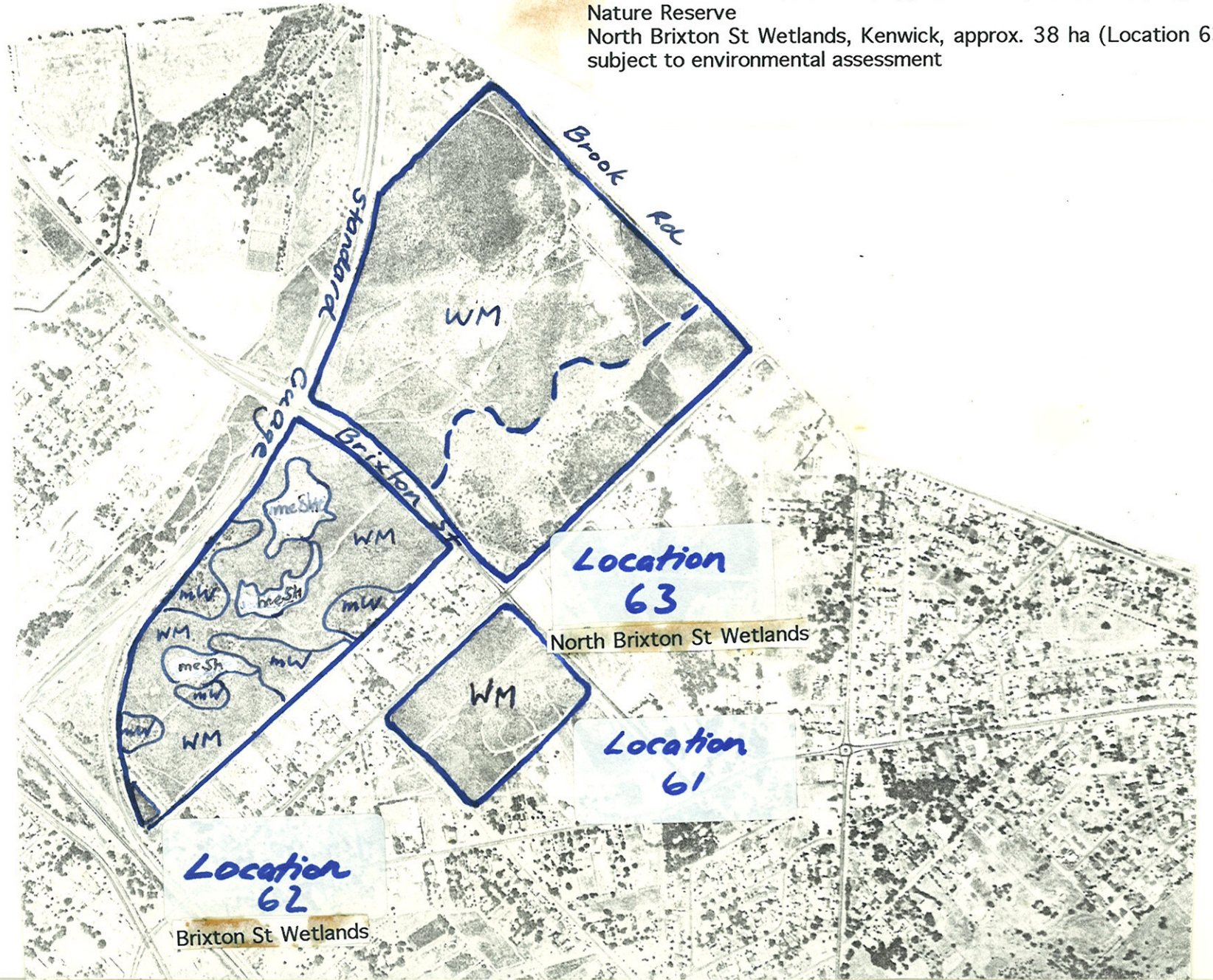
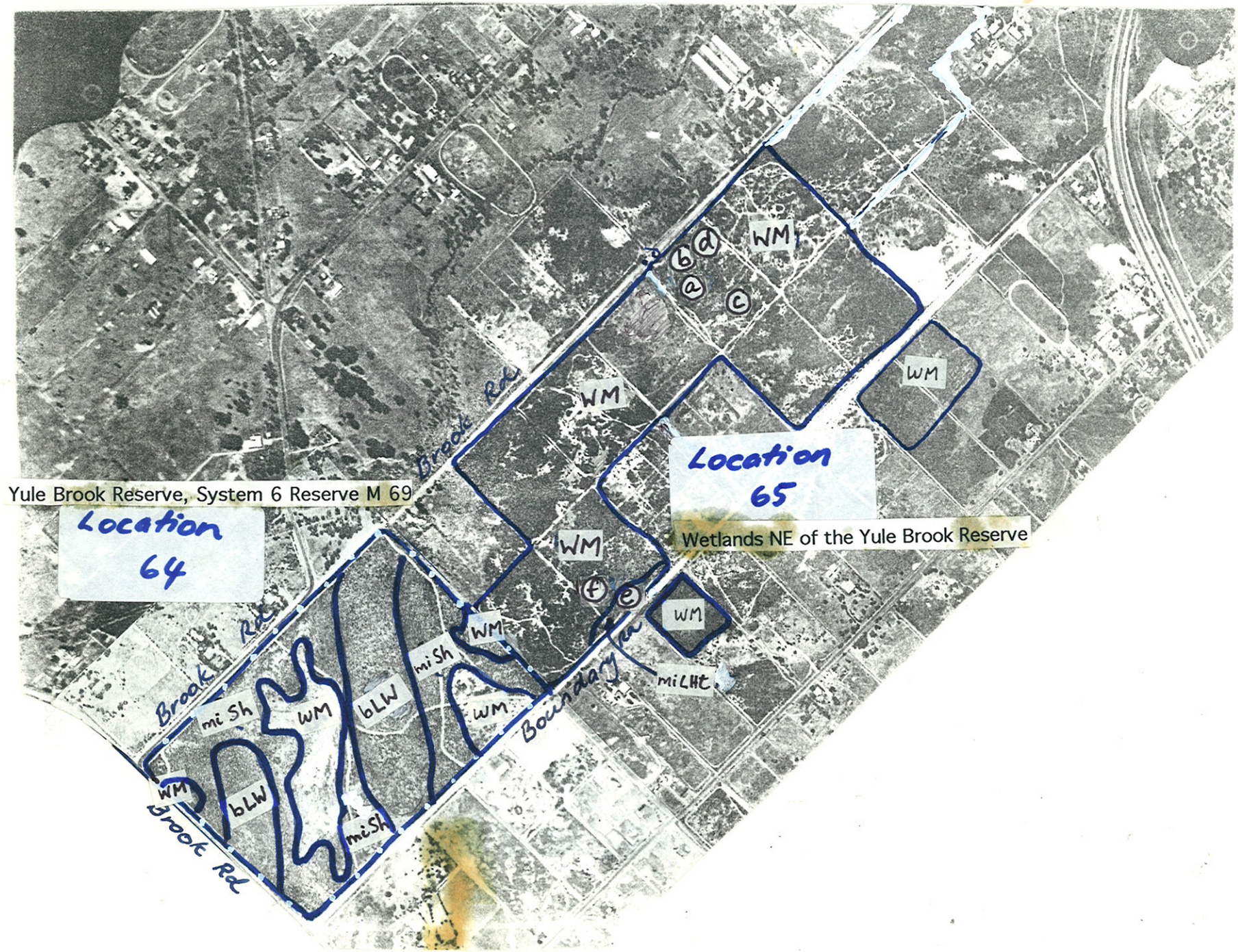
Vegetation Map Area 17a

Canning Wetlands, Locations 62 & 63
Brixton St Wetlands, Kenwick, approx 19 ha (Location 62) - government land, proposed Nature Reserve
North Brixton St Wetlands, Kenwick, approx. 38 ha (Location 63) - private land currently subject to environmental assessment

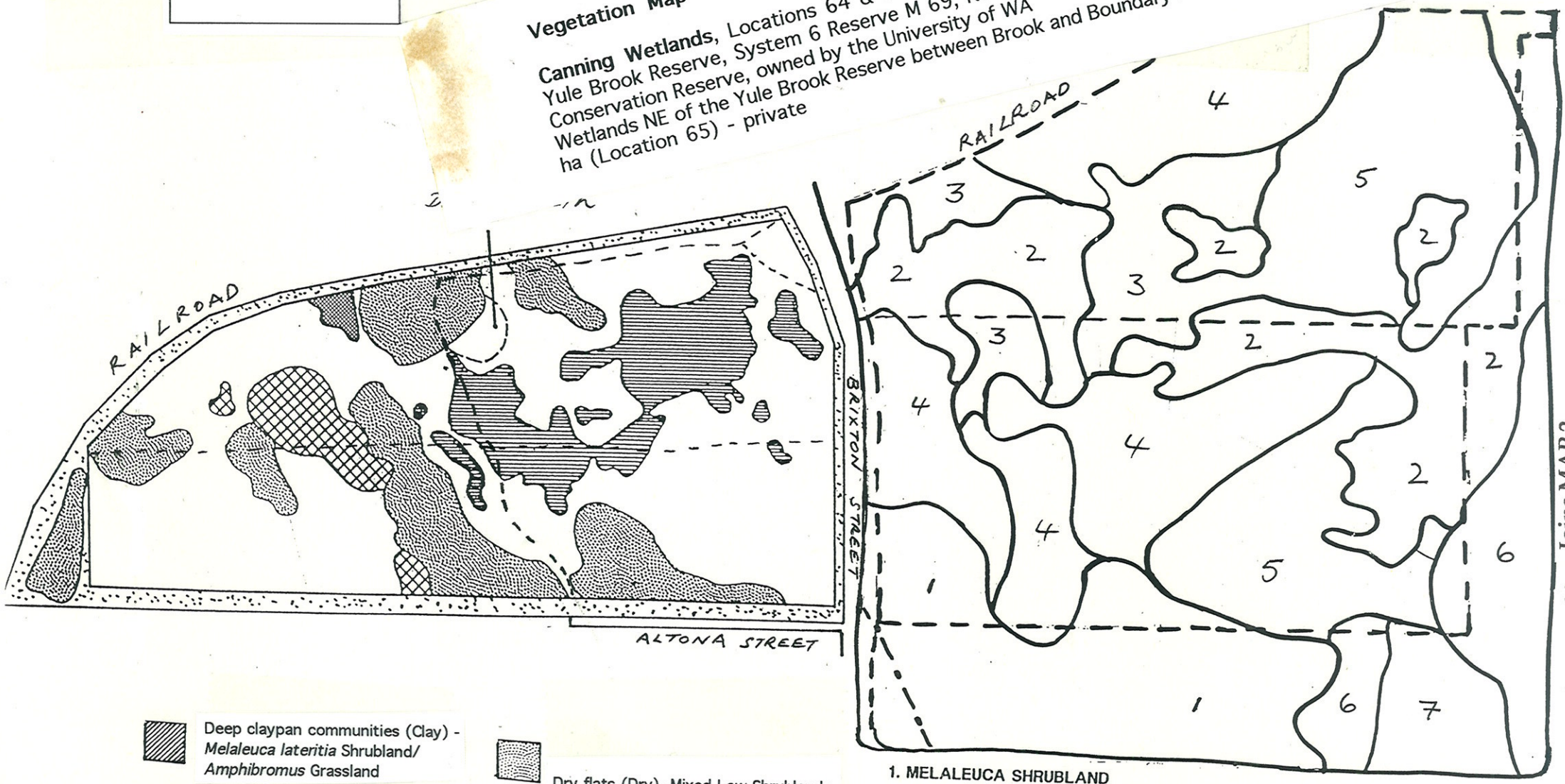



Yule Brook Reserve, System 6 Reserve M 69
Location 64
Location 65
Wetlands NE of the Yule Brook Reserve
Brook Rd
Brook Rd
Brook Rd
Boundary
WM
WM
WM
WM
WM
WM
WM
WM
6d
a
c
f
e
mi Sh
mi Sh
mi Sh
bLW
bLW
miLHt

CELL A

Vegetation Map Area 17b

Canning Wetlands, Locations 64 & 65
Yule Brook Reserve, System 6 Reserve M 69, Kenwick, approx. 28 ha (Location 64) - Flora Conservation Reserve, owned by the University of WA
Wetlands NE of the Yule Brook Reserve between Brook and Boundary Rds, Kenwick, approx. 34 ha (Location 65) - private



Deep claypan communities (Clay) - *Melaleuca lateritia* Shrubland/ *Amphibromus* Grassland

Shallow claypans (Wet) - *Pericalymma* Open Heath

Wet Flats (Vim) - *Viminaria juncea* Tall Shrubland

Dry flats (Dry)- Mixed Low Shrublands

Uplands (Marri) - Marri Woodlands

Disturbed areas (Disturb)

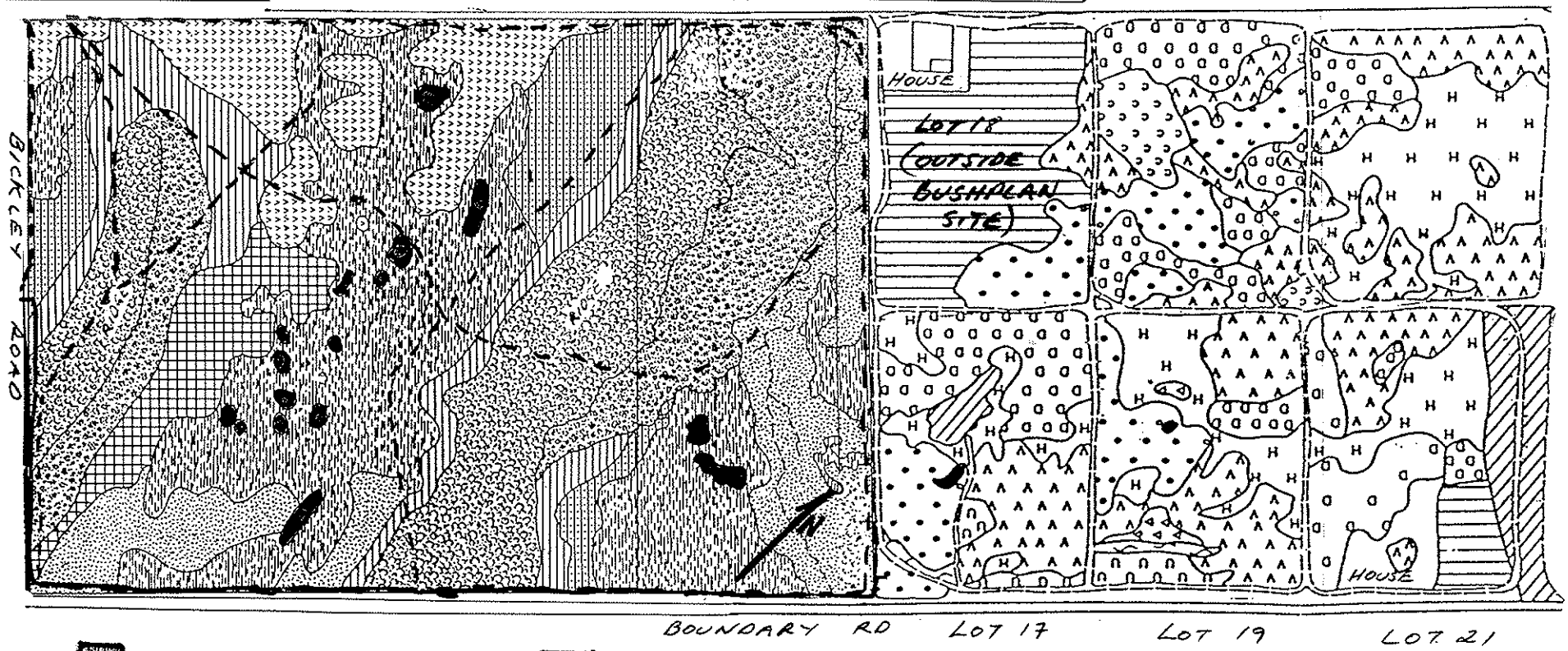
1. MELALEUCA SHRUBLAND
2. LEPTOCARPUS FLATS
3. HYPOCALYMNA/VERTICORDIA LOW SHRUBLAND
4. VIMINARIA TALL SHRUBLAND
5. MIXED LOW SHRUBLAND
6. PERICALYMNA LOW SHRUBLAND
7. EREMAEA LOW SHRUBLAND

Ioims MAP 2

MAP 1

CELL C

CELL D



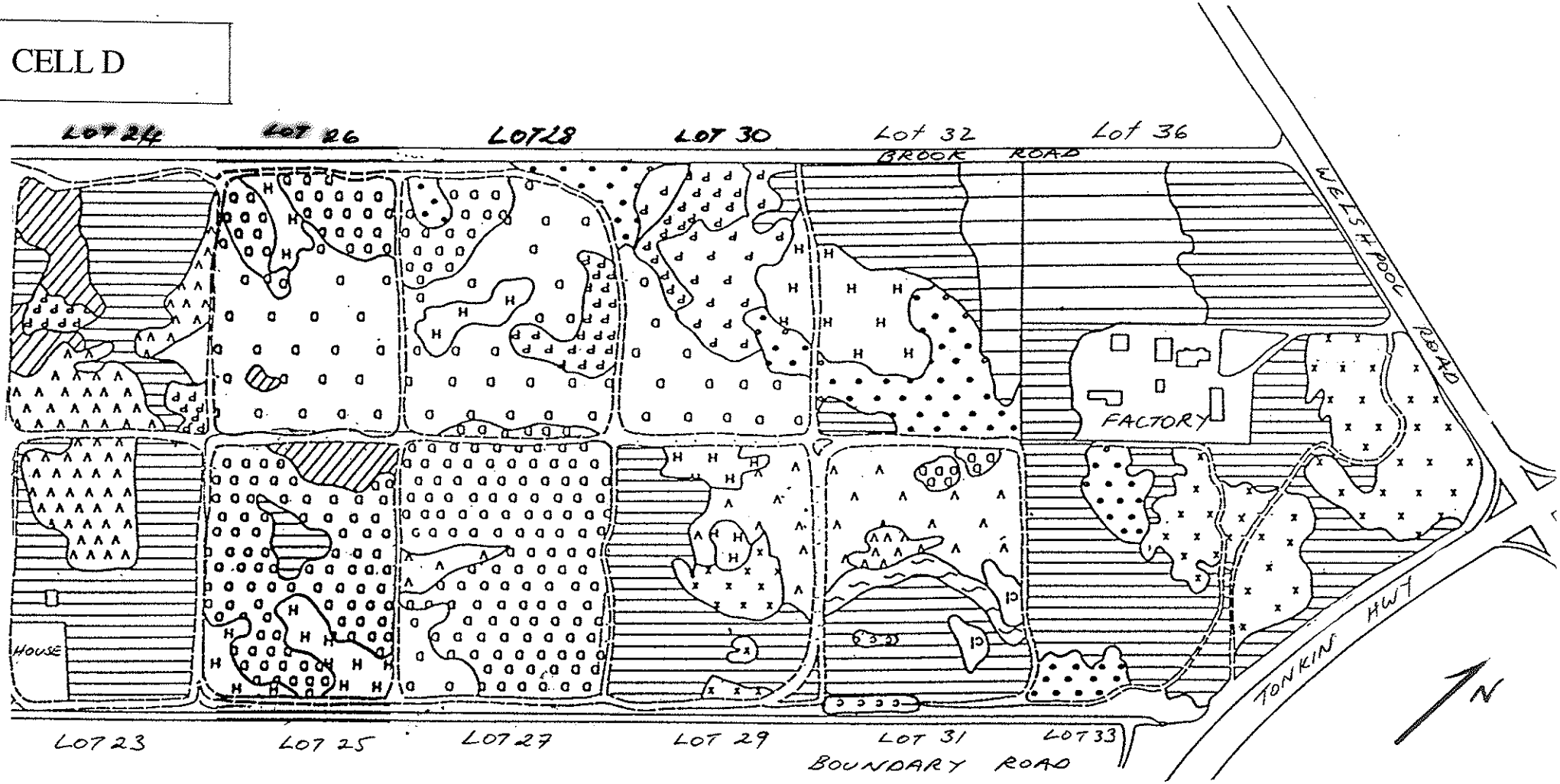
Joins MAP 1

Joins MAP 3

MAP 2

- Leptocarpus flat
- Leptospermum–Restio
- Leptospermum mixed scrub
- Actinostrobus scrub
- Mixed scrub
- Tall scrub
- Banksia trees (on ridge)
- Eremaea scrub
- Mound

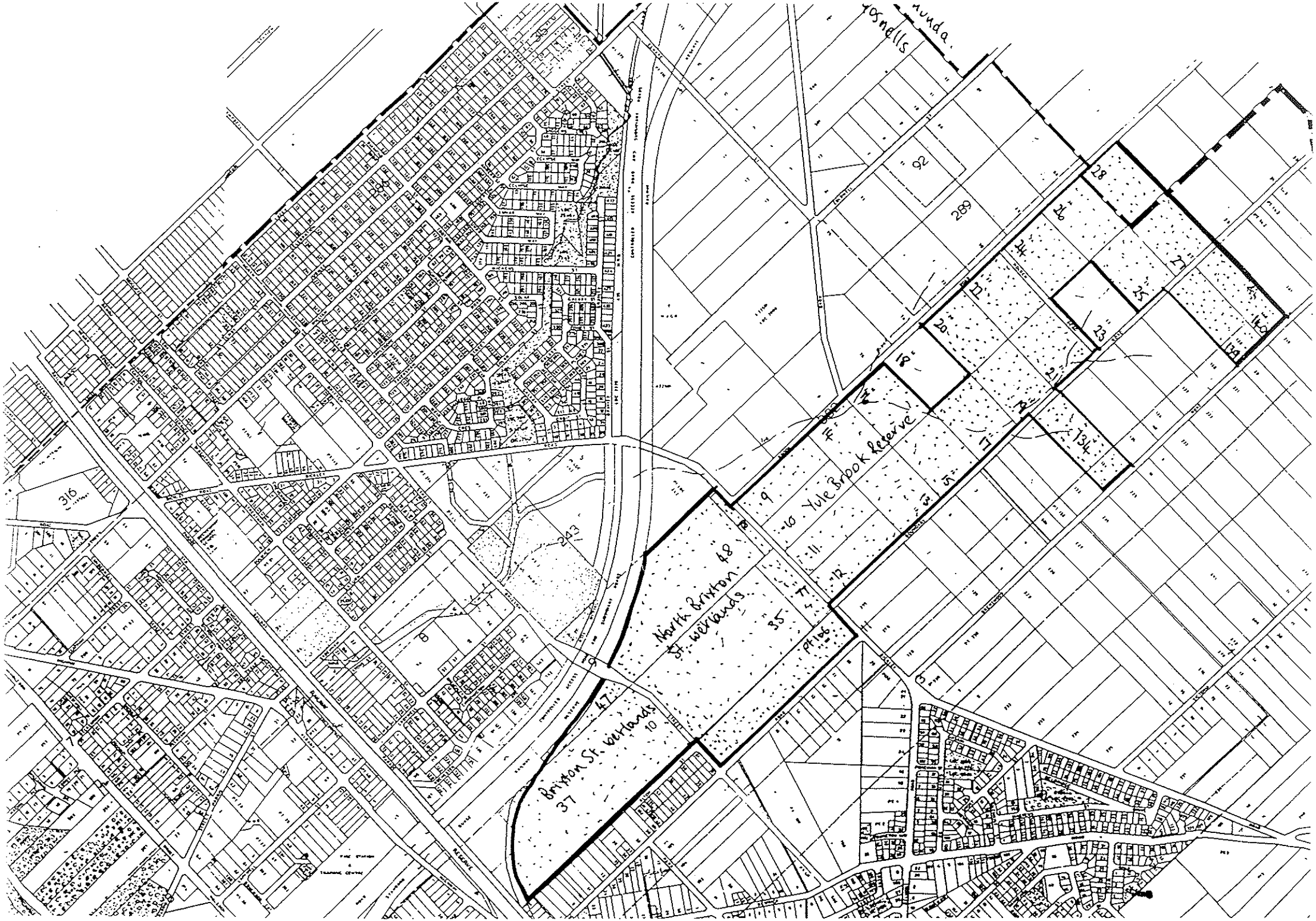
CELL D



Joins MAP 2

MAP 3

- Disturbed areas dominated by Weeds and Grasses with occasional Sedges, Hypocalymma and Eucalyptus spp.
- Recently burnt area of previous community.
- Low Open Woodland of Melaleuca rhaphiophylla and Melaleuca preissiana with occasional Banksia littoralis over tall mixed Myrtaceae spp. -Proteaceae spp. - Actinostrobus pyramidalis over Sedges.
- Open Heath of Hypocalymma angustifolium - Myrtaceae spp. over low Sedges and Grasses.
- Disturbed area of previous community.
- Closed Heath of Myrtaceae spp. - Proteaceae spp. - Actinostrobus pyramidalis over Sedges.
- Disturbed area of previous community.
- Closed Heath of Verticordia plumosa - Hypocalymma angustifolium with emergent Viminaria juncea.
- Open woodland to Low Open Woodland of Eucalyptus rudis - Melaleuca rhaphiophylla over Sedges and Grasses.
- Halophytic Complex of Sarcocornia quinqueflora and Sedges.
- Mixed Open Heath of Myrtaceae spp. over Grasses and Sedges.
- Tall Shrubland of Acacia saligna - Cytisus proliferus over mixed Melaleuca lateritia and Myrtaceae spp. over dense Lepidosperma longitudinale.
- Recently burnt and disturbed area of previous community.
- Low Woodland of Melaleuca rhaphiophylla over Melaleuca lateritia and Acacia lasiocarpa.
- Low Closed Heath of Verticordia plumosa - Verticordia densiflora - Verticordia acerosa.
- Low Open Woodland of Banksia menziesii over Regelia ciliata over mixed Sedges.
- Sedgelands of Cyperaceae spp. with emergent Actinostrobus pyramidalis.


Yonge
92
289
28
26
24
25
23
21
20
18
134
316
243
8
9
10
11
12
Yvie Brook Reserve
North Brixton
St. wetlands
48
35
pt 36
Brixton St. wetlands
47
10
37

OPPORTUNITIES/CONSTRAINTS TO URBANISATION

CATEGORY ONE AREAS
Areas considered inappropriate and/or unsuitable for any development.

CATEGORY TWO AREAS
Areas considered unsuitable and/or undesirable for urban development but may be used for passive and active recreation, to enhance the urban setting or incorporated in multiple use corridors.

11.5. Recommendations

For the purposes of water resource management the following recommendations are made:

11.5.1 Prior to rezoning, areas being considered as future urban areas in the Middle Canning Catchment, should be preceded by and incorporate a strategic stormwater management plan for the relevant planning unit, which recognises the overall water resources objectives of this strategy. (See Section 1.1, Figure 1, Section 9.1.6 and Section 10.5)

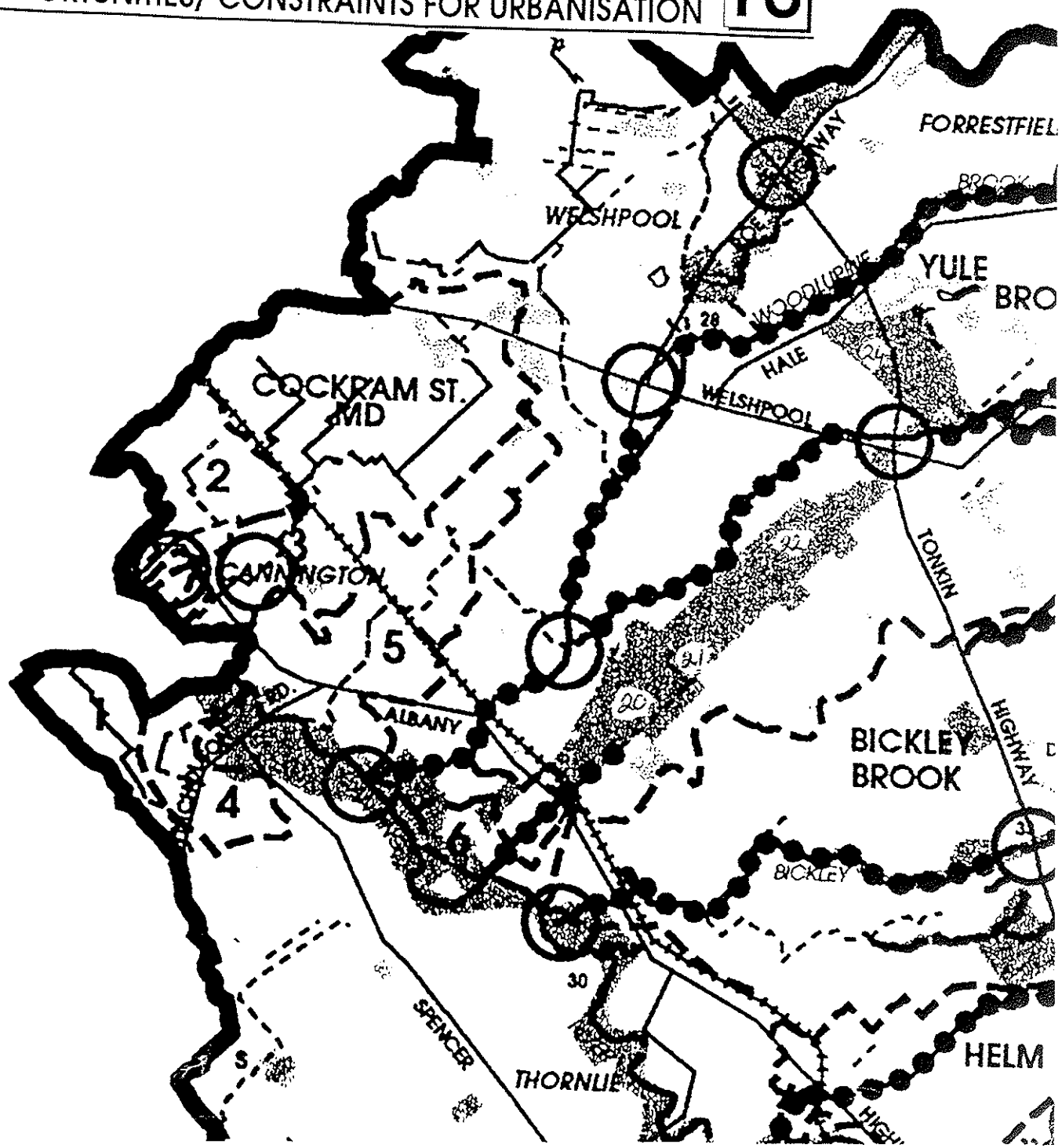
11.5.2 Given the nature of the areas to be urbanised a stratigraphic analysis should be undertaken as an essential input to the planning unit strategic stormwater plan. This should take into account the local geomorphic framework as well as analysis at the wider precinct, planning unit and catchment level. (See Section 3.3)

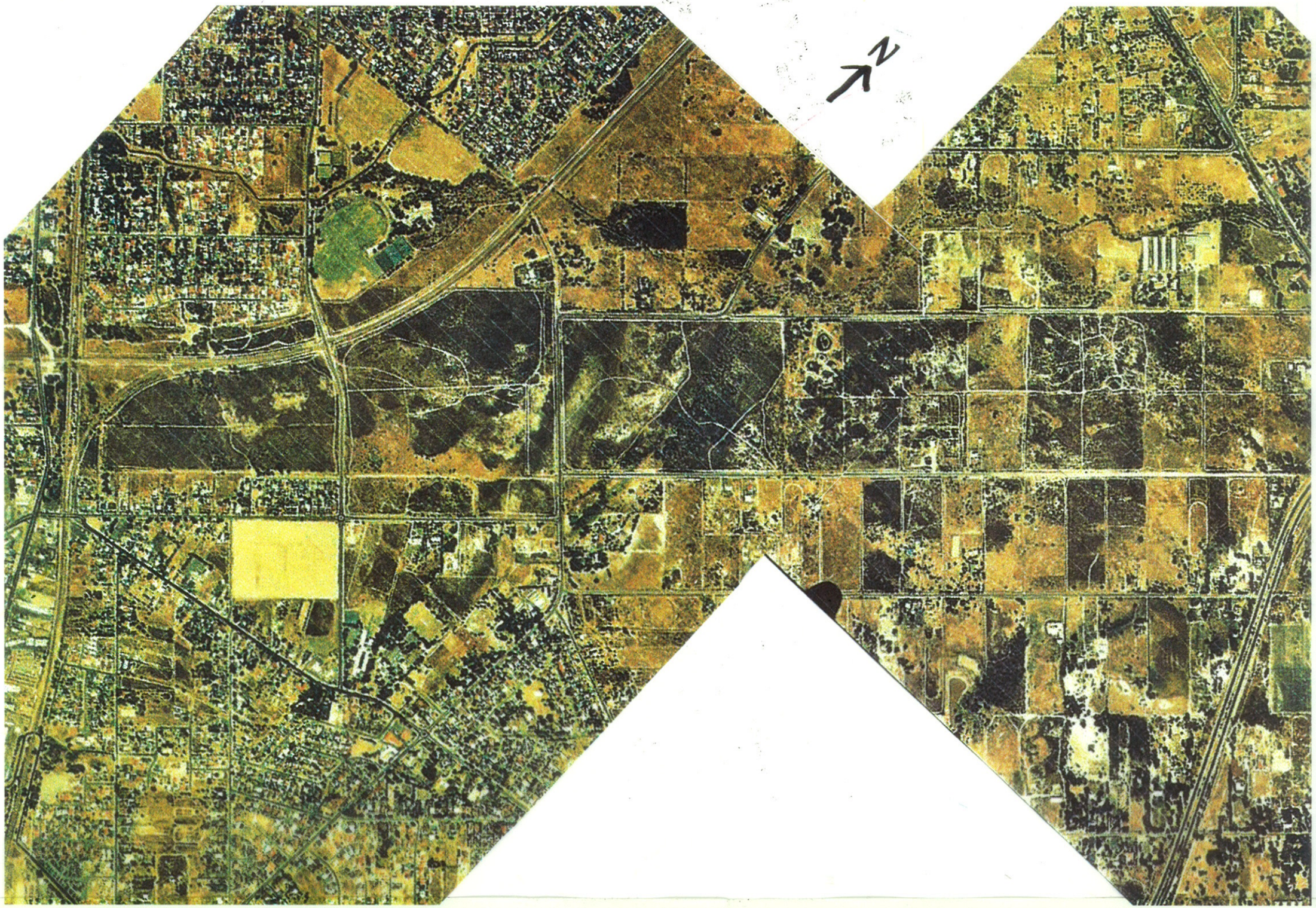
11.5.3 As a matter of priority, floodplain modelling be carried out for catchments containing proposed urban areas to determine the extent of flooding. (See Section 3.3.4, Section 7.3 and Section 9.1.4)

11.5.4 A water monitoring programme be undertaken of the main stormwater conveyance conduits and receiving bodies for proposed future urban areas for both water quantity (peak discharge rate and average annual yield) and water quality. This can be used as base line data to set performance criteria for best management practices. (See Section 3.3.6, Section 7.4, Section 9.1.3 and Section 9.1.5)

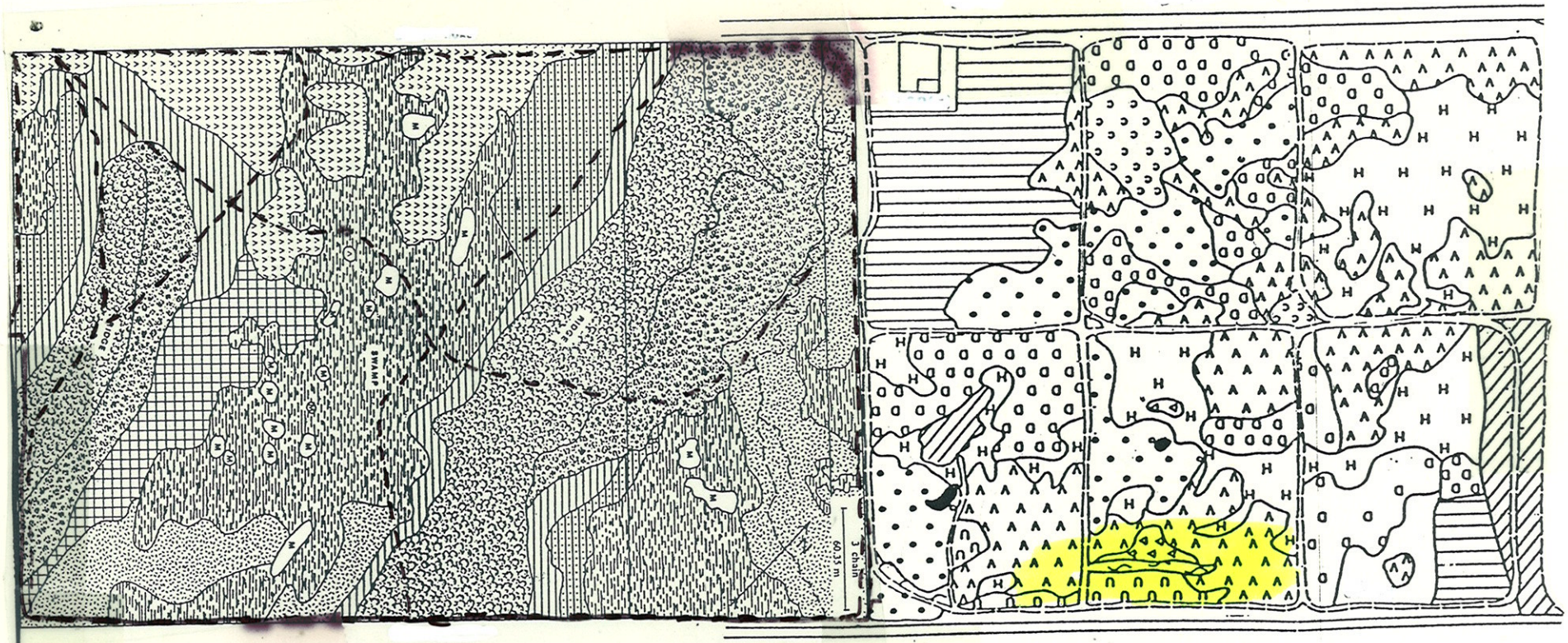
11.5.5 To protect water resource values, Category One and Category Two areas identified in Figure 10 should be precluded from residential development. However, the boundaries of the Category One and Category Two areas which includes areas not previously indentifed for protection should be considered preliminary only, until appropriate stratigraphic analysis, water monitoring and flood mapping is undertaken. (See Section 9.1.2, Table 6 and Section 10.4)

OPPORTUNITIES/ CONSTRAINTS FOR URBANISATION 10





Diffuse heath
Railroad
1. MELALEUCA SHRUBLAND
2. LEPTOCARPUS FLATS
3. HYPOCALYMNA/VERTICORDIA LOW SHRUBLAND
4. VIMINARIA TALL SHRUBLAND
5. MIXED LOW SHRUBLAND
6. PERICALYMNA LOW SHRUBLAND
7. EREMAEA LOW SHRUBLAND



Leptocarpus flat

Leptospermum–Restio

Leptospermum mixed scrub

Actinostrobus scrub

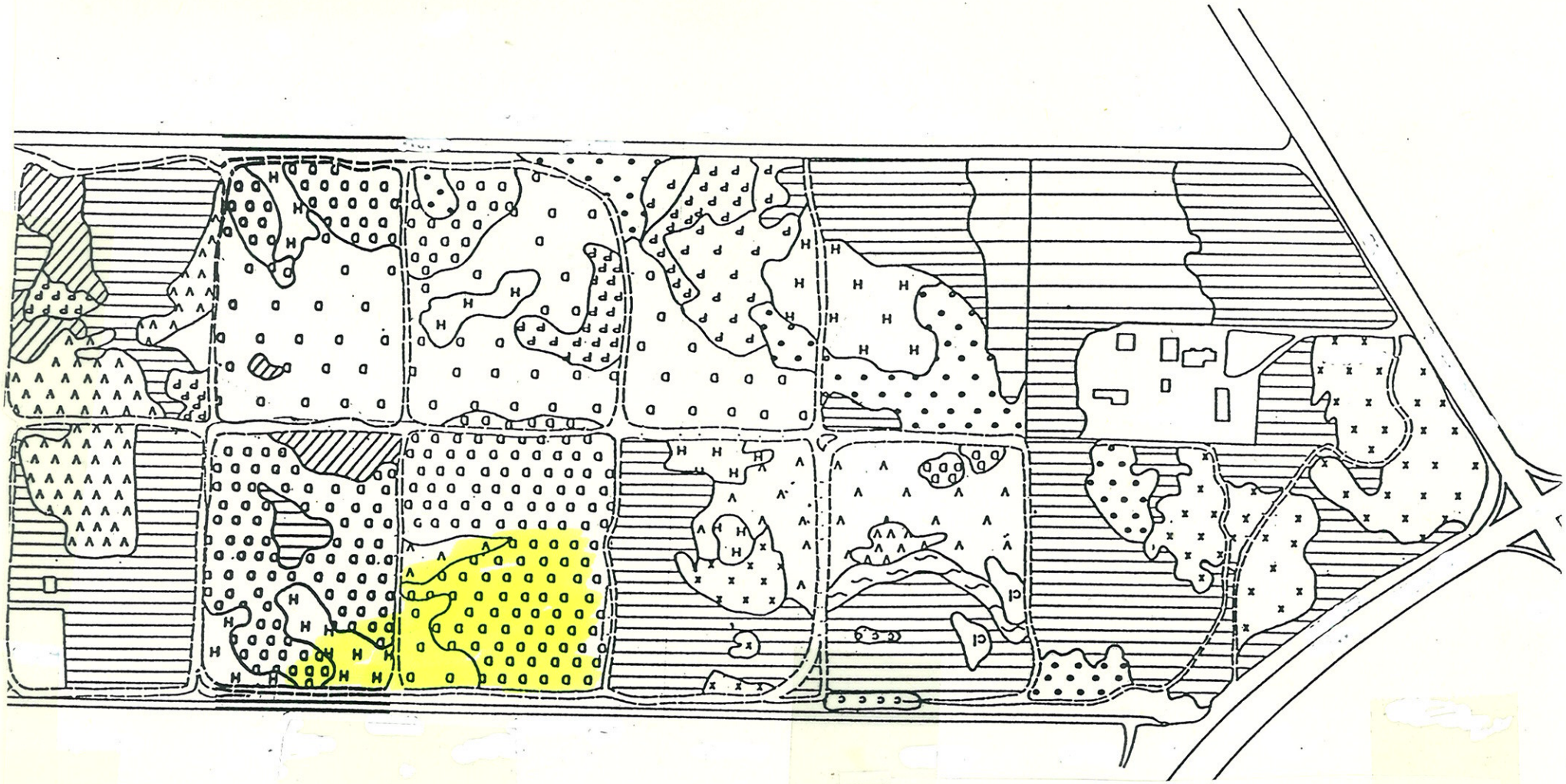
Mixed scrub

Tall scrub

Banksia trees (on ridge)

Eremaea scrub

M Mound



Disturbed areas dominated by Weeds and Grasses with occasional Sedges, Hypocalymma and Eucalyptus spp.

Recently burnt area of previous community.

Low Open Woodland of Melaleuca rhaphiophylla and Melaleuca preissiana with occasional Banksia littoralis over tall mixed Myrtaceae spp. -Proteaceae spp. - Actinostrobus pyramidalis over Sedges.

Open Heath of Hypocalymma angustifolium - Myrtaceae spp. over low Sedges and Grasses.

Disturbed area of previous community.

Closed Heath of Myrtaceae spp. - Proteaceae spp. - Actinostrobus pyramidalis over Sedges.

Disturbed area of previous community.

Closed Heath of Verticordia plumosa - Hypocalymma angustifolium with emergent Viminaria juncea.

Open woodland to Low Open Woodland of Eucalyptus rudis - Melaleuca rhaphiophylla over Sedges and Grasses.

Halophytic Complex of Sarcocornia quinqueflora and Sedges.

Mixed Open Heath of Myrtaceae spp. over Grasses and Sedges.

Tall Shrubland of Acacia saligna - Cytisus proliferus over mixed Melaleuca lateritia and Myrtaceae spp. over dense Lepidosperma longitudinale.

Recently burnt and disturbed area of previous community.

Low Woodland of Melaleuca rhaphiophylla over Melaleuca lateritia and Acacia lasiocarpa.

Low Closed Heath of Verticordia plumosa - Verticordia densiflora - Verticordia acerosa.

Low Open Woodland of Banksia menziesii over Regelia ciliata over mixed Sedges.

Sedgelands of Cyperaceae spp. with emergent Actinostrobus pyramidalis.

441 P01/02 JUN 26 '97 11:55
0621772095 AUSTRALIAN HERITAGE

AUSTRALIAN HERITAGE COMMISSION

FACSIMILE MESSAGE

TO: BRONWEN KEIGHERY

FAX: 08 9485 1187

FROM: MELINDA BROUWER

DATE: 26.6.97 PAGES FOLLOWING: 1

SUBJECT: BRIXTON ST

MESSAGE

Dear Bronwen

This is the boundary which is proposed to go to the next Commission meeting.

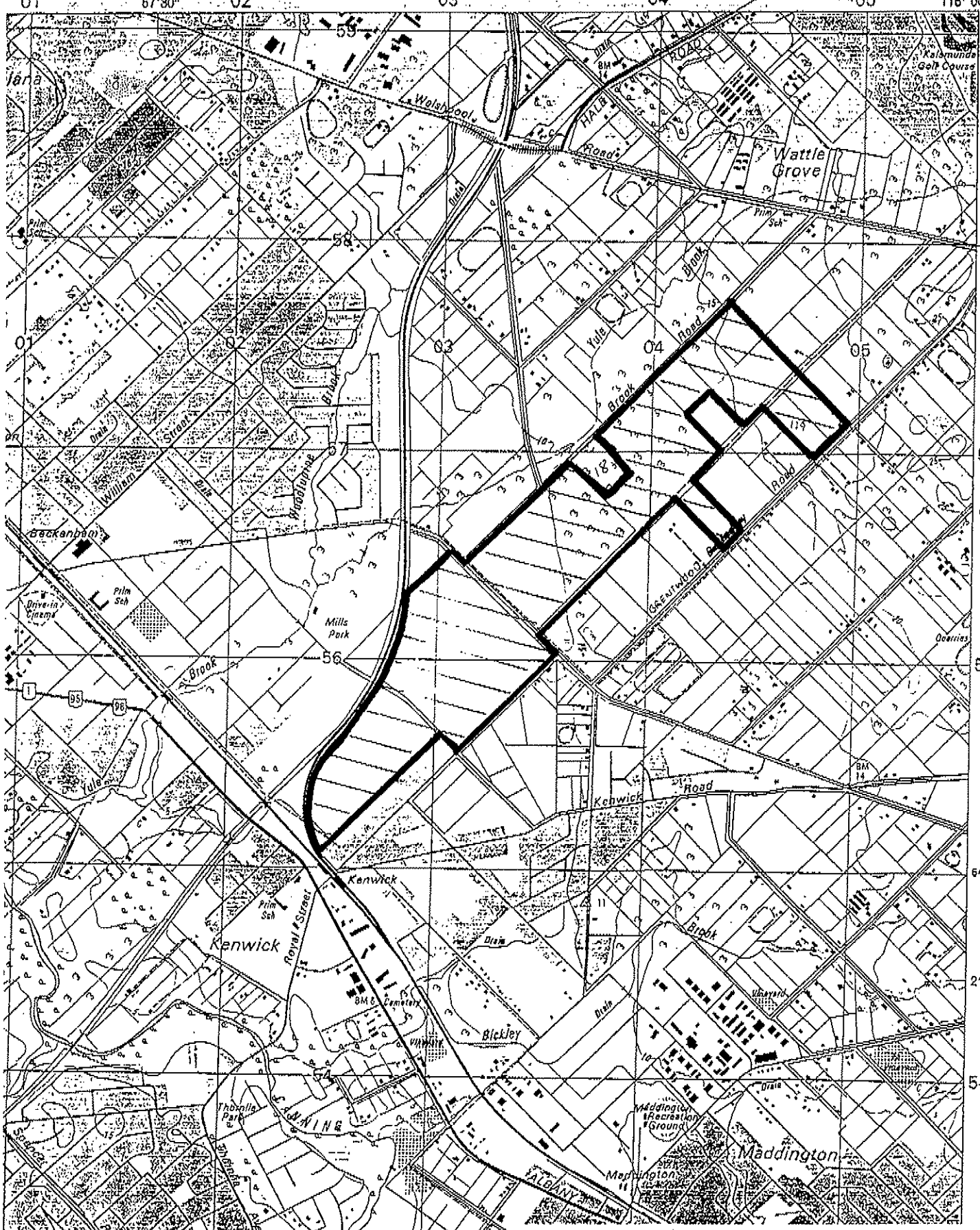
I think this is all I needed to send you - please let me know if I've forgotten something

Cheers

Melinda

MTA HOUSE 39 BRISBANE AVENUE BARTON ACT 2600 PHONE (06) 217 2111 MTA FAX (06) 217 2095 IBM FAX (06) 217 2000
GPO BOX 1567 CANBERRA ACT 2601 AUSTRALIA

REFER TO THIS MAP AS SHEET 2033-I NE (EDITION 1)
SERIES R 811
KALAMUNDA 12 km MIDLAND 16 km



BRIXTON STREET
Name: and ASSOCIATED WETLANDS
State: W.A.
Scale: 1:25,000
File No: 6/2/1/6

BUSHLAND PLANT SURVEY RECORDING SHEET 1- use pencil only

BUSHLAND AREA Lot 106 - Cell A SITE NUMBER L106 Ø1

DATE TRIP 27/08/08 RECORDERS

DATE TRIP RECORDERS

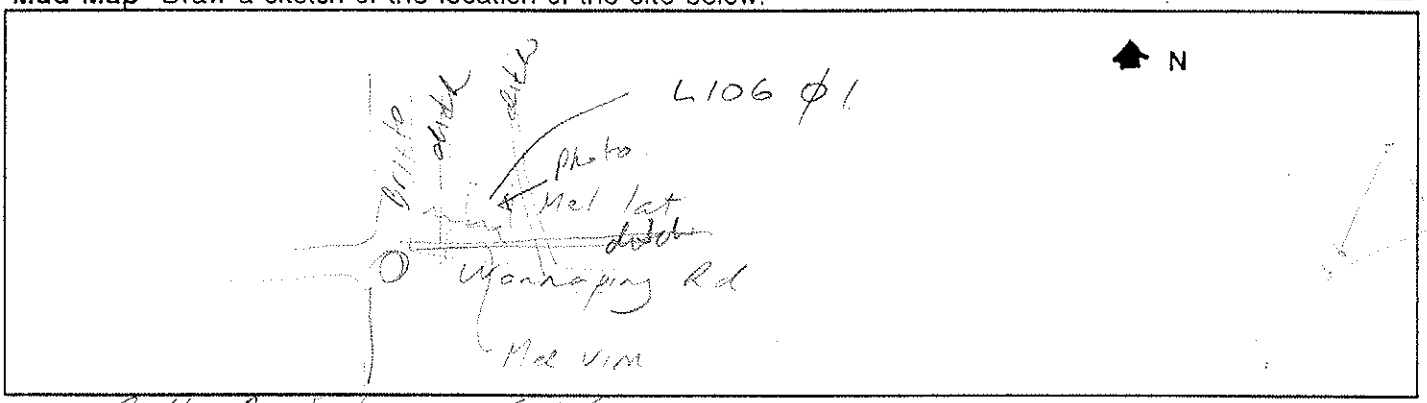
DATE TRIP RECORDERS

BOTANIST Cate Jones, Graham Keighery

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.



Cell A Extreme SW corner

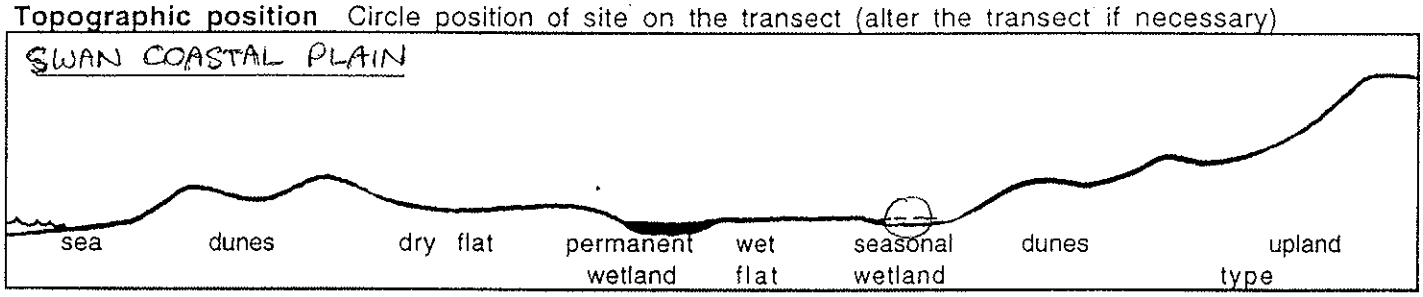
Road Location | Corner Lorton St and

Geographic Location | Latitude: 33° 01' 49" S | Longitude: 115° 58' 32" E | Altitude:

Reference Map Used: Cockburn ± 6m

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: sand, loamy sand, sandy loam, loam, clay, laterite | **Colour** brown

Exposed rock: type | % surface

Sub-surface Soil: sand, loamy sand, sandy loam, loam, clay, laterite | **Colour** brown

Rock: type | depth to rock

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

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

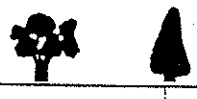
BUSHLAND PLANT SURVEY RECORDING SHEET 2 - use pencil only

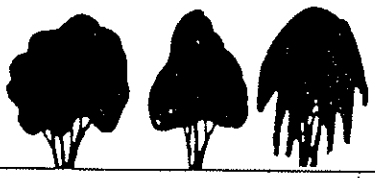
3. VEGETATION STRUCTURE AND COVER

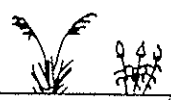
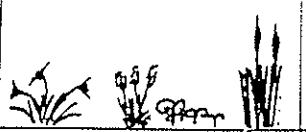
From '*Bushland Plant Survey*' written by B. Keighery (1994) and published by the Wildflower Society of WA (Inc.), PO Box 64 Nedlands WA 6008.

