear.

his area is no longer native vegetation. Although *Kunzea glabrescens* was in the riginal vegetation it was a very minor component. The original seed store in the soil as been lost and the topsoil has probably been severely damaged. This block was dged as condition 5, and could only be restored to native vegetation by intensive and tificial treatment. Only the wettest areas (around Block 5) have regenerated with *startea fascicularis* and not *Kunzea glabrescens*.

lock 4

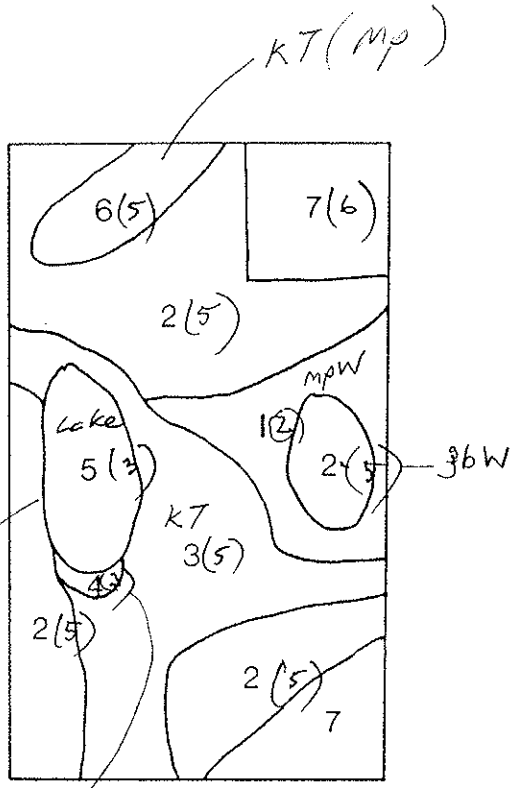
his area is a small remnant of the original vegetation on slightly clayey sand with some ud. It consists of *Eucalyptus rudis* over *Melaleuca teretifolia, Melaleuca viminea, artea fascicularis* and *Kunzea glabrescens*. There is no ground stratum. It is difficult judge how close this is to the original vegetation, but it is the only remnant in good ndition.

his block was judged as condition 3, but this is uncertain. It is essentially native egetation but may have been modified.

INCORRECT.

lock 5

his area is the only site with regular surface water, and is an EPP wetland. According the owner it does not have water every year and the water does not remain for long t it is regularly inundated. The surface is grey mud. It has no vegetation except hemeral herbs. The fringing vegetation consists of *Melaleuca rhaphiophylla* and



SCALE 1:10,000 Approximately

FIGURE 1 VEGETATION BLOCKS

(SKETCH OFF AERIAL PHOTOGRAPHS)

Block 2. Former Jarrah-Banksia woodland, now reduced to pasture covered by a thicket of regrowth *Kunzea ericifolia* and the last few surviving trees on the highest point.

ucalyptus rudis over *Astartea fascicularis* and *Juncus pallidus*, both probably also cluded the species in Block 4 and others. It is difficult to judge how close this is to the riginal vegetation.

his block was judged as condition 3, but this is uncertain. It is essentially native egetation but highly disturbed.

lock 6

his area was formerly pasture but after a fire and the removal of stock it regenerated to dense thicket of *Kunzea glabrescens*. The original vegetation was *Melaleuca reissiana* woodland over shrubs and sedges, on low-lying grey sand with black humus, s described above for Block 1. Little now remains of the original vegetation in the ain block, but the isolated portion in the north has the most remnant native species. gain the ultimate fate of the *Kunzea* is not clear.

his area is no longer native vegetation. Although *Kunzea glabrescens* was in the riginal vegetation it was a very minor component. The original seed store in the soil as been lost and the topsoil has probably been severely damaged. This block was dged as condition 5, and could only be restored to native vegetation by intensive and rtificial treatment.