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

Cover Class 2-10% 11-30% 31 - 70% over 71%

	TREES over 30m	TREES 10 - 30m	TREES under 10m	MALLEES over 8m	MALLEES under 8m
LIFE FORM					30m 10m
COVER CLASS (%)	PLANT No ↓	No. ↓	No. ↓	No. ↓	No. ↓
DOMINANT SPECIES*					

	SHRUBS over 2m	SHRUBS 2m - 1m	SHRUBS under 1m
LIFE FORM			2m 1m
COVER CLASS (%)	No ↓	30-70% (1-3m / 40%) No. ↓	No. ↓
DOMINANT SPECIES*		Mel. lanata	

	GRASSES	HERBS	SEDGES	OTHER
LIFE FORM			 1m	
COVER CLASS (%)	2-10% No. ↓	30-70% No. ↓	10-30% (0.5, 20%) No. ↓	No. ↓
DOMINANT SPECIES*	Briza min.	Spar. bulb	Mesb. cana	
	Lol. rig	Rom rosea		

WEEDS — % COVER

	%	COMMENTS
Trees/Mallees	%	
Shrubs	%	
Grasses	%	
Herbs	%	
Sedges	%	

4. VEGETATION CONDITION SCALE

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

* If more than 3 dominant species write "mixed".

BUSHLAND PLANT SURVEY RECORDING SHEET 3 (2005 update) – use pencil only

5. SPECIES PRESCENCE **Label** each plant with **plant's number, site code, date and plant's name or working name if required**

SITE No L106 01
Date 27/08/08

Record on sheet
- **Column 1** **plant name**
- **Column 2** **plant number (#)**
- **Column 3** **identification checked** - √ when checked

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	#	ID
MALLEES		
SHRUBS		
Mel. rhaph		✓
Mel. lateritia		✓
Mel. viminea subsp. viminea		✓

SHRUBS (cont.)	#	ID
GRASSES		
~~Ehrh. max~~		
*Lolium ?multiflorum		✓
*Briza minor		✓
HERBS		
Sparaxis bulbifera		✓
Thysanotus tenuis (swamp)		✓
Vill. subsp.		✓
~~*Romulea rosea~~ Isoetes sp.		X
*Lotus subu.		✓
Trachyandra thrysoides		✓
*Cotula coronopifolia		✓
*Lythrum hyssopifolia		✓
Hibbertia hypericoides (swamp)		✓
Schoen. juncoides		✓
*Gall. tetragonum		✓
?Hypocalymma ~~robinsonii~~ OR patersonii		✓
Conostylis setigera		✓

HERBS (cont.)	#	ID
SEDGES		
Meeb. cana		✓
Eleocharis ?keigheryi		✓
Meeb. ?rogersii		✓
Chorizandra enodis		✓
Schoenus		X
ADJ Tetrolepis.		✓

*Neurapsis debilis ✓

BUSHLAND PLANT SURVEY RECORDING SHEET 3 (2005 update) – use pencil only

5. SPECIES PRESCENCE **Label** each plant with **plant's number, site code, date and plant's name or working name if required**

SITE No	L106 RD1
Date	27/09/08

Record on sheet
- **Column 1** plant name
- **Column 2** plant number (#)
- **Column 3** identification checked - √ when checked

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	#	ID
MALLEES		
SHRUBS		
Vim juncea		
Acac tastophapa var tasiocarpa		✓
Pimelea imbricata var major		✓
Kunz micrantha subsp micrantha		✓
Hyp. anglest (Darling Range)		✓
Hack. ~~tasiocarpa~~ tasiocarpa		✓
Gya cauliflora		✓
Lasi. spinosa		
Olea paniculata var		✓
Dry. praelegans var praelegans		✓
Vert. acerosa var acerosa		✓
Vert. densiflora var densiflora		
Hak. trifurcata		✓
Verticordia huegelii var huegelii		✓

SHRUBS (cont.)	#	ID
GRASSES		
Neurachne alopecuroidea		✓
Ehrharta hirta		✓
HERBS		
Senecio pinnatifolius		✓
Sparaxis bulbifera		✓
Drosera menziesii menziesii		✓
Stylidium diuris		✓
Stylidium laricifolium		✓
Patersonia occidentalis		✓
Trachymene pilosa		✓
Tetratheca hirsuta		✓
Lotus ~~australis~~ scoparius		✓
Drosera neesii		✓
Acacia cochlearis		✓
Stylidium [illegible]		✓
Dryandra glauca glauca		✓

HERBS (cont.)	#	ID
ADJ LOT-106 RD1		
Isoetes		✓
Schoenus [illegible]		✓
Sowerbaea [illegible]		✓
Schoenus [illegible]		✓
Centrolepis aristata		✓
Lomandra [illegible]		✓
Caladenia [illegible]		✓
Pterostylis [illegible]		✓
Dianella revoluta var revoluta		✓
Schoenus variiculmis		✓
Tribonanthes [illegible]		✓
Tribonanthes [illegible]		✓
Triglochin [illegible]		✓
SEDGES various		
Schoenus [illegible]		✓
Lepidosperma [illegible]		?
Chorizandra [illegible]		✓
Cyathochaeta avenacea		✓

BUSHLAND PLANT SURVEY RECORDING SHEET 1 (2005 update) – use pencil only

BUSHLAND AREA Lot 106 SITE NUMBER Lot 106 Ø2

DATE TRIP 27/08/08 BOTANIST RECORDERS

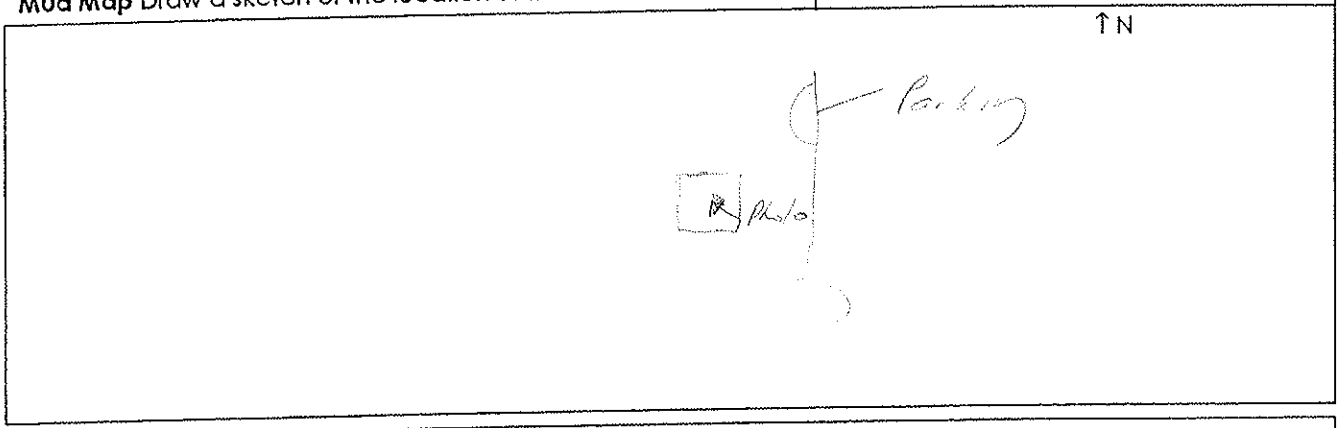
DATE TRIP BOTANIST RECORDERS

DATE TRIP BOTANIST RECORDERS

1. LOCATION of the QUADRAT/SAMPLE POINT

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

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



Road Location

Geographic Location Latitude 33° 01' 46" S Longitude 115° 58' 35" E

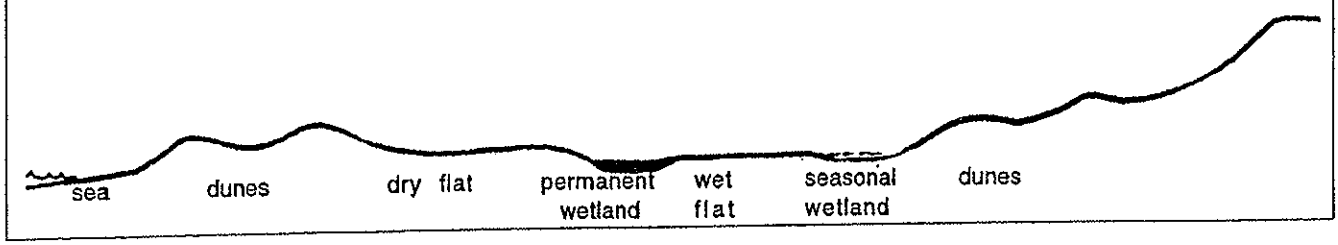
GPS Used: yes/no ***GPS Datum OR Reference Map Used:*** 1 8m

Photograph Photographer's Name C. Foss Photo No.

Topographic position Circle position of site on the transect (alter the transect if necessary eg. for Jarrah Forest)

SWAN COASTAL PLAIN

Upland or Wetland? (circle one)



2. SITE DATA Circle the correct response.

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

Surface Soil: sand, loamy sand, sandy loam, loam, clay, gravel/laterite ***Colour*** grey

Exposed Rock: type % surface

Sub-surface Soil: sand, loamy sand, sandy loam, loam, clay, gravel/laterite ***Colour***

Sub-surface Rock: type depth to rock

Drainage: well mod poor Water depth cm ***Wet:*** all year winter/spring na

Litter: % cover Depth cm

Bare Ground % cover

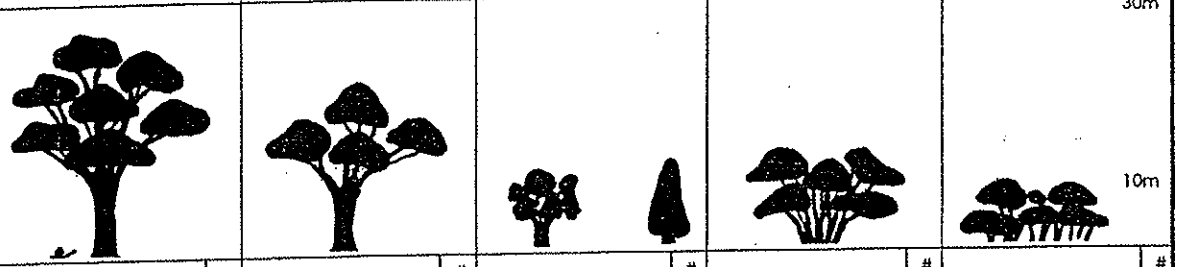
BUSHLAND PLANT SURVEY RECORDING SHEET 2 (2005 update) – use pencil only

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

3. VEGETATION STRUCTURE AND COVER

For each layer **record** – appropriate **growth form**, **cover class** (see below) and **dominant species** in their order of dominance, up to a maximum of 3 species. If more than 3 species are obviously dominant record as many as appropriate to describe each layer. For NVIS record max. height of layer & % crown cover to nearest 5%.

Cover Class	**2 – 10%**	**10 – 30%**	**30 – 70%**	**over 70%**

	TREES			MALLEES	
	over 30m	10 – 30m	under 10m	over 8m	under 8m
GROWTH FORM					
COVER CLASS (%)	#	#	#	#	#
HEIGHT & CROWN COVER (NVIS)					
DOMINANT SPECIES					

	SHRUBS		SHRUBS
	over 2m	2m – 1m	under 1m
GROWTH FORM			
COVER CLASS (%)	#	#	# >70%
HEIGHT & CROWN COVER (NVIS)			70%, 0.75m
DOMINANT SPECIES			Bank Jelmat Aca Acid Vert Lang

	GRASSES	HERBS	SEDGES	OTHER (eg. ferns)
GROWTH FORM				
COVER CLASS (%)	#	# 10-30%	#	#
HEIGHT & CROWN COVER (NVIS)				
DOMINANT SPECIES		Bocya Corstylis Dimeta		

4. VEGETATION CONDITION - Keighery (1994) Vegetation Condition Scale

1 'PRISTINE'		COMMENTS (give reasoning for choice)
2 EXCELLENT		
3 VERY GOOD		
4 GOOD		
5 DEGRADED		

BUSHLAND PLANT SURVEY RECORDING SHEET 3 (2005 update) – use pencil only

5. SPECIES PRESCENCE **Label** each plant with **plant's number, site code, date and plant's name or working name if required**

SITE No Lot 106 02
Date 27/08/08

Record on sheet
- **Column 1** **plant name**
- **Column 2** **plant number (#)**
- **Column 3** **identification checked** - √ when checked

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	#	ID
MALLEES		
SHRUBS		
Vim juncea		√
Bank. telmat		√
Acacia lasio		√
Hak. sulcata		√
Hak. erqust (DR)		√
Melaleuca phys		√
Vert. densi		√
Verticord. linearifolia		√
Hak. varia		√
Scae. lanc		√
Pimelea imb. var major		√
Jacksonia furc		√
Petrophile seminuda		√
Eutaxia virg		√

SHRUBS (cont.)	#	ID
GRASSES		
* Briza minor		√
Neurachne alo		√
* Vulpia		—
* Bromus max		√
Ech. long		√
HERBS		
Acaulk carad.		√
Wun. viv		√
Hyd. cuneata		√
Hydro alata		√
Drac. glauca		√
Drac. menz. menz		√
* Lupinus cosentinii		√
Velleia rotundifolia (Braxton)		√
Conostylis setosa	VSP	√
Borya sphaerocephala		√
Dasypogon bromeliifolius		√
Tab. purpurea	VSP	√
Cassytha glabella		√
* Ursinia anthemoides		√

HERBS (cont.)	#	ID
* Parent ? Lab		—
Caladenia sp.		√
Lom. micrantha		√
Drosera ? rosulata		√
Lasmanthe cornuta ssp rana		√
* Lotus suaveolens		√
Trymalium spathulatum		√
* Pterostylis ? barbata		?
[illegible]		
* Ixiolaena leptolepis		√
SEDGES		
Centrolep. cae		√
Cyath. avon		√
Mem. trem		√
Schoen. nitens		√
Lyginia barbata (dw.)		√
Adj. Charact. orig. area		√
Lepid. rostratum		√
Loc — 32° 01' 46" S; 115° 58'	34	
Vinc. multi		√

BUSHLAND PLANT SURVEY RECORDING SHEET 1 (2005 update) – use pencil only

BUSHLAND AREA LOT 106 SITE NUMBER L106 03

DATE TRIP 22/06/08 BOTANIST AJK, CT RECORDERS

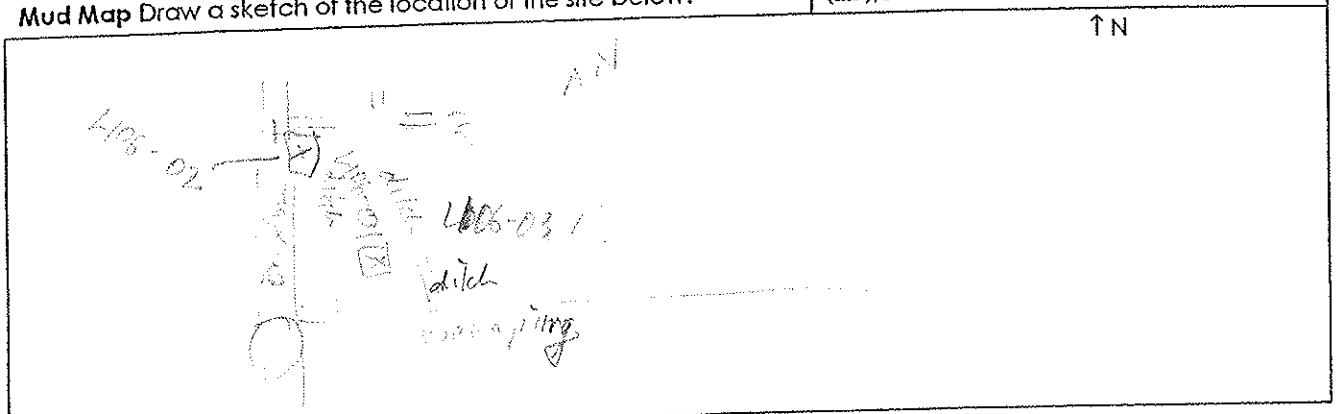
DATE TRIP BOTANIST RECORDERS

DATE TRIP BOTANIST RECORDERS

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/SAMPLE POINT

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



Road Location

Geographic Location **Latitude** 32° 01' 45" S **Longitude** 115° 58' 34" E ± 6m

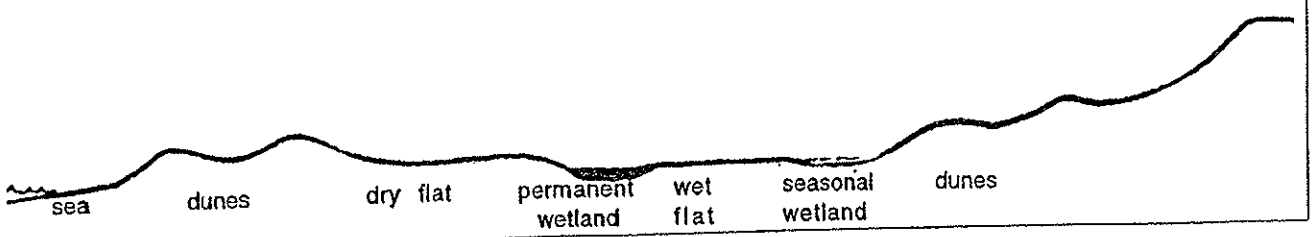
GPS Used: yes/no ***GPS Datum OR Reference Map Used:***

Photograph Photographer's Name C Tauss Photo No.

Topographic position Circle position of site on the transect (alter the transect if necessary eg. for Jarrah Forest)

Upland or Wetland? (circle one)

SWAN COASTAL PLAIN



2. SITE DATA Circle the correct response.

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

Surface Soil: sand, loamy sand, sandy loam, loam, clay, gravel/laterite ***Colour*** grey

Exposed Rock: type % surface

Sub-surface Soil: sand, loamy sand, sandy loam, loam, clay, gravel/laterite ***Colour*** grey

Sub-surface Rock: type depth to rock

Drainage: well mod poor **Water depth** cm ***Wet:*** all year winter/spring na

Litter: % cover

Depth cm

Bare Ground % cover

BUSHLAND PLANT SURVEY RECORDING SHEET 2 (2005 update) – use pencil only

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

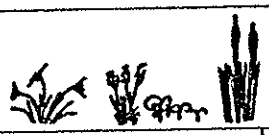
3. VEGETATION STRUCTURE AND COVER

For each layer **record** – appropriate **growth form**, **cover class** (see below) and **dominant species** in their order of dominance, up to a maximum of 3 species. If more than 3 species are obviously dominant record as many as appropriate to describe each layer. For NVIS record max. height of layer & % crown cover to nearest 5%.

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

	TREES			MALLEES	
	over 30m	10 – 30m	under 10m	over 8m	under 8m
GROWTH FORM					
COVER CLASS (%)					
HEIGHT & CROWN COVER (NVIS)					
DOMINANT SPECIES					

	SHRUBS		SHRUBS
	over 2m	2m – 1m	under 1m
GROWTH FORM	Scat. Vim juncea	Fire, reduced height	
COVER CLASS (%)		10 – 30%	2 – 10%
HEIGHT & CROWN COVER (NVIS)		25%	
DOMINANT SPECIES		Mel brevifolia Mel lat acut.	Ac. lasio

	GRASSES	HERBS	SEDGES	OTHER (eg. ferns)
GROWTH FORM				1m
COVER CLASS (%)		2 – 10 %	30 – 70%	
HEIGHT & CROWN COVER (NVIS)				
DOMINANT SPECIES		Sparax Pog. stricta.	Chact. anst Gahn tri.	

4. VEGETATION CONDITION - Keighery (1994) Vegetation Condition Scale

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

COMMENTS (give reasoning for choice)

P10 for RP2, R03

BUSHLAND PLANT SURVEY RECORDING SHEET 3 (2005 update) – use pencil only

5. SPECIES PRESCENCE **Label** each plant with **plant's number, site code, date and plant's name or working name if required**

SITE No L106 03
Date 27/08/05

Record on sheet
- **Column 1** plant name
- **Column 2** plant number (#)
- **Column 3** identification checked - √ when checked

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	#	ID
MALLEES		
SHRUBS		
Mel brevifolia		√
Mel lateriflora var. albiflora		√
Acac. lasio		√
Hypocal cuneat		√
Mel. uncinata subsp. uncinata		√

SHRUBS (cont.)	#	ID
GRASSES		
* Briz min		√
HERBS		
*Sparaxis bulb		√
* Horn foc		√
* Lotus subi		√
Pzoro. stricta		√
* Rom. rosea ?var australis		—
Utricularia multi		√
Tribon. australis		√
Thysanot. ? pat		√
* Arct. calend		√
* Ursin. anth.		√
* Parent lch		—
Scaevola lanceolata		√
Drosera ? bulbosa		—
Schoen juncea		√

HERBS (cont.)	#	ID
Vellia mucronata (Buxton)		√
SEDGES		
Cal tri		√
Chact. anst		√
Conn lepi anst		√
Lepid. long.		√
ADJ		
Lawrencia squamata		

BUSHLAND PLANT SURVEY RECORDING SHEET 3 (2005 update) – use pencil only

5. SPECIES PRESCENCE **Label** each plant with **plant's number, site code, date and plant's name or working name if required**

SITE No L106 R02

Date 27/08/08

Record on sheet
- **Column 1** plant name
- **Column 2** plant number (#)
- **Column 3** identification checked - √ when checked

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 R03	#	ID
Mel rhaph Dom. 70% over		
Mel lat { Tag Araph.		
over Acac nat		
32° 01' 46" 115° 58' 31"		
8m		
MALLEES		

SHRUBS	#	ID
Hyp. affin } 1.5m		
Mel vim } 2-15%		
Mel lat }		
Ac lasia } >70%		
Eutax virg } <1m		
Vim junc		
Hyp. ang.		
Hard drasi		
Mel rhaph		
3 basal leaves		
withered		
width at base x1		
x 2.5		

SHRUBS (cont.)	#	ID
Mel rhaph = Φ1 Mel / Ech ht		
?Juncus / Baumea		
Lepy. Glauca		
Shr Con		
GRASSES		
HERBS		
Trach hue		
Tetr. aur		
?Spergul. bulb		
Burch ?baird		
Samolus junce		
Nr + Nr 2		
reaction bar		

HERBS (cont.)	#	ID
Geranc Celt A		
* Lolium temul.		
* Lolium multi		
Conosperm att rhad	VSP	
Trachyscias	VSP	
? Hibbertia	VSP	
D Drum ? carinata		
Ac Solis		
Gnaph		
Stylia dichot		
Brach multiflore		
Cassytha racemosa		
Schoenus aspor		
Isotropis cune. ssp cuneif.		
Senecio		
Damp linearis		
Lepid rostrat. (2)		
32° 01' 47.5" + 7m		
115° 58' 35.E"		
SEDGES		
Meeb ?roy (= Φ1) 2-10%		
Chori ovat.		

BUSHLAND PLANT SURVEY RECORDING SHEET 1 (2005 update) – use pencil only

BUSHLAND AREA LOT 106 SITE NUMBER L106 Ø4

DATE TRIP 27/06/08 BOTANIST BK, CT RECORDERS

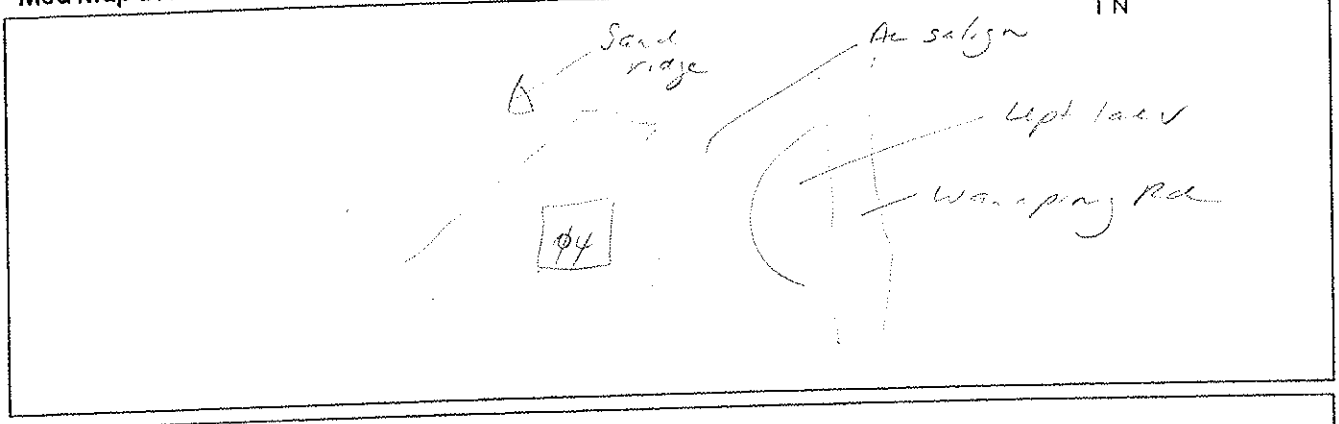
DATE TRIP BOTANIST RECORDERS

DATE TRIP BOTANIST RECORDERS

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/SAMPLE POINT

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



Road Location

Geographic Location Latitude 30° Ø1' 37" S Longitude 115° 58' 42" E ±7m

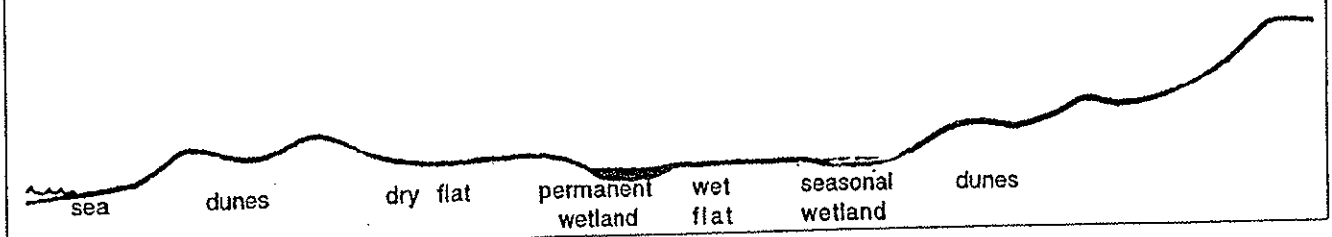
GPS Used: yes/no ***GPS Datum OR Reference Map Used:***

Photograph Photographer's Name C TAYLOR Photo No.

Topographic position Circle position of site on the transect (alter the transect if necessary eg. for Jarrah Forest)

Upland or Wetland? (circle one)

SWAN COASTAL PLAIN



2. SITE DATA Circle the correct response.

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

Surface Soil: sand, loamy sand, sandy loam, loam, clay, gravel/laterite ***Colour*** grey

Exposed Rock: type % surface

Sub-surface Soil: sand, loamy sand, sandy loam, loam, clay, gravel/laterite ***Colour*** grey

Sub-surface Rock: type depth to rock

Drainage: well mod poor Water depth cm ***Wet:*** all year winter/spring na

Litter: % cover ***Bare Ground*** % cover

Depth cm

BUSHLAND PLANT SURVEY RECORDING SHEET 2 (2005 update) – use pencil only

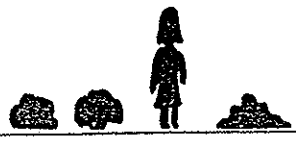
From '*Bushland Plant Survey*' written by B. Keighery (1994) and published by the Wildflower Society of WA (Inc.), PO Box 64 Nedlands WA 6008.

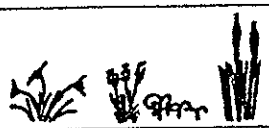
3. VEGETATION STRUCTURE AND COVER

For each layer **record** – appropriate **growth form, cover class** (see below) and **dominant species** in their order of dominance, up to a maximum of 3 species. If more than 3 species are obviously dominant record as many as appropriate to describe each layer. For NVIS record max. height of layer & % crown cover to nearest 5%.

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

	TREES			MALLEES	
	over 30m	10 – 30m	under 10m	over 8m	under 8m
GROWTH FORM					30m 10m
COVER CLASS (%)		#	#	#	#
HEIGHT & CROWN COVER (NVIS)					
DOMINANT SPECIES					

	SHRUBS		SHRUBS	
	over 2m	2m – 1m	under 1m	
GROWTH FORM	occ 7.2m, most tops dead fire		 2m 1m	
COVER CLASS (%)	2-10%	# 30-70%	#	#
HEIGHT & CROWN COVER (NVIS)		(30%)		
DOMINANT SPECIES	Vim juncea	Pen ellip		

	GRASSES	HERBS	SEDGES	OTHER (eg. ferns)
GROWTH FORM			 1m	
COVER CLASS (%)	#	#	>70% #	#
HEIGHT & CROWN COVER (NVIS)				
DOMINANT SPECIES			Trem trem	

4. VEGETATION CONDITION - Keighery (1994) Vegetation Condition Scale

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

COMMENTS (give reasoning for choice)

BUSHLAND PLANT SURVEY RECORDING SHEET 3 (2005 update) – use pencil only

. SPECIES PRESCENCE **Label** each plant with **plant's number, site code, date and plant's name or working name if required**

SITE No LOT 106 Ø4

Date 27/08/08

Record on sheet
- **Column 1** plant name
- **Column 2** plant number (#)
- **Column 3** **identification checked** - √ when checked

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	#	ID
MALLEES		
SHRUBS		
Mel uncin		
Vim juncea		
Pen ellip		
Calothan hirsutus		
Hak varia		
Verb. ?lina		
Acacia saligna		
Xanth ?brunis		

SHRUBS (cont.)	#	ID
GRASSES		
* Briza		
HERBS		
Lom calSP		
Dro glad		
Trib. ? aust		
Cassytha glabella) = Ø1		
* Hyp glabra		

HERBS (cont.)	#	ID
Ø Mostly female		
SEDGES		
Tren. tren		
Hyp. exsul		
Hyp. pusillum		
Schoen. unispicatus		
Meso retrog		
Lyg. inbetalis		
?Schoenus nigricans		
ADJ		
Cyt. leptos		
Gomph. tomentosa		
Stylid repens		

BUSHLAND PLANT SURVEY RECORDING SHEET 3 (2005 update) – use pencil only

5. SPECIES PRESCENCE **Label** each plant with **plant's number, site code, date and plant's name or working name if required**

SITE No	**Record on sheet**	• **Column 1**	**plant name**
Date		• **Column 2**	**plant number (#)**
		• **Column 3**	**identification checked** - √ when checked

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	#	ID
Burnt low lying section		
MALLEES		
SHRUBS		
Peri ellip		
Calo. hirsutus		
Kun pome		

SHRUBS (cont.)	#	ID
L106 D4		
GRASSES		
HERBS		
Drosera occidentalis		
Crassula colorata		
Trib australis		
Stylid diclet		

HERBS (cont.)	#	ID
SEDGES		
Schoenus benth		
32° 01' 37" 115° 58' 42" #6		
Schoenus tesquicampus		
Trees trunk		
Conostylis aust		
Cyath arenaria		
Stepid tons		

BUSHLAND PLANT SURVEY RECORDING SHEET 1 (2005 update) – use pencil only

BUSHLAND AREA Lot 106 SITE NUMBER L106 Ø5

DATE TRIP 28/06/08 BOTANIST CT, BOK RECORDERS

DATE TRIP BOTANIST RECORDERS

DATE TRIP BOTANIST RECORDERS

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/SAMPLE POINT

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

↑N

Road Location

Geographic Location Latitude 32° 01' 37" S Longitude 115° 58' 43" E ± 4m

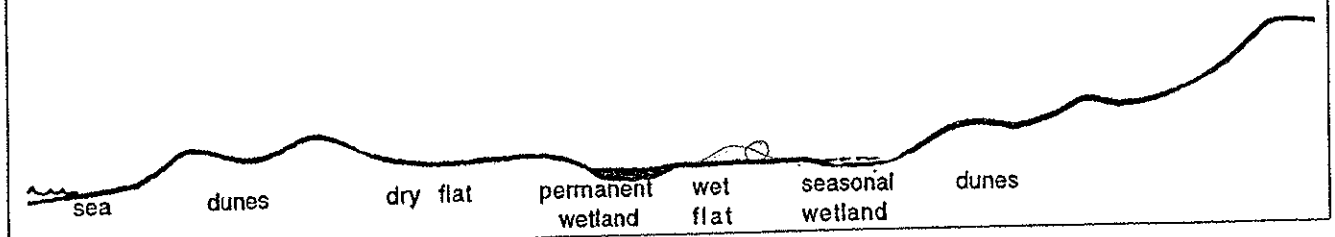
GPS Used: yes/no ***GPS Datum OR Reference Map Used:***

Photograph Photographer's Name Photo No.

Topographic position Circle position of site on the transect (alter the transect if necessary eg. for Jarrah Forest)

Upland or Wetland? (circle one)

SWAN COASTAL PLAIN



2. SITE DATA Circle the correct response.

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

Surface Soil: sand, loamy sand, sandy loam, loam, clay, gravel/laterite ***Colour*** grey

Exposed Rock: type % surface

Sub-surface Soil: sand, loamy sand, sandy loam, loam, clay, gravel/laterite ***Colour*** grey

Sub-surface Rock: type depth to rock

Drainage: well mod poor surface Water depth cm ***Wet:*** all year winter/spring na

Litter: % cover

Depth cm

Bare Ground % cover

BUSHLAND PLANT SURVEY RECORDING SHEET 2 (2005 update) – use pencil only

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

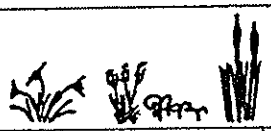
3. VEGETATION STRUCTURE AND COVER

For each layer **record** – appropriate **growth form, cover class** (see below) and **dominant species** in their order of dominance, up to a maximum of 3 species. If more than 3 species are obviously dominant record as many as appropriate to describe each layer. For NVIS record max. height of layer & % crown cover to nearest 5%.

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

	TREES			MALLEES	
	over 30m	10 – 30m	under 10m	over 8m	under 8m
GROWTH FORM					30m 10m
COVER CLASS (%)		#	#	#	#
HEIGHT & CROWN COVER (NVIS)					
DOMINANT SPECIES					

	SHRUBS		SHRUBS	
	over 2m	2m – 1m	under 1m	
GROWTH FORM			2m 1m	
COVER CLASS (%)		# 30 – 70 %	# 30 – 70 %	#
HEIGHT & CROWN COVER (NVIS)				
DOMINANT SPECIES		Ac pulch Jack fusc	Eucm pauci Ten ellip Mel seriata	

	GRASSES	HERBS	SEDGES	OTHER (eg. ferns)
GROWTH FORM				1m
COVER CLASS (%)	#	# 2 – 10 %	# 10 – 30 %	#
HEIGHT & CROWN COVER (NVIS)				
DOMINANT SPECIES		Phleb cil Dasy brom	Lyg bark Hyp exsulca	

4. VEGETATION CONDITION - Keighery (1994) Vegetation Condition Scale

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

COMMENTS (give reasoning for choice)

Rabbit grazing
Annual weeds common

BUSHLAND PLANT SURVEY RECORDING SHEET 3 (2005 update) – use pencil only

5. SPECIES PRESCENCE Label each plant with **plant's number, site code, date and plant's name or working name if required**

SITE No	L106 05
Date	28/08/08

Record on sheet
- **Column 1** plant name
- **Column 2** plant number (#)
- **Column 3** identification checked - √ when checked

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	#	ID
Nuytsia flori		
MALLEES		
SHRUBS		
Acac pulchella var glaberrima		√
Jack hirs		√
Frem pauc var ? pauciflora		–
Loss. eriocarpa		√
Phil spic		√
Calytrix flavescens		√
Com tom		√
Actino pyr.		√
Mel. scriota		√
Dry lind		√
Hyp ang. (SWA)		√
Gono pthy		√
Cassy. glebella		√
Gastrolob capitatum (wet form)		√
Hov trisp		√
Hakea vena		√
Calothamnus hirsutus		√
Xanth preiss		√

SHRUBS (cont.)	#	ID
GRASSES		
* Ehr caly		√
Amphi turb		√
* Briza ? maxima		–
HERBS		
Cross cotyledon		√
* Hyp. glabra		√
* Ori Anthem		√
Cono juncea		√
Drosera erythro		√
Dampi linearis		√
Phleb ciliata		√
Pat. occ occ		√
Dasy brom		√
Calandrinia sp 2		–
Tmy. ? pat		–
Trachy. pilosa		√
Borya congesta		√
Johnson pubesc.		√

HERBS (cont.)	#	ID
Lom herm		√
Lom caesp		√
Xanth hdeg		√
SEDGES		
Lysinia imberbis		√
Hyp exserta		√
Desmo flaccic		√
Centrolepis drumm.		–
Schoenus curvifolius		√
Lepid aff angust		–
Schoenus caesp.		√

BUSHLAND PLANT SURVEY RECORDING SHEET 1 (2005 update) – use pencil only

BUSHLAND AREA Lot 106 SITE NUMBER Lot 106 D6

DATE TRIP 26/08/08 BOTANIST CT, BK RECORDERS

DATE TRIP BOTANIST RECORDERS

DATE TRIP BOTANIST RECORDERS

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/SAMPLE POINT

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

↑N

Road Location

Geographic Location Latitude 32° 01' 37" S Longitude 115° 58' 45" E ± 6m

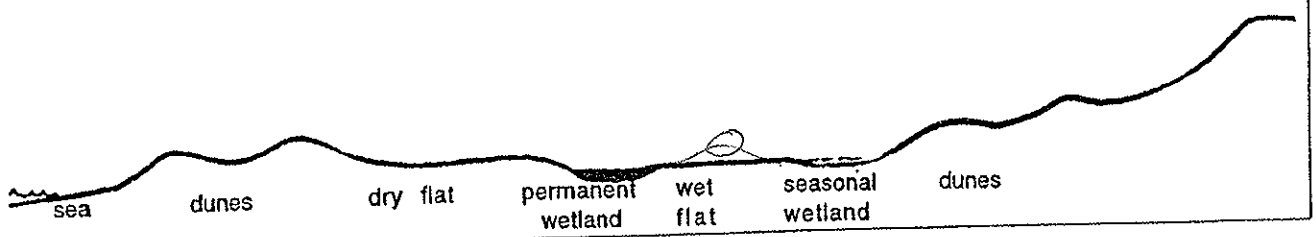
GPS Used: yes/no ***GPS Datum OR Reference Map Used:***

Photograph Photographer's Name C Tonss Photo No.

Topographic position Circle position of site on the transect (alter the transect if necessary eg. for Jarrah Forest)

Upland or Wetland? (circle one)

SWAN COASTAL PLAIN



2. SITE DATA Circle the correct response.

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

Surface Soil: sand, loamy sand, sandy loam, loam, clay, gravel/laterite ***Colour*** grey

Exposed Rock: ***type*** % surface

Sub-surface Soil: sand, loamy sand, sandy loam, loam, clay, gravel/laterite ***Colour*** grey

Sub-surface Rock: ***type*** depth to rock

Drainage: well mod poor Water depth cm ***Wet:*** all year winter/spring na

Surface

Litter: % cover ***Bare Ground*** % cover

Depth cm

BUSHLAND PLANT SURVEY RECORDING SHEET 2 (2005 update) – use pencil only

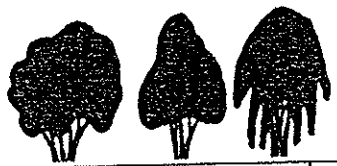
From '*Bushland Plant Survey*' written by B. Keighery (1994) and published by the Wildflower Society of WA (Inc.), PO Box 64 Nedlands WA 6008.

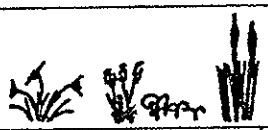
3. VEGETATION STRUCTURE AND COVER

For each layer **record** – appropriate **growth form**, **cover class** (see below) and **dominant species** in their order of dominance, up to a maximum of 3 species. If more than 3 species are obviously dominant record as many as appropriate to describe each layer. For NVIS record max. height of layer & % crown cover to nearest 5%.

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

	TREES			MALLEES	
	over 30m	10 – 30m	under 10m	over 8m	under 8m
GROWTH FORM					
COVER CLASS (%)					
HEIGHT & CROWN COVER (NVIS)					
DOMINANT SPECIES					

	SHRUBS		SHRUBS
	over 2m	2m – 1m	under 1m
GROWTH FORM			
COVER CLASS (%)		2 – 10%	30 – 70%
HEIGHT & CROWN COVER (NVIS)			
DOMINANT SPECIES		Aut pyr	Eucm paucl

	GRASSES	HERBS	SEDGES	OTHER (eg. ferns)
GROWTH FORM				
COVER CLASS (%)		30 – 70%	10 – 30	
HEIGHT & CROWN COVER (NVIS)				
DOMINANT SPECIES		Phleb cil Pat. occ	Lyg ramb. Hyp exs	

4. VEGETATION CONDITION - Keighery (1994) Vegetation Condition Scale

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

COMMENTS (give reasoning for choice)

BUSHLAND PLANT SURVEY RECORDING SHEET 3 (2005 update) – use pencil only

5. SPECIES PRESCENCE **Label** each plant with **plant's number, site code, date and plant's name or working name if required**

SITE No L/06 06
Date 28/08/08

Record on sheet
- **Column 1** **plant name**
- **Column 2** **plant number (#)**
- **Column 3** **identification checked** - √ when checked

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	#	ID
MALLEES		
SHRUBS		
Act. dyr.		✓
Exoc. parv		✓
Mel. sér		✓
Boss ens		✓
Sher lat		✓
Hovea tri tri		✓
Acacia hueg		✓
Gomph tom		✓

SHRUBS (cont.)	#	ID
GRASSES		
* Briz max		✓
Amphib turb		✓
HERBS		
Cono fas		✓
Pel lacid acid		✓
Cal. flava		✓
Dros anther		✓
Lom tasp		✓
* Hyp glabra		✓
Podol lata ssp		✓
Daty bromi		✓
* Urs. anthem		✓
Thy. ?Pat		✓
*Gbd ?cam		✓
Tric. tenella		✓
Lom. hermi		✓
Trach pilosa		✓

HERBS (cont.)	#	ID
Cass. glebella		✓
Dros mac mac		✓
Drinet. uru		✓
Lom. nigric		✓
Calandrinia sp2		✓
Dampiera linear		✓
John pubes		✓
Burch' conjesta		✓
Stylid repens		✓
Fro. preissii		✓
Calandr. coms		✓
Twichl preiss		✓
SEDGES		
Desmo tuscic		✓
Schoenus curv		✓
hyp imb		✓
Schoen caesp		✓
Lep exsulca		✓

BUSHLAND PLANT SURVEY RECORDING SHEET 1 (2005 update) – use pencil only

BUSHLAND AREA Lot 106 SITE NUMBER L106 Ø 4

DATE TRIP 28/06/06 BOTANIST CT, RJK RECORDERS

DATE TRIP BOTANIST RECORDERS

DATE TRIP BOTANIST RECORDERS

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/SAMPLE POINT

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

↑ N

Road Location

Geographic Location Latitude 32° 01' 36" S Longitude 115° 58' 46" E ± 7m

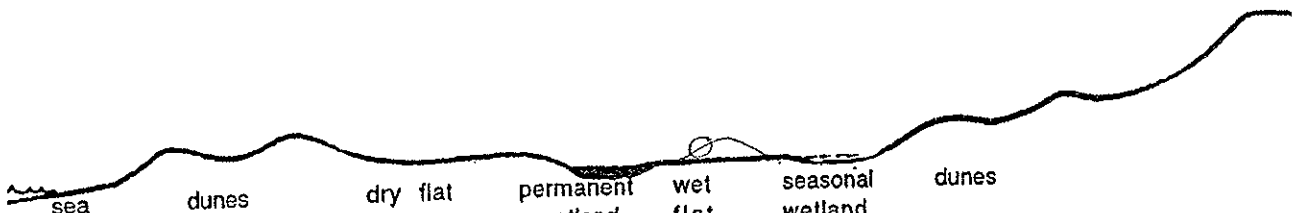
GPS Used: yes/no ***GPS Datum OR Reference Map Used:***

Photograph Photographer's Name C Tam SS Photo No.

Topographic position Circle position of site on the transect (alter the transect if necessary eg. for Jarrah Forest)

Upland or Wetland? (circle one)

SWAN COASTAL PLAIN



2. SITE DATA Circle the correct response.

Slope: flat (gentle) steep ***Aspect:*** N (NE) E SE S SW W NW na

Surface Soil: (sand), loamy sand, sandy loam, loam, clay, gravel/laterite ***Colour*** grey

Exposed Rock: type % surface

Sub-surface Soil: (sand), loamy sand, sandy loam, loam, clay, gravel/laterite ***Colour*** grey

Sub-surface Rock: type depth to rock

Drainage: well (mod) poor Water depth cm ***Wet:*** all year winter/spring na

Litter: % cover ***Bare Ground*** % cover

Depth cm

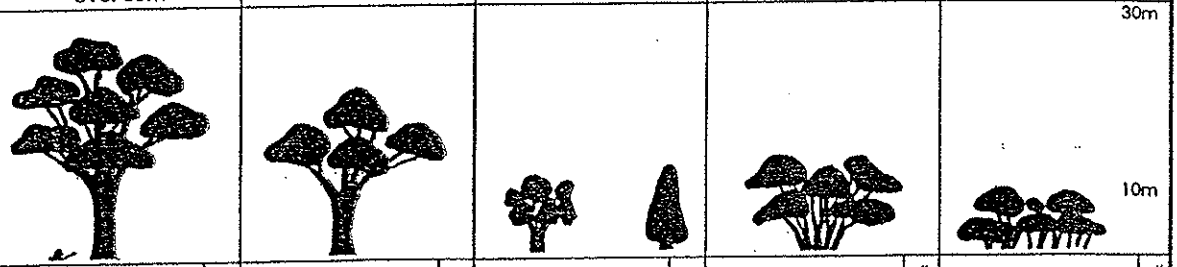
BUSHLAND PLANT SURVEY RECORDING SHEET 2 (2005 update) – use pencil only

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

3. VEGETATION STRUCTURE AND COVER

For each layer **record** – appropriate **growth form**, **cover class** (see below) and **dominant species** in their order of dominance, up to a maximum of 3 species. If more than 3 species are obviously dominant record as many as appropriate to describe each layer. For NVIS record max. height of layer & % crown cover to nearest 5%.

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

	TREES			MALLEES	
	over 30m	10 – 30m	under 10m	over 8m	under 8m
GROWTH FORM					
COVER CLASS (%)					
HEIGHT & CROWN COVER (NVIS)					
DOMINANT SPECIES					

	SHRUBS		SHRUBS
	over 2m	2m – 1m	under 1m
GROWTH FORM			
COVER CLASS (%)	10 – 30%	30 – 70%	
HEIGHT & CROWN COVER (NVIS)			
DOMINANT SPECIES	Act pyra	Mel ser Shr let	

	GRASSES	HERBS	SEDGES	OTHER (eg. ferns)
GROWTH FORM				
COVER CLASS (%)		2 – 10%	2 – 10%	
HEIGHT & CROWN COVER (NVIS)				
DOMINANT SPECIES		Pat occ Cono set Cono junc	Lyg imb. Schoen curv	

4. VEGETATION CONDITION - Keighery (1994) Vegetation Condition Scale

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

COMMENTS (give reasoning for choice)

rabbits
Fire

BUSHLAND PLANT SURVEY RECORDING SHEET 3 (2005 update) – use pencil only

5. SPECIES PRESCENCE **Label** each plant with **plant's number, site code, date and plant's name or working name if required**

SITE No	1106 07
Date	23/08/08

Record on sheet
- **Column 1** plant name
- **Column 2** plant number (#)
- **Column 3** identification checked - √ when checked

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	#	ID
MALLEES		
SHRUBS		
[illegible]		√
Mel [illegible]		√
[illegible] this		√
[illegible]		√
[illegible] = Ø5 var glabrifolia		√
[illegible]		√
Cord narro		√
Jacksonia flamb		√
Gonph tom		√
Dry lind		√
Calytrix = Ø5		√
Lassytha glabella		√
Scholt. inVol		√
Erem pauci ? var pauciflora		–
Gastro capit		√

SHRUBS (cont.)	#	ID

GRASSES	#	ID
[illegible]		√
* Briza maxima		√
Amphi turb		√

HERBS	#	ID
[illegible]		√
Calandrinia sp 2		√
* Vic ancum		√
Trac cyano		√
Stylid piliferum		√
Stylid repens		√
Podotheca = Ø6		√
Trachy pilosa		√
Crass tetr		√
Burch congesta		√
Drosera mac mac		√
Thysi par		√
Cono juncea		√
Cono setigera		√

HERBS (cont.)	#	ID
Pat occid occ		√
Phleb ciliata		√
Arno preiss		√
Lomandra nigricans		√
Damp linearis		√
Cola. flava		√
Lom hern		√
Lom caesp.		√
Dasy brom		√
Catandrin sessilis		√
Watsonia		√
Leporella fimb		√
Tetr. pub.		√
Cassytha ? flava		√
ADD Phleb filifolia		√

SEDGES	#	ID
[illegible]		√
[illegible]		√
Schoenus curvi		√
Hypoxis		√
? Centrolepis ? drum		√
Isolepis marg.		√

BUSHLAND PLANT SURVEY RECORDING SHEET 1 (2005 update) – use pencil only

BUSHLAND AREA Lot 106 Wanaping, Kenwick SITE NUMBER L106 – 06

DATE TRIP _____ BOTANIST B. Keigh RECORDERS _____

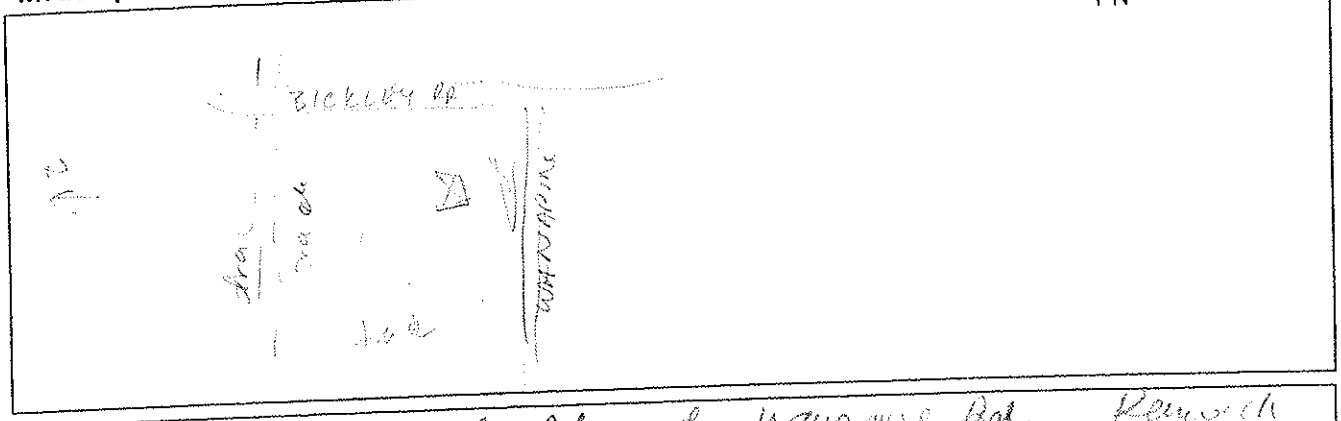
DATE TRIP _____ BOTANIST C. Tauss RECORDERS _____

DATE TRIP _____ BOTANIST _____ RECORDERS _____

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/SAMPLE POINT

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



Road Location corner Bickley Rd and Wanaping Rd Kenwick

Geographic Location Latitude S Longitude E

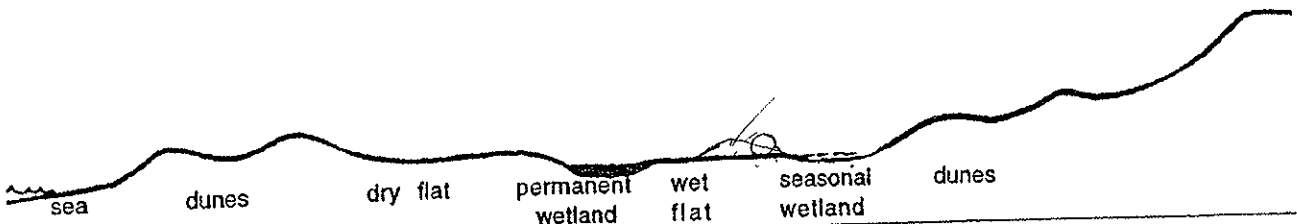
GPS Used: yes/no ***GPS Datum OR Reference Map Used:***

Photograph Photographer's Name Photo No.

Topographic position Circle position of site on the transect (alter the transect if necessary eg. for Jarrah Forest)

Upland or Wetland? (circle one)

SWAN COASTAL PLAIN



2. SITE DATA Circle the correct response.

Slope: (flat) gentle steep ***Aspect:*** N NE E SE S SW W NW (na)

Surface Soil: (sand), loamy sand, sandy loam, loam, clay, gravel/laterite ***Colour*** grey.

Exposed Rock: type % surface

Sub-surface Soil: sand, loamy sand, sandy loam, loam, clay, gravel/laterite ***Colour*** White quartz sand

Sub-surface Rock: type depth to rock

Drainage: (well) mod poor Water depth cm ***Wet:*** all year winter/spring na

Litter: % cover

Depth cm

Bare Ground ~5 % cover

BUSHLAND PLANT SURVEY RECORDING SHEET 2 (2005 update) – use pencil only

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

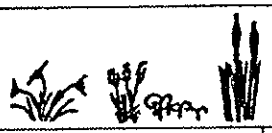
3. VEGETATION STRUCTURE AND COVER

For each layer **record** – appropriate **growth form**, **cover class** (see below) and **dominant species** in their order of dominance, up to a maximum of 3 species. If more than 3 species are obviously dominant record as many as appropriate to describe each layer. For NVIS record max. height of layer & % crown cover to nearest 5%.

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

	TREES			MALLEES	
	over 30m	10 – 30m	under 10m	over 8m	under 8m
GROWTH FORM					
COVER CLASS (%)		#	#	#	#
HEIGHT & CROWN COVER (NVIS)					
DOMINANT SPECIES					

	SHRUBS		SHRUBS
	over 2m	2m – 1m	under 1m
GROWTH FORM			
COVER CLASS (%)		#	70 – 100% #
HEIGHT & CROWN COVER (NVIS)			
DOMINANT SPECIES			Ban tet Act pyr

	GRASSES	HERBS	SEDGES	OTHER (eg. ferns)
GROWTH FORM				1m
COVER CLASS (%)	2 – 10% #	#	#	#
HEIGHT & CROWN COVER (NVIS)				
DOMINANT SPECIES	*Ehr cal			

4. VEGETATION CONDITION - Keighery (1994) Vegetation Condition Scale

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

COMMENTS (give reasoning for choice)

Rabbit Warren

BUSHLAND PLANT SURVEY RECORDING SHEET 3 (2005 update) – use pencil only

5. SPECIES PRESCENCE **Label** each plant with **plant's number, site code, date and plant's name or working name if required**

SITE No L106 – 08
Date 28-08-06

Record on sheet
- **Column 1** plant name
- **Column 2** plant number (#)
- **Column 3** **identification checked** - √ when checked

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	#	ID
MALLEES		
SHRUBS		
Bau tel		✓
Act pyr		✓
Mae pterocarpa		✓
*Fabr calyc.		✓
Aca. pulchella = 05		✓
Con. fast - fest		✓
*Bnz maxima		✓
Jac fur		✓
Bur congesta		✓
* Ura austr.		✓
* Hyp glab		✓
* Sonchus oleraceus		✓
" Cras colorata		✓
Cras exserta		✓
* Gladiolus caryophyll		✓
* Dolichos marginata		✓
* Wahlenbergia sp		✓
Calandrinia flava		✓
Cassytha glabella		✓

SHRUBS (cont.)	#	ID
GRASSES		
HERBS		

HERBS (cont.)	#	ID
SEDGES		

cell A T-3-B 575

BUSHLAND PLANT SURVEY RECORDING SHEET 3 - use pencil only

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

SITE No

Date 1/6/2000

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	Cover
MALLEES		
SHRUBS		
Melal. lateritia	2	
Astartea (Brixton)	1	
Verticordia plum	1	

SHRUBS (cont.)	No	Cover
GRASSES		
Briza max		
HERBS		
Stylidium dichotomum Thys paterson		
Agrostocrinum scabrum		
Borchardia multifl		

HERBS (cont.)	No	Cover
SEDGES		
Lepyrodia muirii		20%
Leptocarpus canus		

Tall A T3 - A 2x2

BUSHLAND PLANT SURVEY RECORDING SHEET 3 - use pencil only

5. SPECIES PRESCENCE

SITE No

Date 1/6/2000

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	Cover	SHRUBS (cont.)	No	Cover	HERBS (cont.)	No	Cover
MALLEES			GRASSES			SEDGES		
SHRUBS			HERBS			Lyptocarpus canus	64	

Cell A T3 – B

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	Cover
MALLEES		
SHRUBS		
Viminaria juncea	25	
Hypocalymma angustif	38	
Acacia lasiocarpha	39	
Verticordia plum	1	
Baeckea camphorosmae	2	
Xanthorrh brunon	3	
Kunzea micrantha	20	

SHRUBS (cont.)	No	Cover
GRASSES		
Neurachne alopecuroidea		
HERBS		
Agrostocrinum scabrum	11	
Burchardia umbell		
Cassytha		
Borya sphaeroceph		
Patrsonia occ		

HERBS (cont.)	No	Cover
SEDGES		
Mesomel. tetragon / Lepidosp. tenuis / Cyathochaeta / Lepidosp scabrum	79	c.
clumps		

cell A T1 A

BUSHLAND PLANT SURVEY RECORDING SHEET 3 - use pencil only

5. SPECIES PRESCENCE — Label each plant with plants number, site code, date and plant's name or working name if required

SITE No	1/6/2000
Date	

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	Cover
Euc. calophylla (2 trees)	23	
MALLEES		
SHRUBS		
Viminaria juncea	23	+ (2 dead)
Xanthorrhoea preissii	2	
Nemcia capitata	13	
Hovea		
Dryandra lindleyana	2	
Hibbertia hypericoides	1	
Acacia lasiocarpa	16	
Gomphotobium margin		

SHRUBS (cont.)	No	Cover
saplings, mature adj		
GRASSES		
Briza maxima		
HERBS		
Burchardia umbellata		

HERBS (cont.)	No	Cover
SEDGES		
Tetraria octandra		70

Cell A T1/B

BUSHLAND PLANT SURVEY RECORDING SHEET 3 - use pencil only

5. SPECIES PRESCENCE

SITE No

Date 1/6/2000

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	Cover
MALLEES		
SHRUBS		
Viminaria juncea	19	
Astartea fascicularis	26	
Pimelea	31	
Verticordia	38	
Kunzea micrantha	7	
Eutaxia microphylla	3	

SHRUBS (cont.)	No	Cover
GRASSES		
HERBS		
Schoenolaena juncea		

HERBS (cont.)	No	Cover
SEDGES		
Lepyrodia muirii		30

cell A T1 – C

BUSHLAND PLANT SURVEY RECORDING SHEET 3 - use pencil only

5. SPECIES PRESCENCE

SITE No

Date 1/6/2000

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

Record on Sheet 2x2

- 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	Cover
MALLEES		
SHRUBS		
Leptocarpus canus	27	
Astartea fascicularis	12	
Pimelea major	50	

SHRUBS (cont.)	No	Cover
GRASSES		
HERBS		

HERBS (cont.)	No	Cover
SEDGES		

cell A T1 / C-D 5x5

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	Cover
MALLEES		
SHRUBS		
Viminaria juncea (17 alive, 7 dead)		
Kunzea micrantha (m/st)		50%
Verticordia plumosa	3	
Pimelea magnifica	1	

SHRUBS (cont.)	No	Cover
GRASSES		
cover > 100 plants		
HERBS		
Cassytha		
Thysanotus patersonii		
Schoenolaena juncea		
Tribonanthes australis		
Burchardia multiflora		
Patersonia occidentalis		

HERBS (cont.)	No	Cover
SEDGES		
Cyathochaeta avenacea	11	

cell A T1 — E. numerous seedlings

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	Cover
Eucc. calophylla		
1 adult (offheart) & saplings		
MALLEES		
SHRUBS		
Viminaria juncea	7	
Nemcia capitatum	38	
Acacia saligna	2	
Hovea trisperma (seedlings)	(27)	
Kennedia prostrata	6	
Hibbertia hypericoides	1	
Hakea trifurcata (seedling)		
Dryandra lindleyi (seedling)	7	
Acacia lasiocarpa (")		
Xanthorrhoea preissii	4	
Kingia aust.	4	

SHRUBS (cont.)	No	Cover
Dampiera linearis		
GRASSES		
Ehrharta calycina		
Briza		
Neurachne alopec		
HERBS		
Romulea rosea		

HERBS (cont.)	No	Cover
SEDGES		
Cyathochaeta avenac		
Tetraria octandra		
Lepidosp. angust		

cell A T2/A

BUSHLAND PLANT SURVEY RECORDING SHEET 3 - use pencil only

5. SPECIES PRESCENCE

SITE No

Date 1-6-2000

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	Cover
Euc. calophylla		
3 trees, 4 seedlings		
MALLEES		
SHRUBS		
Hakea undulata 1 dead		
" trifurcata	27	
Acacia lasiocapha	1	
Dryandra lindleyana	1	
Xanthorrh preissii	4	
Kingia australis	1	
Nemcia capitata	13	

SHRUBS (cont.)	No	Cover
GRASSES		
Newcastlia dispecurodia		40
HERBS		
Watsonia bulbifera		
Opercularia vaginata		
Burchardia umbellata		
Drosera		

HERBS (cont.)	No	Cover
SEDGES		
Tetraria octandra		70
Lepidosperma tenue		
" angustatum		
Desmocladus fasicul		
Mesomelaena tetrag		

Cell A T2 – B

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	Cover	SHRUBS (cont.)	No	Cover	HERBS (cont.)	No	Cover
MALLEES			GRASSES					
SHRUBS								
Viminaria juncea	1					SEDGES		
Pericalymma ellipticum	—		>100, 90% cover			Leptocarpus canus		>70
Xanthorrhoea brunonis	5							
Kingia australis	1		HERBS					

cell A T2/C

BUSHLAND PLANT SURVEY RECORDING SHEET 3 - use pencil only

5. SPECIES PRESCENCE

SITE No

Date 1 – 6 – 2000

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	Cover
Euc. calophylla		
4 trees, 1 1 9 seedlings		
MALLEES		
SHRUBS		
Viminaria Juncea		
5 dead		
Xanthorrhoea preissii	5	
Dryandra lindleyi	5	
Hibbertia hypericoides	8	
Baeckea camphorosmae	2	
Nemcia capitata (seedlings)		

SHRUBS (cont.)	No	Cover
GRASSES		
HERBS		

HERBS (cont.)	No	Cover
SEDGES		
Tetraria octandra		

(C) Cell B T1-A

BUSHLAND PLANT SURVEY RECORDING SHEET 3 - use pencil only

5. SPECIES PRESCENCE

SITE No

Date 1/6/2020

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	Cover
Banksia attenuata	2	
" menziesii	3	
MALLEES		
SHRUBS		
Leucopogon conostoph	2	
Acacia pulchella	1	
Hibbertia hypericoides	10	
" racemosa	2	
Stirlingia latifolia	3	
Conostephium pendulum	6	
Tetratheca hirsp	2	
Jacksonia floribunda	2	
Bossiaea eriocarpa	14	

SHRUBS (cont.)	No	Cover
84 seedlings		
Dampiera linearis		
Hovea trisperma		
GRASSES		
Amphipogon turbinatus		
Briza maxima		
HERBS		
Burchardia umbellata		
Thysanotus patersonii		
Patersonia occidentalis		
Drosera erythrorhiza		
Lomandra serica		
Stylidium repens		
Gladiolus carneus	2	

HERBS (cont.)	No	Cover
SEDGES		
Schoenus curvifolius		
Conostylis candicans		
Lyginia barbata		
Lomandra ~~maritima~~ caespitosa	2	

Cell B T1 - B 2x2m

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	Cover
MALLEES		
SHRUBS		
Kunzea recurva	14	
Verticordia plumosa	1	

SHRUBS (cont.)	No	Cover
GRASSES		
+1 seedling		
HERBS		

HERBS (cont.)	No	Cover
SEDGES		
Restio "applanatus" B	17	
Tramuline Tramula		

CELL B T1 — C 5x5

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	Cover
MALLEES		
SHRUBS		
Banksia telmatiaea 2 live 2 dead		
Hypocalymma angustifolium	10	
Acacia lasiocarpha	1	
HERBS		
Thysanotus		
Stylidium dichotomum		

SHRUBS (cont.)	No	Cover
GRASSES		

HERBS (cont.)	No	Cover
SEDGES		
2x2		
Leptocarpus	25	
Schoenus nigricans		
Lyginia trifida	1	

(C) cell B T2 - B

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	Cover
MALLEES		
SHRUBS		
Acacia pulchella	17	
Jacksonia furcellata	17	
Pericalymma ellipticum		
Eremaea pauciflora	1	
Gompholobium tomentosum		
Actinostrobus pyramidalis (seedlings)	13	
Hovea trisperma		

SHRUBS (cont.)	No	Cover
Dampiera linearis		
>100 (mature >100 seedlings >100)		
HERBS		
Laxmannia ramosa		
Cassytha flava		
Dasypogon bromeliifolius		
Patersonia occidentalis		
Johnsonia pubescens		
Stylidium repens		
GRASSES		

HERBS (cont.)	No	Cover
SEDGES		
Desmocladus fasciculatus		
Hypolaena exsulca		
Lyginia barbata		
Restio leptocarpus		

cell B 2T—C (Nuytsia on rise)

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	Cover
MALLEES		
SHRUBS		
Eremaea pauciflora	1	
Jacksonia floribund	1	
Leucopogon sprengel	2	
Gompholobium tomentosum	9	
Acacia huegelii	2	
Hibbertia hypericoides	2	
Bossiaea eriocarpa	1	
Hovea trisperma	2	
Actinostrobus pyramidalis	2	

SHRUBS (cont.)	No	Cover
GRASSES		
Amphipogon turbinatus		
Ehrharta calycina		
HERBS		
Calectasia cyanea	1	
Johnsonia pubescens	27	
Drosera erythrorhiza		
Patersonia occidentalis	11	
Laxmannia squarrosa		
" ramiosa		
Stylidium repens		
Gladiolus caryophyllaceus		

HERBS (cont.)	No	Cover
SEDGES		
Hypolaena barbata		70%
Schoenus curvifolius		

cell 3 T2-E

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	Cover
MALLEES		
SHRUBS		
Numerous dead Actinost.		
numerous >100 seedlings		
Stirlingia latifol		
2 dead 8 live		
Calothamnus hirsutus	2	
Calytrix aurea	5	
Hypocalymma ang	5	
Kunzea micrantha	1	
Jacksonia furcell	1	
Gomph tomentosa	9	
Verticordia plumosa	10	

SHRUBS (cont.)	No	Cover
Lechenaultia expansa	12	
GRASSES		
Briza max		
~20/90 cover in past		
HERBS		
Laxmannia ramosa		
Cassytha		
Patersonia occid		

HERBS (cont.)	No	Cover
SEDGES		
Restio		
Desmocl hirsutus 90%		70% 90%
Lygina barbat		9%
		70%

cell B CB T2 – F

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	Cover
MALLEES		
SHRUBS		
Hypocalymma ang	17	
Halosarcia	14	
Acacia lasiocarpha	16	
Samolus junce (clumps)	6	

SHRUBS (cont.)	No	Cover
GRASSES		
HERBS		
Acanthocarpus canaric	3	
Romulea rosea		
Eryngium pinn palust		

HERBS (cont.)	No	Cover
SEDGES		
Leptocarpus canus	16	

cell D T 2 — A

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	Cover
MALLEES		
SHRUBS		
Mel uncinata	2	2-10
Hypocalym angust	5	<2
Acacia lasiocarpha	10	<2
Grevillea thelemaniana	1	<2
Verticordia plumosa	1	<2
Calytrix breviseta	1	<2
Calothamnus hirsutus	2	<2
Jacksonia alata	1	<2

SHRUBS (cont.)	No	Cover
Scaevola longiflora		
GRASSES		
HERBS		
Burchardia umbellata		
Gladiolus undulatus		
Stylidium dichotomum		

HERBS (cont.)	No	Cover
SEDGES		
Lepidosperma rostratum	6	2%

cell D T2 — B (19) G. Keighery

BUSHLAND PLANT SURVEY RECORDING SHEET 3 - use pencil only

5. SPECIES PRESCENCE

SITE No 3/5/00

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	Cover
MALLEES		
SHRUBS		
3m Viminaria juncea	11	20
1/2m Mel. lateriflora	1	<2
Mel. viminea	2	<2
Hypocalymma >100		2/10
Banksia tricuspidata	25	2/10
Calothamnus hirsutus	37	2/10
Actinostrobus pyramidalis		
Acacia lasiocarpa		
Hakea trifurcata		

SHRUBS (cont.)	No	Cover
54 dead		
seedlings		
seedlings		
GRASSES		
HERBS		
seedlings		
1 in flower, rest seedlings		
seedling		
Dodonaea lanceolata		

HERBS (cont.)	No	Cover
Laxmannia ramosa		
Conostylis setigera		
Anigozanthos viridis		
SEDGES		
Lyginia imberbis	2	
Schoenus nigricans		
Lepidosperma tenue		
mostly dead		

cell D T2 – D

G. Keighery

BUSHLAND PLANT SURVEY RECORDING SHEET 3 - use pencil only

5. SPECIES PRESCENCE

SITE No

Date 31/5/00

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	Cover
MALLEES		
SHRUBS		
Met. lateriflora	3	10
Hypoc. angustifolium 16	19	42 1
Dodonaea ceratocarpa	6	<2
Calothamnus hirsutus	11	20
Acac. pyramid	2	dead
Acacia lasiocarpha	8	<2
Verticordia plumosa	8	<2
Halosarcia (clumps)	3	

SHRUBS (cont.)	No	Cover
GRASSES		
Briza etc		
35% cover		
Dead		
HERBS		
dead		
40%		
Stylidium dichotomum		
Hypocalymma patersonii		
Dryandra nivea		
Hibbertia racemosa		
Hakea lissocarpa		

HERBS (cont.)	No	Cover
SEDGES		
Leptocarpus (clumps)	5	
(*) Lepidosperma rostratum	1	
(4) DRF		

METROPOLITAN REGION TOWN PLANNING SCHEME ACT. 1959

DECLARATION OF PLANNING CONTROL AREA NO. 35

BRIXTON STREET WETLANDS – KENWICK CITY OF GOSNELLS and SHIRE OF KALAMUNDA

File No: 835-2-25-3

General Description

The Hon Minister for Planning has granted approval to the declaration of a Planning Control Area over various lots known as the 'Brixton Street Wetlands', Kenwick. The area is shown on Western Australian Planning Commission Plan No. 2.0758.

Purpose of the Planning Control Area

The Commission considers that the land in this location is of vital importance to the conservation of natural flora, and wishes to ensure that no development occurs which might prejudice the ultimate reservation of the land for parks and recreation in the Metropolitan Region Scheme.

Duration and Effects

The declaration remains in effect for a period of five years from the date of publication of this notice in the Gazette or until revoked by the Western Australian Planning Commission with approval by the Minister.

A person shall not commence and carry out development in a Planning Control Area without the prior approval of the Western Australian Planning Commission. The penalty for failure to comply with this requirement is $2,000.00, and in the case of a continuing offence a further fine of $200.00 for each day during which the offence continues.

Compensation is payable in respect of land injuriously affected by this declaration, and land so affected may be acquired by the Western Australian Planning Commission in the same circumstance and in the same manner as if the land had been reserved in the Metropolitan Region Scheme for a public purpose.

Where the PCA is Available for Public Inspection

(a) Ministry for Planning
1st Floor
469 Wellington Street
PERTH WA 6000

(b) J S Battye Library
Alexander Library Building
Cultural Centre
NORTHBRIDGE WA 6000

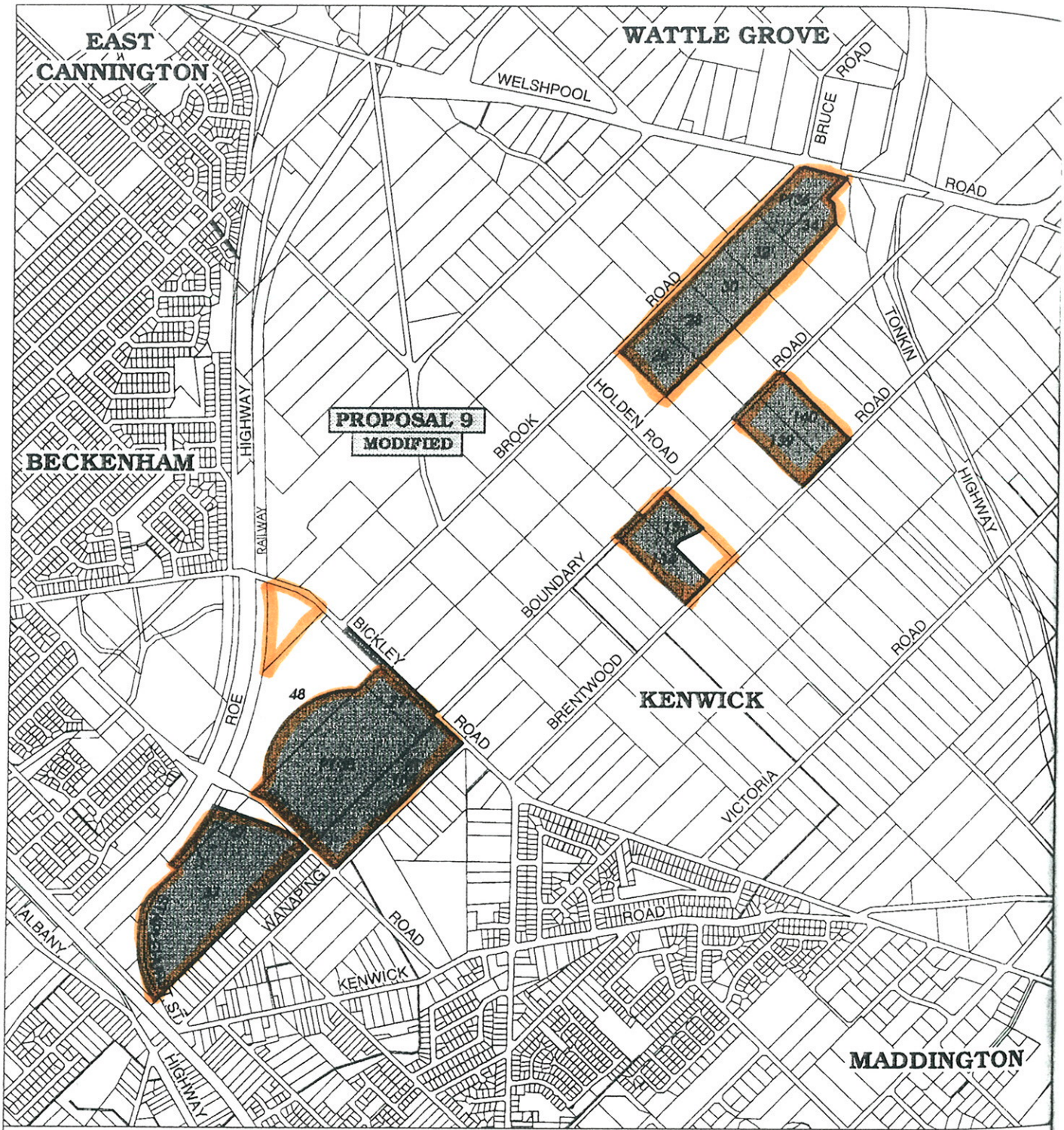
(c) Municipal offices of the City of Gosnells:

(i) City of Gosnells
2120 Albany Highway
GOSNELLS WA 6110

(ii) Shire of Kalamunda
2 Railway Road
KALAMUNDA WA 6076

PETER MELBIN
SECRETARY

G27317



N

SCALE 1:20000

0 1000

metres

SOUTH EAST DISTRICTS
PROPOSED OMNIBUS AMENDMENT (No.3)
AS MODIFIED

14th APRIL 1998

FIGURE 9M

WESTERN AUSTRALIAN PLANNING COMMISSION

CUSTOMER FOCUS

LEGEND

PROPOSED PARKS AND RECREATION RESERVATION

PRODUCED BY LAND INFORMATION BRANCH, STATUTORY MAPPING SECTION MINISTRY FOR PLANNING

Proposal 9

To transfer portion of Lots 1, Pt 35, 37, 47, 48, and Pt 106 Brixton Street, Lot 77 Bickley Road, and portions of Staplehurst Street and Bickley Road road reserves, Kenwick from Urban zone to Parks and Recreation reservation; and Lots 134 Boundary Road and portions of Lots 135, 139 and 140 Boundary Road, portions of Boundary Road road reserve, Lots 26, 28, 30, and 32 Brook Road and Lots Pt 36 and 341 Welshpool Road, Kenwick from Rural zone to Parks and Recreation reservation.

Three submissions were received in response to this proposal.

The Kalamunda Shire Council (20) supported the proposal as fas as it related to the Shire of Kalamunda.

The owner (3) of Lots 28 and 32 Brook Road and Pt Lot 36 Welshpool Road and his planning consultant (12) registered objections to the proposal premised on the inclusion of the land as Special Rural in the Draft Town Planning Scheme for the Shire of Kalamunda and that a Special Rural subdivision with land use restrictions would be sufficient to protect the landscape qualities of the land. The owner advised that the lots were not for sale.

The committee noted that although the Draft Town Planning Scheme for the Shire of Kalamunda designated the subject lots Special Rural zone, the vital importance of conserving the natural flora in this area was paramount.

The Hearings Committee was advised that the Ministry for Planning has been involved in negotiations with the owners of Lot 135 Brentwood Road, Kenwick regarding the proposed alignment of the Parks and Recreation reservation boundary. The boundary as indicated in the detailed plan impacts on a building which the owner wishes to retain.

The Department of Conservation and Land Management has been consulted and an adjustment to the boundary is proposed which will exclude the improvements from the Parks and Recreation reservation and still provide protection to an area of declared rare flora.

Accordingly, it is concluded that the proposal should be modified to adjust the Parks and Recreation reservation on Lot 135 Brentwood Road, Kenwick to exclude the existing improvements and that the remaining components of the proposal should proceed as advertised.

Proposal 10

To transfer the land bounded by Cloister Avenue, Mt Henry Road, Roebuck Drive and Kwinana Freeway, Como (generally referred to as the Mt Henry Hospital site) from Public Purposes (H) reservation to Urban zone.

This proposal seeks to facilitate the redevelopment of the Mt Henry hospital site and to ensure that the zoning reflects the existing land uses on site. Five submissions were received in response to this proposal, of which, one was received after the closing date for submissions.

Facsimile Message

ATTENTION:	**Chris Semeniuk**
ORGANISATION:	V&C Semeniuk Research Group Fax 9447 3705
FROM:	Bronwen Keighery
DATE:	26/5/99
TELEPHONE:	(08) 9222 7028 Fax. (08) 9485 1187
PAGES:	8 including this sheet
SUBJECT:	**INFORMATION FOR HYDROLOGICAL STUDY AT GREATER BRIXTON STREET WETLANDS (BS 387)**

MESSAGE:

Chris
Attached are two sets of maps showing
Map 1 a-c Threatened Species and Communities
Map 2 a-c Tracks and Ownership (this should be useful as it will be easier to locate the transects on land that is owned by government than the privately owned blocks also it would be best to locate them near a track)

Also attached is the is the key to the Mattiske mapping (on Map b/c) which I do not think I sent in the package yesterday.

*Apologies for missing all this yesterday. We had a Friends meeting last night and after this and talking to Vic I realised I had left out some information you needed for planning. I will bring all the reports you requested when we meet in the field and await confirmation of a time. regina would like to accompany us when we are looking for the transect sites.

At the Friends we discussed possible locations of instruments for daily recording. Regina has volunteered to do the readings but would prefer they were at her house (it was not considered wise to locate them in the house opposite as the kids that live there and their friends may be over curious). In the past Regina had a rain gauge in the pool area where there are no trees.

I have arranged with MfP to get the area of the Wetlands on 3 A1 sheets (ie three sheets to cover the area on the A1 sheet I have sent you).
Cheers Bronwen

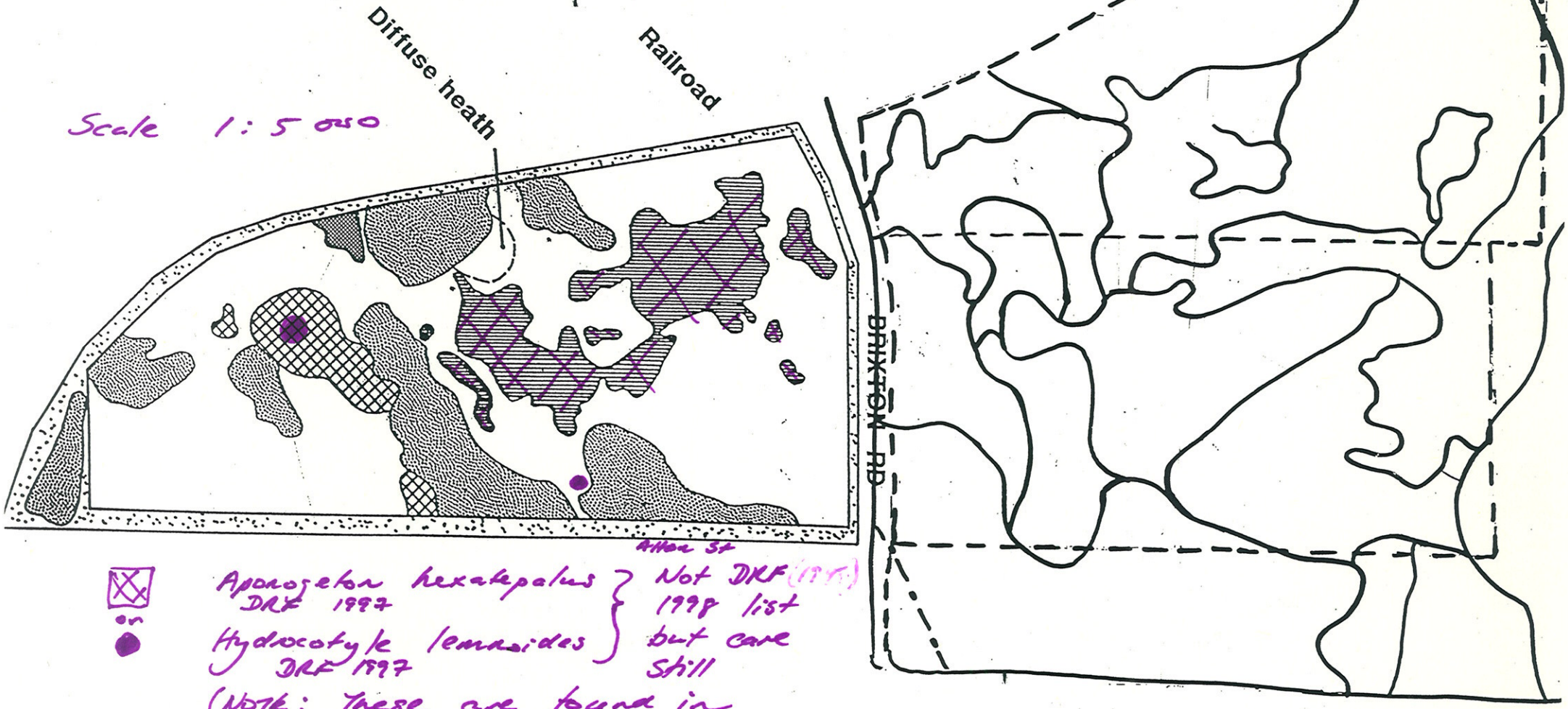
Department of Environmental Protection
Westralia Square, 141, St Georges Terrace, Perth, Western Australia, 6000.
Facsimile: (08) 9322 1598 Telephone: (08) 9222 7000

* Mailed 25/5
- 1:5 000 Vege photo
- plant community mapping (overlay) + keys

Mapla

Threatened Species and Communities Mapla-c

- DRF 1997 + 1998 populations except for orchids (there could well be other isolated occurrences)
- Communities are all threatened except for Banksia Woodlands



⊠ or ● Aporosepalum hexalepalus DRF 1997 } Not DRF 1998 list but care still

Hydrocotyle lemnoides DRF 1997 }

(NOTE: These are found in the claypans)

Map 1b

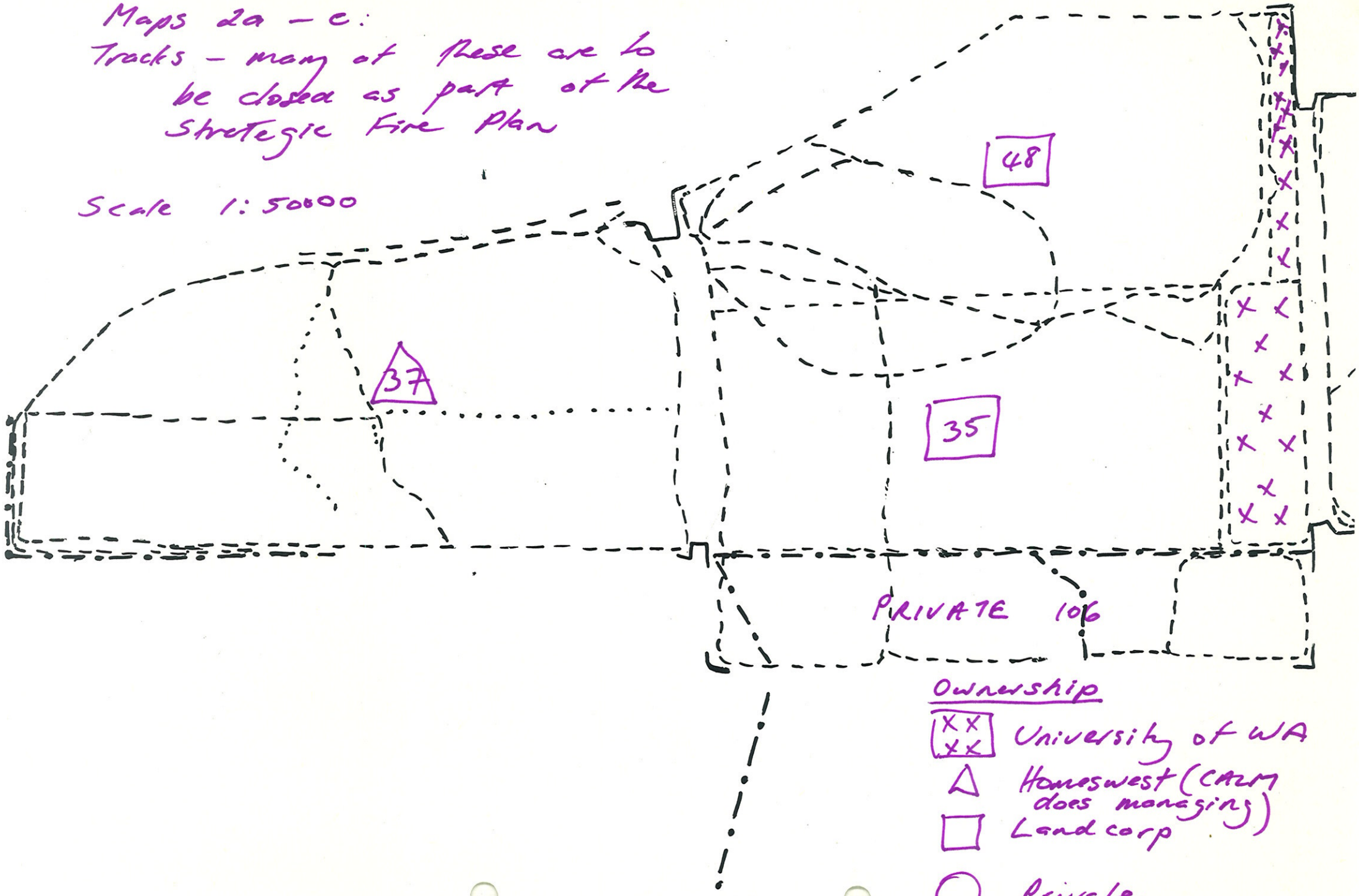
Celtis brevisetta ssp brevisetta
DRE 1998

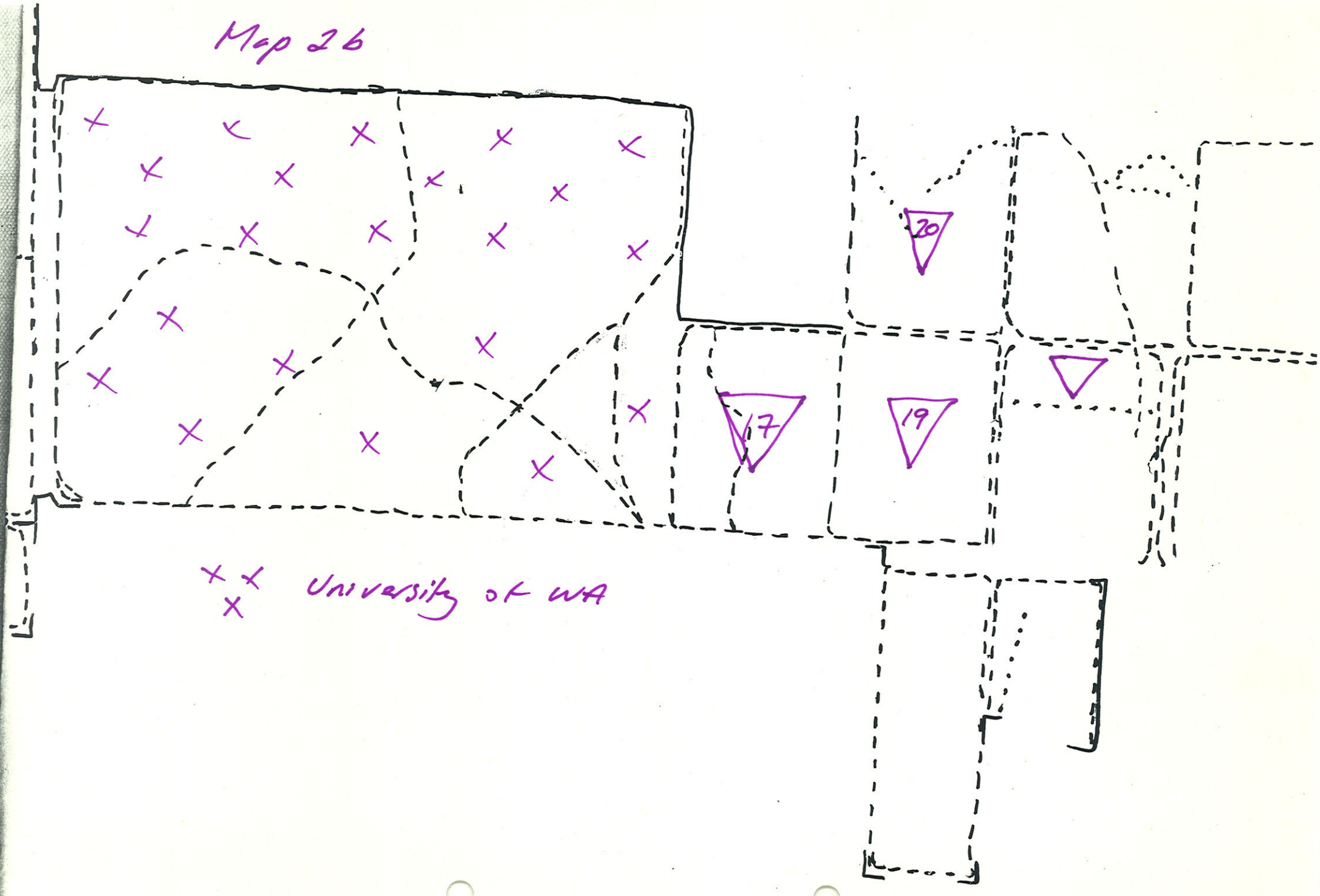
Map 1c

Lepidosperma rostratum

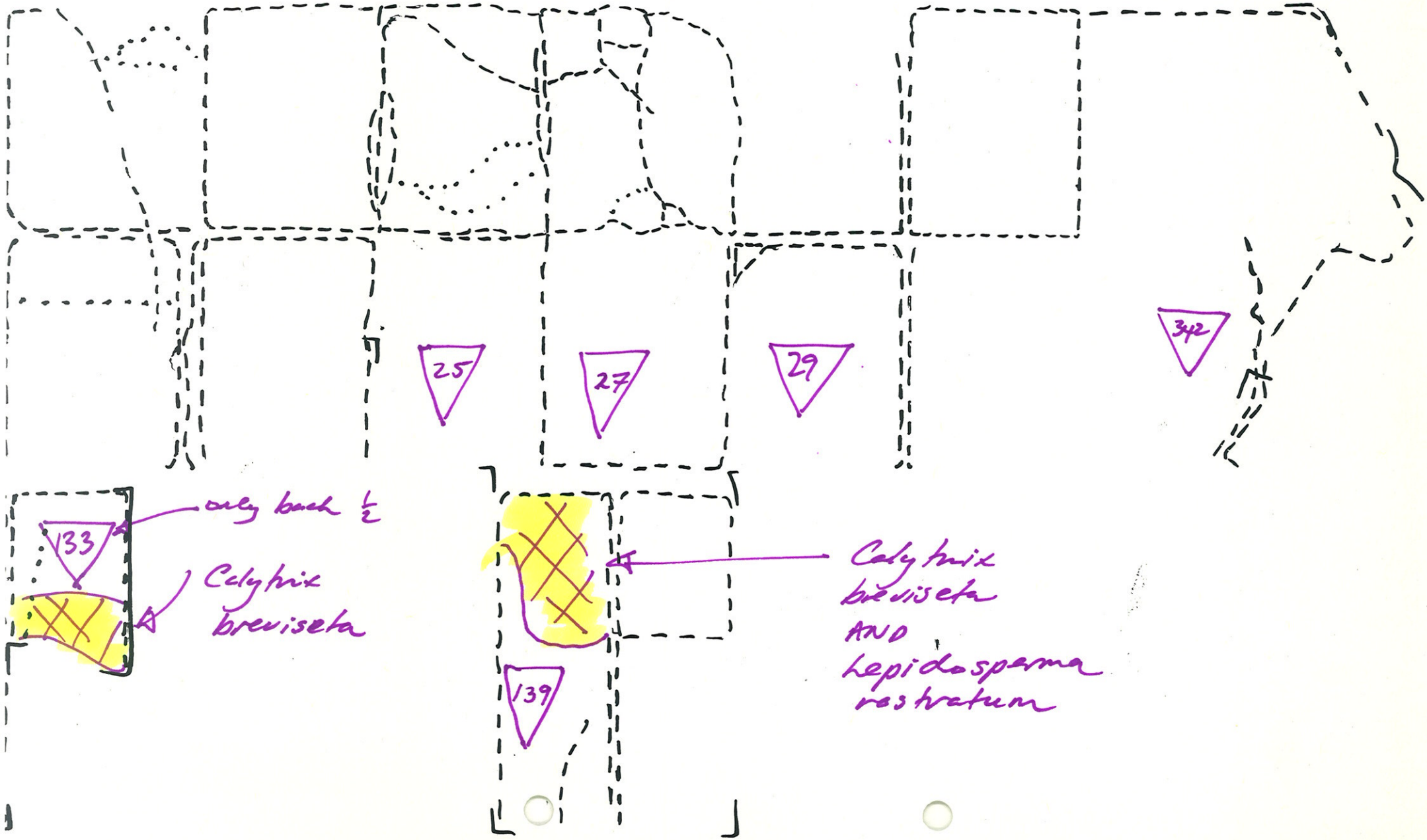
Maps 2a – c:
Tracks – many of these are to be closed as part of the Strategic Fire Plan

Scale 1:50000




Map 26
20
17
19
University of WA

Map 2c


25
27
29
342
33
only back ½
Calythrix breviseta
139
Calythrix breviseta AND Lepidosperma rostratum

BRIXTON1 INTERIM PROTECTION AREA
extracted from Keighery, B.J. and Trudgen, M. (1992) Remnant Vegetation on the Alluvial Soils of the Eastern Side of the Swan Coastal Plain

Location 62 - Brixton St Wetlands. Location Map 9. Vegetation Map Area 17, p96.
Reference: Keighery and Keighery, 1990.
Veg: m W, me Sh, WM (v HSh, mi Ht, H, S) **Cond: Very Good**

GENERAL COMMENTS
This Location is characterised by heavy clay soils associated with ironstone and loamy rises. The deep depressions or ponds that occur in the heavy clay soils characterised by *Melaleuca lateritia* Shrubland over Grassland, Sedgelands or Herblands depending on the time of the year, the shallow depressions by Mixed Open Heath and the flats by Viminaria High Shrubland, Mixed Heaths, Herblands and Sedgelands. Marri Woodland is characteristic of the rises.

The vegetation is generally in Very Good Condition with severe localised disturbance associated with the tracks and rubbish dumping. **Parentucellia viscosa*, **Romulea rosea* and**Sparaxis bulbifera* are is a significant weeds of the clayey soils and **Ehrharta calycina* and **Eragrostis curvula* are common on the margins of the Location and along the tracks.

Descriptions:

Loamy Rises
m W **Marri Woodland over *Viminaria juncea* Open Shrubland over *Hibbertia hypericoides*, *Nemcia capitatum* and *Xanthorrhoea preissii* Low Shrubland over *Xanthosia huegelii*, *Anigozanthos manglesii* and *Dampiera linearis* Herbland and *Tetraria octandra*, *Lepidosperma angustatum* and *Cyathochaeta avenacea* Sedgeland.**

Clay Flats
v Sh ***Viminaria juncea* High Shrubland over *Hypocalymma angustifolium*, *Verticordia serrata*, *Allocasuarina humilis* and *Xanthorrhoea brunonis* Low Open Heath over *Mesomelaena tetragona* and *Leptocarpus coangustatus* Sedgeland.**

mi Ht ***Astartea fascicularis* and *Pericalymma ellipticum* Open Heath over *Goodenia filiformis* var. *filiformis* and *Stylidium roseo-alatum* Herbland and *Leptocarpus canus* Sedgeland.**

Deep Depressions, ponds.
me Sh ***Melaleuca lateritia* Shrubland over *Pimelea imbricata* var. *gracillima* Low Shrubland over *Aponogeton hexatepalus*, *Hydrocotyle lemnoides* and *Wurmbea dioica* ssp nov Herbland and *Leptocarpus coangustatus* Open Sedgeland.**
H ***Aponogeton hexatepalus* and *Wurmbea dioica* ssp nov Herbland**
This association occurs in the flooded ponds in winter and is replaced by ***Amphibromus neesii* Grassland** in the spring.

Shallow Depressions
mi Ht ***Kunzea recurva* Open Heath with scattered *Viminaria juncea* over *Xanthorrhoea brunonis*, *Grevillea bipinnatifida* and *Daviesia physodes* Low Open Heath over *Conostylis festucacea*, *Borya scirpoidea* and *Scaevola lanceolata* Herbland and *Amphipogon turbinatus* and *Cyathochaeta clandestina* Open Sedgeland.**
Species of interest are:
Shrubs: 4#*Acanthocarpus canaliculatus*, 4#*Grevillea bipinnatifida*, 4#*Hakea auriculata*, 4#*Hakea erinacea*, 6#*Petrophile media* var *juncifolia*, 3#*Daviesia physodes*, 4#*Jacksonia alata*, 4#*Melaleuca lateritia*, 4#*Verticordia acerosa*, 4#*Conospermum huegelii*, 4#*Synaphea acutiloba*, 4#*Gompholobium*

marginatum, 4#*Gompholobium aristatum*, 4#*Calytrix aurea*, 4#*Andersonia aristata*, 4#*Vertcordia huegelii* var. *huegellli*

Herbs DRF, 6#*Aponogeton hexatepalus*, 6#*Hydatella dioica*, 4#*Agrostocrinum scabrum*, 5#*Tricoryne humilis*, 4#*Anigozanthos bicolor*, 6#*Tribonanthes* sp, 4#*Patersonia juncea*, 5#*Drosera heterophylla*, 3, 6#*Erynium 'subdecumbens'*, DRF, 6#*Hydrocotyle lemnoides*, 3, 5#*Villarsia submersa*, 6#*Hyalospermum pyrethrum*, 6#*Trichocline* sp4, 4#*Scaevola lanceolata*,5#*Conostylis festucacea*, 5#*Burchardia bairdii*, 4#*Stylidium ecorne*, 4#*Stylidium dichotomum*, 4#*Stylidium canaliculatum*,, 4#*Stylidium divaricatum*, 6#*Calandrinia composita*, 4#*Philydrella drummondii*, 4#*Tribonanthes brachypetala*, 3, 6#*Stylidium utricularioides*, 6#*Eryngium pinnatifida* ssp. *'palustris'* and 5#*Prasophyllum drummondii.*

Sedges 6#*Schoenus capillifolius*, 3, 5#*Schoenus andrewsii*

Location 63 - North Brixton St Wetlands. Location Map 9. Vegetation Map Area 17, p96. Reference: Gobble Garrat, E.M. 1991 Report on the Biological Survey of Lots 48 and Pt 35 Brixton St, Kenwick. Prepared for Hames and Sharley, 1991. This reference is not in the main reference list as it was not available until the mid January, 1992.

Veg: mi LSh/Sh, WM (H, S, mi LHt, v HSh, me HSh, sm LSh)
Cond: Very Good to Very Poor

GENERAL COMMENTS
The vegetation associations at this Location, Mixed Low Open Heath, Low Shrubland to Shrubland, *Viminaria juncea* High Shrubland, *Melaleuca* High Shrubland, Samphire Low Shrubland, Herblands and Sedgelands are influenced by significant intrusions of sand over clay. There are no apparent occurrences of ironstone as found at Location 62 and Location 65.

The condition of the vegetation is variable. The western two thirds of the Location is in Good Condition with patches in Very Good Condition and the western third is Very Poor to Poor. There is severe localised disturbance associated with the tracks. Common weeds on the western side are annual grasses, **Ixia maculata* and **Homeria flaccida*. The eastern side is heavily invaded by **Ehrharta calycina* on the sandier soils to the north and **Stenotaphrum secundatum* and **Cynodon dactylon* on the heavier soils to the south.

Sandy rises over clay

mi LSh/Sh ***Melaleuca*** **species,** ***Acacia*** **species and** ***Verticordia acerosa*** **Low Shrubland with scattered** ***Viminaria juncea*** **over Sedgeland.**

or

Eremaea pauciflora **Shrubland over mixed Low Shrubland over** ***Mesomelaena tetragona*** **and** ***Lyginia barbata*** **Sedgeland.**

Clayey Flats

mi LHt ***Hypocalymma angustifolium*** **and** ***Verticordia*** **species Low Open Heath with scattered** ***Melaleuca viminea, Viminaria juncea*** **and** ***Actinostrobus pyrimidalis*** **over Herbland and Sedgeland.**

v HSh ***Viminaria juncea*** **High Shrubland over mixed Low Open Heath over** ***Mesomelaena tetragona*** **Sedgeland**

me Sh ***Melaleuca raphiophylla, M.lateritia*** **and** ***M. bracteosa*** **Shrubland over exotic Grassland and Herbland.**

S, H **Herbland and** ***Leptocarpus*** **species Sedgeland.**

sm LSh ***Halosarcia halocnemoides*** **(Samphire) Low Shrubland.**

p LHt ***Pericalymma ellipticum*** **Low Open Heath over Herbland and** ***Mesomelaena*** **and** ***Restio tremulus*** **Sedgeland.**

Species of interest are:
Shrubs: 4#*Grevillea bipinnatifida*, 6#*Banksia telmatiaea*, 6#*Petrophile media* ?var *juncifolia*, 4#*Petrophile seminuda*, 5#*Calothamnus hirsutus*, 4#*Verticordia acerosa*, 3, 6#*Grevillea thelemanniana* ssp. *thelemanniana*, 3#*Daviesia physodes*, 4#*Jacksonia alata*, 4#*Melaleuca lateritia*,.4#*Verticordia huegelii*, 4#*Calytrix aurea*, 3#*Gonocarpus pythoides*.

Herbs: 6#*Hydatella dioica*, 4#*Anigozanthos bicolor*,4#*Scaevola lanceolata*,5#*Conostylis festucacea*, 4#*Stylidium dichotomum*, 5#*Isotoma scapigera*, 6#*Eryngium pinnatifida* ssp. *'palustris'* and 5#*Prasophyllum drummondii*.

Sedges: 5#*Restio tremulus*, 4#*Mesomelaena tetragona*.

Location 65: Wetlands NE of the Yule Brook Reserve between Brook and Boundary Rds, Kenwick. Location Map 9. Vegetation Map Area 17, p97.

Veg: WM (S, H, mi Sh, mi Ht, me Sh, sm LSh, me/ac Sc)
Cond: Very Good, Good and Poor with severe localised disturbance.

GENERAL COMMENTS
This Location has a mixture of sandy clays and clays and loamy soils. Although no ironstone was observed in undisturbed areas a section eroded road showed exposed underlying ironstone. Each of the vegetation association subject to site descriptions are not mapped as each association is too small in area. The vegetation is very much affected by drainage. Sites are described from the sandy mounds, well drained flats and poorly drained flats. These terms are relative as the whole Location is poorly drained.

A notable absence from this Location are
- Marri Woodlands and *Banksia* Woodlands on loamy or sandy rises.
- deep claypans. This may be natural but the drainage of this Location may have cause this, the drainage lines described below to the south of the Location may have been connected artificially.

This Location is in varying condition ranging from Completely Degraded to Very Good Condition due to drainage, grazing (rabbits), frequent fires, weed invasion, off-road vehicle activities, vehicle dumping and rubbish dumping. The Location is a mosaic of vegetation associations overlain with a secondary mosaic of disturbance. Most of the Location, except for isolated areas is in Good to Poor Condition and should regenerate if the disturbance factors are reduced. Although there are pockets of vegetation in Good Condition in the areas outside this delineated location these are predominantly in Poor to Very Poor Condition.

Sandy Mounds

GENERAL COMMENTS
The condition of the rises varies from those in Very Good Condition to those in Poor Condition. Weeds found on the rises are **Romulea rosea*, **Sparaxis bulbifera*, **Homeria flaccida*, **Gladiolus angustus*, **Trifolium campestre*, **Lolium*, **Ehrharta longiflora*, **Arctotheca calendula*, **Hypochaeris glabra*, *Watsonia* sp and **Ursinia anthemoides*.