lock 7

his is cleared land with pasture, weeds or only very degraded native remnants. Weeds e abundant including species such as *Carpobrotus edulis* and *Phytolacca octandra* hich are indicative of severe disturbance. This has been pasture, a market garden or een cleared recently for glasshouses.

his land is rated as condition 6. The topsoil has been partly removed and is severely egraded.

he vegetation described here is probably closest to the following floristic community pes defined by the Southern Swan Coastal Plain survey (Gibson *et al.* 1994):

rrah-Banksia woodlands	Type 21a (Central *Banksia attenuata–Eucalyptus marginata* woodlands)
elaleuca preissiana woodlands	Type 4 (*Melaleuca preissiana* damplands) or 5 (Mixed Shrub damplands)
elaleuca preissiana *ucalyptus rudis* *elaleuca rhaphiophylla*	Grading from Type 4 above to Type 11 (Wet forests and woodlands)

ithout floristic information it is not possible to resolve these further.

 38

1.3 Flora

The plant species recorded are described above, and are all typical of the vegetation units present. No rare and/or priority species were found on the site.

There are various records of rare species locally. The most significant are:

Drakaea elastica (Declared Rare Flora) known from immediately to the north, although the known population may have been lost.

Caladenia huegelii (Declared Rare Flora) known to the north.

Diuris micrantha (Declared Rare Flora) known to the west.

None of these species can be surveyed in autumn. These Declared Rare Flora species and some additional Priority species could not be completely discounted as occurring on the site without further searching at appropriate times of the year.

Not discounted

5. DISCUSSION

The main aim of the Bushplan program is to conserve sufficient examples of vegetation and wetlands in a region which has been heavily cleared and where future options are severely constrained.

The site considered here is part of the Bassendean Dunes Complex and would have had a typical vegetation of a mosaic of Banksia woodland with some Jarrah, Sheoak and *Eucalyptus todtiana* on the uplands interspersed with low-lying areas with Melaleucas over shrubs and sedges. The specific floristic units present were probably Type 21a (Central *Banksia attenuata-Eucalyptus marginata* woodlands), Type 4 (*Melaleuca preissiana* damplands) or Type 5 (Mixed Shrub damplands), and grading into Type 11 (wet forests and woodlands).

The description of the site given here notes that it is typical of the landforms regionally, but that the vegetation is a poor representation of the regional vegetation complex.

Lots 100 and 13 have been severely disturbed and now consist of two cleared areas and small areas of vegetation in the wettest part, but mainly regrowth of the shrub *Kunzea glabrescens* on old pasture with almost no other native species present. There appears to be no seedbank left in the soil and the topsoil has been severely degraded. This vegetation gives the superficial appearance of native vegetation but it is not. No priority species were found and there is limited potential for any rare species given the condition of the vegetation. If rare species are present they are most likely to be found in the wettest parts.

Most of the vegetation on these lots clearly does not meet the Bushplan definition of bushland ("land on which there is vegetation which is either a remainder of the natural vegetation of the land, or, if altered, is still representative of the structure and floristics of the natural vegetation, and provides the necessary habitat for native fauna"). It could only be restored to native vegetation by intensive and artificial treatment at great cost.

This highly disturbed area which is now a mono-specific thicket covers all three vegetation types (Jarrah-Banksia woodland, *Melaleuca preissiana* woodland and the wettest areas with *Melaleuca preissiana*, *Eucalyptus rudis* and *Melaleuca thaphiophylla*) although some of this last unit shows some sign of recovery in the wettest parts. The colour plate shows the extent of the degradation for the example of the Jarrah-Banksia woodlands.

The EPP wetland has little remaining fringing vegetation, and the surrounding wettest areas have limited although possibly significant regeneration of one species. The preliminary classification of much of the sumpland as Conservation Category (Hill *et al.* 1996) is doubtful. Only the wettest areas should clearly be preserved on the basis of rarity and condition, and these will require intensive revegetation.