Site a
mi Ht **Scattered** ***Viminaria juncea*** **and** ***Actinostrobus pyramidalis*** **over Mixed Closed Heath over Low Shrubland over Open Sedgeland**

Shrubs: *Viminaria juncea*, *Actinostrobus pyramidalis*, *Hypocalymma angustifolium*, *Acacia lasiocarpa*, *Kunzea recurva*, 5#*Banksia telmatiaea*, *Hakea varia*, 4#*Calothamnus hirsutus*, 4#*Verticordia acerosa*, 3,6#*Grevillea thelemanniana* ssp *thelemaniana*, 3#*Daviesia physodes*,

4#*Jacksonia restioides*, *Acacia stenoptera*, 4#*Andersonia aristata*
Other species common in this association: 4#*Melaleuca lateritia*, *Melaleuca viminea* , *Melaleuca hamulosa*, 5#*Melaleuca bracteosa*, *Melaleuca rhaphiophylla*

Herbs: 4#*Scaevola lanceolata*, *Thysanotus manglesianus*
Adjacent: 5#*Conostylis festucacea*
Other species common in this association: *Drosera glanduligera*, *Brachycome iberidifolia*

Sedges: 5#*Restio tremulus*, *Leptocarpus aristatus*, *Gahnia trifida*
Other species common in this association: *Leptocarpus canus*, *Leptocarpus coangustatus*, *Loxocarya pubescens*

CONDITION
Rating Very Good
Comments:

Aerial Photo: Run
Soil: grey clayey sand over clay
Drainage: moderate
Aspect: NA

Site b
me/ac Sc ***Melaleuca viminea*** **,and** ***Actinostrobus pyramidalis*** **Closed Scrub over Open Herbland and Open Sedgeland**

Shrubs: *Melaleuca viminea* , *Actinostrobus pyramidalis*, *Melaleuca hamulosa*, *Hypocalymma angustifolium*
Other species common in this association: 4#*Petrophile seminuda*, *Dodonaea aptera*

Grasses: **Briza maxima*, **Briza minor*, **Pentaschistis airoides*

Herbs: *Goodenia filiformis*, *Opercularia vaginata*, 5#*Pogonolepis stricta*, *Mitrasacme paradoxa*, *Cotula coronopifolia*
Sedges: *Juncus acutus*, *Juncus holoshoenus*, *Aphelia cyperoides*, *Isolepis cernua Isolepis oldfieldiana*

CONDITION
Rating Very Good
Comments:

Aerial Photo: Run
Soil: grey clayey sand over clay
Drainage: moderate
Aspect: NA

Flats
1) Shallow sandy soil over clay
H, S Herblands and Segelands

The Herblands are variable in their species composition and tend to contain a few species in large numbers. These species are predominantly annual and geophytic herbs and sedges. The Sedgelands contain fewer species. The two associations merge over small areas.

The commonly occurring species in these associations are listed below. These areas may be affected by salt. The following descriptions relate observations in the general area indicated as sites c and d but are related to a series of smaller areas in this general area rather than a specific 10m by 10m area as these communities are smaller than this.

Site c
Fresh

Herbs: *Anigozanthos viridus*, 5#*Burchardia bairdii*, *Brachycome iberidifolia*, *Polypompholyx multifida*, *Drosera menziesii* 'swamp', *Stylidium ecorne*, 4#*Stylidium dichotomum*, 4#*Stylidium divaricatum Tribonanthes australis*, *Drosera glanduligera*
Other species common in this association: 5#*Stylidium guttatum*, 6#*Stylidium utricularioides*, *Stylidium ecorne*, *Bulbine semibarbata*, *Helipterum ?demisium*, *Wurmbea* species, 6#*Calandrinia composita*, *Apium annum*

Sedges: *Leptocarpus aristatus*, *Leptocarpus canus*, *Leptocarpus coangustatus*, *Triglochin procera*, *Triglochin minutissima*, *Centrolepis aristata*, *Aphelia cyperoides*, 5#*Schoenus andrewsii*, *Centrolepis aristata*, *Centrolepis polygyna*, *Schoenus humilis*

Grasses: miscellaneous exotic species

Site d
Salt effected

Herbs: *Halosarcia* sp, *Samolus juncea*, 5#*Isotoma scapigera*, *Apium annuum*, *Wilsonia backhousei*, *Tribonanthes australis*, ?*Calocephalus angianthoides*,5#*Pogonolepis stricta*
Other species common in this association: *Wilsonia humilis*, 4#*Schoenolaena juncea*

Sedges: *Leptocarpus aristatus*, *Baumea* sp, *Schoenus rigens*, *Juncus bufonis*

Grasses: miscellaneous exotic species

2)Heavy ?shallow soils on clay flats
Site e
mi LHt *Verticordia* Low Open Heath over Herbland over Open Sedgeland

Shrubs: 4#*Verticordia acerosa*, 4#*Verticordia plumosa*, *Verticordia densiflora*, 6#*Calytrix breviseta* ssp *breviseta* , *Hypocalymma angustifolium*, *Boronia crenulata*, *Astroloma glaucescens*

Grasses: 4#*Neurachne alopecuroidea*, **Pentaschistis airoides*, **Briza maxima*

Herbs: 4#*Stylidium dichotomum*, 4#*Stylidium divaricatum*, *Borya scirpoidea*, 4#*Philydrella drummondii*, *Goodenia filiformis*, *Burchardia multiflora*, *Stylidium bulbiferum*, *Drosera heterophylla*, *Drosera menziesii'* swamp', *Cotula coronopifolia*, **Parentucellia viscosa*, *Thelymitra sp*, *Diuris carinata*, *Caladenia paludosa*, 4#*Tribonanthes brachypetala*, *Tribonanthes australis*, *Polypompholyx multifida*, **Romulea rosea*, *Thysanotus manglesianus*, *Brachycome iberidifolia*
Other species common in this association:6#*Stylidium utricularioides*, *Stylidium roseo-alatum*

Sedges: *Leptocarpus canus*, 5#*Schoenus andrewsii*, *Centroplepis aristata*, *Centrolepis polygyna*, *Triglochin minutissima*, *Schoenus?humilis*

CONDITION
Rating **Very Good to Good**
Comments: A roadside area but apparently little disturbed.

Aerial Photo: Run 13 5179
Soil: brown grey clay over clay
Drainage: poor
Aspect: flat

3) Wet depression on flat
Site f

me Ht ***Melaleuca uncinata*** **Open to Closed Heath over** ***Velleia trinervis*** **and** ***Eryngium pinnatifida*** **ssp. 'palustris' Open Herbland and** ***Baumea rubiginosa*** **and** ***Leptocarpus coangustatus*** **Open Sedgeland**

Shrubs: 4#*Melaleuca uncinata*, *Melaleuca rhaphiophylla*, *Viminaria juncea*, *Actinostrobus pyramidalis*, *Acacia lasiocarpa*
Adjacent: *Hypocalymma angustifolium*, *Astartea fascicularis*, *Verticordia densiflora*, *Melaleuca pauciflora*, 3,6#*Grevillea thelemanniana* ssp *thelemanniana*

Grasses: **Briza maxima*, **Briza minor*, *Poaceae sps

Herbs: *Velleia trinervis*, 3,6#*Eryngium pinnatifida* ssp 'palustris', *Brachycome iberidifolia*, 5#*Prasophyllum drummondii*, *Hydrocotyle diantha*, *Siloxerus humifusus*, *Cassytha racemosa*
On slight rises adjacent to the Site: *Patersonia occidentalis*, 5#*Conostylis festucacea*, *Laxmannia ramosa*, 4#*Stylidium canaliculatum*

Sedges: *Baumea rubiginosa*, *Leptocarpus coangustatus*, *Leptocarpus canus*, *Lepidosperma* sp, ?*Arthroschoenus*, *Hydrocotyle* sp
Adjacent: *Schoenus nanus*

CONDITION
Rating **Very Good to Good**
Comments:

Aerial Photo: Run 13 5179
Soil: brown grey loam over clay
Drainage: poor
Aspect: flat

BRIXTON ROAD

CANNING LOCATION 10 - LOT 37, GOSNELLS, SHIRE
(ALSO APPLIES TO LOTS 48, 35, 106, IN PART)
Report of Survey

G.J. Keighery and S.D. Hopper

MAJOR POINTS

Brixton Road site has several floral and biological features which make it one of the most outstanding sites for reservation on the Swan Coastal Plain.

1. Presence of rare flora, including Aponogeton hexatepalus and Hydrocotyle lemnoides.

2. Area of phytogeographical significance, containing several species at the northern extremities of their known ranges and species normally not present on the coastal plain but able to survive on heavy soils of this site.

3. Site of special scientific interest, containing hybridizing populations of Tribonanthes (flannel flowers) and Anigozanthos (Kangaroo Paws).

4. The claypans themselves are a rare habitat in the Metropolitan region.

5. The area could be a possible re-establishment site for the Short-necked Tortoise.

Description of the Site

The region consists of a series of interconnected claypans, dominated by Melaleuca laterita, which are inundated during winter and spring. These claypans are surrounded by higher ground, with sandy clay or lateritic soil carrying Viminaria juncea scrub, and a small sandy rise dominated by Eucalyptus calophylla (Marri).

The 170 species currently recorded from the area, are listed under these regions in the Appendix I. Further collecting, especially during spring and summer should greatly increase this listing, especially as the nearby Yule Brook Reserve which has been collected on since 1949 has a species list of over 370 (Speck and Baird, 1984). However, the lists are already significantly different despite the proximity of the areas.

Rare Flora

The claypans of Brixton Road, contain two species of gazetted rare flora, namely Aponogeton hexatepalus and Hydrocotyle lemnoides. Both are present in substantial numbers in this region. The Aponogeton population is the

largest known, and the species is currently not recorded from any nature reserve.

Phytogeographical Significance

Several orchid species (Caladenia ferruginea, Caladenia longicauda ssp. nov. and Thelymitra villosa) occuring here, are at the northern limits of their known ranges.

Because of the high water table and clayey soils the area supports many species normally associated with the lateritic or granitic soils of the northern jarrah forest and Darling Scarp. These species include: Lomandra micrantha, Anigozanthos bicolor (photo 6), Hakea erinacea, Grevillea bipinnatifida, Stirlingia tenuifolia and Synaphea acutiloba (photo 8).

Site of Special Scientific Interest

Apart from the scientific value of preserving rare flora, a rare habitat and outlying populations the site contains co-occurring populations of several related species which are of considerable genetic and taxonomic importance.

Several species of closely related spider orchids are found here (Caladenia ferruginea, Caladenia longicauda and Caladenia pectinata), and the sole known co-occurrence of the Star of Bethlehem Lilies (Calectasia cyanea and Calestasia grandiflora) (photo 9). These populations are of considerable significance in assessing taxonomic status of these plants.

Secondly, several well known species have hybridising populations at Brixton Road Tribonanthes australis x Tribonanthes brachypetala (photo 10); Tribonanthes australis x Tribonanthes variabilis; Anigozanthos bicolor x Anigozanthos manglesi : Anigozanthos manglesii x Anigozanthos viridis). The Tribonanthes hybrids are unique to Brixton Road, and have not been studied in detail, they are of considerable value for evolutionary studies in the genus, and should be preserved.

Rare Habitat

Melaleuca laterita swamps and claypans were once common on the poorly drained flatlands of the northern Swan Coastal Plain, edging the Darling Scarp. Most of this habitat type is now cleared. One of the few surviving sites is J.R. and B. Martyn Reserve, north of Midland.

Brixton Road is essentially similar to this reserve, in containing claypans which support a diverse annual herbfield. However, it is more extensive and is bordered by Viminaria scrub and Marri woodland. Hence, Brixton Road has a different flora.

Several species (currently not gazetted as rare) occuring in the claypans at Brixton Road deserve special note.

APPENDIX I - SPECIES LIST, LOT 37

A. Marri Woodland

Neurachne alopecuroides
✓*Briza minor
✓*Briza maxima
✓*Aira cupiana
✓*Eharhta calycina
✓Stipa trichophylla
✓Lepidosperma tenue
✓Mesomaelaena tetragona
✓Schoenus grandiflorus
✓Schoenus benthamianus
✓Tetraria octandra
✓Loxocarya fasiculata
✓Burchardia umbellata
✓Burchardia multiflora
✓Laxmannia sessiliflora
✓Laxmania squarrosa
✓Lomandra caespitosa
✓Haemodorum laxum
✓Haemodorum spicatum
✓Anigozanthos manglesii
✓Patersonia occidentalis
✓*Romulea rosea
✓Xanthorrhoea preissii
✓Caladenia longicauda
✓Caladenia pectinata
✓Caladenia deformis
✓Diuris longifolia (early flowering race, otherwise only on Darling Plateau)
✓Thelymitra crinita
✓Lyperanthus serratus
✓Dryandra nivea
✓Hakea prostrata (erect form)
✓Nuytsia floribunda
Daviesia incrassata

Schoenus capillifolius: only recorded from Brixton Road, and J.R. and B. Martyn Reserve (photo 11).

Eleeocharis sp. (GK 5180): only known from Brixton Road (photo 12)

Eryngium sp. I: Presently only known from Brixton Road. Previously only known from a collection made at Midland in 1905, and presumed extinct (photo 13).

Eryngium sp. II: previously only known from a degraded railroad reserve north of Serpentine. Its co-occurrence with Eryngium sp. I is of considerable interest.

It is unlikely that any of these species will be able to survive elsewhere on the Swan Coastal Plain, because of the clearing of their restricted habitat.

References

Speck, N.H. and Baird, A.M. (1984) "Vegetation of Yule Brook Reserve near Perth, Western Australia." Journ. Roy. Soc. West. Aust.66: 147-162.

Boundaries Proposed Yule Brook Nature Reserve

The Proposed Yule Brook Nature Reserve comprises about ?150 hectares of seasonal swamps and waterlogged flats north and south of Brixton Street, Kenwick bounded by railway line and Alton Street/Wanaping Road; Yule Brook Reserve (System 6 area M69 also referred to as the Kenwick Swamp) a small part being located immediately south of Bickley Road, and most north of Bickley Road bounded by Brook and Boundary Roads; and wetlands north east of Yule Brook Reserve between Brook and Boundary Roads.

All of the area identified (Map 1) is part of an interconnected wetland continuum on the Pinjarra Plain. This is the largest area of these communities available in the Perth Metropolitan Area and on the Swan Coastal Plain.

The segment north east of Yule Brook Reserve has the most widespread severe localised disturbance. That is some of the lots have been substantially if not completely cleared or have sections which have severe localised disturbance. However these lands contain substantial areas of significantly different plant communities and include the only known populations of a species of Declared Rare Flora *(Calytrix breviseta* subsp. *breviseta)* and *Lepidosperma rostratum*, a rare sedge.

The area is made up of a series of lots:
- Lots 37 and 47 (Homeswest), 48 and 35 (Landcorp) and 106 (freehold) Brixton Street
- Lots 9, 10, 11, 12, 13, 14, 15, 16, 77 and 78 of Location 382 comprising the Yule Brook Botanic Reserve are freehold land owned by the University of Western Australia, for the purpose of teaching and research by the Botany Department.
- Lots 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32 and 33 (freehold) Brook Road
- Lots ?, 36 and 341 ?Welshpool Road
- Lots 134, 135, 139, 140 (freehold) Boundary Road.

Lots 2, 30, 32, 36, 341, 501 and ? lie in the Shire of Kalamunda, and all other lots are in the City of Gosnells.

A series of boundary options are proposed based on ecological values and management to maintain these ecological values. That is the maximum area with the most least edge to area ratio.

Option 1A (principally ecological values but some management areas)
All lands enclosed in the blue highlighter on Map 1 (boundaries identified by Keighery and Trudgen 1992 and recognised as being in need of interim protection by the EPA 1994).

That is lots
- Lots 37 and 47 (Homeswest), 48 and 35 (Landcorp) and 106 (freehold) Brixton Street
- Lots 9, 10, 11, 12, 13, 14, 15, 16, 77 and 78 of Location 382 comprising the Yule Brook Botanic Reserve are freehold land owned by the University of Western Australia, for the purpose of teaching and research by the Botany Department.
- Lots 17, part 18, 19, 20, 21, 22, 24, 25, 26, 27 and 28 (freehold) Brook Road
- part Lots 134, 135, 139, 140 (freehold) Boundary Road.

Most of the Boundary Roads lots are currently identified for P&R Reservation, mapped as Option 1B. It is assumed that these lots have been purchased or will be purchased. Based on this assumption, in the area north east of the University of WA land lots 28 and 30 Brook Road and part Lots 134, 135, 139, 140 (freehold) Boundary Road are additional to the P&R. Part Lot 18 is identified but this should be dealt with in Option 3.
Note: The effectiveness of buying part lots should be considered as on management grounds it is desirable to purchase entire lots. This applies to Lots 18 (part bushland), 134 (mostly bushland), 135, 139 and 140.

Option 2 (principally ecological values and some management values)
Part lots 134, 139 and 30 have significant area of remnant vegetation. Lot 30 has the highest priority in this option as it consolidates the area between Bickley and Brook Roads. The note under Option 1A&B should be noted again.

Option 3 (principally management boundaries with some present and reformed ecological values)
The presence of areas of land with non-conforming uses within the proposed reserve will necessarily lead to conflict of management ; all lots 18, 21 and 23 should be acquired. Where necessary these lands can be revegetated to provide habitat (vegetation with the basic structure of the landforms they now form).

Option 4 (principally management boundaries with some present and reformed ecological values)
To consolidate the area lots 32, 36 and 341 should be acquired. Presently the use of lot 341 illustrates the problem of having lands within the conservation area that can impact on the ecological values of the area ie a distribution site for soils that could be contributing nutrients, dieback and other influences on the conservation areas to the south west.

ADD LOT 243 (? Bickley Rd) to Option 4 based on advice from D. Nunn (5/9/96)

Boundaries determined after

(i) Field inspection 29/8/96 with
MFP: D. Nunn, Kevin Lyndon
CALM: Lyndon Mutter
Conservation Council: Joan Payne
DEP: Bronwen Keighery

(ii) Discussion Neil Gibson & Gregory Keighery from CALM (1/9/96)

(iii) Lyndon Mutter (4/9/96)

(iv) Gary Whisson (5/9/96) L. Mutter 5/9/96 for comment.

(v) Copy faxed to D. Nunn & (no comment apparently necessary) B. J. Keighery 5/9/96

5052 WA 3169(c) METRO REGIONAL AP

Brook Rd

Bickley Rd

Brixton St

Boundary Rd

Brentwood Rd

N

MAP 1 5/9/96

OPTION 1A
DEP 'Threatened or Poorly Reserved Plant Communities'

OPTION 1B
boundary
purchased
P&R Reservation, MFP boundaries and purchases

OPTION 2

OPTION 3:

OPTION 4

MFP → P&R

Option 1 Lot 37 Homeswest
35 Landcorp
45 WAPC
106 Private
77 Uni WA
Urban L243, 135, 139, 140, 26, 28

Option 2
30, 33, 36, 341

Options?
L21 & 23.

WA 3169(c) METRO REGIONAL

5052

Brook Rd

Bickley Rd

Brixton St

Boundary Rd

Brentwood Rd

N

MAP 1 5/9/96

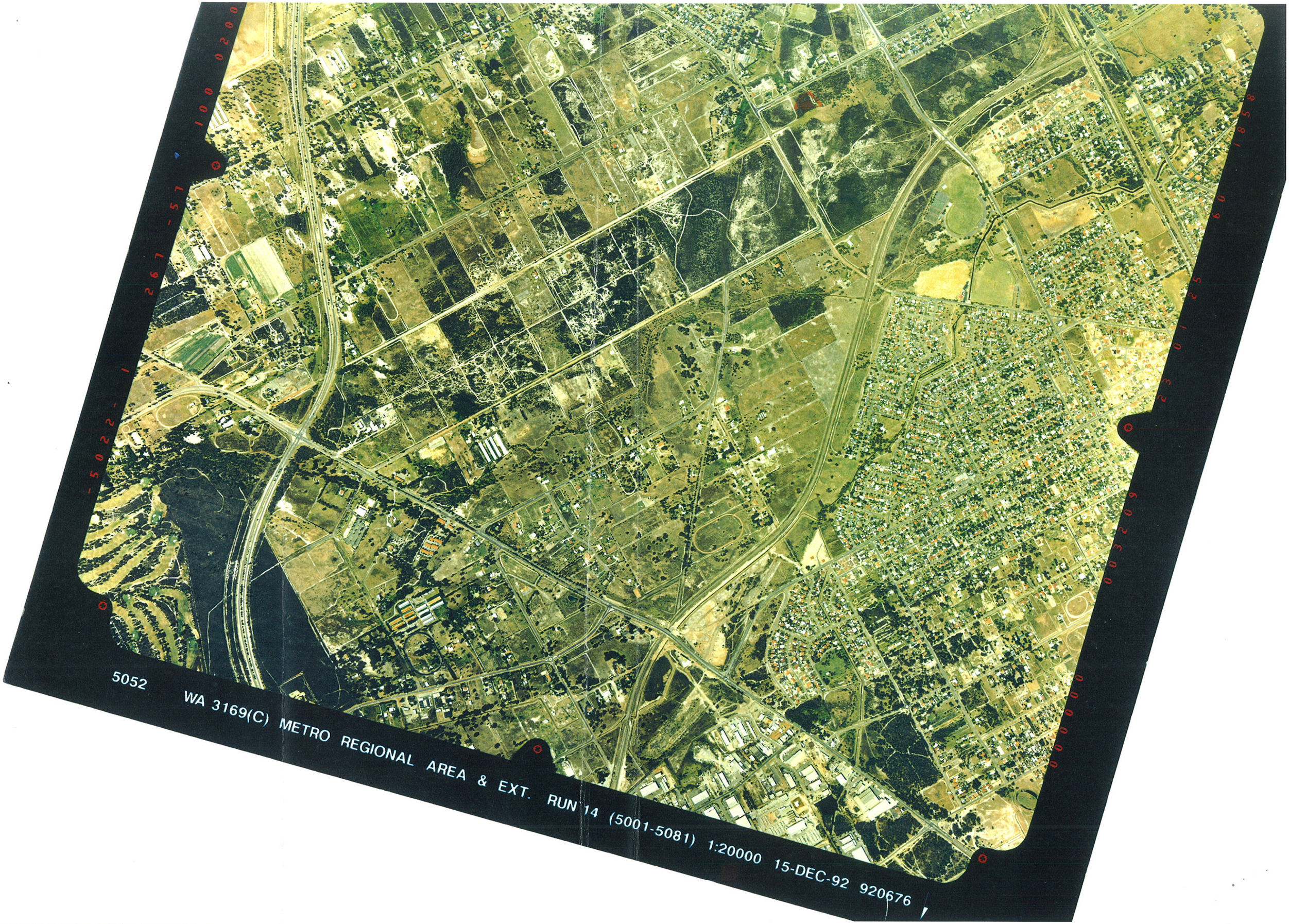
OPTION 1A
DEP 'Threatened or Poorly Reserved Plant Communities'

OPTION 1B
boundary
purchased
P&R Reservation, MFP boundaries and purchases

OPTION 2

OPTION 3:

OPTION 4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WA 3169(C) METRO REGIONAL AREA & EXT. RUN 14 (5001-5081) 1:20000 15-DEC-92 920676

FRIENDS OF BRIXTON STREET
AND THE
CONSERVATION COUNCIL OF WA

A PROPOSAL FOR A YULE BROOK NATURE RESERVE

INTRODUCTION

This is a proposal for the establishment of a Yule Brook Nature Reserve of approximately 137 ha to include the Brixton Street wetland complex. It is also a proposal to close Brixton Street between Alton Street and the Railway to vehicular traffic so that the vegetation continuum can be maintained between the two reserves.

The Brixton Street wetland complex is a remnant of the once vast wetlands of Kenwick. It extends from the railway line (Brixton Street) in the south west to Yule Brook in the north east. It is dominated by extensive seasonally waterlogged flats and ephemeral claypan basins which support a rich plant and animal community and is poorly represented in conservation reserves. It was recognised in the Australian Nature Conservation Agency publication "A Directory of Important Wetlands in Australia".

FLORA

Over 350 plant species are present in the area, which makes the Brixton Street region **floristically significant.** Putting it into a wider context, there are only 1,400 plant species in the whole of Britain so this represents about a quarter of Britain's plant species being present in a tiny area in Kenwick. Bushland in Britain and Europe is largely modified and there are no remaining natural areas with intact vegetation communities. We are fortunate in Western Australia that we still have bushland, much of which is in excellent condition.

The 19 ha Brixton Street (Homeswest) site support 17% of the known flora of the Perth region in less than 0.005% of the area, making it a site of high biodiversity.

The Australian Government recently ratified the Convention on Biological Diversity which is intended to ensure the long term survival of the full range of biological diversity, while at the same time providing for human needs through the sustainable use of biological resources.

In the Brixton complex there are 4 rare plant species and 10 priority listed species under the provisions of the Wildlife Conservation Act. There are also numerous vegetation communities, some of which are uncommon. The winter wet areas are particularly diverse, and the flora includes a suite of specialised short-lived winter plants. The local flora is also known to contain elements normally associated with Darling Scarp habitats.

The proposed Brixton Street flyover would cause an additional break in the vegetation's continuum and be detrimental to the ecological sustainability of the separate reserves.

FAUNA

The fauna of the area is correspondingly rich. As well as supporting many bush birds and waterbirds, the area provides habitat for mammals, with colonies of the rare southern brown bandicoot. Other mammals likely to occur in the area are the honey-possum and up to 9 species of bats.

Southern Brown Bandicoot

Most of the habitat of this delightful Western Australian animal is under threat. It requires secure habitat and prefers heathland associated with winter wet areas, which provides it with some protection from predators. Many bandicoots die on the roads, and road deaths must be considered to be a factor affecting their long term survival capacity. If they are required to cross open ground they are very vulnerable to attack.

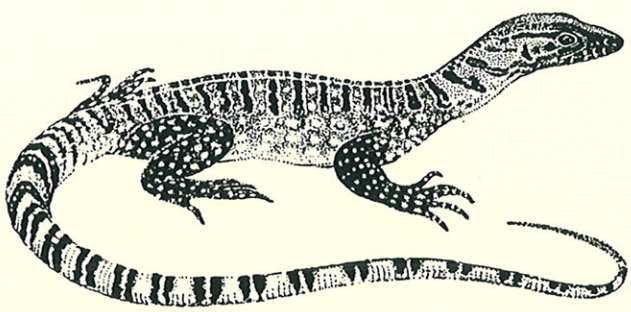
Many Western Australians have never seen this uniquely Australian animal, and yet in the Brixton Street wetlands they are still found.

If this precious animal is to survive, special care will need to be taken to meet its habitat needs. One consideration is to ensure that the bandicoots can move safely between the different areas. This is vital if part of their territory has been burnt as they will need to recolonise alternative territory pending the regrowth of the burnt area.

Roads create a barrier to fauna movement as well as causing casualities. Increasing the width of roads and volume of traffic would create a further barrier to fauna movement. This together with other pressures could in the long term bring about the extinction of the bandicoot colonies in Brixton Street.

Rosenberg Monitor

Numerous geckos, legless lizards, dragon lizards, skinks and monitors are found in the area. The Rosenberg Monitor - an uncommon goanna is present. This remarkable reptile lays its eggs in termite mounds where they are kept safe for approximately 9 months of the year, until the female returns to dig out the young. There are very few recorded sightings of this particular goanna in the metropolitan area. However its presence was confirmed by members of the local community and W.A. Museum records.



CLOSURE OF PART OF BRIXTON STREET

There are 5 options for Brixton Street currently being considered by the Environmental Protection Authority, as part of the Public Environmental Review on the Roe Highway Extension.

One of these options is to close Brixton Street between Alton Street and the railway line, dispersing the traffic via the Roe Highway and Albany Highway. To date no scoping studies have been done to accurately determine the traffic patterns. This needs to be done.

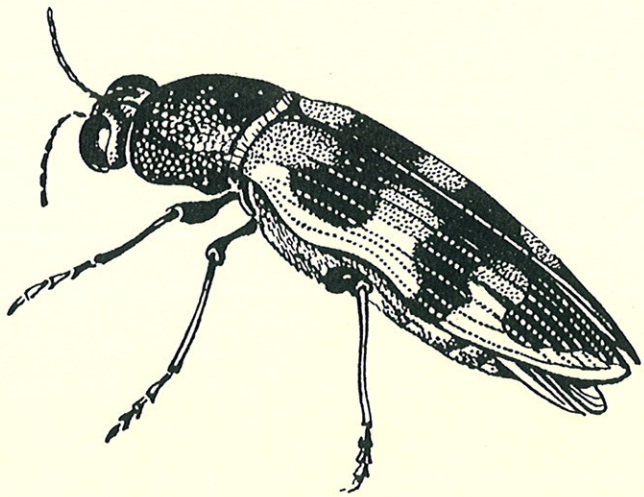
We propose that Brixton Street be closed to traffic and replaced with an attractive timber pedestrian and cycleway broadwalk which would be elevated to overlook the reserve. This broadwalk would link the Beckenham and Kenwick areas greatly benefiting local people. It would also make the proposed amalgamated reserve more viable for fauna, particularly mammals.

Children could safely use the cycleway if travelling the short distance between Kenwick and Beckenham. They are unable to do so now, due to the speed of traffic and the dangers of cycling on this type of road.

Currently Brixton Street appears to be predominantly used by through traffic to join up with William Street. Undoubtedly when the Roe Highway is built there will be a significant shift in traffic patterns and much of the fast traffic currently using Brixton Street will use the Roe Highway instead. Other environmentally sound possibilities should be pursued to provide an alternative east west link.

Freeways truncate the existing fabric of suburbia bring about dislocation of communities and a constant noise and air pollution nuisance to nearby communities. Yet weighing it up, people appear to consider the convenience outweighs the substantial disadvantages.

The proposal to close through traffic on Brixton Street would be likely to have a small impact on some motorists, however the overall gain for the whole community exceeds the small disadvantage.



COMMUNITY NEEDS

Some people may say that an urban community should be happy with footpaths, roads, ovals and other basic facilities. However many people feel that "quality of life" issues should also be considered. Urban dwellers increasingly are seeking natural bushland areas where they can enjoy a quiet walk away from the noise and stress of daily living.

Unfortunately for many people living in the inner suburbs, the "green areas" have gone, replaced with bitumen and concrete. Those residents must travel to Bold Park, Kings Park, Bungendore Park etc. These bushland areas are extensively used and enjoyed by thousands of people.

The Yule Brook Nature Reserve would provide a marvellous opportunity for school children. Children could gain a great deal from being able to experience and learn about a relatively intact natural ecosystem. If the road was replaced by a pedestrian/cycleway broadwalk between the two reserves, there would be further opportunities to observe the clay pans and the plant and animal communities, without impacting on some of the more sensitive areas.

It is proposed that the pedestrian/cycleway broadwalk would be taken over the Roe Freeway to link up with Brixton Street on the Beckenham side of the Roe Highway.

A large well-managed reserve which amalgamates Government owned land in the heart of Kenwick would be a valuable asset for the whole community, but particularly for Beckenham and Kenwick residents who would have their own "Kings Park bushland" right on their doorstep.

PROPOSAL

An opportunity exists now to create a large continuous reserve which would incorporate the existing and proposed reserves into one area, making the area ecologically sustainable for mammals particularly the bandicoots and honey possums. On-going management costs would be substantially reduced with a consolidated reserve.

It is therefore proposed that the area bounded by the railway, Wanaping, Boundary and Brook Roads and Tonkin Highway and Welshpool Road (refer to map below) be incorporated into one Nature Reserve to be managed by the Department of Conservation and Land Management.

Specifically the area would include -

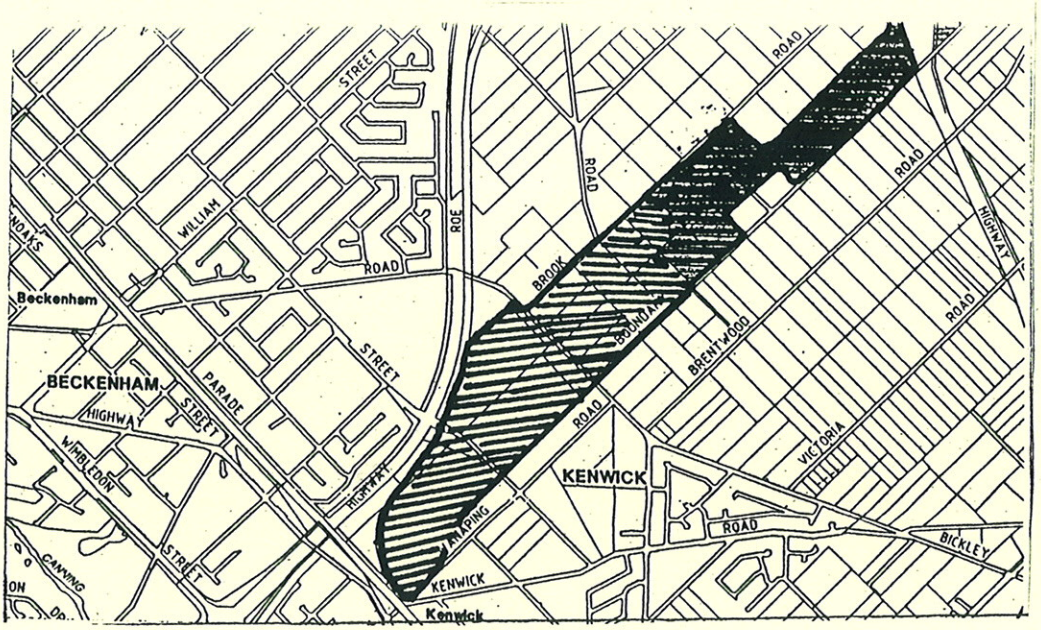
1) Lots 37 and 47 Brixton Street (19 ha) which is currently proposed as a Nature Reserve.

2) Adjoining wetlands, being Lot 48 and Lot 35. (30 ha). Lot 48 has been recommended for acquisition by the EPA to provide a link to proposed and existing reserves to the North. Lot 48 is currently privately owned and should be acquired. Lot 106 Wanaping Road should also be included.

3) Botany Reserve (System 6 area M69), known as the Kenwick Swamp (35ha) The University recently considered disposing of the Reserve to the Department of Conservation and Land Management with provisions for the Botany Department to continue to use the area for scientific studies. No decision to proceed has yet been made.

4) Foothills Metropolitan Region Scheme Amendments (Kenwick) including Lots 17, Lot 19, part Lot 21, part Lot 23, Lot 25, 27, 29 31, 33 Boundary Road, and part Lot 19 and 20, Lot 22, part Lot 24 Brook Road and part Lots 340 and Lot 341 Tonkin Highway (53 ha).

This would enable a relatively compact reserve of approximately 137 ha to be established.

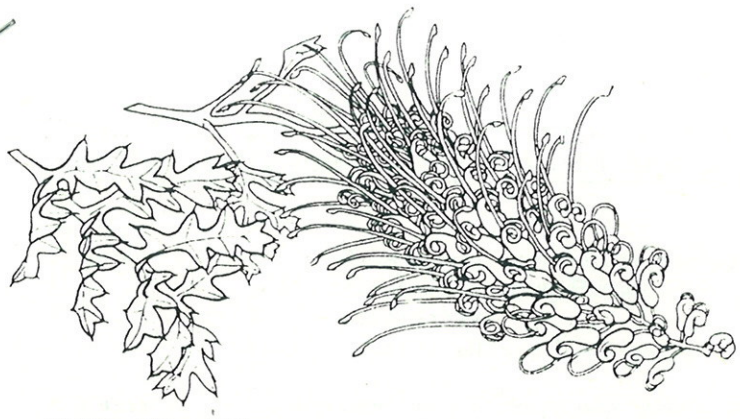


The Friends of Brixton Street and the Conservation Council of W.A. submit this proposition for the establishment of a Yule Brook Nature Reserve, with a small section of roadway in Brixton Street being replaced by a timber pedestrian and cycleway broadwalk so that the two proposed reserves could be amalgamated.

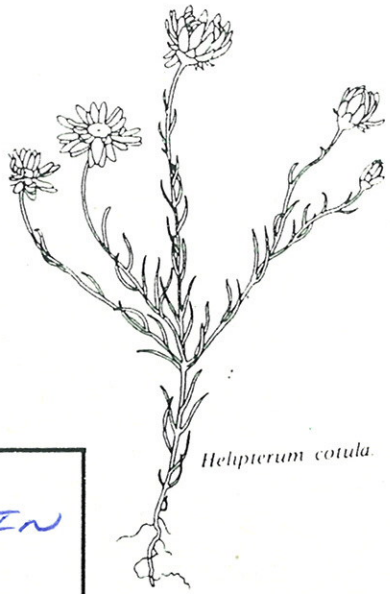
This could occur in conjunction with the Roe Highway extension so as to not inconvenience motorists.

This proposal would enhance the quality of life of local residents and increase property values over time, due to the proximity of such a fine reserve.

Regina Drummond - Convener for the Friends of Brixton Street
Joan Payne - Urban Bushland Coordinator/Conservation Council of W.A.
Wildlife Art by Margaret Wilson



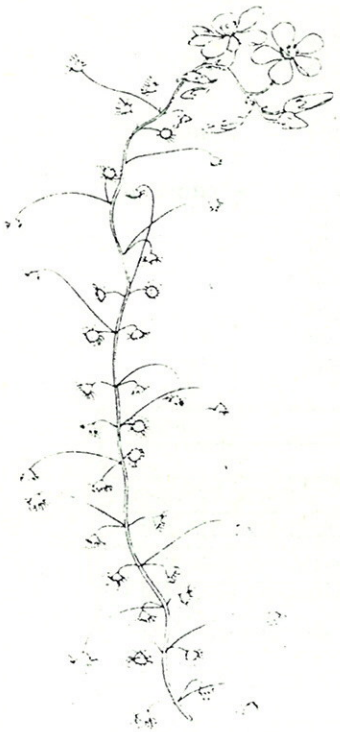
Grevillea bipinnatifida



Helipterum cotula

FROM Flora B&C Keighery IN

Knowing and Managing the Brixton Street Wetlands



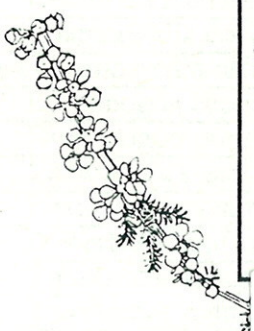
Drosera macrantha

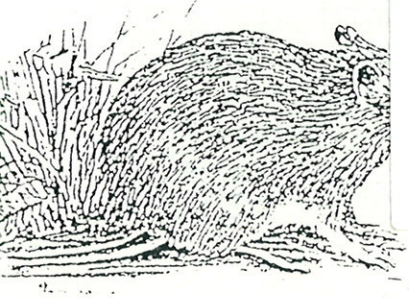
Melaleuca lateritia

compiled by Bronwen Keighery
for
The Friends of Brixton Street Wetlands and the Perth Branch of the Wildflower Society of WA (Inc.) in cooperation with the Department of Conservation and Land Management.

This project was funded by the State Government in the interest of protecting and enhancing our environment.

September 1995





Full document available on request

Burchardia multiflora

Wildflower drawings by Margaret Menadue reproduced with permission from the "Flora of the Perth Region"

Vegetation and Flora Report for Lot 106 Wanaping Road, Kenwick, part interim protected area under the System Six Update Programme
Bronwen Keighery, September 1995.

Introduction

In 1995 a series of bushland areas were identified by the EPA to be given interim protection under the System 6 Update. The majority of these areas are from the eastern side of the Swan Coastal Plain . It has been estimated that the eastern side of Swan Coastal Plain is 97% cleared of vegetation (CALM, 1990). The Wheatbelt considered to be 93% cleared (Beard, 1990) has been the subject of intensive study in the past 15 years but the eastern side of the Swan Coastal Plain has received comparably scant attention even though Beard noted in the same publication that there was "..no virgin vegetation left " on the eastern side of the Swan Coastal Plain. This situation has been recognized for some time and the two most recent regional studies of the Plain (Keighery and Trudgen 1992 and Gibson et al. 1994) both made direct recommendations concerning the high conservation value of all remnants on the eastern side of the Plain, regardless of the size of the remnant.

Lot 106 (the study area) is within the boundaries of "Brixton 1", one of the areas from the eastern side of the Plain given interim protection by the EPA under the System Six Update (Map 1). The boundaries of "Brixton 1" were identified by Keighery and Trudgen (1992) in their recommendation for the "Canning Wetlands" (Map 1), one of twelve specific recommendations. Keighery and Trudgen identified the values of the area. That is:

"This area is the only substantial area of Wetland Mosaic Associations characteristic of the heavy seasonally inundated soils of the flats of the Pinjarra Plain extant. The wetlands encompassed in these locations give some idea of the complexity and diversity of these wetlands that were once widespread on the Pinjarra Plain. The characteristic associations are: *Viminaria juncea* High Shrubland, *Melaleuca* Open Heath, Mixed Low Open Heath, Samphire Low Shrubland, Herblands and Sedgelands. The *Melaleuca* Open Heath and Mixed Low Open Heath are extremely variable depending on the dominant species, generally a suite of myrtaceuos shrubs often with scattered clumped *Actinostrobus pyramidalis*, *Viminaria juncea* and *Melaleuca rhaphiophylla*. Although there are areas in Very Poor Condition and areas of severe localised disturbance much of the area is in Very Good to Good Condition.

Significant taxa: >30 taxa, 4 DRF, 6 priority taxa and DRF
Of interest are: *Aponogeton hexatepalus*, *Schoenus capillifolius*, *Hydatella dioica*, *Acanthocarpus canaliculatus*, *Agrostocrinum scabrum*, *Tricoryne humilis*, *Anigozanthos bicolor*, *Tribonanthes* sp, *Patersonia juncea*, *Grevillea bipinnatifida*, *Hakea auriculata*, *Hakea erinacea*, *Petrophile media* var *juncifolius*, *Drosera heterophylla*, *Eryngium'subdecumbens'*, *Hydrocotyle lemnoides*, *Villarsia submersa*, *Hyalosperma pyrethrum*, *Trichocline* sp, *Banksia telmatiaea*, *Calothamnus hirsutus*, *Verticordia acerosa*, *Grevillea thelemanniana* ssp *thelemanniana*, *Daviesia physoides*, *Jacksonia alata*, *Andersonia aristata*, *Melaleuca lateritia*, *Scaevola lanceolata*, *Conostylis festucacea*, *Restio tremulus*, *Burchardia bairdiae Stylidium ecorne*, *Stylidium dichotomum*, *Stylidium divaricatum*, *Schoenus andrewsii*, *Isotoma scapigera*, *Calandrinia composita*, *Verticordia acerosa*, *Verticordia plumosa*, *Calytrix breviseta* ssp *breviseta* , *Phylydrella drummondii*, *Tribonanthes brachypetala*, *Stylidium utricularioides*, *Melaleuca uncinata*, *Eryngium pinnatifidum* ssp*'palustre'*, *Prasophyllum drummondii*."

(Appendix 1 gives details of the vegetation associations described for the area)

A specific recommendation was made for the area, being that
"CALM liaise urgently with the owners to retain and manage the area for its flora conservation values. Locations 63 and 65 should be acquired for a Nature Reserve encompassing all four locations, vested in the NPNCA."

The Canning Wetlands as identified by Keighery and Trudgen encompass a series of areas which have been the subject of a number of studies. Each of these studies have identified the outstanding flora conservation values of the area and many have recommended various levels of protection for all or part

of the area identified by Keighery and Trudgen. These studies are listed below and additional information on each area can be found in the Appendices attached in an earlier report on Lot 139 Brentwood Road (Keighery June 1995).

• Detailed long term research projects

- Yule Brook Reserve (Map 1 and Appendix 2 Keighery June 1995). As this is a University of WA research area there have been a series of studies on the area, Speck and Baird (1984) details the vegetation and flora of the area.
- Brixton Street Wetlands (Map 1 and Appendix 3 Keighery June 1995), Keighery and Keighery (1990)

The results of these two detailed detailed long term studies establish that the vegetation associations in the study area are complex and varied containing a rich and endemic flora. A compilation of the flora of these two areas (Keighery 1993) that allowed for taxonomic changes and duplications lists 517 native vascular plant taxa in these two areas, that is over one third of the flora of the Swan Coastal Plain.

• Environmental Assessments

- Brixton Street Wetlands (Lot 37 and Lot 47 Brixton Street , Map 1 and Appendix 4 Keighery June 1995), Hames and Sharley 1991a and EPA Bulletin September 1991.
- Glenhaven Estate, Lot 48 and part Lot 35 Brixton Street (Map 1, Appendix 5 Keighery June 1995), Hames and Sharley 1991b and EPA Bulletin July 1992. This study also mapped the vegetation in Lot 106 (Map 2).

These environmental assessments related to housing proposals for the various lots. Lots 37, 47 and part 48 were subsequently identified as conservation areas to be vested in the NPNCA.

• Planning Studies

- Foothills Environmental Audit, Semeniuk 1991
- Boundary and Brook Road, Mattiske and Associates 1992.

These studies recognised the conservation values of land to the north east of Yule Brook Reserve between Boundary and Brook Roads, some of the area has been acquired by the State Planning Commission.

• Rare Flora of the Metropolitan Region Kelly et al. 1993

Populations of four taxa of Declared Rare Flora are found in the area.

• Regional Studies

- Keighery and Trudgen 1992 (Appendix 1 Keighery June 1995)
- Gibson et al 1994 (Appendix 9 Keighery June 1995)

The outstanding conservation values of the area have been recognised by a series of other groups/studies:

(i) Nomination for listing on the register of the National Estate (Map 1).
In 1994 the approximate area of the "Cannington Wetlands" was nominated for listing on the National Estate by the Wildflower Society of WA (Inc.) (Map 1).
(ii) The Conservation Council has proposed that much of the "Cannington Wetlands" become the Yule Brook Nature Reserve (Map 1).
(iii) The Brixton Street Wetlands are listed on the Australian Register of Significant Wetlands (Australian Nature Conservation Authority 1993).

Methods and Limitations

Approximately one hour was spent in the area of Lot 106 (24/8/95). Descriptive information (Sites 1 - 3, Appendix 1) was collected and collections were made of taxa considered of interest.

Much of the area was waterlogged or inundated which limited the effectiveness of the survey as many of the plants characteristic of the area grow and flower as the wetlands dry. Also heavy rain fell throughout the field visit and most of the area had been burnt in a summer fire.

Vegetation

Vegetation Associations (structural units)

The study area has a mixture of sands and clays. The vegetation is very much affected by the proportions of sand to clay and the drainage. Sites are described from the areas of vegetation in best condition on the sandy clays. A ridge of sand towards the north east of the lot (Map 2) was almost toatally cleared and no site was described from this section of the lot. Hames and Sharley (1992) show the area as *Eremaea* Low Shrubland (Map 2). The vegetation associations in the study area on the seasonally inundated areas are best described as Wetland Mosaic Associations (after Keighery and Trudgen 1992). Hames and Sharley (1991b) map the same areas as *Melaleuca* Shrubland and *Pericalymma* Low Shrubland which describes the predominant overstorey but as can be seen from the site descriptions for this study and Hames and Sharley (Gobble - Garratt, Appendix 1) patches of Herblands and Sedgelands occur in association with these units.

The vegetation associations in the study area extend into Lots 48 and 35.

Floristic Community Types (Gibson et al. 1994)

Gibson et al (1994) identified five floristic community types (3a, 7, 8, 10a, 21c & 23a) from the Brixton Street Wetlands (Map 1 - floristic community types 3a & 8) and Yule Brook Reserve (Map 1 - floristic community types 10a, 7, 21c & 23a). There was no overlap of the floristic community types from the two areas, indicating the diversity of floristic units in the area.

No floristic sites have been located in the area of Part Lots 78, 77 &35 and Lots 48 and 106, the area subject to the Hames and Sharley study . However Gobble - Garratt (Hames and Sharley, Appendix 1 1991b) concluded that Part Lots 78, 77 &35 and Lots 48 and 106 had

" floristic similarities with both of the adjacent remnants* of native vegetation, and similarly occupies an intermediate position in the continuum of vegetation types across the area as a whole. The topographic gradient presents a unique set of niches for plant growth, and it is with respect to the different association in the turnover that the site differs from the adjacent ones. The site must thus be considered to occupy a special position in the landscape, as would any area situated midway along a gradient in the physical environment."

* Brixton Street Wetlands and Yule Brook Reserve

Vegetation Condition

Most of Lot 106 was burnt in summer this year. This study and previous studies (Keighery and Trudgen 1992 and Hames and Sharley 1991b) indicate that the vegatation of Lot 106 and part Lot 35 (Map 1) is generally completely degraded or in good to degraded condition (Keighery 1994 = poor to very poor, Trudgen 1993). A few patches are in very good condition (= good, Trudgen, 1993).

The weeds in the completely degraded areas were not recorded. The significant weeds in the bushland areas are *Ehrharta calycina* , *Hypochaeris glabra* and *Ursinia anthemoides* on the sandier soils to the and *Cynodon dactylon* , *Romulea rosea*, *Sparaxis bulbifera* and *Lolium* ?species and on the heavier soils.

The vegetation in the western two thirds of the block (Part Lots 78, 77 &35 and Lots 48 and 106) is in very good condition (= good, Trudgen, 1993).with patches in excellent condition (= very good, Trudgen, 1993). There is severe localised disturbance associated with the tracks.

Flora

There are a considerable number of native taxa in the study area but as most are resprouting or are young seedlings, a detailed assessment of flora can not be made

The outstanding flora diversity of the "Canning Wetlands" (Keighery and Trudgen 1992) is well established by long term studies in the area. Some of the significant taxa identified in the "Canning Wetlands" would be expected to occur in the study area.

Conclusion

While the study area is probably the most degraded section of the "Cannington Wetlands" it does contain areas of remnant vegetation typical of the vegetation associations and flora associated with the poorly conserved seasonally inundated wetlands of the eastern side of the Swan Coastal Plain. Any loss of area of these wetlands will lessen their long term viability, especially with regard to fire and other disturbances. Also the impact of a developing the study area may lessen the long term viabilityof the wetlands by impacting on drainage and nutrient levels in the area.

References

Atkins, K. (14/9/1994) Declared Rare and Priority List for Western Australia. Department of Conservation and Land Management, WA.

Australian Nature Conservation Agency (1993). A Directory of Important Wetlands in Australia. Commonwealth of Australia, Canberra.

Churchward, H.M. and McArthur, W.M. (1980) Landforms and Soils of the Darling System. In "Atlas of Natural Resources, Darling System, Western Australia". Department of Conservation and Environment, Western Australia.

Department of Conservation and Environment. (1983) Conservation Reserves for Western Australia. The Darling System - System 6. Parts 1 &2. Report 13. Department of Conservation and Environment, Perth.

Environmental Protection Authority (1991). Bulletin 577: Subdivision: Concept plan and design Lots 37 and 47 Brixton Street, Kenwick. Report and recommendations of the EPA.

Environmental Protection Authority (1992). Bulletin 635: Proposed urban development of Lots 35 and 48 Brixton Street, Kenwick, City of Gosnells, Report and recommendations of the EPA.

Gibson, N., Keighery, B.J., Keighery, G.J., Burbidge, A. and Lyons, M. (1994) A Floristic survey of the southern Swan Coastal Plain. Unpublished report for the Australian Heritage Commission prepared by department of CALM and the Conservation Council of WA (Inc).

Gobble Garrat, E.M. (1991) Report on the Biological Survey of Lots 48 and Pt 35 Brixton St, Kenwick. Prepared for Hames and Sharley, 1991.

Hames and Sharley (1991a) Proposed Urban Development and Wetland Conservation on Lot 37 and Lot 47 Brixton Street, Kenwick, City of Gosnells.

Hames Sharley Australia (1991b). Consultative Environmental Review: Glenhaven Estate, Lot 48 and part Lot 35 Brixton Street, Kenwick, City of Gosnells. Hames Sharley Australia, Subiaco WA.

Keighery, B.J. (1995) Vegetation and Flora Report for Lot 139 Brentwood Road, Kenwick, part interim protected area under the System Six Update Programme. Unpublished report for the Department of Environmental Protection.

Keighery, B.J. and Trudgen, M.E. (1992) "The Remnant Vegetation of the Eastern Side of the Swan Coastal Plain." Unpublished report to the Department of Conservation of Land Management for the National Estate Grants Programme.

Keighery G. J. and Keighery B. J. (1991). Floristics of Reserves and Bushland Areas of the Perth Region (System 6), Parts II Brixton Street Wetlands in Floristics of Reserves and Bushland Areas of the Perth Region (System 6), Parts II to IV. Wildflower Society of Western Australia (Inc.).

Keighery G. J. (1993). Species list for Brixton Street and Yule Brook Reserve. CALM unpublished

Kelly, A., Taylor A., Langley, M.A., Spooner, A. and Coates, D.J.. (1993) "Declared Rare Flora and Other Plants in Need of Special Protection in the Metropolitan Region". Wildlife Management Programme 10. Department of Conservation and Land Management, WA

Mattiske, E.M. and Associates (1992) Flora and Vegetation - Boundary and Brook Roads, Kenwick. An unpublished report for Department of Planning and Urban Development.

Semeniuk Research, V. and C. Group (1991) Environmental and Landscape Audit of South-west, North-west, North-east, South-east and Foothills Corridors, Perth Metropolitan Area.. Stage 3, Interim report Foothills Corridor Study. Unpublished report for the Department of Planning and Urban Development.

Speck N. H., Baird A. M. (1984). Vegetation of Yule Brook Reserve near Perth, Western Australia. J. Roy. Soc. of WA 66, Pt 4, 147 - 162.

Trudgen, M.E. (1993) Vegetation Condition Scale. In "Urban Bushland Policy", National Trust of Australia (WA), Perth.

Appendix 1: Vegetation associations
Descriptions are extrapolated from the remains of the vegetation, terminology is from Keighery 1994, p52.

Site 1
Scattered *Actinostrobus pyramidalis* to Tall Open Scrub over *Banksia telmatiaea* , *Melaleuca* sp Band *Stirlingia latifolia* Open Heath

Shrubs: *Actinostrobus pyramidalis, Hypocalymma angustifolium, Banksia telmatiaea, Jacksonia ?furcellata* , *Melaleuca* sp B
Herbs: *Anigozanthos humilis, Tribonanthes australis, Conostylis juncea, Conostylis ?festucacea*

Site 2
Melaleuca rhaphiophylla Thicket to Scrub over *Pericalymma elliptica* Open Heath to Open Shrubland over Herbland and Sedgeland.

Shrubs: *Melaleuca raphiophylla* , *Viminaria juncea*
Herbs: *Tribonanthes australis, Burchardia multiflora*
Sedges: *Schoenus elegans, S. odontocarpus*

Site 3
Scattered *Melaleuca rhaphiophylla* to Tall Open Shrubland over *Melaleuca viminea* and *?Kunzea recurva* Shrubland

Shrubs: *Melaleuca rhaphiophylla* , *M. lateriflora, ?Kunzea recurva* , *Acanthocarpus canaliculatus*
Herbs: *Tribonanthes australis, Polypompholyx multifida, Drosera glanduligera, D. menziesii* subsp. *menziesii*

Appendix 2:

Location Descriptions for Part Lots 78, 77 and 35 and Lots 48 and 106, Keighery, B.J. and Trudgen, M.E. (1992) "The Remnant Vegetation of the Eastern Side of the Swan Coastal Plain." Unpublished report to the Department of Conservation of Land Management for the National Estate Grants Programme.

Location 63 - North Brixton St Wetlands. Location Map 9. Vegetation Map Area 17, p96. Reference: Gobble Garrat, E.M. 1991 Report on the Biological Survey of Lots 48 and Pt 35 Brixton St, Kenwick. Prepared for Hames and Sharley, 1991. This reference is not in the main reference list as it was not available until the mid January, 1992.

Veg: mi LSh/Sh, WM (H, S, mi LHt, v HSh, me HSh, sm LSh) Cond: Very Good to Very Poor

GENERAL COMMENTS
The vegetation associations at this Location, Mixed Low Open Heath, Low Shrubland to Shrubland, *Viminaria juncea* High Shrubland, *Melaleuca* High Shrubland, Samphire Low Shrubland, Herblands and Sedgelands are influenced by significant intrusions of sand over clay. There are no apparent occurrences of ironstone as found at Location 62 and Location 65.

The condition of the vegetation is variable. The western two thirds of the Location is in Good Condition with patches in Very Good Condition and the eastern third is Very Poor to Poor. There is severe localised disturbance associated with the tracks. Common weeds on the western side are annual grasses, **Ixia maculata* and **Homeria flaccida*. The eastern side is heavily invaded by **Ehrharta calycina* on the sandier soils to the north and **Stenotaphrum secundatum* and **Cynodon dactylon* on the heavier soils to the south.

Sandy rises over clay

mi LSh/Sh *Melaleuca* species, *Acacia* species and *Verticordia acerosa* Low Shrubland with scattered *Viminaria juncea* over Sedgeland.

or

Eremaea pauciflora Shrubland over mixed Low Shrubland over *Mesomelaena tetragona* and *Lyginia barbata* Sedgeland.

Clayey Flats

mi LHt *Hypocalymma angustifolium* and *Verticordia* species Low Open Heath with scattered *Melaleuca viminea*, *Viminaria juncea* and *Actinostrobus pyrimidalis* over Herbland and Sedgeland.

v HSh *Viminaria juncea* High Shrubland over mixed Low Open Heath over *Mesomelaena tetragona* Sedgeland

me Sh *Melaleuca rhaphiophylla*, *M.lateritia* and *M. bracteosa* Shrubland over exotic Grassland and Herbland.

S, H Herbland and *Leptocarpus* species Sedgeland.

sm LSh *Halosarcia halocnemoides* (Samphire) Low Shrubland.

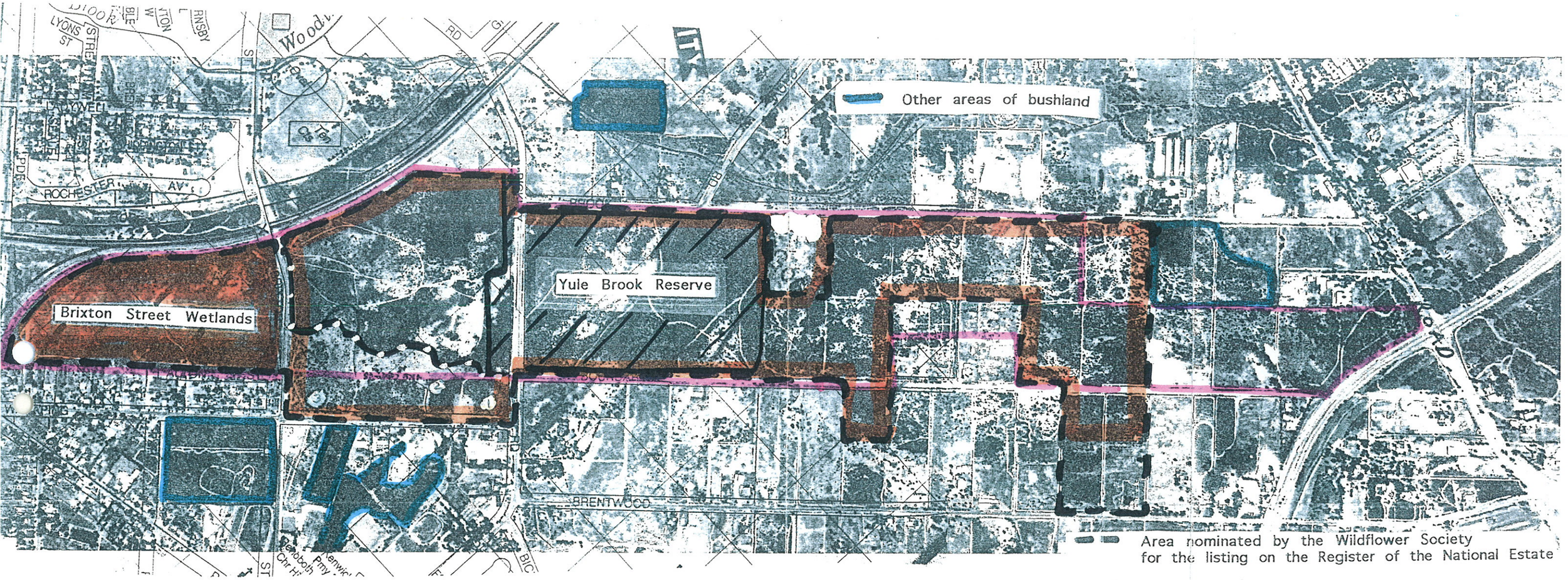
p LHt *Pericalymma ellipticum* Low Open Heath over Herbland and *Mesomelaena* and *Restio tremulus* Sedgeland.

Species of interest are:
Shrubs: 4#*Grevillea bipinnatifida*, 6#*Banksia telmatiaea*, 6#*Petrophile media* ?var

juncifolia, 4#*Petrophile seminuda*, 5#*Calothamnus hirsutus*, 4#*Verticordia acerosa*, 3, 6#*Grevillea thelemanniana* ssp. *thelemanniana*, 3#*Daviesia physodes*, 4#*Jacksonia alata*, 4#*Melaleuca lateritia*,.4#*Verticordia huegelii*, 4#*Calytrix aurea*, 3#*Gonocarpus pythoides.*

Herbs: 6#*Hydatella dioica*, 4#*Anigozanthos bicolor*,4#*Scaevola lanceolata*, 5#*Conostylis festucacea*, 4#*Stylidium dichotomum*, 5#*Isotoma scapigera*, 6#*Eryngium pinnatifidum* ssp. '*palustris*' and 5#*Prasophyllum drummondii.*

Sedges: 5#*Restio tremulus*, 4#*Mesomelaena tetragona.*



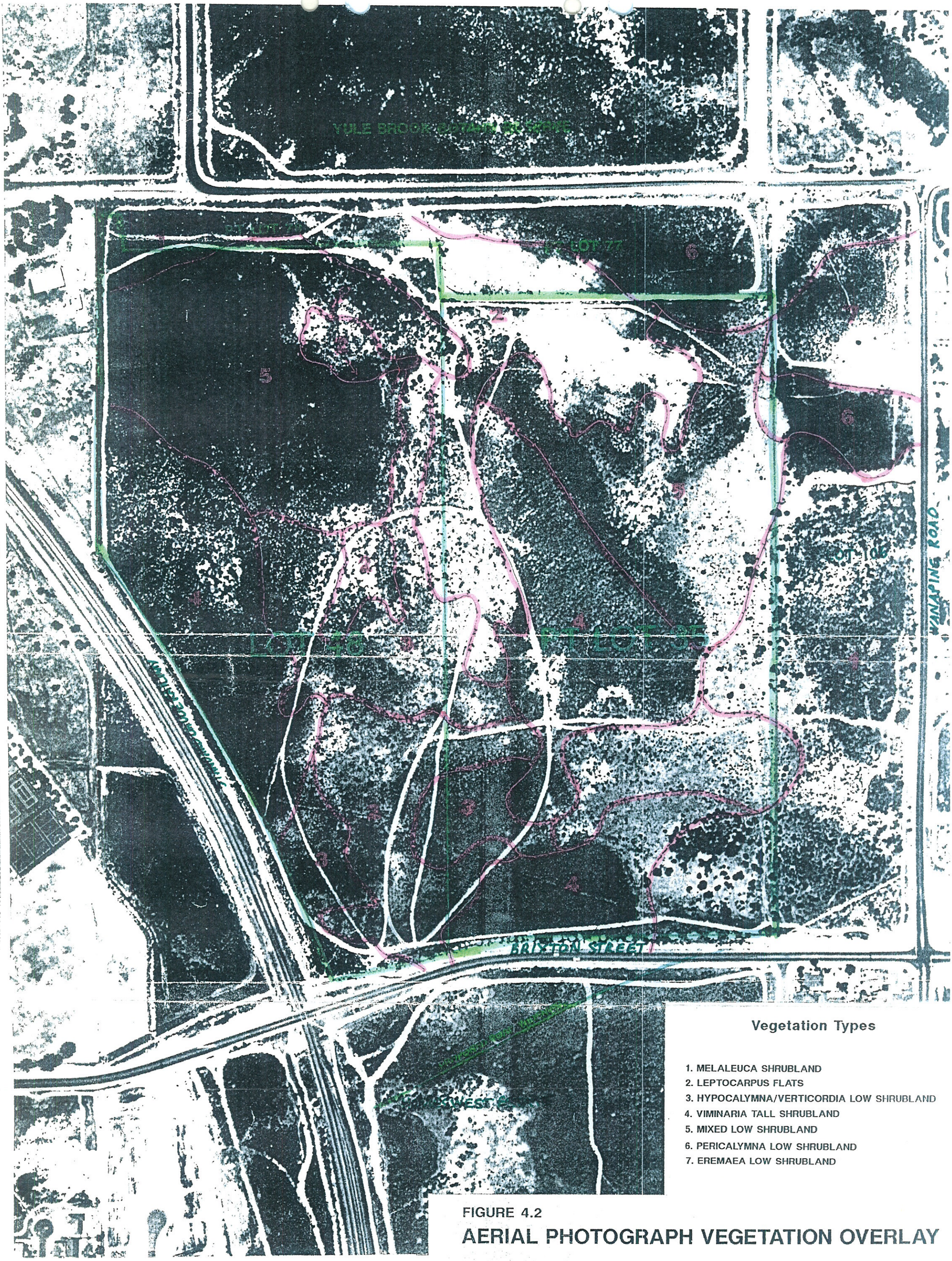
Area nominated by the Wildflower Society for the listing on the Register of the National Estate

Reserved Area

'Interim listed' System 6 update

'Yule Brook Nature Reserve'

MAP 1



Vegetation Types

1. MELALEUCA SHRUBLAND
2. LEPTOCARPUS FLATS
3. HYPOCALYMNA/VERTICORDIA LOW SHRUBLAND
4. VIMINARIA TALL SHRUBLAND
5. MIXED LOW SHRUBLAND
6. PERICALYMNA LOW SHRUBLAND
7. EREMAEA LOW SHRUBLAND

FIGURE 4.2

AERIAL PHOTOGRAPH VEGETATION OVERLAY

MAP 2

Vegetation and Flora Report for Lot 139 Brentwood Road, Kenwick, part interim protected area under the System Six Update Programme
Bronwen Keighery, June 1995.

Introduction

In 1995 a series of bushland areas were identified by the EPA to be given interim protection under the System 6 Update. The majority of these areas are from the the eastern side of the Swan Coastal Plain . It has been estimated that the eastern side of Swan Coastal Plain is 97% cleared of vegetation (CALM, 1990). The Wheatbelt considered to be 93% cleared (Beard, 1990) has been the subject of intensive study, in the past 15 years but the eastern side of the Swan Coastal Plain has received comparably scant attention even though Beard noted in the same publication that there was "..no virgin vegetation left " on the eastern side of the Swan Coastal Plain. This situation has been recognized for some time and the two most recent regional studies of the Plain (Keighery and Trudgen 1992 and Gibson et al. 1994) both made direct recommendations concerning the the high conservation value of all remnants on the eastern side of the Plain, regardless of the size of the remnant.

Part of Lot 139 (the study area) is within the boundaries of "Brixton 1", one of the areas from the eastern side of the Plain given interim protection by the EPA under the System Six Update (Map 1, Photo 1)). The boundaries of "Brixton 1" were identified by Keighery and Trudgen (1992) in their recommendation for the "Canning Wetlands" (Map 2 and Appendix 1), one of twelve specific recommendations. Keighery and Trudgen identified the values of the area. That is:

"This area is the only substantial area of Wetland Mosaic Associations characteristic of the heavy seasonally inundated soils of the flats of the Pinjarra Plain extant. The wetlands encompassed in these locations give some idea of the complexity and diversity of these wetlands that were once widespread on the Pinjarra Plain. The characteristic associations are: *Viminaria juncea* High Shrubland, *Melaleuca* Open Heath, Mixed Low Open Heath, Samphire Low Shrubland, Herblands and Sedgelands. The *Melaleuca* Open Heath and Mixed Low Open Heath are extremely variable depending on the dominant species, generally a suite of myrtaceuos shrubs often with scattered clumped *Actinostrobus pyrimidalis, Viminaria juncea* and *Melaleuca raphiophylla.* Although there are areas in Very Poor Condition and areas of severe localised disturbance much of the area is in Very Good to Good Condition.

Significant taxa: >30 taxa, 4 DRF, 6 priority taxa and DRF
Of interest are: *Aponogeton hexatepalus, Schoenus capillifolius, Hydatella dioica, Acanthocarpus cannaliculatus, Agrostocrium scabrum, Tricoryne humilis, Anigazanthos bicolor, Tribonanthes* sp, *Patersoniajuncea, Grevillea bipinnatifida, Hakea auriculata, Hakea erinacea, Petrophile media* var *juncifolia, Drosera heterophylla, Erynium'subdecumbens', Hydrocotyle lemnoides, Villarsia submersa, Hyalospermum pyrethrum, Trichocline* sp, *Banksia telmatiea, Calothamnus hirsutus, Verticordia acerosa, Grevillea thelemanniana* ssp *thelemanniana, Daviesia physoides, Jacksonia alata, Andersonia aristata, Melaleca laterita, Scaevola lanceolata, Conostylis festucacea, Restio tremuluss, Buchardia bairdii, Stylidium ecorne, Stylidium dichotomum, Stylidium divaricatum, Schoenus andrewsii, Isotoma scapigera, Calandrinia composita, Verticordia acerosa, Verticordia plumosa, Calytrix breviseta* ssp *breviseta , Phylidrella drummondii, Tribonanthes brachypetala, Stylidium utriculariodes, Melaleuca uncinata, Eryngium bipinnatifidum* ssp'*palastris', Phrasophyllum drummondii.*"

(Appendix 1 gives details of the vegetation associations described for the area)

A specific recommendation was made for the area, being that
"CALM liaise urgently with the owners to retain and manage the area for its flora conservation values. Locations 63 and 65 should be acquired for a Nature Reserve encompassing all four locations, vested in the NPNCA."

The Canning Wetlands as identified by Keighery and Trudgen encompass a series of areas which have been the subject of a number of studies. Each of these studies have identified the outstanding flora conservation values of the area and many have recommended various levels of protection for all or part of the area identified by Keighery and Trudgen. These studies include

• Detailed long term research projects

- Yule Brook Reserve (Map 2, Area 3 and Appendix 2). As this is a University of WA research area there have been a series of studies on the area, Speck and Baird (1984) details the vegetation and flora of the area.

- Brixton Street Wetlands (Map 2, Area 1 and Appendix 3), Keighery and Keighery (1990)

The results of these two detailed detailed long term studies establish that the vegetation associations in the the study area are complex and varied containing a rich and endemic flora. A compilation of the flora of these two areas (Keighery 1993) that allowed for taxonomic changes and duplications lists 517 native vascular plant taxa in these two areas, that is over one third of the flora of the Swan Coastal Plain.

• Environmental Assessments

- Lot 37 and Lot 47 Brixton Street (Map 2, Area 1 and Appendix 4), Hames and Sharley 1991 and EPA Bulletin September 1991.

- Glenhaven Estate, Lot 48 and part Lot 35 Brixton Street (Map 2, Area 2 and Appendix 5), Hames and Sharley 1991 and EPA Bulletin July 1992.

These environmental assessments related to housing proposals for the various lots. Lots 37, 47 and part 48 were subsequently identified as conservation areas to be vested in the NPNCA.

• Planning Studies

- Foothills Environmental Audit (Map 2, Area 4 and Appendix 6), Semeniuk 1991
- Boundary and Brook Road (Map 2, Area 4 and Appendix 7) Mattiske and Associates 1992.

These studies recognised the conservation values of Area 4, some of the area has been acquired.

• Rare Flora of the Metropolitan Region Kelly et al. 1993

Populations of four taxa of Declared Rare Flora were identified in the area (Map 2 and Appendix 8), one population of *Calytrix breviseta* subsp. *breviseta* was identified in Lot 139. The then owners of the property were notified (Appendix 8).

• Regional Studies

- Keighery and Trudgen 1992 (Map 2 and Appendix 1)
- Gibson et al 1994 (Appendix 9)

The outstanding conservation values of the area have been recognised by a series of other groups/studies:

(i) Nomination for listing on the register of the National Estate.

In 1994 the approximate area of the "Cannington Wetlands" was nominated for listing on the National Estate by the Wildflower Society of WA (Inc.).

(ii) The Conservation Council has proposed that much of the "Cannington Wetlands" become the Yule Brook Nature Reserve.

(iii) The Brixton Street Wetlands are listed on the Australian Register of Significant Wetlands (Australian Nature Conservation Authority 1993).

Methods and Limitations

Approximately three hours were spent in the area and on the adjacent State Planning Commission land (22/6/95 and 25/6/95). Descriptive information (Sites 1 - 6) was collected for the entire area and collections were made of taxa considered of interest.

The detail of this survey was limited by time of the year and the prolonged drought over the previous spring, summer and autumn. In early winter the rich annual and geophytic flora that are characteristic of these seasonally inundated areas are in the early stages of growth or yet to start growing and are not evident. These taxa are not only important in identifying the flora present in the area but are also critical in assessing condition as the proportions of native taxa and weed taxa are critical in assessing condition. Consequently the annual and geophytic flora of the area have not been sampled and all condition ratings are conditional, needing to be fully assessed in late spring and early summer. Also, it appears that there have been a large number of shrub deaths in the area which are most likely a response to drought, but have again made condition difficult to determine.

Vegetation

Vegetation Associations (structural units)

The study area has a mixture of sandy clays and clays. Ironstone nodules were observed in the around site 5 and underlying sheet ironstone was observed along Brook Road. The vegetation is very much affected by the proportions of sand to clay and the drainage. Sites are described from the sandy mounds, well drained flats and poorly drained flats. These terms are relative as the whole study area is poorly drained.

The vegetation associations in the study area (Appendix 10, Map 3) are best described as Wetland Mosaic Associations (after Keighery and Trudgen 1992) characteristic of the heavy seasonally inundated soils of the flats of the Pinjarra Plain. The associations present are: *Melaleuca* Scrub to Shrubland (Photos 2 and 3) and, *Verticordia* and Mixed Heaths (Photo 4), Herblands and Sedgelands (Photo 4).

The vegetation associations in the study area are similar to those in the adjacent lands on the northern side of Brook Road described by Keighery and Trudgen (Appendix 1, Location 65) and Mattiske and Associates 1992.(Appendix 6). The vegetation associations are complementary to those in the remainder of the "Canning Wetlands" (Keighery and Trudgen 1992).

Floristic Community Types (Gibson et al. 1994)

Gibson et al (1994) identified five floristic community types (3a, 7, 8, 10a, 21c & 23a) from the Brixton Street Wetlands (Map 2, Area 1 - floristic community types 3a & 8) and Yule Brook Reserve (Map 2, Area 3 - floristic community types 10a, 7, 21c & 23a). There was no overlap of the floristic community types from the two areas, indicating the diversity of floristic units in the area.

Areas 2 and 4 (Map 2) were not sampled, as at the time of this study these were private lands, and private lands were excluded from the study. Units of vegetation that are structurally and floristically similar to most of those in the Area 4 (Map 2), which is the area most similar to the study area, were sampled elsewhere on the Plain. These areas contained floristic community types 7, 8 and 10a, all associated with the seasonally inundated wet flats on the eastern side of the Plain. However a unit similar to the *Verticordia* Heath (Appendix 10, Site 6) was not sampled and while it appears to be floristically most similar to floristic community type 8, it may well be an additional floristic community type.

Vegetation Condition

The study area on Lot 139 is in varying condition ranging from Very Poor to Very Good Condition, most likely due to past grazing and continued grazing by rabbits leading to weed invasion, drought (possibly also drainage) and rubbish dumping. The study area is a mosaic of vegetation associations overlain with a secondary mosaic of disturbance. Most of the Location, except for isolated areas is in Very Good to Good Condition and should regenerate if the disturbance factors are reduced.

The most significant weeds observed at the time of the study were: *Romulea rosea*, *Sparaxis bulbifera*, *Lolium* ?species, grasses, *Hypochaeris glabra* and *Ursinia anthemoides*.

The undisturbed areas of vegetation in the study area are in Very Good condition. A characteristic feature of areas of vegetation on the eastern side of the Swan Coastal Plain is the proximity of vegetation in Very Good Condition occurring alongside severely disturbed area (Keighery and Trudgen 1992). This is appears to be related to the dense shrub, herb and sedge strata characteristic of most vegetation associations on the eastern side of the Plain which, when intact, provide few opportunities for weed establishment. However once these strata are repetitively disturbed to the extent that density of these strata is reduced and the store of perenniating organs in the soil is depleted weeds become established.

The remainder of Lot 139 has been cleared however native species were regrowing over much of this area from either seed or bulbs, rhizomes etc (Photo 5).

Flora

A diversity of shrubs and sedges were identified in the study area (Appendix 10) however a detailed assessment of flora cannot be made at the time of the year in which the study was conducted (see Methods and Limitations) or within the time available

The outstanding flora diversity of the "Canning Wetlands" (Keighery and Trudgen 1992) is well established by long term studies in the area (see Introduction and Appendices 2 and 3). A series of significant taxa identified in these and other studies are found in the study area. Also one taxon, *Lepidosperma rostratum*, was located during this study which was known from a single collection.

Significant Taxa

Rediscoverd Taxon
Several hundred plants of *Lepidosperma rostratum* were found in the study area. This taxon was initially identified by G. Keighery (Conservation and Land Management) and confirmed by Karen Wilson (Royal Botanic Gardens, Sydney) who is currently revising the Cyperaceae. This taxon was previously only known from the type collection that was collected in the Cannington area by S.T. Blake on 22 Aug. 1947 (K. Wilson pers. comm.). Plants of this taxon were also located in the land to the north of Brook Road but the extent of the populations could not be estimated as most of the plants had not regrown after the fire. As a consequence of this study *Lepidosperma rostratum* will be recommended for Priority 1 listing ("Taxa which are known from one or a few populations which are under threat" Atkins 1994) and that consideration be given for its gazettal as Declared Rare Flora (G. Keighery pers. comm.).

Declared Rare Flora
Calytrix breviseta ssp *breviseta* was located in the study area. Investigations of Declared Rare Flora files at CALM, established that this taxon had been identified on Lot 139 previously (see Introduction and Appendix 7). This taxon is only known from three population to the north and south of Brook Road and was presumed extinct until it was relocated in 1991. The population in the State Planning Commission land was burnt in summer 1994 (Photo 6) and all plants are at the seedling stage. The plants in the study area are mature as the area has not been burnt for many years.

Priority 1 Taxa - "Taxa which are known from one or a few populations which are under threat"
Acacia lasiocarpa var *bracteolata* 'long peduncle form varient' (G.J. Keighery 5026)
This taxon is endemic to the eastern side of the Plain and Gibson et al (1994) found that it was confined to community types 7 and 8, on the seasonally waterlogged and inundated heavy soils of the Pinjarra Plain.

Priority 4 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."

Grevillea thelemanniana subsp. *thelemanniana*
This taxon has recently been raised to specific status (Olde and Marriot 1995) as *Grevillea thelemanniana* and is now considered confined to the Cannington area. Olde and Marriot place it in category 2EC, that is endangered, found in a proclaimed conservation reserve and with a known range of less than 100km. Endangered taxa are considered to be "Likely to disappear in the wild within one or two decades if present land use and causal factors continue." This category is based on the coding devised by Briggs and Leigh (1988) and is equivalent to Declared Rare Flora in Western Australia.

Verticordia lindleyi subsp. *lindleyi*
This taxon is confined to seasonally inundated flats on the eastern side of the Swan Coastal Plain.

Also a series of taxa characteristically associated with the only with the seasonally inundated flats on the eastern side of the Swan Coastal Plain (Keighery and Trudgen 1992) were identified in the study area: *Acanthocarpus cannaliculatus, Banksia telmatiea, Calothamnus hirsutus, Verticordia acerosa, Jacksonia restiodes, Scaevola lanceolata,Verticordia acerosa, Verticordia plumosa* and *Stylidium dichotomum.*

Conclusion

The study area area has considerable conservation value containing vegetation associations and flora associated with the poorly conserved seasonally inundated wetlands of the eastern side of the Swan Coastal Plain. The Cannington area contains the largest connected remnants of these communities. Any loss of area of these wetlands will lessen their long term viability, especially with regard to fire and other disturbances.

The populations of Declared Rare Flora, a rediscovered taxon (another potentially rare species) and Priority flora further contribute to the area's conservation value. The Department of Environmental Protection should liaise urgently with CALM to ensure that the current owners of the land are notified of their obligations under the Wildlife Conservation Act concerning the protection of Declared Rare Flora.

References

Atkins, K. (14/9/1994) Declared Rare and Priority List for Western Australia. Department of Conservation and Land Management, WA.

Australian Nature Conservation Agency (1993). A Directory of Important Wetlands in Australia. Commonwealth of Australia, Canberra.

Churchward, H.M. and McArthur, W.M. (1980) Landforms and Soils of the Darling System. In "Atlas of Natural Resources, Darling System, Western Australia". Department of Conservation and Environment, Western Australia.

Department of Conservation and Environment. (1983) Conservation Reserves for Western Australia. The Darling System - System 6. Parts 1 &2. Report 13. Department of Conservation and Environment, Perth.

Environmental Protection Authority (1991). Bulletin 577: Subdivision: Concept plan and design Lots 37 and 47 Brixton Street, Kenwick. Report and recommendations of the EPA.

Environmental Protection Authority (1992). Bulletin 635: Proposed urban development of Lots 35 and 48 Brixton Street, Kenwick, City of Gosnells, Report and recommendations of the EPA.

Gibson, N., Keighery, B.J., Keighery, G.J., Burbidge, A. and Lyons, M. (1994) A Floristic survey of the southern Swan Coastal Plain. Unpublished report for the Australian Heritage Commission prepared by department of CALM and the Conservation Council of WA (Inc).

Gobble Garrat, E.M. (1991) Report on the Biological Survey of Lots 48 and Pt 35 Brixton St, Kenwick. Prepared for Hames and Sharley, 1991.

Hames and Sharley (1991) Proposed Urban Development and Wetland Conservation on Lot 37 and Lot 47 Brixton Street, Kenwick, City of Gosnells.

Hames Sharley Australia (1991). Consultative Environmental Review: Glenhaven Estate, Lot 48 and part Lot 35 Brixton Street, Kenwick, City of Gosnells. Hames Sharley Australia, Subiaco WA.

Keighery, B.J. and Trudgen, M.E. (1992) "The Remnant Vegetation of the Eastern Side of the Swan Coastal Plain." Unpublished report to the Department of Conservation of Land Management for the National Estate Grants Programme.

Keighery G. J. and Keighery B. J. (1991). Floristics of Reserves and Bushland Areas of the Perth Region (System 6), Parts II Brixton Street Wetlands in Floristics of Reserves and Bushland Areas of the Perth Region (System 6), Parts II to IV. Wildflower Society of Western Australia (Inc.).

Keighery G. J. (1993). Species list for Brixton Street and Yule Brook Reserve. CALM unpublished

Kelly, A., Taylor A., Langley, M.A., Spooner, A. and Coates, D.J.. (1993) "Declared Rare Flora and Other Plants in Need of Special Protection in the Metropolitan Region". Wildlife Management Programme 10. Department of Conservation and Land Management, WA

Mattiske, E.M. and Associates (1992) Flora and Vegetation - Boundary and Brook Roads, Kenwick. An unpublished report for Department of Planning and Urban Development.

Olde, P. and Marriot, N. (1995) The Grevillea Book. Volumes 1, 2 & 3. Kangaroo Press, Kenthurst.

Semeniuk Research, V. and C. Group (1991) Environmental and Landscape Audit of South-west, North-west, North-east, South-east and Foothills Corridors, Perth Metropolitan Area. Stage 3, Interim report Foothills Corridor Study. Unpublished report for the the department of Planning and Urban Development.

Speck N. H., Baird A. M. (1984). Vegetation of Yule Brook Reserve near Perth, Western Australia. J. Roy. Soc. of WA 66, Pt 4, 147 - 162.

Trudgen, M.E. (1994) Vegetation Condition Scale. In "Urban Bushland Policy", National Trust of Australia (WA), Perth.

Photo 1 (above)**:** Looking east towards the Daring Scarp across the 'Cannington Wetlands"

Photo 2 (below): *Melaleuca* Scrub, Site 1.

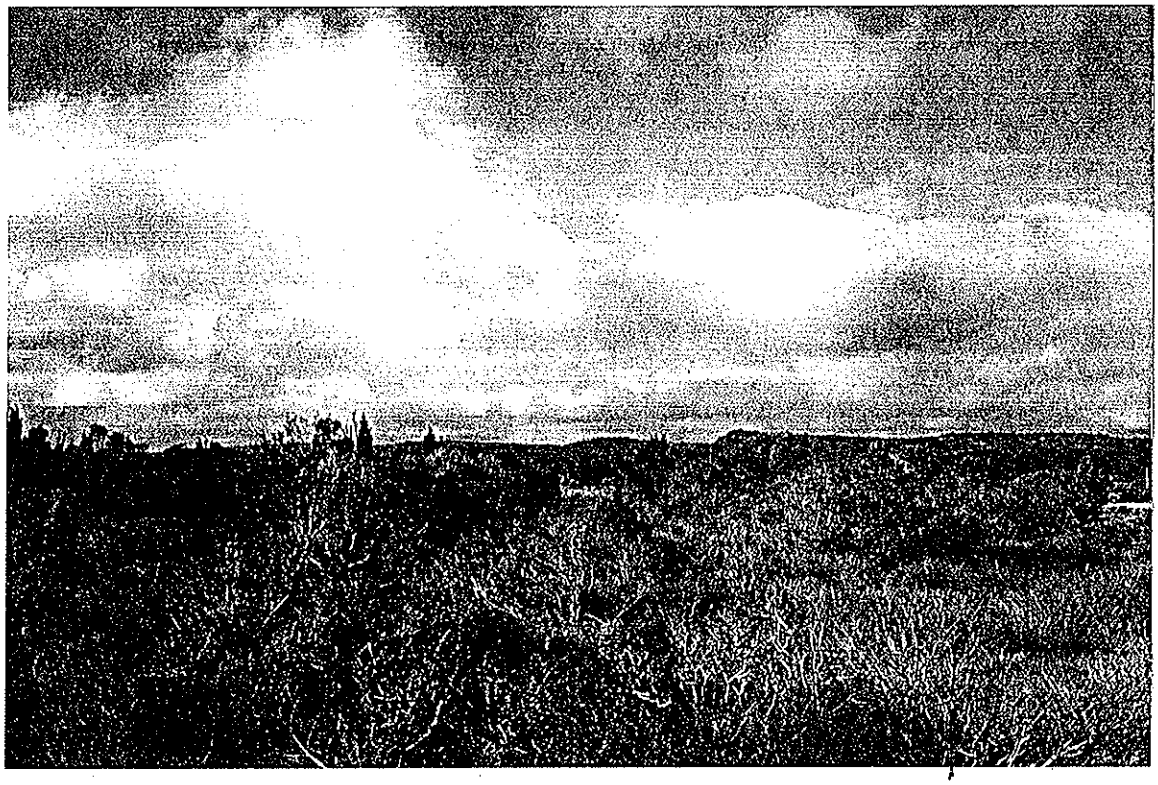
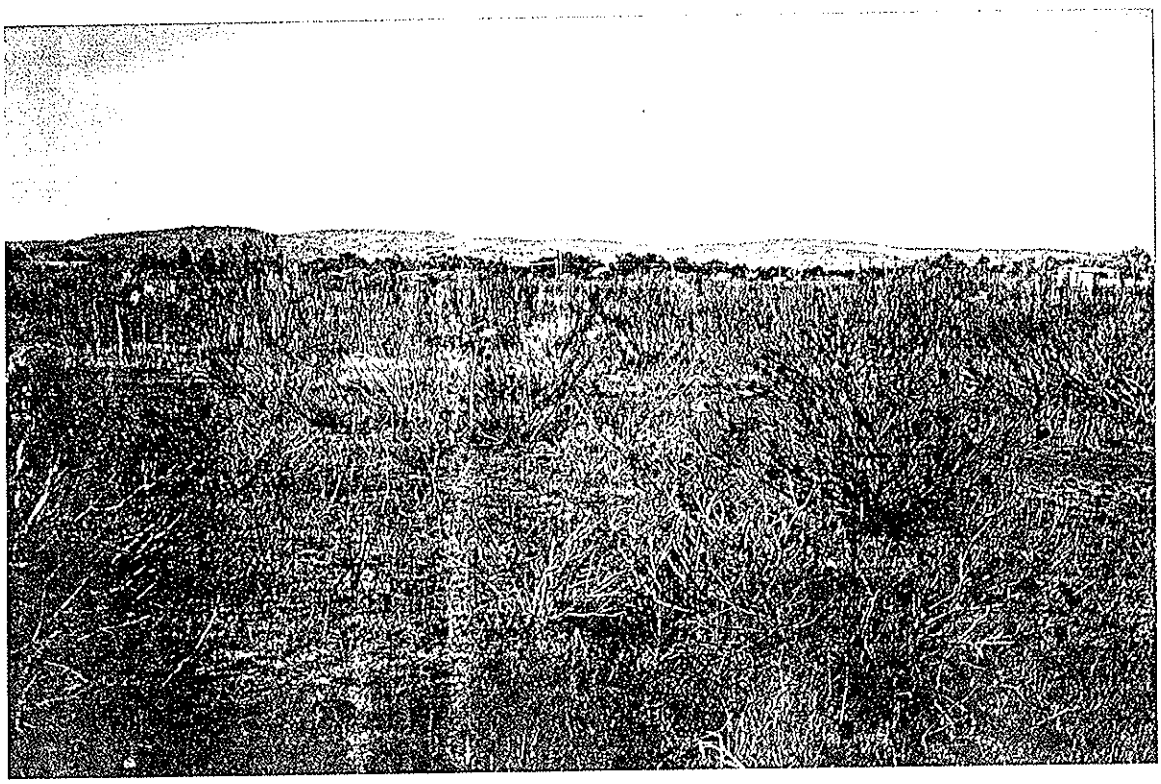


Photo 3 (above): *Melaleuca* Shrubland, Site 2.

Photo 4 (below): Mixed Heaths surrounding areas of Sedgelands and Herblands. The Verticordia Heath is found on the interface between Heaths and Sedgelands/Herblands. Sites 3, 4, 5 & 6.

Photo 5 (above): The cleared area of Lot 139, regeneration is visible along the mound of cleared vegetation.

Photo 6 (below): Area 4 burnt in a summer fire. Regeneration is progressing well from seeds and bulbs, rhizomes etc.

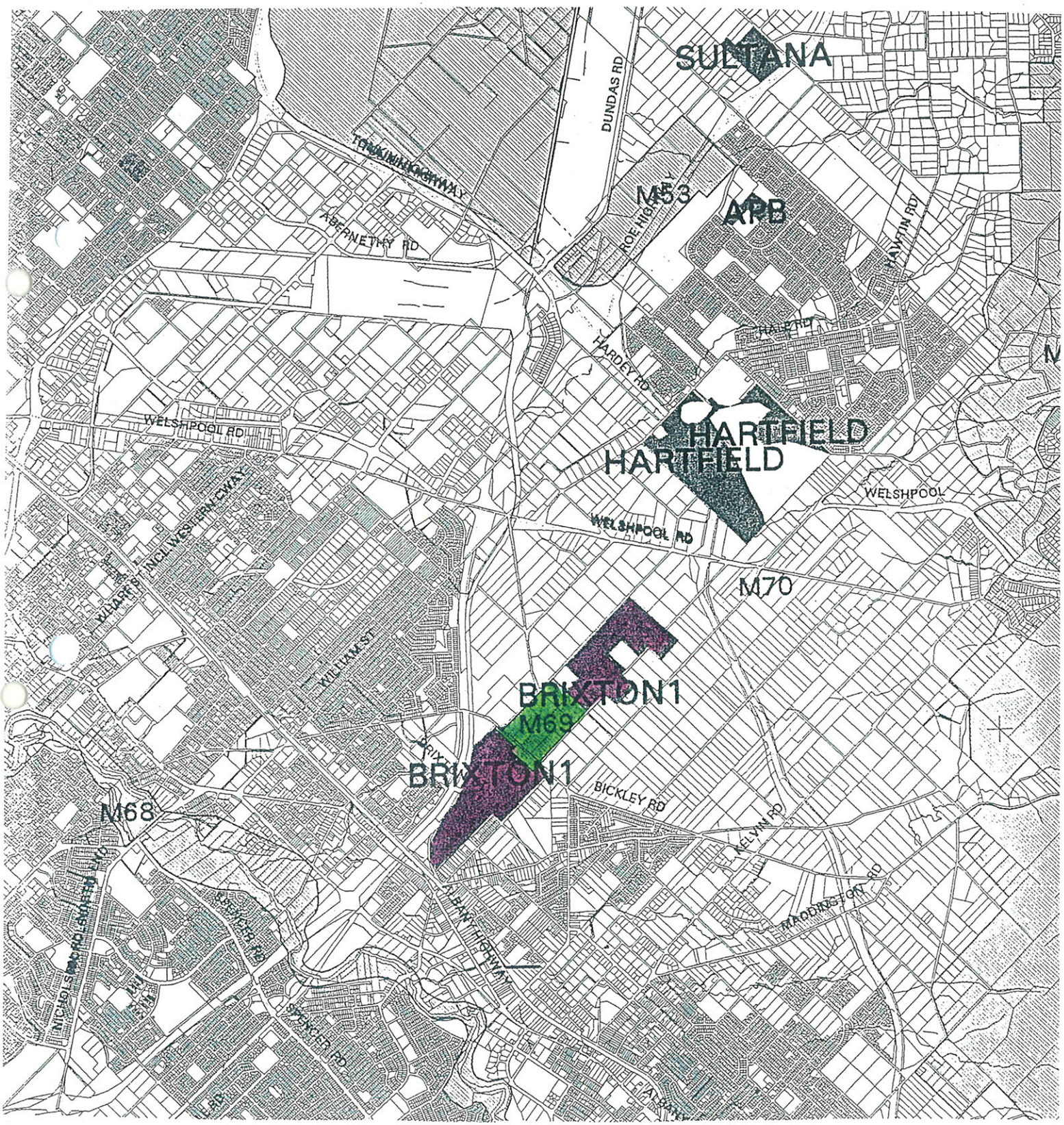


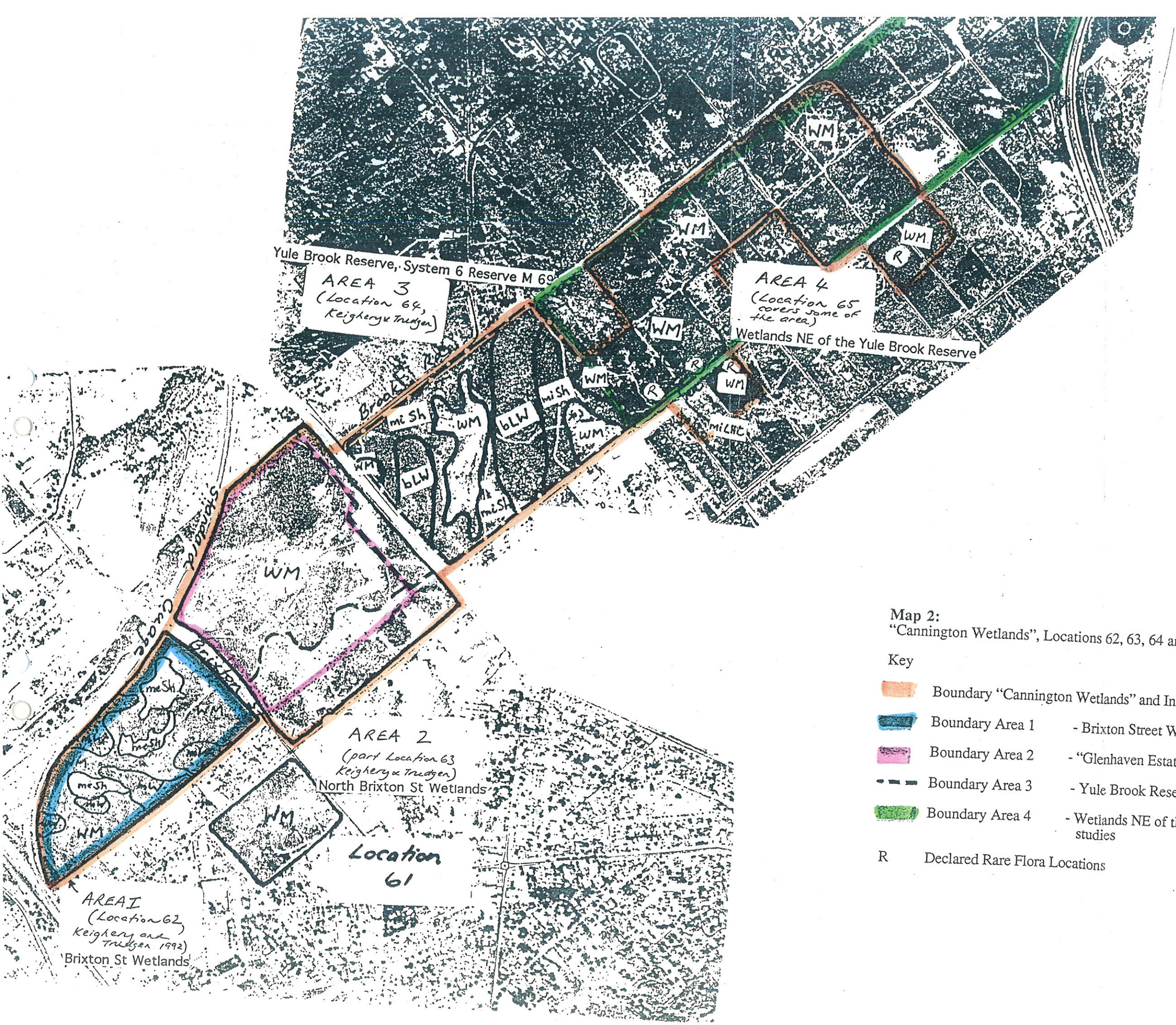
Map 1:
Boundaries of Interim Protected Areas

Key

Interim Protected Area

System 6 Area



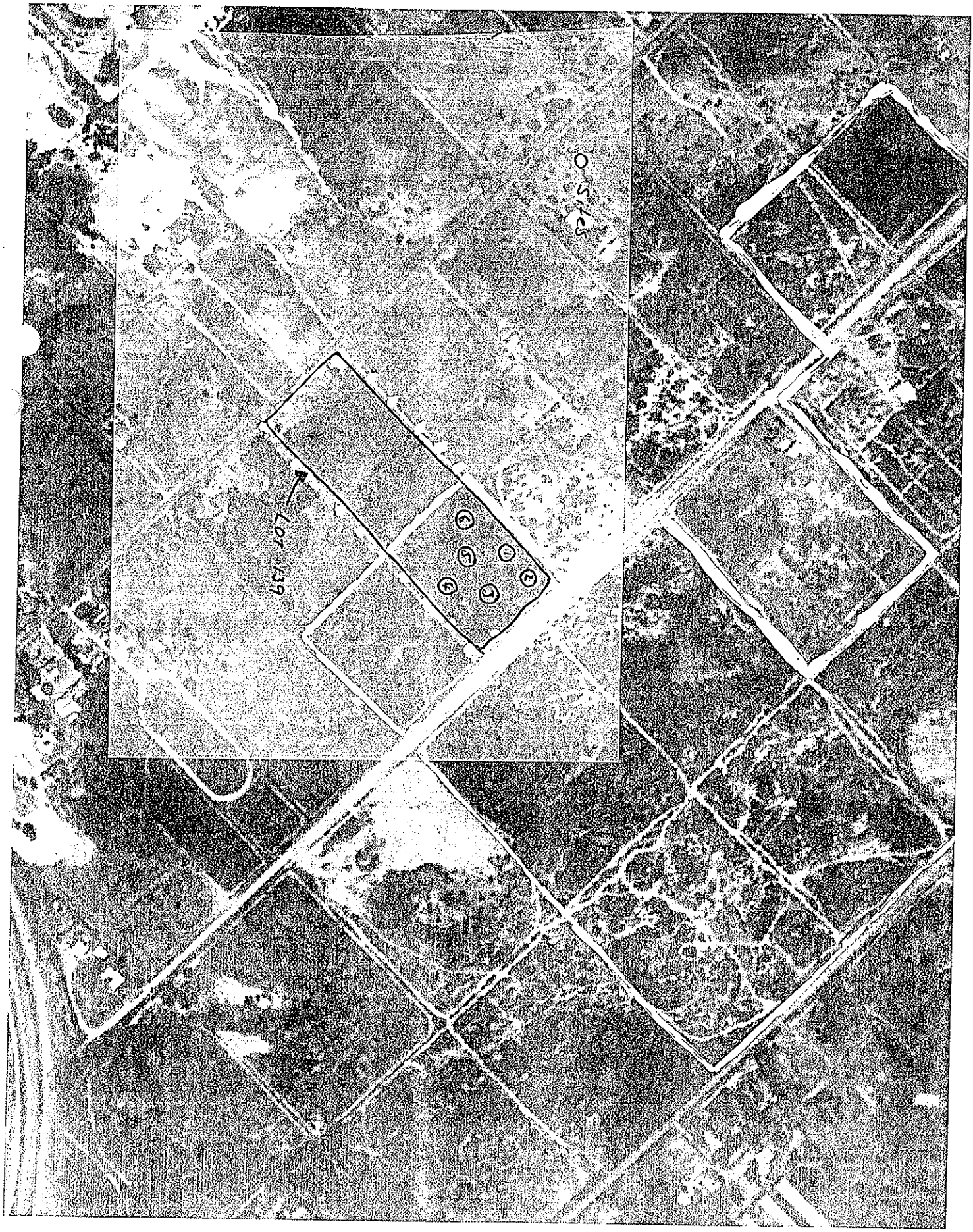


Map 2:
"Cannington Wetlands", Locations 62, 63, 64 and 65 (Keighery and Trudgen 1992)

Key

- Boundary "Cannington Wetlands" and Interim Protected Area
- Boundary Area 1 - Brixton Street Wetlands
- Boundary Area 2 - "Glenhaven Estate"
- Boundary Area 3 - Yule Brook Reserve
- Boundary Area 4 - Wetlands NE of the Yule Brook Reserve, area of the planning studies
- R Declared Rare Flora Locations

Map 3:
Lot 139 and adjacent area of the Cannington Wetlands. Metropolitan Street Directory, Run 13, Photo 5179, 1: 5000 (X4 enlargement 1: 20000), 4/1/1991.



Appendix 1:

Location Descriptions for the Cannington Wetlands from Keighery, B.J. and Trudgen, M.E. (1992) "The Remnant Vegetation of the Eastern Side of the Swan Coastal Plain." Unpublished report to the Department of Conservation of Land Management for the National Estate Grants Programme.

Location 62 - Brixton St Wetlands. Location Map 9. Vegetation Map Area 17, p96. Reference: Keighery and Keighery, 1990.

Veg: m W, me Sh, WM (v HSh, mi Ht, H, S) **Cond: Very Good**

GENNERAL COMMENTS

This Location is characterised by heavy clay soils associated with ironstone and loamy rises. The deep depressions or ponds that occur in the heavy clay soils characterised by *Melaleuca lateritia* Shrubland over Grassland, Sedgelands or Herblands depending on the time of the year, the shallow depressions by Mixed Open Heath and the flats by Viminaria High Shrubland, Mixed Heaths, Herblands and Sedgelands. Marri Woodland is characteristic of the rises.

The vegetation is generally in Very Good Condition with severe localised disturbance associated with the tracks and rubbish dumping. **Parentucellia viscosa*, **Romulea rosea* and **Sparaxis bulbifera* are is a significant weeds of the clayey soils and **Ehrharta calycina* and **Eragrostis curvula* are common on the margins of the Location and along the tracks.

Descriptions

Loamy Rises

m W — Marri Woodland over *Viminaria juncea* Open Shrubland over *Hibbertia hypericoides, Nemcia capitatum* and *Xanthorrhoea preissii* Low Shrubland over *Xanthosia huegelii, Anigozanthos manglesii* and *Dampiera linearis* Herbland and *Tetraria octandra, Lepidosperma angustatum* and *Cyathochaeta avenacea* Sedgeland.

Clay Flats

v Sh — *Viminaria juncea* High Shrubland over *Hypocalymma angustifolium, Verticordia serrata, Allocasuarina humilis* and *Xanthorrhoea brunonis* Low Open Heath over *Mesomelaena tetragona* and *Leptocarpus coangustatus* Sedgeland.

mi Ht — *Astartea fascicularis* and *Pericalymma ellipticum* Open Heath over *Goodenia filiformis* var. *filiformis* and *Stylidium roseo-alatum* Herbland and *Leptocarpus canus* Sedgeland.

Deep Depressions, ponds.

me Sh — *Melaleuca lateritia* Shrubland over *Pimelea imbricata* var. *gracillima* Low Shrubland over *Aponogeton hexatepalus, Hydrocotyle lemnoides* and *Wurmbea dioica* ssp nov Herbland and *Leptocarpus coangustatus* Open Sedgeland.

H — *Aponogeton hexatepalus* and *Wurmbea dioica* ssp nov Herbland

This association occurs in the flooded ponds in winter and is replaced by *Amphibromus neesii* Grassland in the spring.

Shallow Depressions

mi Ht — *Kunzea recurva* Open Heath with scattered *Viminaria juncea* over *Xanthorrhoea brunonis, Grevillea bipinnatifida* and *Daviesia physodes* Low Open Heath over *Conostylis festucacea, Borya scirpoidea* and *Scaevola lanceolata* Herbland and *Amphipogon turbinatus* and *Cyathochaeta clandestina* Open Sedgeland.

Species of interest are:
Shrubs: 4#*Acanthocarpus canaliculatus*, 4#*Grevillea bipinnatifida*, 4#*Hakea auriculata*, 4#*Hakea erinacea*, 6#*Petrophile media* var *juncifolia*, 3#*Daviesia physodes*, 4#*Jacksonia alata*, 4#*Melaleuca lateritia*, 4#*Verticordia acerosa*, 4#*Conospermum huegelii*, 4#*Synaphea acutiloba*, 4#*Gompholobium marginatum*, 4#*Gompholobium aristatum*, 4#*Calytrix aurea*, 4#*Andersonia aristata*, 4#*Vertcordia huegelii* var. *huegellli*
Herbs DRF, 6#*Aponogeton hexatepalus*, 6#*Hydatella dioica*, 4#*Agrostocrinum scabrum*, 5#*Tricoryne humilis*, 4#*Anigozanthos bicolor*, 6#*Tribonanthes* sp, 4#*Patersonia juncea*, 5#*Drosera heterophylla*, 3, 6#*Erynium 'subdecumbens'*, DRF, 6#*Hydrocotyle lemnoides*, 3, 5#*Villarsia submersa*, 6#*Hyalospermum pyrethrum*, 6#*Trichocline* sp4, 4#*Scaevola lanceolata*,5#*Conostylis festucacea*, 5#*Burchardia bairdii*, 4#*Stylidium ecorne*, 4#*Stylidium dichotomum*, 4#*Stylidium canaliculatum*,, 4#*Stylidium divaricatum*, 6#*Calandrinia composita*, 4#*Philydrella drummondii*, 4#*Tribonanthes brachypetala*, 3, 6#*Stylidium utricularioides*, 6#*Eryngium pinnatifida* ssp. *'palustris'* and 5#*Prasophyllum drummondii.*
Sedges 6#*Schoenus capillifolius*, 3, 5#*Schoenus andrewsii*

Location 63 - North Brixton St Wetlands. Location Map 9. Vegetation Map Area 17, p96. Reference: Gobble Garrat, E.M. 1991 Report on the Biological Survey of Lots 48 and Pt 35 Brixton St, Kenwick. Prepared for Hames and Sharley, 1991. This reference is not in the main reference list as it was not available until the mid January, 1992.

Veg: mi LSh/Sh, WM (H, S, mi LHt, v HSh, me HSh, sm LSh) Cond: Very Good to Very Poor

GENERAL COMMENTS
The vegetation associations at this Location, Mixed Low Open Heath, Low Shrubland to Shrubland, *Viminaria juncea* High Shrubland, *Melaleuca* High Shrubland, Samphire Low Shrubland, Herblands and Sedgelands are influenced by significant intrusions of sand over clay. There are no apparent occurrences of ironstone as found at Location 62 and Location 65.

The condition of the vegetation is variable. The western two thirds of the Location is in Good Condition with patches in Very Good Condition and the western third is Very Poor to Poor. There is severe localised disturbance associated with the tracks. Common weeds on the western side are annual grasses, **Ixia maculata* and **Homeria flaccida*. The eastern side is heavily invaded by **Ehrharta calycina* on the sandier soils to the north and **Stenotaphrum secundatum* and **Cynodon dactylon* on the heavier soils to the south.