Much of this land is in poor condition and its status within the rest of the Bushplan site is not clear from only the vegetation and flora values. There are other issues to consider including the extent of the wetlands to be preserved and the status of the adjoining land.

 36

This degraded portion joins good vegetated areas to the east and west (although divided from the west by a large cleared corridor for a powerline). These issues cannot be settled solely on the basis of vegetation and condition, and further discussion is required with government.

HSA
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LOTS 100 and 13,

TREEBY ROAD, ANKETELL.

RARE FLORA.

Prepared by

Hart, Simpson and Associates Pty Ltd

for

Well Holdings Pty Ltd

September 2000

CONTENTS.

1. SUMMARY.

Lots 100 and 13 off Treeby Rd in Anketell are proposed for urban development. They are part of a site nominated as Bushplan Site 270. An assessment of the vegetation and flora was carried out in autumn 1999 by Hart, Simpson and Associates. This concluded that the vegetation was heavily disturbed but there was some potential for rare flora to be present based on regional records. As part of the environmental assessment of the proposal a rare flora survey was requested.

The site is partly cleared for intensive horticulture. There are also Jarrah-Banksia woodlands reduced to a few trees over regrowth of Kunzea shrubs, and various wetland areas mostly degraded to regrowth.

An intensive study was carried out on 23rd September 2000 to search for rare flora species. In total 108 native species were recognised. Weeds are abundant on the site but the species were not examined or recorded. No Declared Rare Flora species were found. The only Priority species found was *Jacksonia sericea* (Priority 3) which was found in the initial survey. This species is scarce but widespread regionally in the Perth region, and occurs on adjacent land. The presence of this species is not sufficient to give the block a high conservation value. Priority species are not protected by legislation.

The opportunity was taken to examine the entire flora present and the condition of the vegetation. The study confirmed that the vegetation is severely degraded. Much of it is regenerating from pasture and has a very low density of native species. Many of the 108 native species recorded are present in very small numbers, and other species common in this vegetation unit are missing.

There are limited numbers of rare species known in the general region and in this habitat. The most likely Declared Rare Flora species are *Drakaea elastica*, a small orchid, which has been recorded nearby to the north, the Spider Orchid *Caladenia huegelii*, and two small donkey orchids. Particular attention was given to orchids, and 13 species were found. Some of these were present in very small numbers, including some common species. All but a few leaves could be confirmed as not being any rare or Priority species.

Given the history of grazing and the poor state of the vegetation it is concluded that there is very limited potential for any other rare or Priority species to occur on the site. No further work can be justified.

2. INTRODUCTION.

Lots 100 and 13 off Treeby Rd in Anketell are proposed for urban development. They are part of a site nominated as Bushplan Site 270. An assessment of the vegetation and flora was carried out in autumn 1999 by Hart, Simpson and Associates. This concluded that the vegetation was heavily disturbed but there was some potential for rare flora to be present based on regional records. As part of the environmental assessment of the proposal a rare flora survey was requested.

Specifically the survey was carried out to:

- Review the existing rare flora records in the general area.
- Search for any rare species present.
- Review the potential for any rare species to be present.

The results of the study are given here.

3. METHODS.

A listing of rare flora species known from the region was obtained from the Department of Conservation and Land Management rare flora database and other information, and the habitats of species which might be present were examined from collections in the W.A. Herbarium and other information.

The site was examined by making extensive traverses by vehicle and on foot with two people on 23/9/00. This season was chosen to be at about the peak flowering season for the Declared Rare Flora species which might be present. All native species encountered were recorded and either identified or at least shown to not be any Declared Rare Flora or Priority species.

The opportunity was also taken to examine the total flora present and the condition of the vegetation.

Weeds are abundant on the site but the species were not examined or recorded.

4. RESULTS.

The rare flora species known in the general area are listed in Table 1 (next page). The closest Declared Rare Flora species are:

- *Drakaea elastica* known from immediately to the north, although the known population may have been lost. This would probably occur in low-lying Banksia woodlands or the fringe of wet areas.

- *Caladenia huegelii* known to the west and north. This would occur in Banksia woodland.

- *Diuris micrantha* known to the west. This would occur in wet sites.

- *Diuris purdei* known to the east. This would occur in wet sites.

Various Priority species are known including:

- *Tripterococcus paniculatus* (Priority 1). A single plant was found to the south-east in the previous survey on the edge of a low-lying area. This species is restricted to similar habitats on the south and east of Perth where it is threatened by urban expansion.

- *Jacksonia sericea* (Priority 3) which was widespread on adjacent land in the previous survey, mainly in and along the edge of the low-lying areas. It is widespread on the coastal plain but mainly in the Perth region.

- *Aotus cordifolia* (Priority 3) which was found once in the previous survey on adjacent land in a wet area. This species is widespread along the Darling Scarp and associated wet areas on the coastal plain from north of Perth south to Witchcliffe.

- *Verticordia lindleyi* ssp. *lindleyi* (Priority 4), known further to the north.

- The aquatic *Aponogeton hexatepalus* (Priority 4), known to the west.

A range of other species known more widely could also be present.

The entire list of 108 native plant species recorded on the site in this survey is given in Appendix 1.

TABLE 1. Rare species known in the general area.

CATEGORY	SPECIES	SOURCE
DECLARED RARE FLORA		
	Caladenia huegelii	CALM database
	Diuris micrantha	CALM database
	Diuris purdei	CALM database
	Drakaea elastica	CALM database
PRIORITY 1		
	Acacia lasiocarpa var. bracteolata (long peduncle variant)	CALM database
	Tripterococcus paniculatus	Previous survey
PRIORITY 3		
	Aotus cordifolia	Previous survey
	Jacksonia sericea	Previous survey
PRIORITY 4		
	Aponogeton hexatepalus	CALM database
	Dodonaea hackettiana	CALM database
	Verticordia lindleyi ssp. lindleyi	CALM database

No Declared Rare Flora species were found on the site.

The only Priority species found was *Jacksonia sericea* (Priority 3). Approximately 15 individuals were seen, mainly in the northern part of the block. Priority 3 species are defined by CALM as "Poorly known taxa. Taxa which are known from several populations, and the taxa are not believed to be under immediate threat (ie. not currently endangered), either due to the number of populations (generally >5), or known populations being large, and either widespread or protected. Such taxa are under consideration for declaration as 'rare flora' but are in need of further survey".

Particular attention was given to orchids, and 13 species were found. Some of these were present in very small numbers, including some common species. All but one clump of a few leaves of *Caladenia* with no flowers could be identified or at least confirmed as not being the rare species listed above.

The site is part of the Bassendean Dunes Complex and originally had a typical vegetation of a mosaic of Banksia woodland with some Jarrah, Sheoak and *Eucalyptus todtiana* on the uplands interspersed with low-lying areas with Melaleucas over shrubs and sedges. There is also one wet area which holds water for some time but dries out in summer.

The field work confirmed that the vegetation is severely degraded. Some of the site is cleared and continues to be used for intensive horticulture. Most of the site has been cleared for pasture many years ago and now has only scattered original trees and understorey plants which survived. The only areas with a significant proportion of original vegetation are around the one wet area with free water and in a few parts of the dampland areas. The entire site has also been affected by drains which are joined to adjacent properties.

Since grazing stopped and a fire, there has been dense regrowth of *Kunzea ericifolia* over most of the site, and in the wettest parts of *Astartea fascicularis*.

The abundance of the species in Appendix 1 was scored as:

\+ One to a few plants only seen
++ Plants scattered about or at least numerous in some part of the site
+++ Large numbers of plants present

This is scored in terms of the number of individuals present now, not what was there originally. Only a handful of species are common as individuals, and no species are present in their original numbers except *Kunzea ericifolia* and *Astartea fascicularis*. which have proliferated greatly.