Sandy rises over clay

mi LSh/Sh ***Melaleuca*** **species,** ***Acacia*** **species and** ***Verticordia acerosa*** **Low Shrubland with scattered** ***Viminaria juncea*** **over Sedgeland.**

or

Eremaea pauciflora **Shrubland over mixed Low Shrubland over** ***Mesomelaena tetragona*** **and** ***Lyginia barbata*** **Sedgeland.**

Clayey Flats

mi LHt ***Hypocalymma angustifolium*** **and** ***Verticordia*** **species Low Open Heath with scattered** ***Melaleuca viminea, Viminaria juncea*** **and** ***Actinostrobus pyrimidalis*** **over Herbland and Sedgeland.**

v HSh ***Viminaria juncea*** **High Shrubland over mixed Low Open Heath over** ***Mesomelaena tetragona*** **Sedgeland**

me Sh — *Melaleuca raphiophylla, M.lateritia* and *M. bracteosa* Shrubland over exotic Grassland and Herbland.

S, H — Herbland and *Leptocarpus* species Sedgeland.

sm LSh — *Halosarcia halocnemoides* (Samphire) Low Shrubland.

p LHt — *Pericalymma ellipticum* Low Open Heath over Herbland and *Mesomelaena* and *Restio tremulus* Sedgeland.

Species of interest are:
Shrubs: 4#*Grevillea bipinnatifida*, 6#*Banksia telmatiaea*, 6#*Petrophile media* ?var *juncifolia*, 4#*Petrophile seminuda*, 5#*Calothamnus hirsutus*, 4#*Verticordia acerosa*, 3, 6#*Grevillea thelemanniana* ssp. *thelemanniana*, 3#*Daviesia physodes*, 4#*Jacksonia alata*, 4#*Melaleuca lateritia*,.4#*Verticordia huegelii*, 4#*Calytrix aurea*, 3#*Gonocarpus pythoides.*
Herbs: 6#*Hydatella dioica*, 4#*Anigozanthos bicolor*,4#*Scaevola lanceolata*,5#*Conostylis festucacea*, 4#*Stylidium dichotomum*, 5#*Isotoma scapigera*, 6#*Eryngium pinnatifida* ssp. *'palustris'* and 5#*Prasophyllum drummondii.*
Sedges: 5#*Restio tremulus*, 4#*Mesomelaena tetragona.*

Location 64 - Yule Brook Reserve, System 6 Reserve M 69. Location Map 9. Vegetation Map Area 17, p97.
Reference: Speck and Baird, 1984.

Veg: b LW, mi Sh/Ht, WM (H, S and me Ht, v HSh, ac HSh, p Sh, sm LSh, me HSh) **Cond: Very Good to Poor.**

GENERAL COMMENTS
At this Location there are considerable areas of sand and no evidence of ironstone. The sand forms several ridges with intervening clayey areas. Low sandy mounds are scattered throughout the clayey areas. The characteristic vegetation of the ridges is *Banksia* Low Woodland with Mixed Shrubland on the slopes and Sedgelands, Herblands, mixed Shrublands/Heaths *Melaleuca* High Shrubland and *Actinostrobus* High Shrubland on the flats.

The condition of the vegetation is Very Good with some severe weed invasion on the margins. areas along the southern boundary are severely invaded by **Ehrharta calycina*, with some **Watsonia* along Brook Rd and perennial and annual grasses along Boundary Rd just below the sandy ridge in the Mixed Shrubland.

Descriptions

Sandy Rises

b LW — *Banksia attenuata* and *Banksia menziesii* Low Woodland over Low Shrubland over Herbland.

mi Sh/Ht — *Eremaea pauciflora* and *Allocasuarina humilis* Shrubland to Open Heath
in patches on the ridge and on the upperslopes of the ridge and
Pericalymma ellipticum, Banksia telmatiaea, Hypocalymma angustifolium and *Daviesia physodes* Shrubland to Open Heath
on the lower slopes of the ridges.

Sandy Clay Flats

- shallow depressions
H, S — Herbland and *Leptocarpus aristatus* Sedgeland

sm Sh *Halosarcia halocemoides* Low Shrubland

- low sandy rises
p Sh *Pericalymma ellipticum* Shrubland over Herbland and *Restio tremulus* Sedgeland

- sandy mounds and low sandy rises
mi LHt *Melaleuca bracteosa*, *Hakea varia*, *Banksia telmatiaea* and *Verticordia* species Low Open Heath

ac HSh *Actinostrobus pyramidalis* High Shrubland over *Hypocalymma angustifolium*, *Pericalymma ellipticum*, *Melaleuca lateritia*, *Kunzea micrantha* and *Verticordia* species Shrubland over Herbland.

me HSh *Melaleuca rhaphiophylla*, *M.uncinata*, *M.viminea* and *M.cuticularis* High Shrubland.

Species of interest are:
Shrubs: 6#*Banksia telmatiaea*, 5#*Calothamnus hirsutus*, 4#*Verticordia acerosa*, 3, 6#*Grevillea thelemanniana* ssp. *thelemanniana*, 3#*Daviesia physodes*, 4#*Andersonia aristata*, 4#*Melaleuca lateritia*, 5#*Melaleuca uncinata*.

Herbs: 5#*Byblis gigantea*, 4#*Agrostocrinum scabrum*, 4#*Anigozanthos bicolor*, 4#*Patersonia juncea*, 5#*Drosera heterophylla*, 4#*Scaevola lanceolata*,5#*Conostylis festucacea*, 5#*Burchardia bairdii*, 4#*Stylidium ecorne*, 4#*Stylidium dichotomum*, 4#*Stylidium divaricatum*, 4#*Stylidium canaliculatum*, 5#*Isotoma scapigera*, 4#*Tribonanthes brachypetala*, 6#*Eryngium pinnatifida* ssp. *'palustris'* and 5#*Prasophyllum drummondii*.

Sedges: 5#*Restio tremulus*, 3, 5#*Schoenus andrewsii*

Location 65: Wetlands NE of the Yule Brook Reserve between Brook and Boundary Rds, Kenwick. Location Map 9. Vegetation Map Area 17, p97.
Veg: WM (S, H, mi Sh, mi Ht, me Sh, sm LSh, me/ac Sc)
Cond: Very Good, Good and Poor with severe localised disturbance.
GENERAL COMMENTS
This Location has a mixture of sandy clays and clays and loamy soils. Although no ironstone was observed in undisturbed areas a section eroded road showed exposed underlying ironstone. Each of the vegetation association subject to site descriptions are not mapped as each association is too small in area. The vegetation is very much affected by drainage. Sites are described from the sandy mounds, well drained flats and poorly drained flats. These terms are relative as the whole Location is poorly drained.
A notable absence from this Location are
- Marri Woodlands and *Banksia* Woodlands on loamy or sandy rises.
- deep claypans. This may be natural but the drainage of this Location may have cause this, the drainage lines described below to the south of the Location may have been connected artificially.

This Location is in varying condition ranging from Completely Degraded to Very Good Condition due to drainage, grazing (rabbits), frequent fires, weed invasion, off-road vehicle activities, vehicle dumping and rubbish dumping. The Location is a mosaic of vegetation associations overlain with a secondary mosaic of disturbance. Most of the Location, except for isolated areas is in Good to Poor Condition and should regenerate if the disturbance factors are reduced. Although there are pockets of vegetation in Good Condition in the areas outside this delineated location these are predominantly in Poor to Very Poor Condition.

Sandy Mounds

GENERAL COMMENTS

The condition of the rises varies from those in Very Good Condition to those in Poor Condition. Weeds found on the rises are **Romulea rosea*, **Sparaxis bulbifera*, **Homeria flaccida*, **Gladiolus angustus*, **Trifolium campestre*, **Lolium*, **Ehrharta longiflora*, **Arctotheca calendula*, **Hypochaeris glabra*, *Watsonia* sp and **Ursinia anthemoides*.

Site a

mi Ht **Scattered *Viminaria juncea* and *Actinostrobus pyramidalis* over Mixed Closed Heath over Low Shrubland over Open Sedgeland**

Shrubs: *Viminaria juncea*, *Actinostrobus pyramidalis*, *Hypocalymma angustifolium*, *Acacia lasiocarpa*, *Kunzea recurva*, 5#*Banksia telmatiaea*, *Hakea varia*, 4#*Calothamnus hirsutus*, 4#*Verticordia acerosa*, 3,6#*Grevillea thelemanniana* ssp *thelemaniana*, 3#*Daviesia physodes*, 4#*Jacksonia restioides*, *Acacia stenoptera*, 4#*Andersonia aristata*

Other species common in this association: 4#*Melaleuca lateritia*, *Melaleuca viminea* , *Melaleuca hamulosa*, 5#*Melaleuca bracteosa*, *Melaleuca rhaphiophylla*

Herbs: 4#*Scaevola lanceolata*, *Thysanotus manglesianus*

Adjacent: 5#*Conostylis festucacea*

Other species common in this association: *Drosera glanduligera*, *Brachycome iberidifolia*

Sedges: 5#*Restio tremulus*, *Leptocarpus aristatus*, *Gahnia trifida*

Other species common in this association: *Leptocarpus canus*, *Leptocarpus coangustatus*, *Loxocarya pubescens*

CONDITION

Rating Very Good

Comments:

Aerial Photo: Run

Soil: grey clayey sand over clay

Drainage: moderate

Aspect: NA

Site b

me/ac Sc ***Melaleuca viminea* ,and *Actinostrobus pyramidalis* Closed Scrub over Open Herbland and Open Sedgeland**

Shrubs: *Melaleuca viminea* , *Actinostrobus pyramidalis*, *Melaleuca hamulosa*, *Hypocalymma angustifolium*

Other species common in this association: 4#*Petrophile seminuda*, *Dodonaea aptera*

Grasses: **Briza maxima*, **Briza minor*, **Pentaschistis airoides*

Herbs: *Goodenia filiformis*, *Opercularia vaginata*, 5#*Pogonolepis stricta*, *Mitrasacme paradoxa*, *Cotula coronopifolia*

Sedges: *Juncus acutus*, *Juncus holoshoenus*, *Aphelia cyperoides*, *Isolepis cernua* *Isolepis oldfieldiana*

CONDITION

Rating Very Good

Comments:

Aerial Photo: Run

Soil: grey clayey sand over clay

Drainage: moderate

Aspect: NA

Flats

1) Shallow sandy soil over clay

H, S Herblands and Segelands

The Herblands are variable in their species composition and tend to contain a few species in large numbers. These species are predominantly annual and geophytic herbs and sedges. The Sedgelands contain fewer species. The two associations merge over small areas.

The commonly occurring species in these associations are listed below. These areas may be affected by salt. The following descriptions relate observations in the general area indicated

as sites c and d but are related to a series of smaller areas in this general area rather than a specific 10m by 10m area as these communities are smaller than this.

Site c
Fresh
Herbs: *Anigozanthos viridus*, 5#*Burchardia bairdii*, *Brachycome iberidifolia*, *Polypompholyx multifida*, *Drosera menziesii* 'swamp', *Stylidium ecorne*, 4#*Stylidium dichotomum*, 4#*Stylidium divaricatum Tribonanthes australis*, *Drosera glanduligera*
Other species common in this association: 5#*Stylidium guttatum*, 6#*Stylidium utricularioides*, *Stylidium ecorne*, *Bulbine semibarbata*, *Helipterum ?demisium*, *Wurmbea* species, 6#*Calandrinia composita*, *Apium annum*
Sedges: *Leptocarpus aristatus*, *Leptocarpus canus*, *Leptocarpus coangustatus*, *Triglochin procera*, *Triglochin minutissima*, *Centrolepis aristata*, *Aphelia cyperoides*, 5#*Schoenus andrewsii*, *Centrolepis aristata*, *Centrolepis polygyna*, *Schoenus humilis*
Grasses: miscellaneous exotic species

Site d
Salt effected
Herbs: *Halosarcia* sp, *Samolus juncea*, 5#*Isotoma scapigera*, *Apium annuum*, *Wilsonia backhousei*, *Tribonanthes australis*, *?Calocephalus angianthoides*,5#*Pogonolepis stricta*
Other species common in this association: *Wilsonia humilis*, 4#*Schoenolaena juncea*
Sedges: *Leptocarpus aristatus*, *Baumea* sp, *Schoenus rigens*, *Juncus bufonis*
Grasses: miscellaneous exotic species

2)Heavy ?shallow soils on clay flats
Site e
mi LHt ***Verticordia* Low Open Heath over Herbland over Open Sedgeland**
Shrubs: 4#*Verticordia acerosa*, 4#*Verticordia plumosa*, *Verticordia densiflora*, 6#*Calytrix breviseta* ssp *breviseta* , *Hypocalymma angustifolium*, *Boronia crenulata*, *Astroloma glaucescens*
Grasses: 4#*Neurachne alopecuroidea*, **Pentaschistis airoides*, **Briza maxima*
Herbs: 4#*Stylidium dichotomum*, 4#*Stylidium divaricatum*, *Borya scirpoidea*, 4#*Philydrella drummondii*, *Goodenia filiformis*, *Burchardia multiflora*, *Stylidium bulbiferum*, *Drosera heterophylla*, *Drosera menziesii*' swamp', *Cotula coronopifolia*, **Parentucellia viscosa*, *Thelymitra sp*, *Diuris carinata*, *Caladenia paludosa*, 4#*Tribonanthes brachypetala*, *Tribonanthes australis*, *Polypompholyx multifida*, **Romulea rosea*, *Thysanotus manglesianus*, *Brachycome iberidifolia*
Other species common in this association:6#*Stylidium utricularioides*, *Stylidium roseo-alatum*
Sedges: *Leptocarpus canus*, 5#*Schoenus andrewsii*, *Centroplepis aristata*, *Centrolepis polygyna*, *Triglochin minutissima*, *Schoenus?humilis*
CONDITION
Rating **Very Good to Good**
Comments: A roadside area but apparently little disturbed.
Aerial Photo: Run 13 5179
Soil: brown grey clay over clay
Drainage: poor
Aspect: flat

3) Wet depression on flat
Site f
me Ht ***Melaleuca uncinata* Open to Closed Heath over *Velleia trinervis* and *Eryngium pinnatifida* ssp. 'palustris' Open Herbland and *Baumea rubiginosa* and *Leptocarpus coangustatus* Open Sedgeland**

Shrubs: 4#*Melaleuca uncinata*, *Melaleuca rhaphiophylla*, *Viminaria juncea*, *Actinostrobus pyramidalis*, *Acacia lasiocarpa*
Adjacent: *Hypocalymma angustifolium*, *Astartea fascicularis*, *Verticordia densiflora*, *Melaleuca pauciflora*, 3,6#*Grevillea thelemanniana* ssp *thelemanniana*
Grasses: **Briza maxima*, **Briza minor*, *Poaceae sps
Herbs: *Velleia trinervis*, 3,6#*Eryngium pinnatifida* ssp 'palustris', *Brachycome iberidifolia*, 5#*Prasophyllum drummondii*, *Hydrocotyle diantha*, *Siloxerus humifusus*, *Cassytha racemosa*
On slight rises adjacent to the Site: *Patersonia occidentalis*, 5#*Conostylis festucacea*, *Laxmannia ramosa*, 4#*Stylidium canaliculatum*
Sedges: *Baumea rubiginosa*, *Leptocarpus coangustatus*, *Leptocarpus canus*, *Lepidosperma* sp, ?*Arthroschoenus*, *Hydrocotyle* sp
Adjacent: *Schoenus nanus*
CONDITION
Rating **Very Good to Good**
Comments:
Aerial Photo: Run 13 5179
Soil: brown grey loam over clay
Drainage: poor
Aspect: flat

Appendix 8:
Kelly, A., Taylor A., Langley, M.A., Spooner, A. and Coates, D.J.. (1993) "Declared Rare Flora and Other Plants in Need of Special Protection in the Metropolitan Region". Wildlife Management Programme 10. Department of Conservation and Land Management, WA

The entry in Kelly et al. for *Calytrix breviseta* subsp. *breviseta* , the Rare Flora Report Form and the letter to owner Lot 139 (9/11/92) are attached.

RARE FLORA REPORT FORM

Synonymic: Lasiopetalum brevisetum ssp. brevisetum — POPULATION No.: 3

File No. District:

Proposed DRF ☐ Priority Species No. ☐ Geog. Restr. ☐

Routine Inspection ☐ Re-survey ☐ Opportunistic Survey ☐

Population Name: Anne Kelly — TITLE: Consultant Botanist — SURVEY DATE: 23-10-92

Location: Swan — DISTRICT: Perth — SHIRE: City of Goshells.

District Site Ref.: — MAP REF.: StreetSmart Directory 1990 Map 86 A6

LAND STATUS:

Nature Res.	☐	Water Res.	☐	Gravel Res. MRD	☐	Gravel Res. Shire	☐
National Park	☐	Railway Res.	☐	Rd. Verge MRD	☐	Rd. Verge Shire	☐
State Forest	☐	Private	☑	VCL	☐	Shire Reserve	☐
Other	☐	State:					

LOCALITY: In centre of block between Boundary and Brentwood Roads. Block commences 1.5 km north of Bickley Road on Boundary + Brentwood Roads.

LATITUDE: — LONGITUDE: — ALTITUDE: — ASPECT:

LANDFORM:

Hilltop	☐	Flat	☑	Drainageline	☐	Swamp	☐	Ridge	☐
Outcrop	☐	Breakaway	☐	Slope	☐	Gully	☐	Valley	☐
Riverbank	☐	Lake Edge	☐	Low Plain	☐	Sand Dune	☐	Cliff	☐
Firebreak	☐	Other: ? possibly wet in winter							

ROCK TYPE:	Laterite	☐	Granite	☐	Dolerite	☐	Limestone	☐	Other:
ROCK FORM:	Sheet	☐	Boulder	☐	Fluviatile Gravel	☐	Concretionary gravel	☐	
SOIL TYPE:	Sand	☑	Loam	☐	Clay	☐	Peat	☐	Gravel ☐
SOIL COLOUR:	Red	☐	Brown	☑	Yellow	☐	White	☐	Grey ☑
SOIL CONDITION:	Perm. wet	☐	Moist	☐	Dry	☑	Saline	☐	Other:

VEGETATION CLASSIFICATION (Muir's): Low Heath C/D.

ASSOCIATED SPECIES: Verticordia acerosa, V. plumosa, Acacia sp. Leptocarpus sp., Hypocalymma angustifolium, Grevillea thelemanniana ssp. thelemanniana

NO. OF PLANTS:

Estimated ☑ Actual ☐ Mature: 100+ Seedlings: — Dead: — Area Occupied:

REPRODUCTIVE STATE: in bud ☐ flower(late) ☑ immature fruit ☐ dehisced ☐ vegetative ☐

POLLINATORS: Native bees ☐ honey bees ☐ mammals ☐ birds ☐ insects ☐

Other observations:

CONDITIONS OF POPULATION: Recently burnt ☐ diseased ☐ disturbed ☐ undisturbed ☐

Other ☐ State: Average. Area of population quite degraded. Plants themselves appear to be in good condition.

POTENTIAL THREATS: Firebreaks ☐ mining ☐ recreational activities ☐ 'disease' ☐ weeds ☑

grazing ☐ clearing ☑ prescribed burning ☐ Other ☐ State

FIRE HISTORY: Not known ☑ Burnt in 19 — Summer ☐ Autumn ☐ Winter ☐ Spring ☐

Next control burn: Year: — Month:

VOUCHER SPECIMEN: Retained ☐ W.A. Herb. ☐ Other ☐ State:

ATTACHED: Map ☐ Mudmap ☑ Illustration ☐ Photo ☐ Field Notes ☐

ACTION: Taken:

Required: by District ☐ S.O.H.G. ☑ State: Determine ownership and advise accordingly.

FENCING REQUIREMENT:

ROADSIDE MARKERS: n/a

OTHER COMMENTS: Block is up for sale (4ha) Peet, Goshells. ph 398 6055

COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ State:

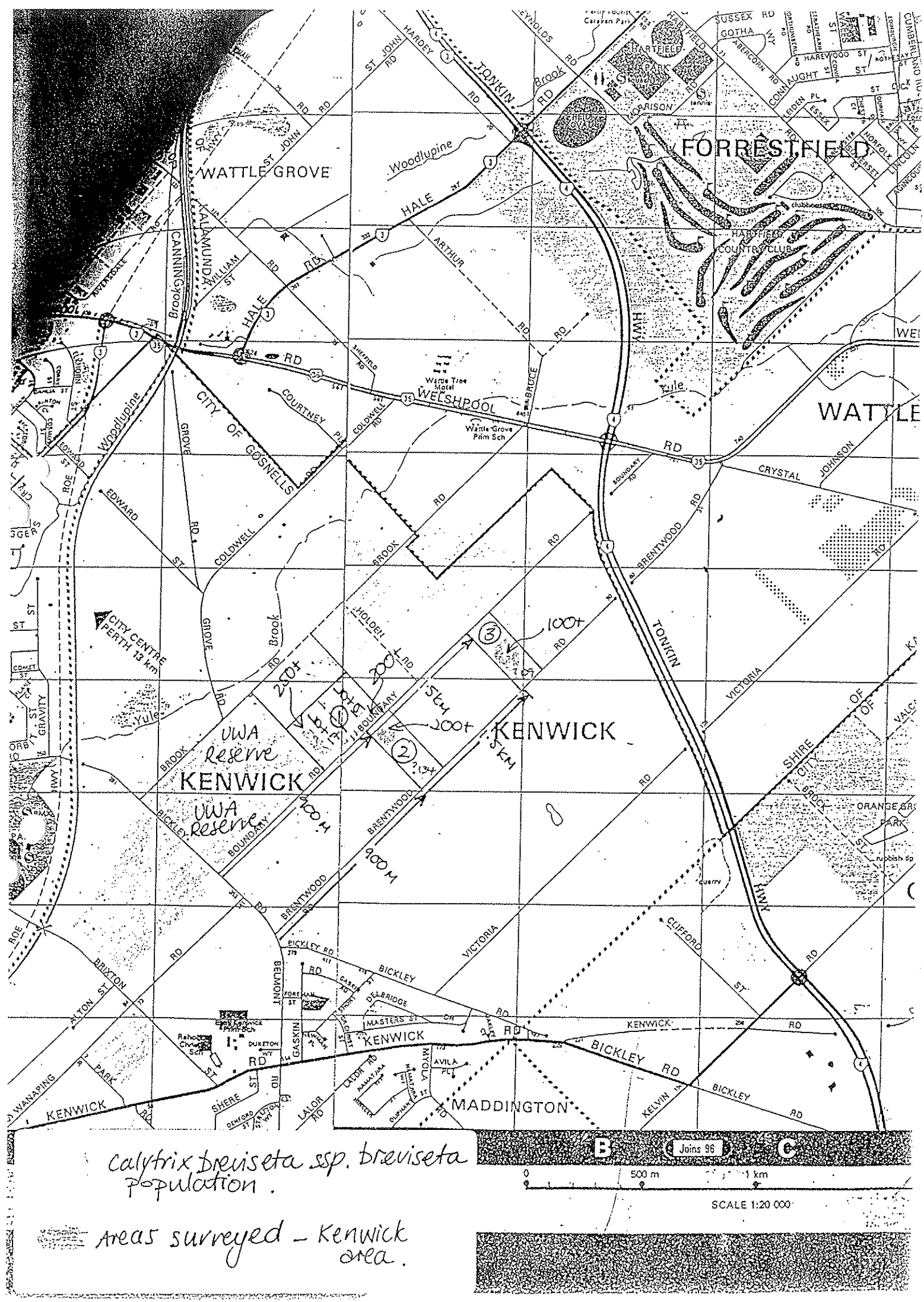
SOHG TO SEND COPY TO: Regional Office ☑ District Office ☑ Other ☐ State: More accurate survey of the site is required next flowering season.

Signed: Kelly. Date: 29/10/92.

NOTE: More than one box, in any section, may be ticked.

① EFC

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, WILDLIFE ADMINISTRATION



Calytrix breviseta ssp. breviseta
Population.

Areas surveyed – Kenwick area.

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

HEAD OFFICE
HACKETT DRIVE CRAWLEY
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Please address all correspondence to Executive Director, P.O. Box 104, COMO W.A. 6152

Your Ref:
Our Ref: 028944F3702
Enquiries: Mr D Stefoni
Phone: 367 0442

Dear Sir

DECLARED RARE FLORA - *Calytrix breviseta* subsp. *breviseta*

I wish to advise that a population of the above species of rare Western Australian flora is located on your property Lot 139, Boundary Road, Kenwick.

A description of the rare flora and a map showing its approximate location are enclosed for your information. Should you require assistance to identify the plants, my Officer at Perth (405 1222) will be able to arrange a joint onsite inspection.

Western Australia's flora is world-renowned for its richness and uniqueness, and constitutes a significant part of our State's natural heritage. Some 10,000 plant species are known from Western Australia, the majority of which are unique to this State. Many of these species are also either rare or threatened with becoming extinct, as a consequence of the great floral diversity and past land uses. Management of these rare flora populations is thus required to preserve this important part of our heritage.

The Wildlife Conservation Act sets out requirements for the protection of rare flora. Essentially the requirements provide that rare flora shall not be taken by any person without the consent of the Minister for the Environment. An extract from the Act is attached.

I would be grateful if you would arrange your operations, so that the area of rare flora is not disturbed. If you wish to discuss the management of this population of rare flora, or should you find the presence of the flora on your property causes you to be disadvantaged, I would be pleased if you would contact my Administrative Officer, Flora (09 367 0422).

The location of rare flora populations are kept confidential to assist in their conservation and to protect your privacy. I would therefore appreciate you maintaining this confidentiality unless a disclosure assists in preserving the population, such as when a contractor is operating nearby.

If you sell your property, I would appreciate you advising my Administrative Officer, Flora so that the new owner/s can be advised of the rare flora accordingly.

This Department is endeavouring to protect our State's rare flora, and your assistance to help conserve this population would be appreciated.

Yours faithfully

.....
Syd Shea
EXECUTIVE DIRECTOR

9 November, 1992
enc

cc Peet & Company Ltd
6 Fremantle Road
GOSNELLS
cc D.M. Perth

Appendix 9:

Gibson, N., Keighery, B.J., Keighery, G.J., Burbidge, A. and Lyons, M. (1994) A Floristic survey of the southern Swan Caostal Plain. Unpublished report for the Australian Heritage Commission prepared by department of CALM and the Conservation Council of WA (Inc).

The recommendations of Gibson et al. and descriptions of the floristic community types (7, 8 & 10a) found on the seasonally inundated wetlands on the eastern side of the Plain are attached.

The next four community types are typical clay pan, clay flat and ironstone communities (seasonal wetlands) of the heavy soil of the eastern side of the plain and the heavy soils near the Peel - Harvey estuary. Keighery and Trudgen (1992) describe these communities as a mosaic of structural types. Sites of community type 7 are generally dominated by either *Melaleuca viminea, M. uncinata, M. cuticularis* or *Casuarina obesa* or a mixture of these species. This community occurs on heavy clay soils that are generally inundated from winter into mid summer. Species composition (*Melaleuca cuticularis,* and *Casuarina obesa*) may indicate some saline influence for at least some part of the year.

High frequencies of species in species group J defines community types 7 to 10. Differences between these groups is primarily on proportions of the species shown in Table 12, and in occurrence of a series of less frequent species restricted to each of these four types.

In community type 7, for example, such species as *Brachycome bellidioides, Schoenus* sp 2, *Centrolepis polygyna, Pogonolepis strigosa* and *Cotula coronopifolia* (species group J) are more typical of this community. In addition species such as *Angianthus* aff. *drummondii, Eryngium pinnatifidum* subsp. *palustre* Ms, and *Blennospora* aff. *drummondii* occur in this community in low frequency (<50%) and are absent from community types 8 to 10.

These four clay pan, clay flat and ironstone communities are the most species rich seasonal wetlands (35.5 - type 9 to 53.7 - type 10b), with type 7 having an average of 46.4 species. Much of the species richness in all four communities types comes from geophytes and an annual flora that germinates, grows and flowers sequentially as these areas dry over summer. While the massive sheet ironstone finds surface expression in community type 10b, ironstone is known to occur at varying depth in the other three communities in this group.

In early spring many of the sites in community type 7 are covered by free water up to 30 cm deep. *Cotula coronopifolia* formed yellow floating mats in some pools while others were dominated by *Villarsia submersa.* Aquatic species are common in this community type early in the growing season. As the wetland dries a succession of species such as *Centrolepis* spp. and annual *Stylidium* spp. successively germinate grow and flower, resulting in an extended flowering period of over three months. It is likely that some of these communities would have occurred in the totally altered *Casuarina obesa* woodland south of Serpentine (Keighery and Trudgen 1992). The understorey of these stands have been completely converted to improved pasture. Some sites within community type 7 have significant variation in species composition and it may be that other related communities have been lost due to agricultural development.

Weed frequencies tend to be high in these four communities but given the high species richness the percentage of weeds is low to moderate. Average vegetation condition similarly ranges from 2.1 to 2.7.

Community type 8 are the clay pan communities which can be dominated by *Viminaria juncea, Melaleuca viminea, M. lateritia* or *M. uncinata* but also occasionally by *Eucalyptus wandoo.* They differ in proportions of species from species group E, and occurrence of such species as *Hypocalymma angustifolium, Acacia lasiocarpa* var. *bracteolata* (Long peduncle form), and *Verticordia huegelii* at moderate frequencies (Table 12). Aquatic annuals are again common but pools probably are not inundated to the same depth or for the same length of time as those above. Species richness averages 52 species / plot with weed frequencies of 11 / plot (almost entirely annuals or geophytes). This community had the highest disturbance score of the heavy soil wetland communities (2.7). This community type is distributed from Ellen Brook to Waterloo on small remnants of less than 20 ha (Appendix 1).

Average species richness in community type 9 fell dramatically to 35.5 (significantly lower than other heavy soil wetland communities) (Table 13). This community represents shrublands or open woodlands of clay flats that are inundated for long periods. Sedges are more apparent in this community (moderate frequencies of *Chorizandra enodis, Cyathochaeta avenacea, Lepidosperma longitudinale* and *Leptocarpus coangustatus*) and weed frequencies (2.2 / plot) drop significantly lower than other heavy soil wetlands, presumably because of the long inundation times.

The most rapidly drying of the clay flats form community type 10. These generally have shallower microtopography than the previous three community types or else have thin skeletal soils. Indeed two distinct subgroups are recognisable for this community. Both subgroups are differentiated from the other clay pan community types by the almost complete lack of low frequency species in species group H. This species group includes aquatic annuals and geophytes typical of the other clay pan and flat communities (eg. *Schoenus natans, Crassula natans, Eryngium pinnatifidum* subsp. *palustre* Ms, *Wurmbea dioica* subsp. aff. *alba* and *Amphibromus neesii*). Community type 10b occurs on small areas of ironstone with thin skeletal soils in the Busselton area. Much of this land unit has been cleared. These sites have an endemic flora which can be seen in species group G. These endemics include *Petrophile latericola* Ms, *Andersonia* aff. *latiflora, Dryandra* sp 30, *Hakea* aff. *varia* (Yellow flowered form with an earlier flowering period), *Loxocarya magna,* and *Lepyrodia* aff. *macra.* These communities are very rich with large numbers of annuals and geophytes.

Community type: 7

Herb rich saline shrublands in clay pans

Reservation Status: Well reserved
Conservation Status: Vulnerable

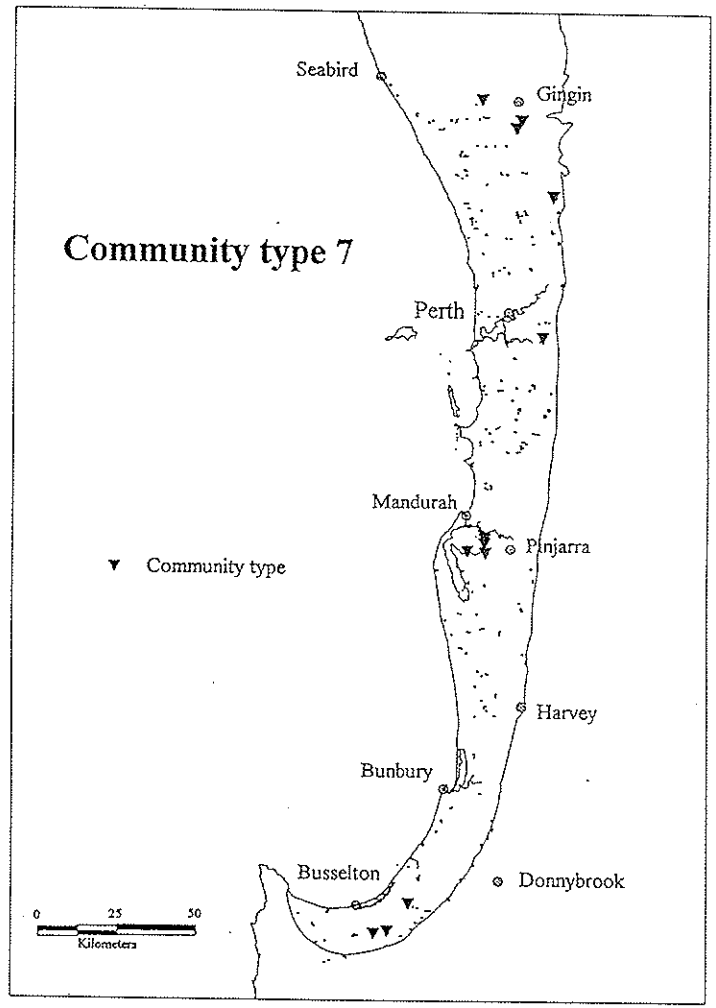
Typical Species:

Trees	Shrubs	Herbs
		**Briza minor*
		Centrolepis aristata
		Philydrella pygmaea

Other common species:

Trees	Shrubs	Herbs
	Melaleuca viminea	*Brachyscome bellidioides*
		**Briza maxima*
		Centrolepis polygyna
		**Cicendia filiformis*
		Goodenia micrantha
		**Hypochaeris glabra*
		Pogonolepis stricta
		Polypompholyx multifida
		Schoenus odontocarpus
		Schoenus sp. 2 (GJK 5739)
		Siloxerus humifusus
		Thysanotus manglesianus/ patersonii complex

Mean species richness:	46.4	Structural units
Mean weed frequency:	8	low woodland A
		low woodland B
Mean vegetation condition:	2.3	open low woodland A
		dense heath A
Number of quadrats:	18	heath A
		thicket
		scrub
		low scrub A
		open scrub
		open herbs



Community type: 8

Herb rich shrublands in clay pans

Reservation Status: Well reserved
Conservation Status: Vulnerable

Typical Species:

Trees	Shrubs	Herbs
		**Briza maxima*
		**Briza minor*
		Centrolepis aristata
		**Cicendia filiformis*
		**Cyperus tenellus*
		**Romulea rosea*

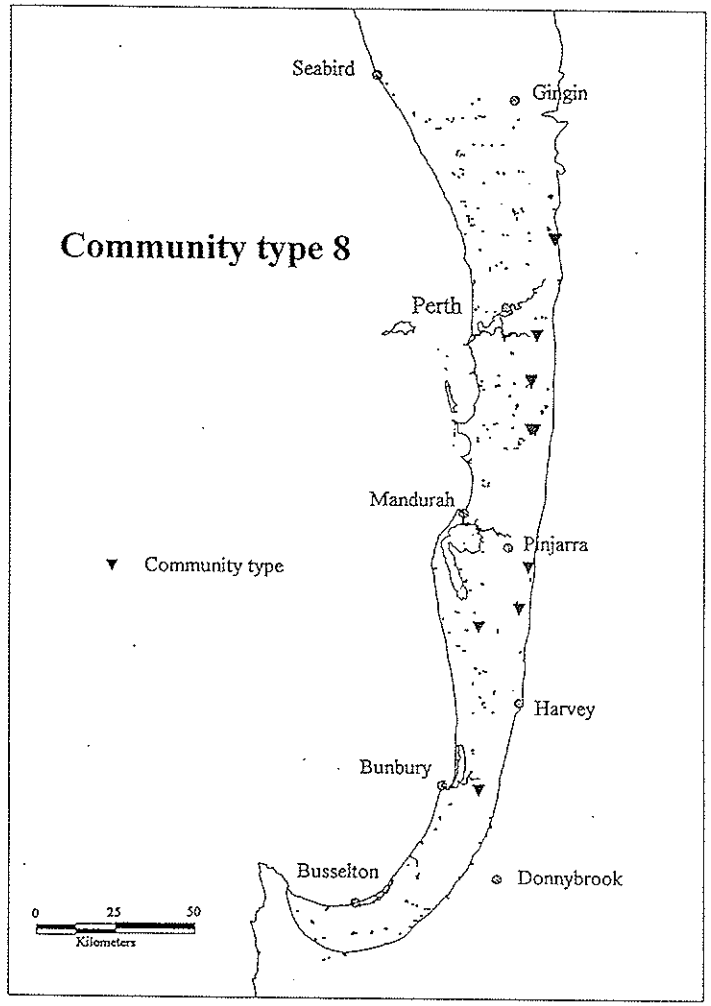
Other common species:

Trees	Shrubs	Herbs
	Viminaria juncea	**Aira caryophyllea*
		Chorizandra enodis
		Drosera menziesii subsp. *menziesii*
		Drosera rosulata
		Goodenia micrantha
		Haemodorum simplex
		Hyalosperma cotula
		** Hypochaeris glabra*
		** Juncus capitatus*
		** Monopsis debilis*
		** Parentucellia viscosa*
		Schoenus odontocarpus

Mean species richness:	52
Mean weed frequency:	11
Mean vegetation condition:	2.7
Number of quadrats:	21

Structural units

woodland
low woodland B
dense thicket
dense low heath D
thicket
scrub
low scrub A
low scrub B
open scrub
open low scrub B
herbs



Community type: 10a

Shrublands on dry clay flats

Reservation Status: Well reserved
Conservation Status: Vulnerable

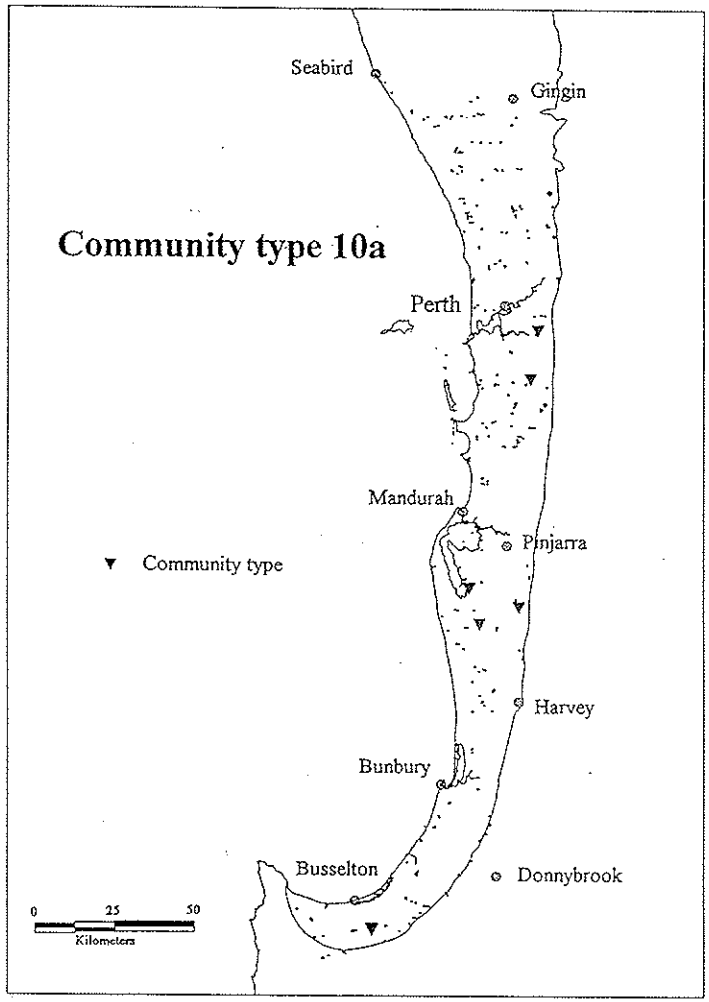
Typical Species:

Trees	Shrubs	Herbs
	Hakea sulcata	*Aphelia cyperoides*
	Verticordia densiflora	*Centrolepis aristata*
		**Cyperus tenellus*
		Drosera gigantea subsp. *gigantea*
		Drosera menziesii subsp. *menziesii*
		Schoenolaena juncea
		Schoenus rigens

Other common species:

Trees	Shrubs	Herbs
	Hakea varia	*Burchardia multiflora*
	Pericalymma ellipticum	**Briza minor*
	Viminaria juncea	*Centrolepis drummondiana*
		**Cicendia filiformis*
		Conostylis aculeata
		**Hypochaeris glabra*
		**Juncus capitatus*
		Patersonia occidentalis
		Polypompholyx multifida
		Schoenus odontocarpus
		Stylidium calcaratum
		Thelymitra antennifera
		Thysanotus thyrsoideus
		Philydrella pygmaea
		Siloxerus humifusus

		Structural units
Mean species richness:	51.8	dense heath B
Mean weed frequency:	5.8	thicket
Mean vegetation condition:	2.1	heath B
		scrub
Number of quadrats:	8	dwarf scrub C
		open scrub
		open low scrub B



RECOMMENDATIONS

This study of the plant communities of the Swan Coastal Plain between Seabird and the foothills of the Whicher Range has lead to the following recommendations:

1) Eleven taxa should be proposed for listing as Declared Rare Flora and the priority listing for 13 taxa should be changed as detailed (Table 6).

2) The three most threatened community types need urgent reservation. The following areas should be declared as A class Nature Reserves for the protection of flora and fauna:

a) the southern ironstone communities from the five small areas of State Forest and the road and rail reserve east of Ruabon Nature Reserve. (This road and rail reserve is also of regional significance as it is one of the last two remaining continuous vegetated transects in the study area showing the catena of original vegetation types on the eastern side of the plain.)

b) the sedgeland in Holocene dune swales in the Point Becher area (M106) and the north west corner of Lake Walyungup (M103).

c) the eastern *Banksia attenuata* woodlands over species rich dense shrublands from Koondoola open space, Landsdale Rd, M12, and M 53.

3) Final selection of areas for reservation of the 10 poorly reserved community types should be made in conjunction with species reservation data currently being collected.

4) The road and drain reserve on the southern side of Mundijong Road be declared as an A class Nature Reserve. (This area is of regional significance being the second catena of vegetation types across the eastern side of the plain).

5) As a consequence of the small amount of remnant vegetation on the eastern side of the plain, all such remnants in the study area with the basic vegetation intact or able to be regenerated are of high conservation value.

6) A further analysis of reservation status is needed since the present definition does not consider the area of communities reserved.

7) A similar analysis needs to be undertaken to determine conservation values of remnants not covered in this study since floristic community types are not well correlated to presently available geomorphological or vegetation mapping.

8) Additional work on the Swan Coastal Plain is required to determine, more precisely, the nature of floristic variation in the seasonal wetlands (because of their high levels of heterogeneity).

Appendix 10:
Description of sites located in Lot 139.

Site 1 (poorly drained flat), Photo 2
***Melaleuca viminea* Tall Open Scrub over scattered *Actinostrobus pyramidalis* over *Hypocalymma angustifolium* Open Heath over *Leptocarpus canus* Sedgeland**
Shrubs: *Melaleuca viminea* , *Actinostrobus pyramidalis*, *Hypocalymma angustifolium*, *Acacia lasiocarpa* var. *bracteolata* (long peduncle form), *Acanthocarpus canaliculatus*
Grasses: **Briza maxima*
Herbs: *Pogonolepis gracilis* (swamp form), *Buchardia ?multiflora*, * *Romulea rosea*
Sedges: *Leptocarpus canus*
CONDITION
Rating Very Good to Good
Comments: Spot deaths of shrubs and sedges in the site and area of the site, possibly effects long summer drought. Patches of * *Romulea rosea.* The area has been long unbrunt and the shubs are fully grown and gnarled with age.
Soil: grey clayey sand over clay
Drainage: moderate

Site 2 (poorly drained flat), Photo 3
***Melaleuca leptoclada* Tall Shrubland over Mixed Open Low Heath over *Leptocarpus canus* Sedgeland**
Shrubs: *Melaleuca leptoclada*, *Hypocalymma angustifolium*, *Acacia lasiocarpa* var. *bracteolata* (long peduncle form), *Acanthocarpus canaliculatus*, *Verticordia ?plumosa*, *Grevillea thelemanniana*, *Petrophile seminuda.*
Area: scattered samphires, *Melaleuca bracteosa*
CONDITION
Rating Very Good to Good
Comments: The area has been long unburnt and the shubs are fully grown and gnarled with age. Adjacent areas appear to have been ?grazed, partially cleared significant weed invasion, miscellaneous grasses, *Sparaxis bulbifera* patch and *Lolium* species. Condition good to degraded.
Soil: grey clayey sand over clay
Drainage: moderate

Site 3 (poorly drained flat), Photo 4
Herbland and Annual Sedgeland
Herbs: *Tribonanthes ?australis*, *Tribonanthes brachypetala*, *Drosera* species, *Bracycome* sp, *Pogonolepis gracilis* (swamp form)
Sedges: *Centrolepis aristata*
Grasses: miscellaneous exotic species

Site 4 (slight sandier rise), Photo 4
Scattered *Viminaria juncea* and *Actinostrobus pyramidalis* over Mixed Closed to Open Heath over Open Sedgeland
Shrubs: *Viminaria juncea*, *Actinostrobus pyramidalis*, *Hypocalymma angustifolium*, *Banksia telmatiaea*, *Calothamnus hirsutus*, *Petrophile seminuda*, *Jacksonia restioides*, *Acacia stenoptera*
Sedges: *Gahnia trifida*, *Schoenus rigens*
CONDITION
Rating Very Good
Soil: grey clayey sand over clay
Drainage: moderate
Aspect: NA

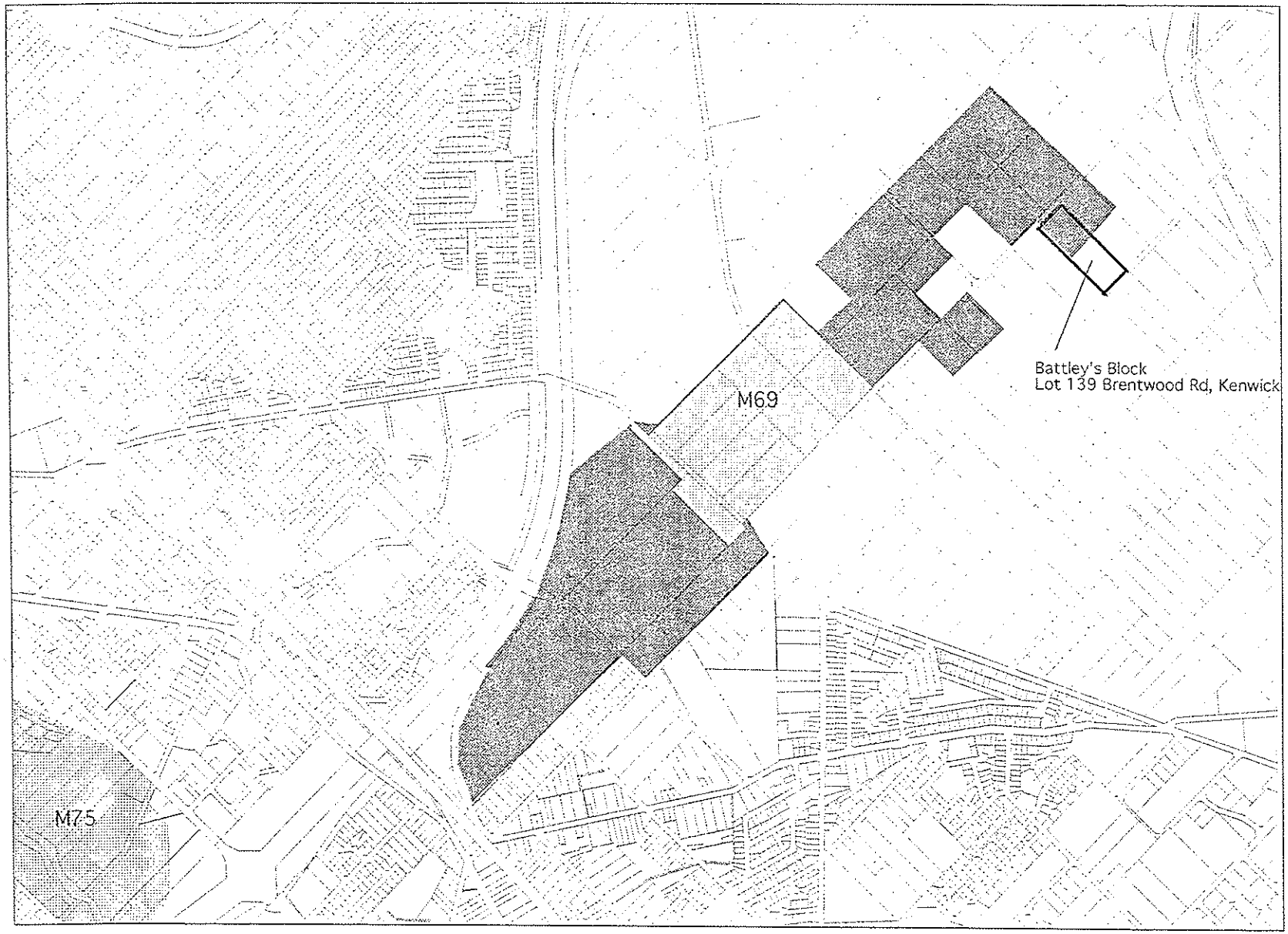
Site 5 (poorly drained flat), Photo 4

Herbland and *Leptocarpus aristatus* Sedgeland

Site 6 (margins poorly drained flat), Photo 4
***Verticordia* Low Open Heath over Herbland over Open Sedgeland**
Shrubs: *Verticordia ?acerosa*, *Verticordia ?plumosa*, *Verticordia densiflora*, *Calytrix breviseta* ssp *breviseta* , *Hypocalymma angustifolium*,
Grasses: *Neurachne alopecuroidea*, **Briza maxima*
Herbs: *Stylidium divaricatum*, *Borya scirpoidea*,**Romulea rosea*
Sedges: *Leptocarpus* sp, *Centroplepis aristata*,
CONDITION
Rating **Very Good to Good**
Aerial Photo: Run 13 5179
Soil: brown grey clay over clay, ironstone nodules on the surface
Drainage: poor

The Herblands and Sedgelands of the area are variable in their species composition and tend to contain a few species in large numbers. These species are predominantly annual and geophytic herbs and sedges. The two associations merge over small areas. At the time of this study most herbs were at such an early stage of growth that in general they could not be identified. In some cases dead plants from the previous years growth indicated the species present. However previous work on the land to the north of Brook Road has identified the following taxa and many of these would be expected to occur in the area.
Fresh
Herbs: *Anigozanthos viridus*, *Burchardia bairdii*, *Brachycome iberidifolia*, *Polypompholyx multifida*, *Pogonolepis gracilis* (swamp form), *Drosera menziesii* 'swamp', *Stylidium ecorne*, *Stylidium dichotomum*, *Stylidium divaricatum*, *Tribonanthes australis*, *Tribonanthes brachypetala*, *Drosera glanduligera*, *Stylidium guttatum*, *Stylidium utricularioides*, *Stylidium ecorne*, *Bulbine semibarbata*, *Helipterum ?demisium*, *Wurmbea* species, *Calandrinia composita*, *Apium annum*, *Haemodorum simplex*, Velleya trinervis, Drser tubaestylis, *Samolus juncea*, *Isotoma scapigera*, *Apium annuum*, *Wilsonia backhousei*, *Tribonanthes australis*, *Pogonolepis stricta*, *Wilsonia humilis*, *Schoenolaena juncea*

Sedges: *Leptocarpus aristatus*, *Leptocarpus canus*, *Leptocarpus coangustatus*, *Triglochin procera*, *Triglochin minutissima*, *Centrolepis aristata*, *Aphelia cyperoides*, *Schoenus andrewsii*, *Centrolepis aristata*, *Centrolepis polygyna*, *Schoenus humilis*, *Leptocarpus aristatus*, *Lepidosperma londnitudinale*, *Schoenus rigens*, *Juncus bufonis*
Grasses: miscellaneous exotic species



Location of Significant Vegetation on Lot 139,
Brentwood Rd - Mr and Mrs Battley

N

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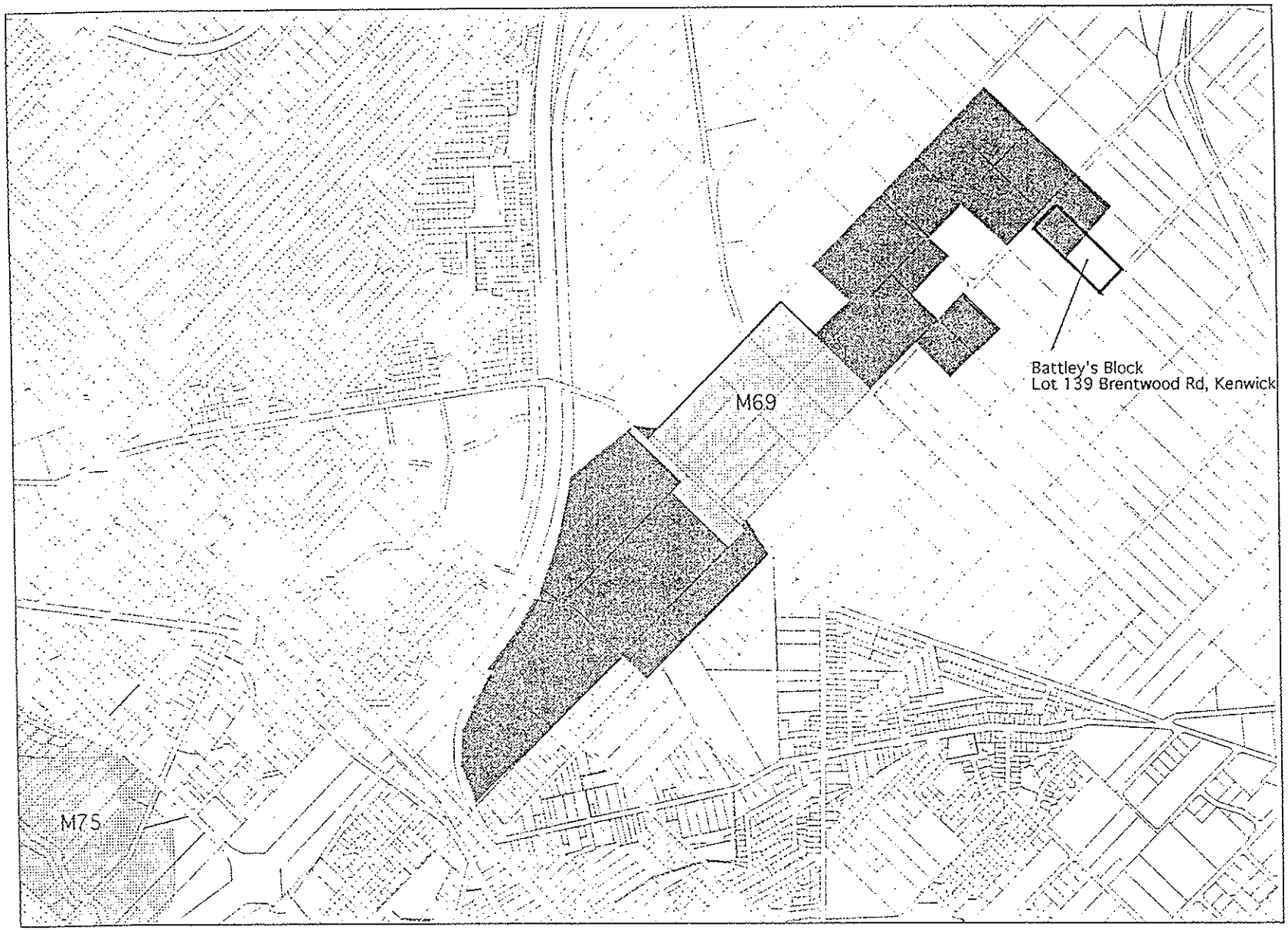
0 200 400 600 Meters

Threatened and Poorly Reserved Plant Communities, Brixton 1

System 6



Location of Significant Vegetation on Lot 139,
Brentwood Rd - Mr and Mrs Battley

N

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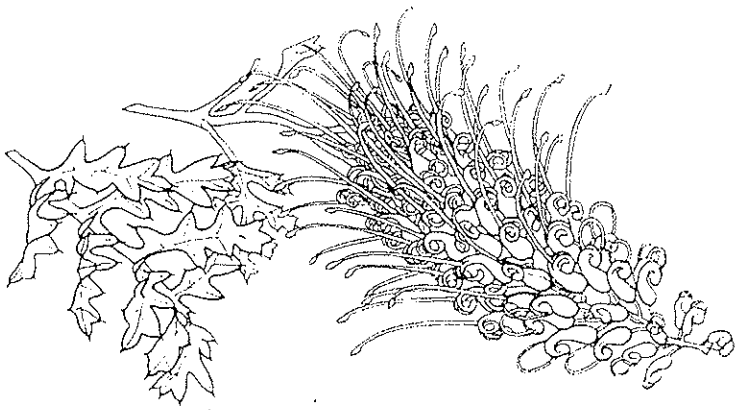
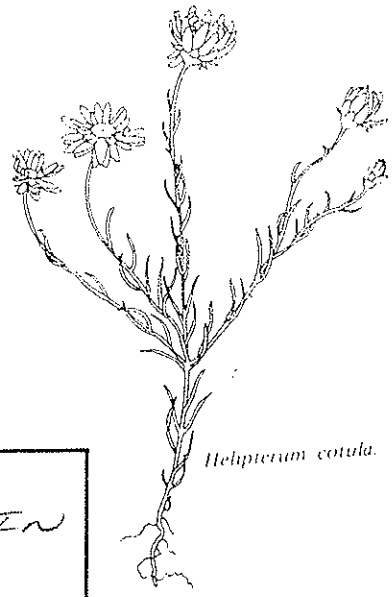
0 200 400 600 Meters

Threatened and Poorly Reserved Plant Communities, Brixton 1



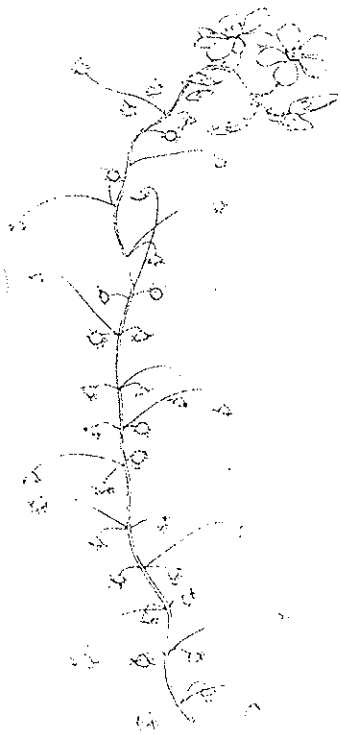
Grevillea hipinnatifida



Helipterum cotula.