The flora is now dominated by a few hardy species.

5. DISCUSSION.

An intensive survey produced 108 native species. Weeds are abundant but were not examined. No Declared Rare Flora species were found. The only Priority species found was *Jacksonia sericea* (Priority 3) which was found adjacent in the initial survey. This species is scarce but widespread regionally in the Perth region, and occurs on the adjacent land. Priority species are not protected by legislation, although their presence is normally considered. The presence of this one Priority 3 species is not sufficient to give the block a high conservation value.

There are limited numbers of rare species known in the general region and in this habitat. The most likely Declared Rare Flora species are *Drakaea elastica*, a small orchid, which has been recorded nearby to the north, the Spider Orchid *Caladenia huegelii*, and two small donkey orchids. Particular attention was given to orchids, and 13 species were found. Some of these were present in very small numbers, including some normally common species. All but one clump of a few Caladenia leaves without flowers could be confirmed as not being any rare or Priority species, and the chance that these will be any rare or Priority species is extremely small.

The present study has confirmed that the vegetation is severely degraded. Much of it is regenerating from pasture and has a very low density of native species. Many of the 108 native species recorded are present in very small numbers, and other species originally common in this vegetation unit are completely missing.

The bushland does not meet the definition of bushland given in Perth's Bushplan ("land on which there is vegetation which is either a remainder of the natural vegetation of the land, or, if altered, is still representative of the structure and floristics of the natural vegetation, and provides the necessary habitat for native fauna"). Almost all of the vegetation on the area considered here no longer has the structure or floristics. Plots of $100m^2$ would probably yield only a few species over most of the block. The only areas with anything like the original vegetation are around the one wet area which has free water and a few of the better dampland areas. It is understood that these areas are proposed for preservation in the development plan.

Given the small number of rare species locally, the failure to find anything but one Priority 3 species in the current survey, the history of grazing and the poor state of the vegetation it is concluded that there is limited potential for any other rare or Priority species to occur on the site. No further work can be justified.

APPENDIX 1. List of the native flora, with abundance scored as:

\+ One to a few plants only seen
++ Plants scattered about or at least numerous in some part of the site
+++ Large numbers of plants present

SPECIES	ABUNDANCE
DICOTYLEDONS	
APIACEAE	
Centella asiatica	++
ASTERACEAE	
Rhodanthe citrina	+
Cotula coronopifolia	+
Senecio hispidula	+
CASUARINACEAE	
Allocasuarina fraseriana	+
CRASSULACEAE	
Crassula sp.	++
DILLENIACEAE	
Hibbertia subvaginata	++
DROSERACEAE	
Drosera erythrorhiza	+++
Drosera gigantea	+
Drosera glanduligera	+++
Drosera macrantha	++
Drosera menziesii	++
Drosera neesii	+
Drosera pallida	+
Drosera pulchella	++
Drosera sp. rosette	+++
EPACRIDACEAE	
Leucopogon australis	+
Leucopogon conostephioides	++
GOODENIACEAE	
Dampiera linearis	+
?Velleia trinervis	
HALORAGACEAE	
Gonocarpus ?pithyoides	++

	ABUNDANCE
LAURACEAE	
Cassytha sp.	++
LOBELIACEAE	
Lobelia alata	+
LOGANIACEAE	
Phyllangium paradoxum	+
LORANTHACEAE	
Nuytsia floribunda	+
MIMOSACEAE	
Acacia huegelii	+
Acacia pulchella	++
Acacia saligna	+
Acacia ?stenoptera	+
MYRTACEAE	
Agonis linearifolia	++
Astartea fascicularis	+++
Calothamnus lateralis	++
Eucalyptus marginata	++
Eucalyptus rudis	+++
Eucalyptus todtiana	+
Hypocalymma angustifolium	+++
Hypocalymma robustum	++
Kunzea ericifolia	+++
Melaleuca lateritia	++
Melaleuca polygaloides	++
Melaleuca preissiana	++
Melaleuca rhaphiophylla	+++
Melaleuca teretifolia	++
Melaleuca thymoides	++
Melaleuca viminea	++
Scholtzia involucrata	++
PAPILIONACEAE	
Aotus gracillimum	+++
Aotus procumbens	+++
Bossiaea eriocarpa	++
Euchilopsis linearis	++