FROM Flora Bx C Keighery IN

Knowing and Managing the Brixton Street Wetlands



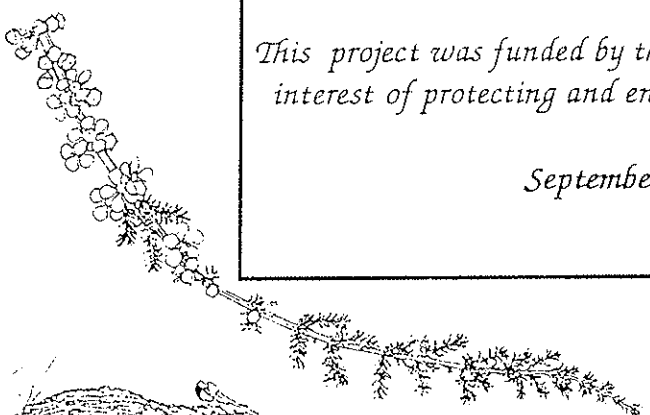
Drosera macrantha

Melaleuca lateritia

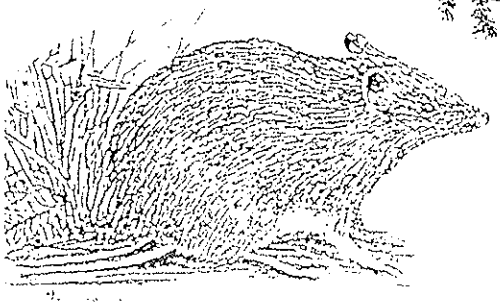
compiled by Bronwen Keighery
for
The Friends of Brixton Street Wetlands and the Perth Branch of the Wildflower Society of WA (Inc.) in cooperation with the Department of Conservation and Land Management.

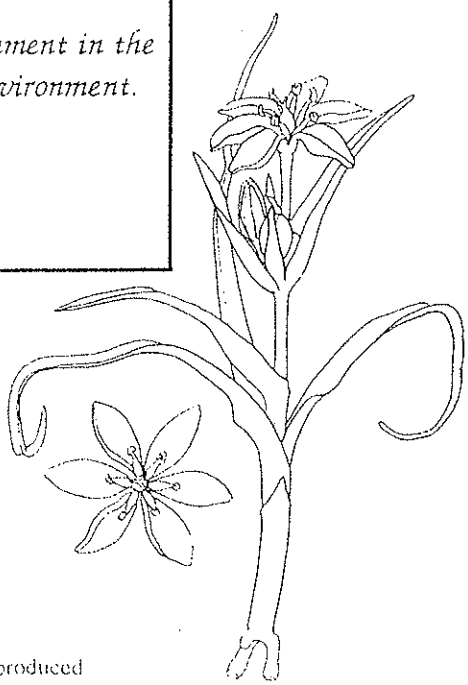
This project was funded by the State Government in the interest of protecting and enhancing our environment.

September 1995



Baeckea camphorosmae





Burchardia multiflora

Wildflower drawings by Margaret Menadue reproduced with permission from the "Flora of the Perth Region"

Flora Table 2: Flora of the Brixton Street Wetlands
Updated from Keighery and Keighery 1991, September 1995

Key

Column 1
- e Taxa from the eastern side of the Plain
- p East and the Darling Plateau.
- U unusual record
- t taxonomically significant taxa

Column 2 Conservation Code, Priority Code. Atkins, 1994.
- R: Declared Rare Flora - Extant Taxa
- X: Declared Rare Flora - Presumed Extinct Taxa
- 1: Priority One - Poorly Known Taxa
- 2: Priority Two - Poorly Known Taxa
- 3: Priority Three - Poorly Known Taxa
- 4: Priority Four - Rare Taxa
- 5: Priority Five - Proposed Declared Rare Flora

DRF = Survey comprehensive & existing data avail.
? DRF = check existing info on distrib (survey done).
P = check existing info to determine level priority listing.

Column 3 Taxa in family, listed alphabetically. Names follow Gibson *et al.* 1994.

Columns 4 - 6 Plant Communities (see Map 3)
- Clay = Deep claypan communities (*Melaleuca lateritia* Shrubland/*Amphibromus* grassland)
- Vim = *Viminaria juncea* Tall Shrubland (wet flats)
- Wet = *Pericalymma* Open Heath (shallow claypans)
- Dry = Mixed Low Shrublands
- Marri = Marri Woodlands (uplands)
- Disturb = disturbed areas, dominated by weed taxa

Taxon	Clay	Vim	Wet	Dry	Marri	Disturb
Amaranthaceae						
Ptilotus declinatus					•	
Ptilotus drummondii		•				
U Ptilotus esquamatus			•			
Ptilotus manglesii					•	
Ptilotus stirlingii		•				
Anthericaceae						
Borya scirpoidea		•			•	
Borya sphaerocephala		•			•	
Caesia occidentalis					•	
Chamaescilla corymbosa		•			•	
e/t Chamaescilla aff. spiralis (GJK 12501)	•					
Dichopogon capillipes					•	
Dichopogon preissii	•		•			
Laxmannia sessiliflora ssp. australis		•			•	
Laxmannia squarrosa					•	
Sowerbaea laxiflora		•		•	•	
Thysanotus arbuscula		•				
Thysanotus manglesianus		•			•	
Thysanotus patersonii		•				
Thysanotus sparteus		•			•	
Thysanotus tenellus		•				
Thysanotus thyrsoideus		•			•	
Thysanotus triandrus		•			•	
Tricoryne elatior					•	
Tricoryne humilis		•				

Taxon	Clay	Vim	Wet	Dry	Marri	Disturb
Apiaceae						
e/t1Eryngium pinnatifidum ssp. "palustre" (GJK 8757)	•					
e/t1Eryngium subdecumbens (GJK 5390)	•					
Homalosciadium homalocarpum		•			•	
Hydrocotyle callicarpa		•				
Hydrocotyle diantha	•	•				
R Hydrocotyle lemnoides	•					
Schoenolaena juncea	•	•				
Xanthosia huegelii		•			•	
Aponogetonaceae						
eR Aponogeton hexatepalus	•					
Asteraceae						
* Arctotheca calendula						•
Centipeda cunninghamii (minima)		•				
* Conyza albida (canadensis)						•
Craspedia sp.					•	
* Gazania linearis						•
Gnephosis tenuissima - dummondii complex				•		
Hyalosperma cotula		•			•	
* Hypochaeris glabra	•	•	•	•	•	•
Ixiolaena viscosa					•	
e Myriocephalus helichrysoides	•					
Myriocephalus isoetes	•					
Myriocephalus occidentalis	•					
Podolepis canescens		•				
t Podolepis gracilis "swamp" (GJK 13126)	•					
Podolepis gracilis					•	
Pogonolepis stricta	•					
P Rhodanthe pyrethrum	•					
Senecio diaschides(GJK 6665)		•			•	
Senecio minimus		•				
Siloxerus humifusus		•	•	•		
* Sonchus oleraceus		•	•	•	•	•
e/t Trichocline sp. (GJK 6382)	•					
* Ursinia anthemoides	•	•	•	•	•	•
Campanulaceae						
* Wahlenbergia capensis					•	
Wahlenbergia gracilenta		•			•	
Caryophyllaceae						
* Silene gallica var. gallica					•	
Centrolepidaceae						
Aphelia cyperoides		•			•	
Brizula drummondii	•					
Brizula muelleri		•				
Centrolepis drummondiana				•	•	
Centrolepis aristata		•	•	•	•	

Taxon	Clay	Vim	Wet	Dry	Marri	Disturb
Centrolepis glabra	•	•	•		•	
Centrolepis humillima	•	•	•			
Centrolepis polygyna	•					
Colchicaceae						
Burchardia multiflora		•		•	•	
Burchardia congesta					•	
t Wurmbea dioica subsp. aff. alba	•					
Crassulaceae						
Crassula colorata					•	
* Crassula natans	•					
Cuscutaceae						
Cuscuta australis	•					
Cyperaceae						
Baumea arthrophylla	•	•				
Baumea juncea		•				
Chorizandra enodis	•	•				
Cyathochaeta avenacea		•	•	•	•	
* Cyperus tennellus		•	•	•	•	•
Eleocharis acuta	•					
e/t1 Eleocharis sp. Kenwick (GJK 5179)	•					
* Isolepis cyperoides	•	•	•			
Isolepis cernua					•	
* Isolepis hystrix	•	•				
Isolepis marginata	•					
Isolepis oldfieldiana						
Isolepis setiformis (GJK 4178)	•					•
Isolepis sp. (GJK 6458)	•					
Isolepis stellata		•				
Lepidosperma angustatum					•	
Lepidosperma leptostachyum			•		•	
Lepidosperma longitudinale	•	•				
Mesomelaena tetragona		•		•	•	
4 Schoenus andrewsii		•				
Schoenus asperocarpus		•				
3 Schoenus benthamii		•	•			
Schoenus bifidus		•	•			
e2 Schoenus capillifolius	•					
Schoenus elegans		•				
Schoenus grandiflorus					•	
Schoenus odontocarpus	•					
1 Schoenus pennisetis	•					
Schoenus rigens		•	•	•		
Schoenus sculptus	•					
Schoenus tenellus	•		•			
Schoenus sp. 2 (GJK 12803)	•	•				
Tetraria octandra						

DRF

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Lepidosperma rostratum (Lots 27, 29 & 139)

Taxon	Clay	Vim	Wet	Dry	Marri	Disturb
Dasypogonaceae						
Acanthocarpus canaliculatus		•		•		
Calectasia cyanea				•		
Calectasia grandiflora		•		•		
Kingia australis				•	•	
Lomandra caespitosa					•	
Lomandra micrantha					•	
Lomandra odora				•	•	
Dilleniaceae						
Hibbertia aurea					•	
Hibbertia hypericoides					•	
Droseraceae						
Drosera rosulata		•		•		
Drosera erythrorhiza					•	
Drosera gigantea	•	•				
Drosera glanduligera		•		•	•	
Drosera heterophylla		•				
e/t Drosera macrantha Swan Coastal Plain form (BJK & NG 228)					•	
Drosera menziesii subsp. menziesii	•	•				
Drosera menziesii subsp. penicillaris				•	•	
4 Drosera occidentalis subsp. occidentalis		•				
Drosera stolonifera subsp. stolonifera					•	
Drosera tubaestylis		•			•	
Epacridaceae						
U Andersonia aristata			•			
Astroloma pallidum		•			•	
Lysinema ciliatum				•	•	
RF ▽ 1 Andersonia gracilis (UWA Yule Brook Reserve)						
Euphorbiaceae						
Monotaxis grandiflora						
Poranthera microphylla				•	•	
Gentianaceae						
* Centaurium erythraea						•
* Cicendia filiformis	•	•				
Goodeniaceae						
4 Anthotium junciforme	•	•				
Dampiera linearis		•			•	
Goodenia caerulea	•	•			•	
Goodenia pulchella		•				
Goodenia micrantha	•	•				
Scaevola glandulifera					•	
Scaevola lanceolata	•	•				
Velleia aff. trinervis (GJK 10429)		•				
Haemodoraceae						
Anigozanthos bicolor		•			•	

Taxon	Clay	Vim	Wet	Dry	Marri	Disturb
Anigozanthos bicolor x manglesii				•		
Anigozanthos bicolor x viridis				•		
Anigozanthos manglesii					•	
Anigozanthos viridis	•	•				
Conostylis aculeata subsp. aculeata					•	
Conostylis festucacea subsp.festucacea				•		
Conostylis setigera		•		•	•	
Haemodorum laxum	•	•				
Haemodorum paniculatum					•	
Haemodorum simplex	•					
Haemodorum sparsiflorum	•	•				
Haemodorum spicatum					•	
t Tribonanthes aff. uniflora (GJK 6259)	•					
Tribonanthes australis (GJK 6248)		•		•	•	
t Tribonanthes australis x brachypetala						
Tribonanthes brachypetala (GJK 6249)	•	•				
Tribonanthes longipetala (GJK 6262)		•		•	•	
t Tribonanthes uniflora x australis (GJK 6260)		•				
Haloragaceae						
Gonocarpus nodulosus		•				
Gonocarpus pithyoides					•	
Myriophyllum crispatum	•					
Hydatellaceae						
e2 Hydatella dioica	•					
Trithuria bibracteata	•	•				
Trithuria submersa	•					
Hydrocharitaceae						
Ottelia ovalifolia	•					
Hypoxidaceae						
Hypoxis occidentalis		•				
Iridaceae						
* Babiana stricta						•
* Chasmanthe floribunda						•
* Freesia leichtlinii						•
* Gladiolus caryophyllaceus					•	•
* Hesperantha falcata						•
* Hexaglottis lewisiae						•
Patersonia juncea		•				
Patersonia occidentalis		•		•	•	
* Romulea rosea		•		•	•	
* Sparaxis bulbifera		•		•		•
* Watsonia bulbillifera		•				•
* Watsonia marginata	•					
Isoetaceae						
Isoetes drummondii	•					

Taxon	Clay	Vim	Wet	Dry	Marri	Disturb
Juncaceae						
Juncus bufonius				•	•	
* Juncus capitatus						•
Juncus holoschoenus				•		
Juncaginaceae						
t Triglochin aff. calcitrapa (GJK 10430)				•		
Triglochin calcitrapum		•			•	
Triglochin minutissimum		•				
Triglochin procerum	•					
2 Triglochin stowardii	•	•				
Lamiaceae						
* Stachys arvensis						•
Lauraceae						
Cassytha glabella				•		
Lentibulariaceae						
Polypompholyx multifida	•	•		•		
Polypompholyx tenella		•		•		
Utricularia menziesii	•					
Utricularia violacea	•					
Lobeliaceae						
Isotoma hypocrateriformis					•	
Isotoma pusilla	•					
Isotoma scapigera	•					
* Monopsis debilis	•	•				
Loranthaceae						
Nuytsia floribunda					•	
Linaceae						
* Linum trigynum						•
Lycopodiaceae						
Phylloglossum drummondii	•	•	•	•		
Lythraceae						
* Lythrum hyssopifolia			•			•
Marsileaceae						
Pilularia novae-hollandiae	•					
Meliaceae						
* Melia azedarach						•
Menyanthaceae						
Villarsia capitata	•	•				
4 Villarsia submersa	•					

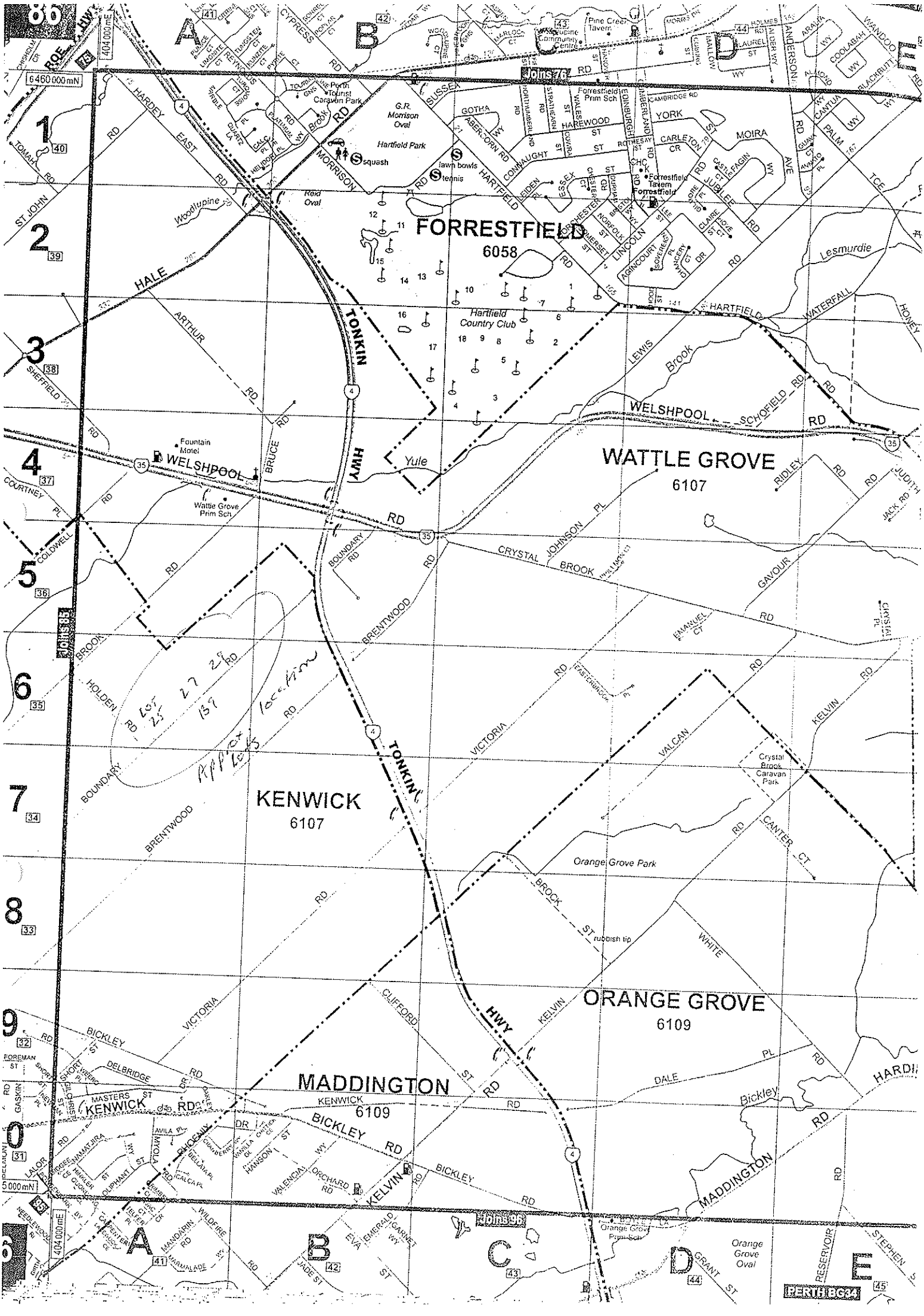
Taxon	Clay	Vim	Wet	Dry	Marri	Disturb
Mimosaceae						
Acacia lasiocarpa		•			•	
Acacia pulchella		•		•	•	
Acacia saligna						
Acacia sessilis					•	
Myoporaceae						
e/t Eremophoia glabra subsp. Brixton (GJK 6246) Chlorella			•			
Myrtaceae						
e/t Astartea aff. fascicularis		•	•	•		
Baeckea camphorosmae		•			•	
Calytrix aurea		•	•	•		
Eucalyptus calophylla					•	
Hypocalymma angustifolium		•	•	•		
Hypocalymma robustum					•	
Kunzea aff. recurva (GJK 6830)	•	•				
Kunzea micrantha			•			
Melaleuca lateritia	•					
Melaleuca rhaphiophylla		•				
Melaleuca viminea	•	•				
Pericalymma ellipticum		•				
Verticordia acerosa		•	•			
Verticordia densiflora		•	•			
Verticordia huegelii var. huegelii		•	•			
e4 Verticordia lindleyi var. lindleyi			•	•		
Verticordia pennigera		•	•	•		
Onagraceae						
* Oenothera mollissima						•
Ophioglossaceae						
Ophioglossum lusitanicum subsp. coriaceum			•			
Orchidaceae						
Caladenia deformis		•				
Caladenia ferruginea		•			•	
Caladenia flava				•		
Caladenia paludosa		•			•	
Caladenia longicauda		•			•	
Caladenia pectinata		•			•	
Diuris emarginata	•	•				
t Diurus longifolia (early flowering race)		•			•	
Eriochilus dilatatus		•			•	
Eriochilus scaber					•	
Leporella fimbriata					•	
Lyperanthus serratus					•	
Microtis unifolia		•				
Prasophyllum drummondii	•	•				
Pterostylis sanguinea					•	
Thelymitra antennifera		•				

Taxon	Clay	Vim	Wet	Dry	Marri	Disturb
Thelymitra crinita		•				
Thelymitra flexuosa		•				
Thelymitra villosa		•				
Oxalidaceae						
* Oxalis glabra						•
* Oxalis pes-caprae						•
* Oxalis polyphylla						•
* Oxalis purpurea						•
Papilionaceae (Fabaceae)						
Daviesia decurens					•	
Daviesia physodes					•	
t Dillwynia aff. cinerascens		•			•	
Eutaxia virgata	•	•	•			
Gompholobium aristatum					•	
Gompholobium marginatum		•			•	
Kennedia prostrata					•	
* Lupinus consentinii						•
Nemcia capitata		•			•	
* Ornithopus compressus	•					•
* Robinia pseudoacacia						•
Sphaerolobium linophyllum		•				
* Trifolium angustifolium						•
* Trifolium arvense						•
* Trifolium cernuum						•
* Trifolium dubium					•	•
* Vicia sativa subsp. nigra					•	•
Viminaria juncea		•		•	•	
Philydraceae						
Philydrella drummondii	•	•		•		
Philydrella pygmaea	•	•		•		
Phormiaceae						
U Agrostocrinum scabrum (glabrous form)		•	•			
Dianella revoluta var. divaricata					•	
Poaceae						
Agrostis avenacea	•	•			•	
Agrostis plebia	•					
* Aira caryophyllea		•			•	
Amphibromus neesii	•					
Amphipogon debilis var. fallax					•	
Amphipogon laguroides		•			•	
Amphipogon turbinatus					•	
* Arundo donax						•
* Avena fatua						•
* Briza maxima		•	•	•	•	•
* Briza minor		•	•	•	•	•
* Cynodon dactylon	•					
Danthonia caespitosa (GJK 9666)	•					

Taxon	Clay	Vim	Wet	Dry	Marri	Disturb
* Ehrharta calycina					•	•
* Ehrharta longiflora		•			•	•
* Eragrostis curvula						
Eragrostis elongata		•	•			
* Lagurus ovatus						•
* Lolium temulentum	•					
Microlaena stipoides					•	
Neurachne alopecuroidea		•			•	
* Paspalum dilatatum	•					•
* Phalaris minor						•
* Pennisetum clandestinum						•
Polypogon tenellus	•					
* Rynchelytrum clandestinum						•
Stipa compressa					•	
Stipa semibarbata					•	
Stipa trichophylla					•	
* Stenotraphrum repens						•
* Tribolium uniolae						•
* Vulpia myuros	•	•				
Polygalaceae						
Comesperma calymega				•		
Comesperma volubile		•				
Portulacaceae						
Calandrinia composita	•	•				
e/t1Calandrinia sp. Kenwick (GJK 10905)	•					
Primulaceae						
* Anagallis arvensis					•	•
* Anagallis minor	•					
Proteaceae						
U Conospermum huegelii		•				
Dryandra nivea		•			•	
Grevillea bipinnatifida		•			•	
Hakea candolleana		•				
Hakea erinacea		•				
Hakea incrassata		•			•	
Hakea lissocarpha		•			•	
Hakea prostrata					•	
Hakea sp. ? auriculata (GJK 8014)		•				
Hakea sulcata		•		•		
Hakea trifurcata					•	
Hakea undulata					•	
Hakea varia			•			
Isopogon asper				•		
Isopogon dubius		•				
t Petrophile media var. juncifolius ms		•			•	
Petrophile seminuda		•				
Stirlingia simplex		•				
3 Synaphea acutiloba		•				

Taxon	Clay	Vim	Wet	Dry	Marri	Disturb
Synaphea petiolaris		•			•	
Restionaceae						
Anarthria laevis		•				
Leptocarpus canus	•	•				
Leptocarpus coangustatus		•				
Lepyrodia glauca	•					
Loxocarya fasciculata		•			•	
Hypolaena exsulca					•	
Rubiaceae						
Opercularia vaginata		•			•	
Rutaceae						
U Boronia cymosa					•	
Eriostemon spicatus		•			•	
Scrophulariaceae						
Glossostigma drummondii	•					
Gratiola peruviana	•					
* Parentucellia viscosa	•	•				
Selaginellaceae						
Selaginella gracillima		•	•			
Solanaceae						
* Solanum nigrum					•	
Stackhousiaceae						
Stackhousia pubescens					•	
Tripterococcus brunonis		•		•	•	
Stylidiaceae						
Levenhookia pusilla		•				
Stylidium brunonianum		•			•	
Stylidium bulbiferum		•		•		
Stylidium calcaratum					•	
Stylidium calcaratum (rose form)	•	•				
Stylidium canaliculatum		•				
Stylidium carnosum					•	
Stylidium dichotomum				•	•	
Stylidium divaricatum		•				
Stylidium ecorne	•					
Stylidium inundatum	•					
e1 Stylidium mimeticum	•					
Stylidium perpusillum	•					
Stylidium periscelianthum	•					
Stylidium petiolare	•	•				
Stylidium pulchellum	•	•				
Stylidium repens					•	
Stylidium roseo-alatum	•	•				
Stylidium utricularioides	•	•				

Taxon	Clay	Vim	Wet	Dry	Marri	Disturb
Thymelaeaceae						
e Pimelea imbricata var. major	•					
Xanthorrhoeaceae						
Xanthorrhoea ?brunonis		•		•		
Xanthorrhoea preissii					•	
Zannichelliaceae						
Lepilaena australis	•					


FORRESTFIELD
6058
WATTLE GROVE
6107
KENWICK
6107
ORANGE GROVE
6109
MADDINGTON
6109
WELSHPOOL
TONKIN HWY
HALE
ARTHUR
SHEFFIELD
HARDEY
EAST
ST JOHN
TOMAH
MORRISON
HARTFIELD
WOODLUPINE
REID OVAL
G.R. MORRISON OVAL
HARTFIELD PARK
SQUASH
LAWN BOWLS
TENNIS
HARTFIELD COUNTRY CLUB
FORRESTFIELD TAVERN
PINE CREEK TAVERN
THE PORCH TOURIST CARAVAN PARK
FOUNTAIN MOTEL
WATTLE GROVE PRIM SCH
FORRESTFIELD PRIM SCH
ORANGE GROVE PARK
CRYSTAL BROOK CARAVAN PARK
ORANGE GROVE PRIM SCH
ORANGE GROVE OVAL
RUBBISH TIP
LESMURDIE
LEWIS BROOK
HARTFIELD WATERFALL
WELSHPOOL SCHOFIELD RD
YULE
BRUCE
COURTNEY
COLDWELL
BOUNDARY
BROOK
HOLDEN
BRENTWOOD
CRYSTAL BROOK
GAVOUR
RIDLEY
JUDITH
JACK RD
VICTORIA
VALCAN
KELVIN
CANTER CT
WHITE
CLIFFORD
BICKLEY
DELBRIDGE
DALE
KENWICK
MASTERS
FOREMAN
GASKIN
SHORT
LALOR
PHOENIX
AVILA
HANSON
VALENCIA
ORCHARD
MADDINGTON
RESERVOIR
STEPHEN
MANDARIN
WILDFIRE
MARMALADE
EVA
EMERALD
GARNET
JADE
GRANT
ROE HWY
JOHNSTON
BUSSEY
GOTHA
ABERCORN
CONNAUGHT
ESSEX
LEIDEN
CHESTER
DURHAM
BOSTON
NORFOLK
SOMERSET
LINCOLN
AGINCOURT
SOVEREIGN
CHANCERY
CLAIRE
JUBILEE
CARLETON
MOIRA
YORK
HAREWOOD
STRATHEARN
HORTHUMBERLAND
EDINBURGH
CUMBERLAND
CAMBRIDGE RD
CYPRESS
HOLMES
LAUREL
ANDERSON
WANDOO
COOLABAH
BLACKBUTT
CANTUM
PALM
AWMTO
GUNN
CHOK
CASTLEFAGIN
GORE
LEE
ENAMUEL
CRYSTAL
BRENTWOOD
HOLDEN
BOUNDARY
VICTORIA
KELVIN
CANTER
DALE
BICKLEY
MADDINGTON
WHITE
RUBBISH TIP
ORANGE GROVE PARK
CRYSTAL BROOK CARAVAN PARK
ORANGE GROVE PRIM SCH
ORANGE GROVE OVAL
RESERVOIR
STEPHEN
GRANT
JADE
EVA
EMERALD
GARNET
MANDARIN
WILDFIRE
MARMALADE
NEEDLEWOOD
CARPENTER
JOHNSTON
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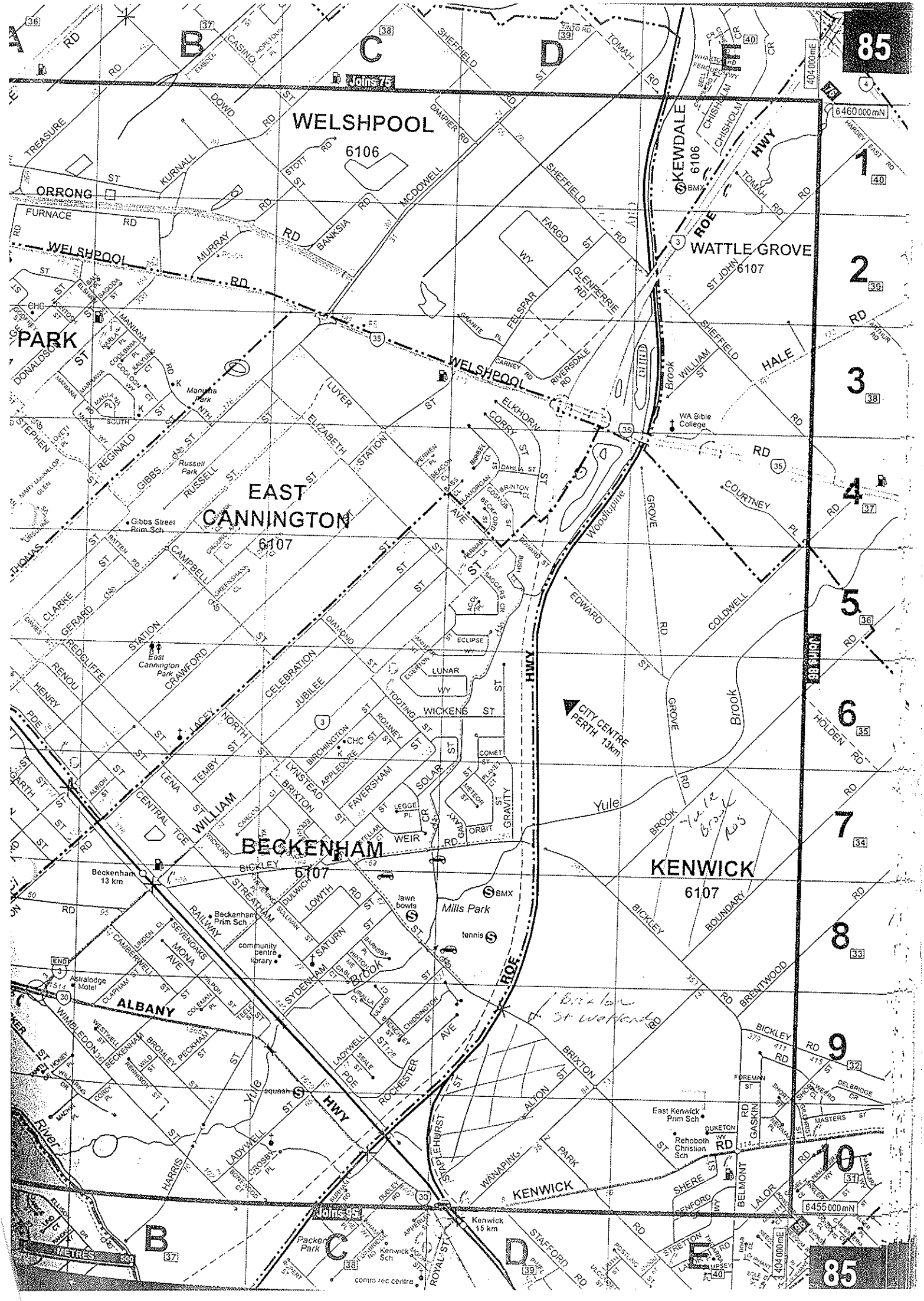
85
WELSHPOOL
6106
KEWDALE
6106
WATTLE GROVE
6107
EAST CANNINGTON
6107
BECKENHAM
6107
KENWICK
6107
PARK
ORRONG
FURNACE RD
WELSHPOOL RD
SHEFFIELD
HALE
ROE HWY
ALBANY HWY
STATION
ELIZABETH
RUSSELL
GIBBS
REGINALD
CAMPBELL
CLARKE
GERARD
CRAWFORD
CELEBRATION
JUBILEE
WICKENS ST
LACEY
WILLIAM
BRIXTON
FAVERSHAM
SOLAR
GRAVITY
WEIR
BICKLEY
LOWTH
SATURN
SYDENHAM
ROCHESTER
LADYWELL
ALTON
BRIXTON
BRENTWOOD
BOUNDARY
COURTNEY
COLDWELL
EDWARD
HOLDEN
GROVE
Brook
Yule Brook
Mills Park
lawn bowls
tennis
BMX
East Kenwick Prim Sch
Rehoboth Christian Sch
WA Bible College
Gibbs Street Prim Sch
Beckenham Prim Sch
East Cannington Park
Russell Park
Manning Park
community centre
library
Packenham Park
Kenwick Sch
comm rec centre
Astralodge Motel
CITY CENTRE PERTH 13km
Beckenham 13 km
Kenwick 15 km
John's Rd
6460 000mN
6455 000mN
404 000mE
METRES 500

Evaluation of the National Estate Value of remnant bushland on the Swan Coastal Plain between Moore River and Mandurah

BRIXTON STREET AND ASSOCIATED WETLANDS, KENWICK

including System 6 area M69

Full document available on request

Prepared by Mary Gray

For the Wildflower Society of WA (Inc.)

December 1993

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The Greater Brixton Street Wetlands Management Guidelines, Natural History and Research

compiled by Janice Marshall
for the Friends of Brixton Street Wetlands Inc

This project was funded by the World Wildlife Fund for Nature

June 2000

Full document available on request

Vegetation and Flora Report for Lot 130 Brentwood Road, Kenwick, part interim protected area under the System Six Update Programme
Bronwen Keighery, June 1995.

Introduction

In 1995 a series of bushland areas were identified by the EPA to be given interim protection under the System 6 Update. The majority of these areas are from the the eastern side of the Swan Coastal Plain . It has been estimated that the eastern side of Swan Coastal Plain is 97% cleared of vegetation (CALM, 1990). The Wheatbelt considered to be 93% cleared (Beard, 1990) has been the subject of intensive study, in the past 15 years but the eastern side of the Swan Coastal Plain has received comparably scant attention even though Beard noted in the same publication that there was "..no virgin vegetation left " on the eastern side of the Swan Coastal Plain. This situation has been recognized for some time and the two most recent regional studies of the Plain (Keighery and Trudgen 1992 and Gibson et al. 1994) both made direct recommendations concerning the the high conservation value of all remnants on the eastern side of the Plain, regardless of the size of the remnant.

Part of Lot 139 (the study area) is within the boundaries of "Brixton 1", one of the areas from the eastern side of the Plain given interim protection by the EPA under the System Six Update (Map 1, Photo 1)). The boundaries of "Brixton 1" were identified by Keighery and Trudgen (1992) in their recommendation for the "Canning Wetlands" (Map 2 and Appendix 1), one of twelve specific recommendations. Keighery and Trudgen identified the values of the area. That is:

"This area is the only substantial area of Wetland Mosaic Associations characteristic of the heavy seasonally inundated soils of the flats of the Pinjarra Plain extant. The wetlands encompassed in these locations give some idea of the complexity and diversity of these wetlands that were once widespread on the Pinjarra Plain. The characteristic associations are: *Viminaria juncea* High Shrubland, *Melaleuca* Open Heath, Mixed Low Open Heath, Samphire Low Shrubland, Herblands and Sedgelands. The *Melaleuca* Open Heath and Mixed Low Open Heath are extremely variable depending on the dominant species, generally a suite of myrtaceuos shrubs often with scattered clumped *Actinostrobus pyrimidalis, Viminaria juncea* and *Melaleuca raphiophylla.* Although there are areas in Very Poor Condition and areas of severe localised disturbance much of the area is in Very Good to Good Condition.

Significant taxa: >30 taxa, 4 DRF, 6 priority taxa and DRF
Of interest are: *Aponogeton hexatepalus, Schoenus capillifolius, Hydatella dioica, Acanthocarpus cannaliculatus, Agrostocrium scabrum, Tricoryne humilis, Anigazanthos bicolor, Tribonanthes* sp, *Patersoniajuncea, Grevillea bipinnatifida, Hakea auriculata, Hakea erinacea, Petrophile media* var *juncifolia, Drosera heterophylla, Erynium'subdecumbens', Hydrocotyle lemnoides, Villarsia submersa, Hyalospermum pyrethrum, Trichocline* sp, *Banksia telmatiea, Calothamnus hirsutus, Verticordia acerosa, Grevillea thelemanniana* ssp *thelemanniana, Daviesia physoides, Jacksonia alata, Andersonia aristata, Melaleca laterita, Scaevola lanceolata, Conostylis festucacea, Restio tremuluss, Buchardia bairdii, Stylidium ecorne, Stylidium dichotomum, Stylidium divaricatum, Schoenus andrewsii, Isotoma scapigera, Calandrinia composita, Verticordia acerosa, Verticordia plumosa, Calytrix breviseta* ssp *breviseta , Phylidrella drummondii, Tribonanthes brachypetala, Stylidium utriculariodes, Melaleuca uncinata, Eryngium bipinnatifidum* ssp*'palastris', Phrasophyllum drummondii.*"

(Appendix 1 gives details of the vegetation associations described for the area)

A specific recommendation was made for the area, being that
"CALM liaise urgently with the owners to retain and manage the area for its flora conservation values. Locations 63 and 65 should be acquired for a Nature Reserve encompassing all four locations, vested in the NPNCA."

The Canning Wetlands as identified by Keighery and Trudgen encompass a series of areas which have been the subject of a number of studies. Each of these studies have identified the outstanding flora conservation values of the area and many have recommended various levels of protection for all or part of the area identified by Keighery and Trudgen. These studies include

• Detailed long term research projects

- Yule Brook Reserve (Map 2, Area 3 and Appendix 2). As this is a University of WA research area there have been a series of studies on the area, Speck and Baird (1984) details the vegetation and flora of the area.

- Brixton Street Wetlands (Map 2, Area 1 and Appendix 3), Keighery and Keighery (1990)

The results of these two detailed detailed long term studies establish that the vegetation associations in the the study area are complex and varied containing a rich and endemic flora. A compilation of the flora of these two areas (Keighery 1993) that allowed for taxonomic changes and duplications lists 517 native vascular plant taxa in these two areas, that is over one third of the flora of the Swan Coastal Plain.

• Environmental Assessments

- Lot 37 and Lot 47 Brixton Street (Map 2, Area 1 and Appendix 4), Hames and Sharley 1991 and EPA Bulletin September 1991.

- Glenhaven Estate, Lot 48 and part Lot 35 Brixton Street (Map 2, Area 2 and Appendix 5), Hames and Sharley 1991 and EPA Bulletin July 1992.

These environmental assessments related to housing proposals for the various lots. Lots 37, 47 and part 48 were subsequently identified as conservation areas to be vested in the NPNCA.

• Planning Studies

- Foothills Environmental Audit (Map 2, Area 4 and Appendix 6), Semeniuk 1991
- Boundary and Brook Road (Map 2, Area 4 and Appendix 7) Mattiske and Associates 1992.

These studies recognised the conservation values of Area 4, some of the area has been acquired.

• Rare Flora of the Metropolitan Region Kelly et al. 1993

Populations of four taxa of Declared Rare Flora were identified in the area (Map 2 and Appendix 8), one population of *Calytrix breviseta* subsp. *breviseta* was identified in Lot 139. The then owners of the property were notified (Appendix 8).

• Regional Studies

- Keighery and Trudgen 1992 (Map 2 and Appendix 1)
- Gibson et al 1994 (Appendix 9)

The outstanding conservation values of the area have been recognised by a series of other groups/studies:

(i) Nomination for listing on the register of the National Estate.

In 1994 the approximate area of the "Cannington Wetlands" was nominated for listing on the National Estate by the Wildflower Society of WA (Inc.).

(ii) The Conservation Council has proposed that much of the "Cannington Wetlands" become the Yule Brook Nature Reserve.

(iii) The Brixton Street Wetlands are listed on the Australian Register of Significant Wetlands (Australian Nature Conservation Authority 1993).

Methods and Limitations

Approximately three hours were spent in the area and on the adjacent State Planning Commission land (22/6/95 and 25/6/95). Descriptive information (Sites 1 - 6) was collected for the entire area and collections were made of taxa considered of interest.

The detail of this survey was limited by time of the year and the prolonged drought over the previous spring, summer and autumn. In early winter the rich annual and geophytic flora that are characteristic of these seasonally inundated areas are in the early stages of growth or yet to start growing and are not evident. These taxa are not only important in identifying the flora present in the area but are also critical in assessing condition as the proportions of native taxa and weed taxa are critical in assessing condition. Consequently the annual and geophytic flora of the area have not been sampled and all condition ratings are conditional, needing to be fully assessed in late spring and early summer. Also, it appears that there have been a large number of shrub deaths in the area which are most likely a response to drought, but have again made condition difficult to determine.

Vegetation

Vegetation Associations (structural units)

The study area has a mixture of sandy clays and clays. Ironstone nodules were observed in the around site 5 and underlying sheet ironstone was observed along Brook Road. The vegetation is very much affected by the proportions of sand to clay and the drainage. Sites are described from the sandy mounds, well drained flats and poorly drained flats. These terms are relative as the whole study area is poorly drained.

The vegetation associations in the study area (Appendix 10, Map 3) are best described as Wetland Mosaic Associations (after Keighery and Trudgen 1992) characteristic of the heavy seasonally inundated soils of the flats of the Pinjarra Plain. The associations present are: *Melaleuca* Scrub to Shrubland (Photos 2 and 3) and, *Verticordia* and Mixed Heaths (Photo 4), Herblands and Sedgelands (Photo 4).

The vegetation associations in the study area are similar to those in the adjacent lands on the northern side of Brook Road described by Keighery and Trudgen (Appendix 1, Location 65) and Mattiske and Associates 1992.(Appendix 6). The vegetation associations are complementary to those in the remainder of the "Canning Wetlands" (Keighery and Trudgen 1992).

Floristic Community Types (Gibson et al. 1994)

Gibson et al (1994) identified five floristic community types (3a, 7, 8, 10a, 21c & 23a) from the Brixton Street Wetlands (Map 2, Area 1 - floristic community types 3a & 8) and Yule Brook Reserve (Map 2, Area 3 - floristic community types 10a, 7, 21c & 23a). There was no overlap of the floristic community types from the two areas, indicating the diversity of floristic units in the area.

Areas 2 and 4 (Map 2) were not sampled, as at the time of this study these were private lands, and private lands were excluded from the study. Units of vegetation that are structurally and floristically similar to most of those in the Area 4 (Map 2), which is the area most similar to the study area, were sampled elsewhere on the Plain. These areas contained floristic community types 7, 8 and 10a, all associated with the seasonally inundated wet flats on the eastern side of the Plain. However a unit similar to the *Verticordia* Heath (Appendix 10, Site 6) was not sampled and while it appears to be floristically most similar to floristic community type 8, it may well be an additional floristic community type.

Vegetation Condition

The study area on Lot 139 is in varying condition ranging from Very Poor to Very Good Condition, most likely due to past grazing and continued grazing by rabbits leading to weed invasion, drought (possibly also drainage) and rubbish dumping. The study area is a mosaic of vegetation associations overlain with a secondary mosaic of disturbance. Most of the Location, except for isolated areas is in Very Good to Good Condition and should regenerate if the disturbance factors are reduced.

The most significant weeds observed at the time of the study were: *Romulea rosea*, *Sparaxis bulbifera*, *Lolium* ?species, grasses, *Hypochaeris glabra* and *Ursinia anthemoides*.

The undisturbed areas of vegetation in the study area are in Very Good condition. A characteristic feature of areas of vegetation on the eastern side of the Swan Coastal Plain is the proximity of vegetation in Very Good Condition occurring alongside severely disturbed area (Keighery and Trudgen 1992). This is appears to be related to the dense shrub, herb and sedge strata characteristic of most vegetation associations on the eastern side of the Plain which, when intact, provide few opportunities for weed establishment. However once these strata are repetitively disturbed to the extent that density of these strata is reduced and the store of perenniating organs in the soil is depleted weeds become established.

The remainder of Lot 139 has been cleared however native species were regrowing over much of this area from either seed or bulbs, rhizomes etc (Photo 5).

Flora

A diversity of shrubs and sedges were identified in the study area (Appendix 10) however a detailed assessment of flora cannot be made at the time of the year in which the study was conducted (see Methods and Limitations) or within the time available

The outstanding flora diversity of the "Canning Wetlands" (Keighery and Trudgen 1992) is well established by long term studies in the area (see Introduction and Appendices 2 and 3). A series of significant taxa identified in these and other studies are found in the study area. Also one taxon, *Lepidosperma rostratum*, was located during this study which was known from a single collection.

Significant Taxa

Rediscoverd Taxon
Several hundred plants of *Lepidosperma rostratum* were found in the study area. This taxon was initially identified by G. Keighery (Conservation and Land Management) and confirmed by Karen Wilson (Royal Botanic Gardens, Sydney) who is currently revising the Cyperaceae. This taxon was previously only known from the type collection that was collected in the Cannington area by S.T. Blake on 22 Aug. 1947 (K. Wilson pers. comm.). Plants of this taxon were also located in the land to the north of Brook Road but the extent of the populations could not be estimated as most of the plants had not regrown after the fire. As a consequence of this study *Lepidosperma rostratum* will be recommended for Priority 1 listing ("Taxa which are known from one or a few populations which are under threat" Atkins 1994) and that consideration be given for its gazettal as Declared Rare Flora (G. Keighery pers. comm.).

Declared Rare Flora
Calytrix breviseta ssp *breviseta* was located in the study area. Investigations of Declared Rare Flora files at CALM, established that this taxon had been identified on Lot 139 previously (see Introduction and Appendix 7). This taxon is only known from three population to the north and south of Brook Road and was presumed extinct until it was relocated in 1991. The population in the State Planning Commission land was burnt in summer 1994 (Photo 6) and all plants are at the seedling stage. The plants in the study area are mature as the area has not been burnt for many years.

Priority 1 Taxa - "Taxa which are known from one or a few populations which are under threat"
Acacia lasiocarpa var *bracteolata* 'long peduncle form varient' (G.J. Keighery 5026)
This taxon is endemic to the eastern side of the Plain and Gibson et al (1994) found that it was confined to community types 7 and 8, on the seasonally waterlogged and inundated heavy soils of the Pinjarra Plain.

Priority 4 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."

Grevillea thelemanniana subsp. *thelemanniana*
This taxon has recently been raised to specific status (Olde and Marriot 1995) as *Grevillea thelemanniana* and is now considered confined to the Cannington area. Olde and Marriot place it in category 2EC, that is endangered, found in a proclaimed conservation reserve and with a known range of less than 100km. Endangered taxa are considered to be "Likely to disappear in the wild within one or two decades if present land use and causal factors continue." This category is based on the coding devised by Briggs and Leigh (1988) and is equivalent to Declared Rare Flora in Western Australia.

Verticordia lindleyi subsp. *lindleyi*
This taxon is confined to seasonally inundated flats on the eastern side of the Swan Coastal Plain.

Also a series of taxa characteristically associated with the only with the seasonally inundated flats on the eastern side of the Swan Coastal Plain (Keighery and Trudgen 1992) were identified in the study area: *Acanthocarpus cannaliculatus*, *Banksia telmatiea, Calothamnus hirsutus, Verticordia acerosa, Jacksonia restiodes, Scaevola lanceolata,Verticordia acerosa, Verticordia plumosa* and *Stylidium dichotomum.*

Conclusion

The study area area has considerable conservation value containing vegetation associations and flora associated with the poorly conserved seasonally inundated wetlands of the eastern side of the Swan Coastal Plain. The Cannington area contains the largest connected remnants of these communities. Any loss of area of these wetlands will lessen their long term viability, especially with regard to fire and other disturbances.

The populations of Declared Rare Flora, a rediscovered taxon (another potentially rare species) and Priority flora further contribute to the area's conservation value. The Department of Environmental Protection should liaise urgently with CALM to ensure that the current owners of the land are notified of their obligations under the Wildlife Conservation Act concerning the protection of Declared Rare Flora.

References

Atkins, K. (14/9/1994) Declared Rare and Priority List for Western Australia. Department of Conservation and Land Management, WA.

Australian Nature Conservation Agency (1993). A Directory of Important Wetlands in Australia. Commonwealth of Australia, Canberra.

Churchward, H.M. and McArthur, W.M. (1980) Landforms and Soils of the Darling System. In "Atlas of Natural Resources, Darling System, Western Australia". Department of Conservation and Environment, Western Australia.

Department of Conservation and Environment. (1983) Conservation Reserves for Western Australia. The Darling System - System 6. Parts 1 &2. Report 13. Department of Conservation and Environment, Perth.