	ABUNDANCE
Eutaxia virgata	++
Gompholobium tomentosum	++
Hardenbergia comptoniana	+
Hovea ?trisperma	+
Jacksonia furcellata	+
Jacksonia sericea	+
Pultenaea reticulata	++
POLYGALACEAE	
Comesperma calymega	+
PROTEACEAE	
Adenanthos cygnorum	+
Banksia attenuata	+
Banksia ilicifolia	+
Banksia menziesii	+
Petrophile linearis	+
RUBIACEAE	
Opercularia hispidula	+
RUTACEAE	
Philotheca spicata	+
SANTALACEAE	
Exocarpos sparteus	+
STYLIDIACEAE	
Stylidium brunonianum	++
Stylidium piliferum	++
MONOCOTYLEDONS	
ANTHERICACEAE	
Thysanotus manglesianus	+
Thysanotus multiflorus	+
Thysanotus patersonii	+
COLCHICACEAE	
Burchardia congesta	+++

	ABUNDANCE
COMMELINACEAE	
Cartonema philydroides	++
CYPERACEAE	
Baumea articulata	+
Baumea ?rubiginosa	+
Cyathochaeta ?equitans	+
Lepidosperma longitudinale	+++
Schoenus efoliatus	+++
DASYPOGONACEAE	
Dasypogon bromeliifolius	+++
Lomandra caespitosa	+
Lomandra hermaphrodita	+
HAEMODORACEAE	
Conostylis juncea	++
Haemodorum sp.	+
Phlebocarya ciliata	++
IRIDACEAE	
Patersonia occidentalis	+
Patersonia sp. occidentalis (swamp form)	+
JUNCACEAE	
Juncus pallidus	+++
ORCHIDACEAE	
Caladenia discoidea	+
Caladenia flava	+++
Caladenia latifolia	++
Cyrtostylis sp.	++
Diuris aff. corymbosa	+
Leporella fimbriata	+
Leptoceras menziesii	+
Microtis media ssp. media	+++
Pterostylis aff. nana	++
Pterostylis recurva	+
Pterostylis aff. vittata	++
Pyrorchis nigricans	+
Thelymitra pauciflora	++

	ABUNDANCE
PHORMIACEAE	
Dianella revoluta	+
POACEAE	
Amphipogon ?debilis	+
RESTIONACEAE	
Desmocladus flexuosus	+
Dielsia stenostachya	+++
Hypolaena exsulca	+++
Lyginia imberbis	++
Meeboldina scariosa	++
XANTHORRHOEACEAE	
Xanthorrhoea preissii	+++

Bushplan Site 270
9-1-98

↑
track E

Area A

track W →

Area B

Bushplan Site 270

9-1-98

Area C

Area D

Site 7
Looking S
from lowest
point in
wetland
area GS 270

Site 7
Looking E
to road and
bushland
beyond GS270

Site 7
Looking SSE from low point to bankside BS270

Site 3
Looking E into deep wetland
BS 270

Site 4
(Slide 04)
Banksia
Woodland
Ridge 65270

Sit 4 (adj)
'Ne
br
w

5273 WA 3169(C) METRO REGIONAL AREA & EXT. RUN 11 (5233-5311) 1:20000 15-DEC-92 920676

5050 WA 3166(C) METRO REGIONAL AREA & EXT. RUN 10 (5001-5087) 1:20000 11-DEC-92 920676