Environmental Protection Authority (1991). Bulletin 577: Subdivision: Concept plan and design Lots 37 and 47 Brixton Street, Kenwick. Report and recommendations of the EPA.

Environmental Protection Authority (1992). Bulletin 635: Proposed urban development of Lots 35 and 48 Brixton Street, Kenwick, City of Gosnells, Report and recommendations of the EPA.

Gibson, N., Keighery, B.J., Keighery, G.J., Burbidge, A. and Lyons, M. (1994) A Floristic survey of the southern Swan Coastal Plain. Unpublished report for the Australian Heritage Commission prepared by department of CALM and the Conservation Council of WA (Inc).

Gobble Garrat, E.M. (1991) Report on the Biological Survey of Lots 48 and Pt 35 Brixton St, Kenwick. Prepared for Hames and Sharley, 1991.

Hames and Sharley (1991) Proposed Urban Development and Wetland Conservation on Lot 37 and Lot 47 Brixton Street, Kenwick, City of Gosnells.

Hames Sharley Australia (1991). Consultative Environmental Review: Glenhaven Estate, Lot 48 and part Lot 35 Brixton Street, Kenwick, City of Gosnells. Hames Sharley Australia, Subiaco WA.

Keighery, B.J. and Trudgen, M.E. (1992) "The Remnant Vegetation of the Eastern Side of the Swan Coastal Plain." Unpublished report to the Department of Conservation of Land Management for the National Estate Grants Programme.

Keighery G. J. and Keighery B. J. (1991). Floristics of Reserves and Bushland Areas of the Perth Region (System 6), Parts II Brixton Street Wetlands in Floristics of Reserves and Bushland Areas of the Perth Region (System 6), Parts II to IV. Wildflower Society of Western Australia (Inc.).

Keighery G. J. (1993). Species list for Brixton Street and Yule Brook Reserve. CALM unpublished

Kelly, A., Taylor A., Langley, M.A., Spooner, A. and Coates, D.J.. (1993) "Declared Rare Flora and Other Plants in Need of Special Protection in the Metropolitan Region". Wildlife Management Programme 10. Department of Conservation and Land Management, WA

Mattiske, E.M. and Associates (1992) Flora and Vegetation - Boundary and Brook Roads, Kenwick. An unpublished report for Department of Planning and Urban Development.

Olde, P. and Marriot, N. (1995) The Grevillea Book. Volumes 1, 2 & 3. Kangaroo Press, Kenthurst.

Semeniuk Research, V. and C. Group (1991) Environmental and Landscape Audit of South-west, North-west, North-east, South-east and Foothills Corridors, Perth Metropolitan Area. Stage 3, Interim report Foothills Corridor Study. Unpublished report for the the department of Planning and Urban Development.

Speck N. H., Baird A. M. (1984). Vegetation of Yule Brook Reserve near Perth, Western Australia. J. Roy. Soc. of WA 66, Pt 4, 147 - 162.

Trudgen, M.E. (1994) Vegetation Condition Scale. In "Urban Bushland Policy", National Trust of Australia (WA), Perth.

Photo 1 (above): Looking east towards the Daring Scarp across the 'Cannington Wetlands"

Photo 2 (below): *Melaleuca* Scrub, Site 1.

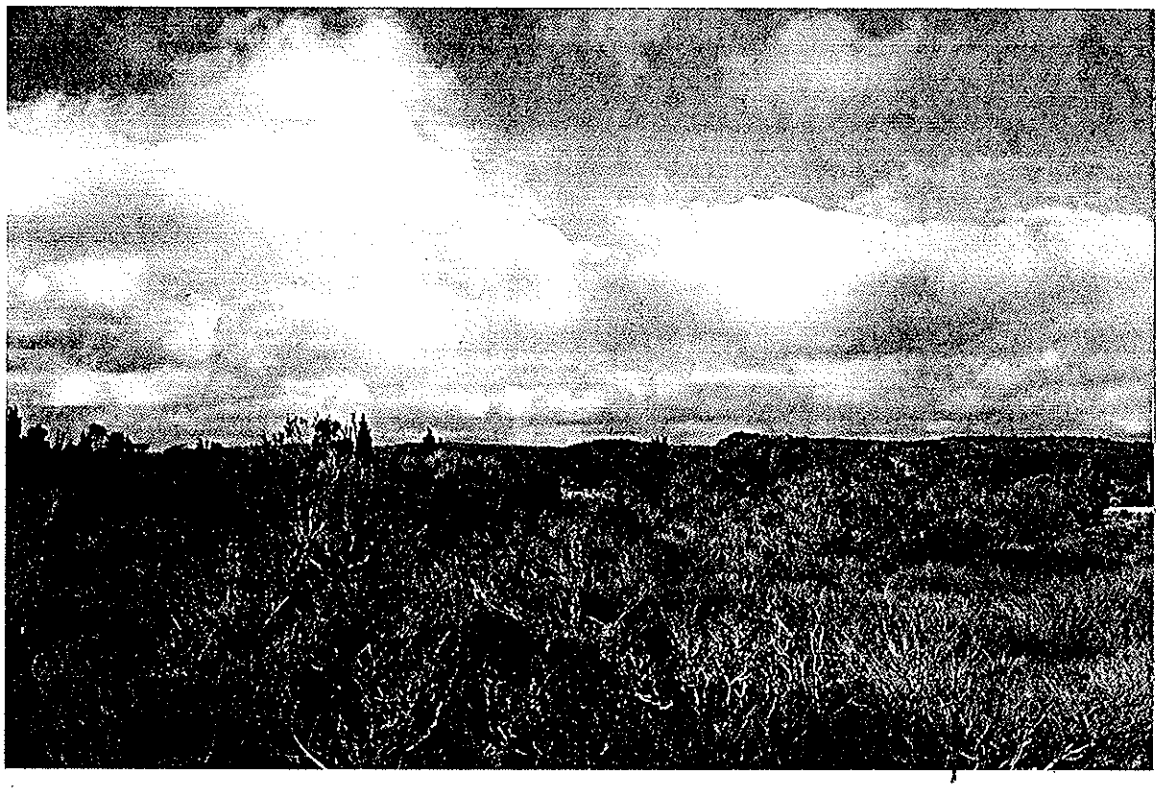
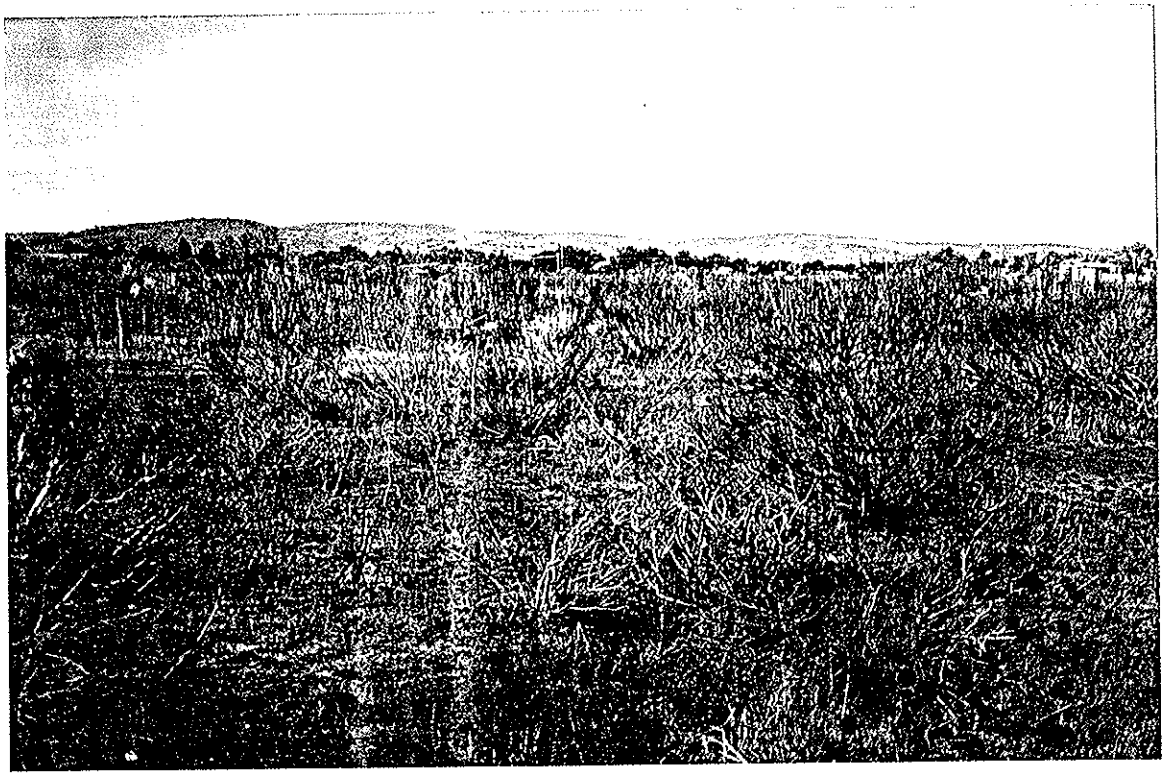


Photo 3 (above): *Melaleuca* Shrubland, Site 2.

Photo 4 (below): Mixed Heaths surrounding areas of Sedgelands and Herblands. The Verticordia Heath is found on the interface between Heaths and Sedgelands/Herblands. Sites 3, 4, 5 & 6.

Photo 5 (above)**:** The cleared area of Lot 139, regeneration is visible along the mound of cleared vegetation.

Photo 6 (below): Area 4 burnt in a summer fire. Regeneration is progressing well from seeds and bulbs, rhizomes etc.

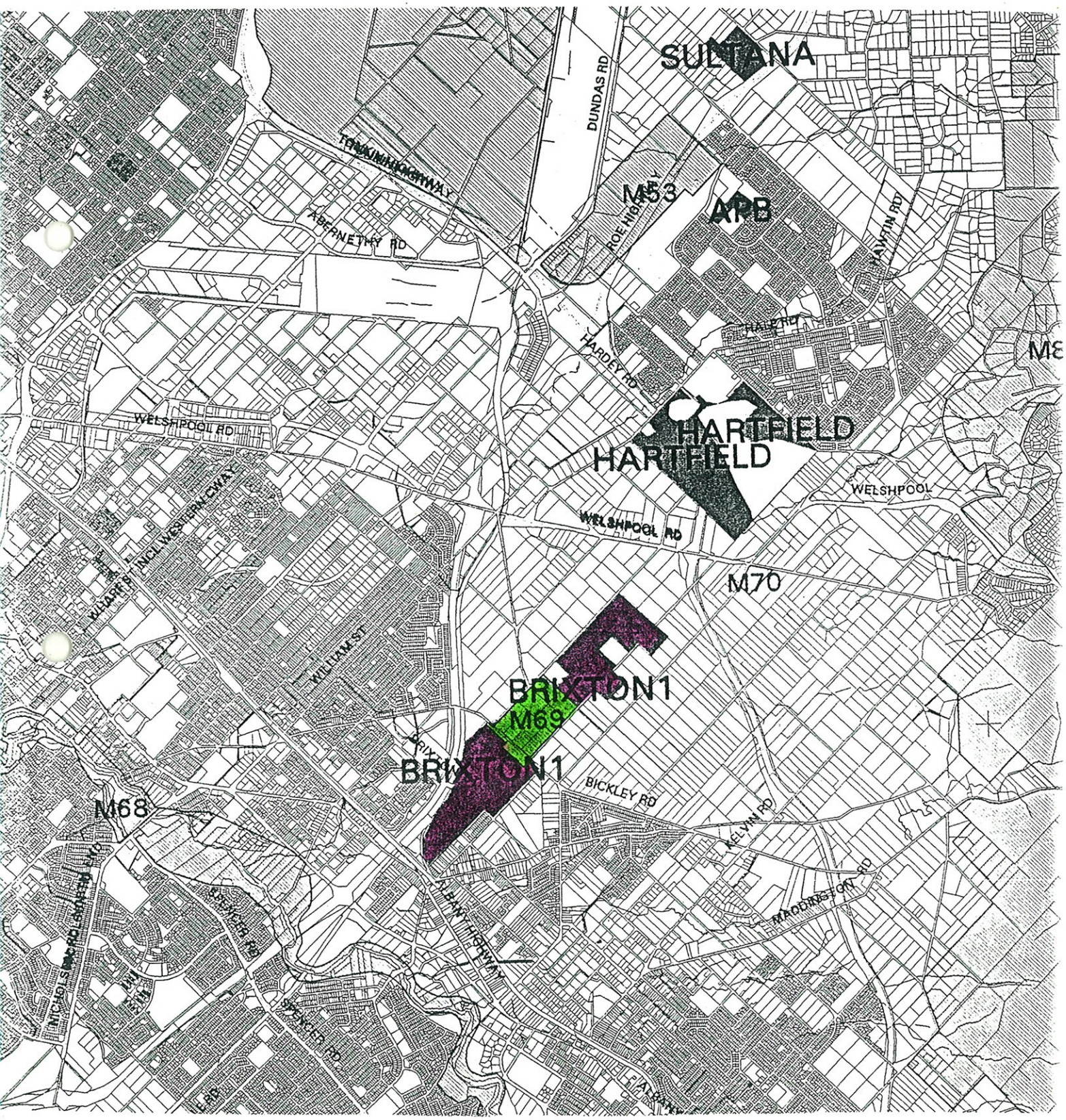


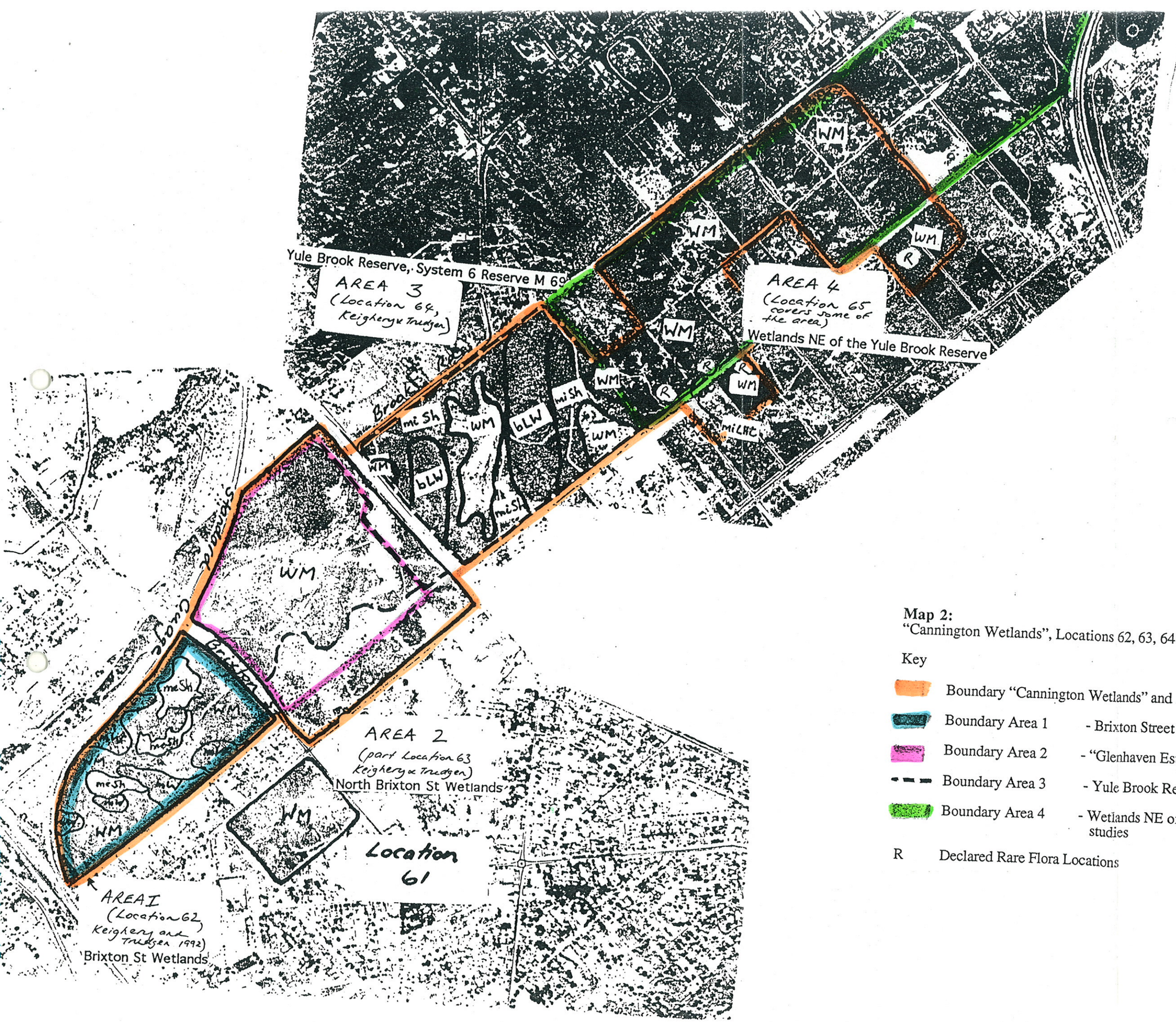
Map 1:
Boundaries of Interim Protected Areas

Key

Interim Protected Area

System 6 Area



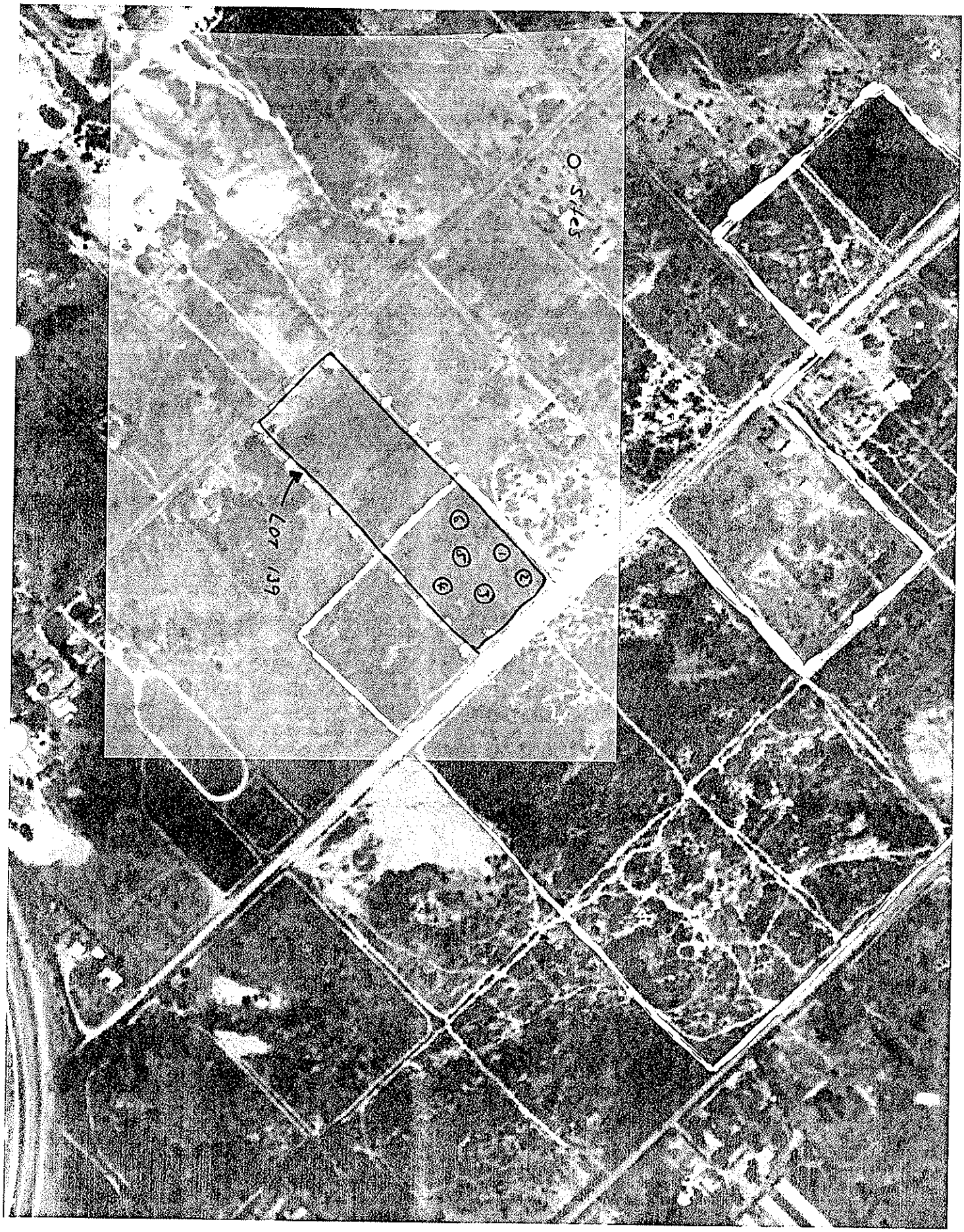


Map 2:
"Cannington Wetlands", Locations 62, 63, 64 and 65 (Keighery and Trudgen 1992)

Key

- Boundary "Cannington Wetlands" and Interim Protected Area
- Boundary Area 1 - Brixton Street Wetlands
- Boundary Area 2 - "Glenhaven Estate"
- Boundary Area 3 - Yule Brook Reserve
- Boundary Area 4 - Wetlands NE of the Yule Brook Reserve, area of the planning studies
- R Declared Rare Flora Locations

Map 3:
Lot 139 and adjacent area of the Cannington Wetlands. Metropolitan Street Directory, Run 13, Photo 5179, 1: 5000 (X4 enlargement 1: 20000), 4/1/1991.



Appendix 1:

Location Descriptions for the Cannington Wetlands from Keighery, B.J. and Trudgen, M.E. (1992) "The Remnant Vegetation of the Eastern Side of the Swan Coastal Plain." Unpublished report to the Department of Conservation of Land Management for the National Estate Grants Programme.

Location 62 - Brixton St Wetlands. Location Map 9. Vegetation Map Area 17, p96. Reference: Keighery and Keighery, 1990.
Veg: m W, me Sh, WM (v HSh, mi Ht, H, S) **Cond: Very Good**
GENNERAL COMMENTS
This Location is characterised by heavy clay soils associated with ironstone and loamy rises. The deep depressions or ponds that occur in the heavy clay soils characterised by *Melaleuca lateritia* Shrubland over Grassland, Sedgelands or Herblands depending on the time of the year, the shallow depressions by Mixed Open Heath and the flats by Viminaria High Shrubland, Mixed Heaths, Herblands and Sedgelands. Marri Woodland is characteristic of the rises.
The vegetation is generally in Very Good Condition with severe localised disturbance associated with the tracks and rubbish dumping. **Parentucellia viscosa*, **Romulea rosea* and **Sparaxis bulbifera* are is a significant weeds of the clayey soils and **Ehrharta calycina* and **Eragrostis curvula* are common on the margins of the Location and along the tracks.

Descriptions

Loamy Rises

m W — Marri Woodland over *Viminaria juncea* Open Shrubland over *Hibbertia hypericoides*, *Nemcia capitatum* and *Xanthorrhoea preissii* Low Shrubland over *Xanthosia huegelii*, *Anigozanthos manglesii* and *Dampiera linearis* Herbland and *Tetraria octandra*, *Lepidosperma angustatum* and *Cyathochaeta avenacea* Sedgeland.

Clay Flats

v Sh — *Viminaria juncea* High Shrubland over *Hypocalymma angustifolium*, *Verticordia serrata*, *Allocasuarina humilis* and *Xanthorrhoea brunonis* Low Open Heath over *Mesomelaena tetragona* and *Leptocarpus coangustatus* Sedgeland.

mi Ht — *Astartea fascicularis* and *Pericalymma ellipticum* Open Heath over *Goodenia filiformis* var. *filiformis* and *Stylidium roseo-alatum* Herbland and *Leptocarpus canus* Sedgeland.

Deep Depressions, ponds.

me Sh — *Melaleuca lateritia* Shrubland over *Pimelea imbricata* var. *gracillima* Low Shrubland over *Aponogeton hexatepalus*, *Hydrocotyle lemnoides* and *Wurmbea dioica* ssp nov Herbland and *Leptocarpus coangustatus* Open Sedgeland.

H — *Aponogeton hexatepalus* and *Wurmbea dioica* ssp nov Herbland

This association occurs in the flooded ponds in winter and is replaced by ***Amphibromus neesii*** Grassland in the spring.

Shallow Depressions

mi Ht — *Kunzea recurva* Open Heath with scattered *Viminaria juncea* over *Xanthorrhoea brunonis*, *Grevillea bipinnatifida* and *Daviesia physodes* Low Open Heath over *Conostylis festucacea*, *Borya scirpoidea* and *Scaevola lanceolata* Herbland and *Amphipogon turbinatus* and *Cyathochaeta clandestina* Open Sedgeland.

Species of interest are:
Shrubs: 4#*Acanthocarpus canaliculatus*, 4#*Grevillea bipinnatifida*, 4#*Hakea auriculata*, 4#*Hakea erinacea*, 6#*Petrophile media* var *juncifolia*, 3#*Daviesia physodes*, 4#*Jacksonia alata*, 4#*Melaleuca lateritia*, 4#*Verticordia acerosa*, 4#*Conospermum huegelii*, 4#*Synaphea acutiloba*, 4#*Gompholobium marginatum*, 4#*Gompholobium aristatum*, 4#*Calytrix aurea*, 4#*Andersonia aristata*, 4#*Vertcordia huegelii* var. *huegellli*
Herbs DRF, 6#*Aponogeton hexatepalus*, 6#*Hydatella dioica*, 4#*Agrostocrinum scabrum*, 5#*Tricoryne humilis*, 4#*Anigozanthos bicolor*, 6#*Tribonanthes* sp, 4#*Patersonia juncea*, 5#*Drosera heterophylla*, 3, 6#*Erynium 'subdecumbens'*, DRF, 6#*Hydrocotyle lemnoides*, 3, 5#*Villarsia submersa*, 6#*Hyalospermum pyrethrum*, 6#*Trichocline* sp4, 4#*Scaevola lanceolata*,5#*Conostylis festucacea*, 5#*Burchardia bairdii*, 4#*Stylidium ecorne*, 4#*Stylidium dichotomum*, 4#Stylidium *canaliculatum*,, 4#*Stylidium divaricatum*, 6#*Calandrinia composita*, 4#*Philydrella drummondii*, 4#*Tribonanthes brachypetala*, 3, 6#*Stylidium utricularioides*, 6#*Eryngium pinnatifida* ssp. *'palustris'* and 5#*Prasophyllum drummondii*.
Sedges 6#*Schoenus capillifolius*, 3, 5#*Schoenus andrewsii*

Location 63 - North Brixton St Wetlands. Location Map 9. Vegetation Map Area 17, p96. Reference: Gobble Garrat, E.M. 1991 Report on the Biological Survey of Lots 48 and Pt 35 Brixton St, Kenwick. Prepared for Hames and Sharley, 1991. This reference is not in the main reference list as it was not available until the mid January, 1992.

Veg: mi LSh/Sh, WM (H, S, mi LHt, v HSh, me HSh, sm LSh) Cond: Very Good to Very Poor

GENERAL COMMENTS
The vegetation associations at this Location, Mixed Low Open Heath, Low Shrubland to Shrubland, *Viminaria juncea* High Shrubland, *Melaleuca* High Shrubland, Samphire Low Shrubland, Herblands and Sedgelands are influenced by significant intrusions of sand over clay. There are no apparent occurrences of ironstone as found at Location 62 and Location 65.

The condition of the vegetation is variable. The western two thirds of the Location is in Good Condition with patches in Very Good Condition and the western third is Very Poor to Poor. There is severe localised disturbance associated with the tracks. Common weeds on the western side are annual grasses, **Ixia maculata* and **Homeria flaccida*. The eastern side is heavily invaded by **Ehrharta calycina* on the sandier soils to the north and **Stenotaphrum secundatum* and **Cynodon dactylon* on the heavier soils to the south.

Sandy rises over clay

mi LSh/Sh ***Melaleuca* species, *Acacia* species and *Verticordia acerosa* Low Shrubland with scattered *Viminaria juncea* over Sedgeland.**

or

***Eremaea pauciflora* Shrubland over mixed Low Shrubland over *Mesomelaena tetragona* and *Lyginia barbata* Sedgeland.**

Clayey Flats

mi LHt ***Hypocalymma angustifolium* and *Verticordia* species Low Open Heath with scattered *Melaleuca viminea*, *Viminaria juncea* and *Actinostrobus pyrimidalis* over Herbland and Sedgeland.**

v HSh ***Viminaria juncea* High Shrubland over mixed Low Open Heath over *Mesomelaena tetragona* Sedgeland**

me Sh ***Melaleuca raphiophylla, M.lateritia*** **and** ***M. bracteosa*** **Shrubland over exotic Grassland and Herbland.**

S, H **Herbland and** ***Leptocarpus*** **species Sedgeland.**

sm LSh ***Halosarcia halocnemoides*** **(Samphire) Low Shrubland.**

p LHt ***Pericalymma ellipticum*** **Low Open Heath over Herbland and** ***Mesomelaena*** **and** ***Restio tremulus*** **Sedgeland.**

Species of interest are:
Shrubs: 4#*Grevillea bipinnatifida*, 6#*Banksia telmatiaea*, 6#*Petrophile media* ?var *juncifolia*, 4#*Petrophile seminuda*, 5#*Calothamnus hirsutus*, 4#*Verticordia acerosa*, 3, 6#*Grevillea thelemanniana* ssp. *thelemanniana*, 3#*Daviesia physodes*, 4#*Jacksonia alata*, 4#*Melaleuca lateritia*,.4#*Verticordia huegelii*, 4#*Calytrix aurea*, 3#*Gonocarpus pythoides*.
Herbs: 6#*Hydatella dioica*, 4#*Anigozanthos bicolor*,4#*Scaevola lanceolata*,5#*Conostylis festucacea*, 4#*Stylidium dichotomum*, 5#*Isotoma scapigera*, 6#*Eryngium pinnatifida* ssp. *'palustris'* and 5#*Prasophyllum drummondii*.
Sedges: 5#*Restio tremulus*, 4#*Mesomelaena tetragona*.

Location 64 - Yule Brook Reserve, System 6 Reserve M 69. Location Map 9. Vegetation Map Area 17, p97.
Reference: Speck and Baird, 1984.

Veg: b LW, mi Sh/Ht, WM (H, S and me Ht, v HSh, ac HSh, p Sh, sm LSh, me HSh) **Cond: Very Good to Poor.**

GENERAL COMMENTS
At this Location there are considerable areas of sand and no evidence of ironstone. The sand forms several ridges with intervening clayey areas. Low sandy mounds are scattered throughout the clayey areas. The characteristic vegetation of the ridges is *Banksia* Low Woodland with Mixed Shrubland on the slopes and Sedgelands, Herblands, mixed Shrublands/Heaths *Melaleuca* High Shrubland and *Actinostrobus* High Shrubland on the flats.

The condition of the vegetation is Very Good with some severe weed invasion on the margins. areas along the southern boundary are severely invaded by **Ehrharta calycina*, with some **Watsonia* along Brook Rd and perennial and annual grasses along Boundary Rd just below the sandy ridge in the Mixed Shrubland.

Descriptions

Sandy Rises

b LW ***Banksia attenuata*** **and** ***Banksia menziesii*** **Low Woodland over Low Shrubland over Herbland.**

mi Sh/Ht ***Eremaea pauciflora*** **and** ***Allocasuarina humilis*** **Shrubland to Open Heath**
in patches on the ridge and on the upperslopes of the ridge and
Pericalymma ellipticum, Banksia telmatiaea, Hypocalymma angustifolium **and** ***Daviesia physodes*** **Shrubland to Open Heath**
on the lower slopes of the ridges.

Sandy Clay Flats

- shallow depressions
H, S **Herbland and** ***Leptocarpus aristatus*** **Sedgeland**

sm Sh ***Halosarcia halocemoides*** **Low Shrubland**

- low sandy rises
p Sh ***Pericalymma ellipticum*** **Shrubland over Herbland and** ***Restio tremulus*** **Sedgeland**

- sandy mounds and low sandy rises
mi LHt ***Melaleuca bracteosa, Hakea varia, Banksia telmatiaea*** **and** ***Verticordia*** **species Low Open Heath**

ac HSh ***Actinostrobus pyramidalis*** **High Shrubland over** ***Hypocalymma angustifolium, Pericalymma ellipticum, Melaleuca lateritia, Kunzea micrantha*** **and** ***Verticordia*** **species Shrubland over Herbland.**

me HSh ***Melaleuca rhaphiophylla, M.uncinata, M.viminea*** **and** ***M.cuticularis*** **High Shrubland.**

Species of interest are:
Shrubs: 6#*Banksia telmatiaea*, 5#*Calothamnus hirsutus*, 4#*Verticordia acerosa*, 3, 6#*Grevillea thelemanniana* ssp. *thelemanniana*, 3#*Daviesia physodes*, 4#*Andersonia aristata*, 4#*Melaleuca lateritia*, 5#*Melaleuca uncinata.*

Herbs: 5#*Byblis gigantea*, 4#*Agrostocrinum scabrum*, 4#*Anigozanthos bicolor*, 4#*Patersonia juncea*, 5#*Drosera heterophylla*, 4#*Scaevola lanceolata*,5#*Conostylis festucacea*, 5#*Burchardia bairdii*, 4#*Stylidium ecorne*, 4#*Stylidium dichotomum*, 4#*Stylidium divaricatum*, 4#*Stylidium canaliculatum*, 5#*Isotoma scapigera*, 4#*Tribonanthes brachypetala*, 6#*Eryngium pinnatifida* ssp. '*palustris*' and 5#*Prasophyllum drummondii.*

Sedges: 5#*Restio tremulus*, 3, 5#*Schoenus andrewsii*

Location 65: Wetlands NE of the Yule Brook Reserve between Brook and Boundary Rds, Kenwick. Location Map 9. Vegetation Map Area 17, p97.
Veg: WM (S, H, mi Sh, mi Ht, me Sh, sm LSh, me/ac Sc)
Cond: Very Good, Good and Poor with severe localised disturbance.
GENERAL COMMENTS
This Location has a mixture of sandy clays and clays and loamy soils. Although no ironstone was observed in undisturbed areas a section eroded road showed exposed underlying ironstone. Each of the vegetation association subject to site descriptions are not mapped as each association is too small in area. The vegetation is very much affected by drainage. Sites are described from the sandy mounds, well drained flats and poorly drained flats. These terms are relative as the whole Location is poorly drained.
A notable absence from this Location are
- Marri Woodlands and *Banksia* Woodlands on loamy or sandy rises.
- deep claypans. This may be natural but the drainage of this Location may have cause this, the drainage lines described below to the south of the Location may have been connected artificially.

This Location is in varying condition ranging from Completely Degraded to Very Good Condition due to drainage, grazing (rabbits), frequent fires, weed invasion, off-road vehicle activities, vehicle dumping and rubbish dumping. The Location is a mosaic of vegetation associations overlain with a secondary mosaic of disturbance. Most of the Location, except for isolated areas is in Good to Poor Condition and should regenerate if the disturbance factors are reduced. Although there are pockets of vegetation in Good Condition in the areas outside this delineated location these are predominantly in Poor to Very Poor Condition.

Sandy Mounds

GENERAL COMMENTS

The condition of the rises varies from those in Very Good Condition to those in Poor Condition. Weeds found on the rises are **Romulea rosea*, **Sparaxis bulbifera*, **Homeria flaccida*, **Gladiolus angustus*, **Trifolium campestre*, **Lolium*, **Ehrharta longiflora*, **Arctotheca calendula*, **Hypochaeris glabra*, *Watsonia* sp and **Ursinia anthemoides.*

Site a

mi Ht **Scattered *Viminaria juncea* and *Actinostrobus pyramidalis* over Mixed Closed Heath over Low Shrubland over Open Sedgeland**

Shrubs: *Viminaria juncea*, *Actinostrobus pyramidalis*, *Hypocalymma angustifolium*, *Acacia lasiocarpa*, *Kunzea recurva*, 5#*Banksia telmatiaea*, *Hakea varia*, 4#*Calothamnus hirsutus*, 4#*Verticordia acerosa*, 3,6#*Grevillea thelemanniana* ssp *thelemaniana*, 3#*Daviesia physodes*, 4#*Jacksonia restioides*, *Acacia stenoptera*, 4#*Andersonia aristata*

Other species common in this association: 4#*Melaleuca lateritia*, *Melaleuca viminea* , *Melaleuca hamulosa*, 5#*Melaleuca bracteosa*, *Melaleuca rhaphiophylla*

Herbs: 4#*Scaevola lanceolata*, *Thysanotus manglesianus*

Adjacent: 5#*Conostylis festucacea*

Other species common in this association: *Drosera glanduligera*, *Brachycome iberidifolia*

Sedges: 5#*Restio tremulus*, *Leptocarpus aristatus*, *Gahnia trifida*

Other species common in this association: *Leptocarpus canus*, *Leptocarpus coangustatus*, *Loxocarya pubescens*

CONDITION

Rating Very Good

Comments:

Aerial Photo: Run

Soil: grey clayey sand over clay

Drainage: moderate

Aspect: NA

Site b

me/ac Sc ***Melaleuca viminea*** **,and *Actinostrobus pyramidalis* Closed Scrub over Open Herbland and Open Sedgeland**

Shrubs: *Melaleuca viminea* , *Actinostrobus pyramidalis*, *Melaleuca hamulosa*, *Hypocalymma angustifolium*

Other species common in this association: 4#*Petrophile seminuda*, *Dodonaea aptera*

Grasses: **Briza maxima*, **Briza minor*, **Pentaschistis airoides*

Herbs: *Goodenia filiformis*, *Opercularia vaginata*, 5#*Pogonolepis stricta*, *Mitrasacme paradoxa*, *Cotula coronopifolia*

Sedges: *Juncus acutus*, *Juncus holoshoenus*, *Aphelia cyperoides*, *Isolepis cernua* *Isolepis oldfieldiana*

CONDITION

Rating Very Good

Comments:

Aerial Photo: Run

Soil: grey clayey sand over clay

Drainage: moderate

Aspect: NA

Flats

1) Shallow sandy soil over clay

H, S **Herblands and Segelands**

The Herblands are variable in their species composition and tend to contain a few species in large numbers. These species are predominantly annual and geophytic herbs and sedges. The Sedgelands contain fewer species. The two associations merge over small areas.

The commonly occurring species in these associations are listed below. These areas may be affected by salt. The following descriptions relate observations in the general area indicated

as sites c and d but are related to a series of smaller areas in this general area rather than a specific 10m by 10m area as these communities are smaller than this.

Site c
Fresh
Herbs: *Anigozanthos viridus*, 5#*Burchardia bairdii*, *Brachycome iberidifolia*, *Polypompholyx multifida*, *Drosera menziesii* 'swamp', *Stylidium ecorne*, 4#*Stylidium dichotomum*, 4#*Stylidium divaricatum Tribonanthes australis*, *Drosera glanduligera*
Other species common in this association: 5#*Stylidium guttatum*, 6#*Stylidium utricularioides*, *Stylidium ecorne*, *Bulbine semibarbata*, *Helipterum ?demisium*, *Wurmbea* species, 6#*Calandrinia composita*, *Apium annum*
Sedges: *Leptocarpus aristatus*, *Leptocarpus canus*, *Leptocarpus coangustatus*, *Triglochin procera*, *Triglochin minutissima*, *Centrolepis aristata*, *Aphelia cyperoides*, 5#*Schoenus andrewsii*, *Centrolepis aristata*, *Centrolepis polygyna*, *Schoenus humilis*
Grasses: miscellaneous exotic species

Site d
Salt effected
Herbs: *Halosarcia* sp, *Samolus juncea*, 5#*Isotoma scapigera*, *Apium annuum*, *Wilsonia backhousei*, *Tribonanthes australis*, *?Calocephalus angianthoides*,5#*Pogonolepis stricta*
Other species common in this association: *Wilsonia humilis*, 4#*Schoenolaena juncea*
Sedges: *Leptocarpus aristatus*, *Baumea* sp, *Schoenus rigens*, *Juncus bufonis*
Grasses: miscellaneous exotic species

2)Heavy ?shallow soils on clay flats
Site e
mi LHt ***Verticordia* Low Open Heath over Herbland over Open Sedgeland**
Shrubs: 4#*Verticordia acerosa*, 4#*Verticordia plumosa*, *Verticordia densiflora*, 6#*Calytrix breviseta* ssp *breviseta* , *Hypocalymma angustifolium*, *Boronia crenulata*, *Astroloma glaucescens*
Grasses: 4#*Neurachne alopecuroidea*, **Pentaschistis airoides*, **Briza maxima*
Herbs: 4#*Stylidium dichotomum*, 4#*Stylidium divaricatum*, *Borya scirpoidea*, 4#*Philydrella drummondii*, *Goodenia filiformis*, *Burchardia multiflora*, *Stylidium bulbiferum*, *Drosera heterophylla*, *Drosera menziesii'* swamp', *Cotula coronopifolia*, **Parentucellia viscosa*, *Thelymitra sp*, *Diuris carinata*, *Caladenia paludosa*, 4#*Tribonanthes brachypetala*, *Tribonanthes australis*, *Polypompholyx multifida*, **Romulea rosea*, *Thysanotus manglesianus*, *Brachycome iberidifolia*
Other species common in this association:6#*Stylidium utricularioides*, *Stylidium roseo-alatum*
Sedges: *Leptocarpus canus*, 5#*Schoenus andrewsii*, *Centroplepis aristata*, *Centrolepis polygyna*, *Triglochin minutissima*, *Schoenus?humilis*
CONDITION
Rating **Very Good to Good**
Comments: A roadside area but apparently little disturbed.
Aerial Photo: Run 13 5179
Soil: brown grey clay over clay
Drainage: poor
Aspect: flat

3) Wet depression on flat
Site f
me Ht ***Melaleuca uncinata* Open to Closed Heath over *Velleia trinervis* and *Eryngium pinnatifida* ssp. 'palustris' Open Herbland and *Baumea rubiginosa* and *Leptocarpus coangustatus* Open Sedgeland**

Shrubs: 4#*Melaleuca uncinata*, *Melaleuca rhaphiophylla*, *Viminaria juncea*, *Actinostrobus pyramidalis*, *Acacia lasiocarpa*
Adjacent: *Hypocalymma angustifolium*, *Astartea fascicularis*, *Verticordia densiflora*, *Melaleuca pauciflora*, 3,6#*Grevillea thelemanniana* ssp *thelemanniana*
Grasses: **Briza maxima*, **Briza minor*, *Poaceae sps
Herbs: *Velleia trinervis*, 3,6#*Eryngium pinnatifida* ssp 'palustris', *Brachycome iberidifolia*, 5#*Prasophyllum drummondii*, *Hydrocotyle diantha*, *Siloxerus humifusus*, *Cassytha racemosa*
On slight rises adjacent to the Site: *Patersonia occidentalis*, 5#*Conostylis festucacea*, *Laxmannia ramosa*, 4#*Stylidium canaliculatum*
Sedges: *Baumea rubiginosa*, *Leptocarpus coangustatus*, *Leptocarpus canus*, *Lepidosperma* sp, ?*Arthroschoenus*, *Hydrocotyle* sp
Adjacent: *Schoenus nanus*
CONDITION
Rating **Very Good to Good**
Comments:
Aerial Photo: Run 13 5179
Soil: brown grey loam over clay
Drainage: poor
Aspect: flat

Appendix 8:
Kelly, A., Taylor A., Langley, M.A., Spooner, A. and Coates, D.J.. (1993) "Declared Rare Flora and Other Plants in Need of Special Protection in the Metropolitan Region". Wildlife Management Programme 10. Department of Conservation and Land Management, WA

The entry in Kelly et al. for *Calytrix breviseta* subsp. *breviseta* , the Rare Flora Report Form and the letter to owner Lot 139 (9/11/92) are attached.

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT
RARE FLORA REPORT FORM

Matrix breviseta ssp. breviseta — POPULATION No.: 3

Taxon/Locality: — File No. District:

Proposed DRF ☐ Priority Species No. ☐ Geog. Restr. ☐

Population ☑ Routine Inspection ☑ Re-survey ☐ Opportunistic Survey ☐

Reporter: Anne Kelly — TITLE: Consultant Botanist — SURVEY DATE: 23-10-92

Location: Swan — DISTRICT: Perth — SHIRE: City of Gosnells.

District Site Ref.: — MAP REF.: StreetSmart Directory 1990 Map 86 A6

LAND STATUS:

Nature Res.	☐	Water Res.	☐	Gravel Res. MRD	☐	Gravel Res. Shire	☐
National Park	☐	Railway Res.	☐	Rd. Verge MRD	☐	Rd. Verge Shire	☐
State Forest	☐	Private	☑	VCL	☐	Shire Reserve	☐
Other	☐	State:					

LOCALITY: In centre of block between Boundary and Brentwood Roads. Block commences 1.5 km north of Bickley Road on Boundary + Brentwood Roads.

LATITUDE: — LONGITUDE: — ALTITUDE: — ASPECT:

LANDFORM:

Hilltop	☐	Flat	☑	Drainageline	☐	Swamp	☐	Ridge	☐
Outcrop	☐	Breakaway	☐	Slope	☐	Gully	☐	Valley	☐
Riverbank	☐	Lake Edge	☐	Low Plain	☐	Sand Dune	☐	Cliff	☐
Firebreak	☐	Other: ? possibly wet in winter							

ROCK TYPE:	Laterite	☐	Granite	☐	Dolerite	☐	Limestone	☐	Other:
ROCK FORM:	Sheet	☐	Boulder	☐	Fluviatile Gravel	☐	Concretionary gravel	☐	
SOIL TYPE:	Sand	☑	Loam	☐	Clay	☐	Peat	☐	Gravel ☐
SOIL COLOUR:	Red	☐	Brown	☑	Yellow	☐	White	☐	Grey ☑
SOIL CONDITION:	Perm. wet	☐	Moist	☐	Dry	☑	Saline	☐	Other:

VEGETATION CLASSIFICATION (Muir's): Low Heath C/D.

ASSOCIATED SPECIES: Verticordia acerosa, V. plumosa, Acacia sp. Leptocarpus sp., Hypocalymma angustifolium, Grevillea thelemanniana ssp. thelemanniana

NO. OF PLANTS:
Estimated ☑ Actual ☐ Mature: 100+ Seedlings: Dead: Area Occupied:

REPRODUCTIVE STATE: in bud ☐ flower(late) ☑ immature fruit ☐ dehisced ☐ vegetative ☐

POLLINATORS: Native bees ☐ honey bees ☐ mammals ☐ birds ☐ insects ☐

Other observations:

CONDITIONS OF POPULATION: Recently burnt ☐ diseased ☐ disturbed ☐ undisturbed ☐
Other ☐ State: Average. Area of population quite degraded. Plants themselves appear to be in good condition.

POTENTIAL THREATS: Firebreaks ☐ mining ☐ recreational activities ☐ 'disease' ☐ weeds ☑
grazing ☐ clearing ☑ prescribed burning ☐ Other ☐ State

FIRE HISTORY: Not known ☑ Burnt in 19 Summer ☐ Autumn ☐ Winter ☐ Spring ☐
Next control burn: Year: Month:

VOUCHER SPECIMEN: Retained ☐ W.A. Herb. ☐ Other ☐ State:
ATTACHED: Map ☑ Mudmap ☐ Illustration ☐ Photo ☐ Field Notes ☐

ACTION: Taken:
Required: by District ☐ S.O.H.Q. ☑ State: Determine ownership and advise accordingly.

FENCING REQUIREMENT:
ROADSIDE MARKERS: n/a
OTHER COMMENTS: Block is up for sale (4ha). Peet, Gosnells. ph 398 6055

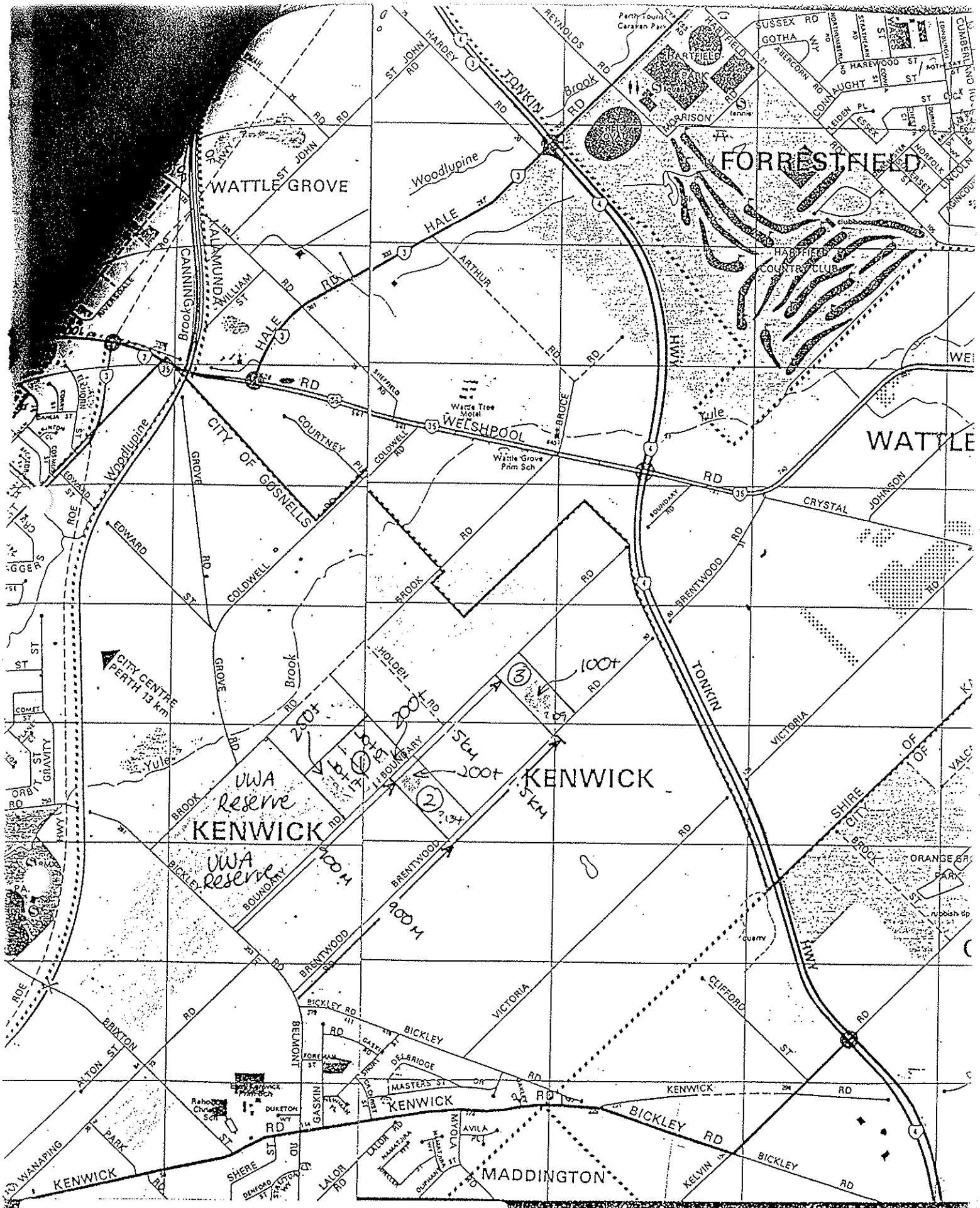
COPY SENT TO: Regional Office ☐ District Office ☐ Other ☐ State:
SOHQ TO SEND COPY TO: Regional Office ☑ District Office ☑ Other ☐ State: More accurate sketch of the site is required next flowering season.

Signed: Kelly Date: 29/10/92

NOTE: More than one box, in any section, may be ticked.

EFC

RECORDS: PLEASE FORWARD TO ADMINISTRATIVE OFFICER, FLORA, WILDLIFE ADMINISTRATION



Calytrix breviseta ssp. breviseta population.

Areas surveyed - Kenwick area.

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

HEAD OFFICE
HACKETT DRIVE CRAWLEY
WESTERN AUSTRALIA
Phone (09) 3868811
Telex AA94585
Facsimile (09) 3861578

STATE OPERATIONS HEADQUARTERS
50 HAYMAN ROAD COMO
WESTERN AUSTRALIA
Phone (09) 367 0333
Telex AA 94616
Facsimile (09) 367 0466

Please address all correspondence to Executive Director, P.O. Box 104, COMO W.A. 6152

Your Ref:
Our Ref: 028944F3702
Enquiries: Mr D Stefoni
Phone: 367 0442

Dear Sir

DECLARED RARE FLORA - *Calytrix breviseta* subsp. *breviseta*

I wish to advise that a population of the above species of rare Western Australian flora is located on your property Lot 139, Boundary Road, Kenwick.

A description of the rare flora and a map showing its approximate location are enclosed for your information. Should you require assistance to identify the plants, my Officer at Perth (405 1222) will be able to arrange a joint onsite inspection.

Western Australia's flora is world-renowned for its richness and uniqueness, and constitutes a significant part of our State's natural heritage. Some 10,000 plant species are known from Western Australia, the majority of which are unique to this State. Many of these species are also either rare or threatened with becoming extinct, as a consequence of the great floral diversity and past land uses. Management of these rare flora populations is thus required to preserve this important part of our heritage.

The Wildlife Conservation Act sets out requirements for the protection of rare flora. Essentially the requirements provide that rare flora shall not be taken by any person without the consent of the Minister for the Environment. An extract from the Act is attached.

I would be grateful if you would arrange your operations, so that the area of rare flora is not disturbed. If you wish to discuss the management of this population of rare flora, or should you find the presence of the flora on your property causes you to be disadvantaged, I would be pleased if you would contact my Administrative Officer, Flora (09 367 0422).

The location of rare flora populations are kept confidential to assist in their conservation and to protect your privacy. I would therefore appreciate you maintaining this confidentiality unless a disclosure assists in preserving the population, such as when a contractor is operating nearby.

If you sell your property, I would appreciate you advising my Administrative Officer, Flora so that the new owner/s can be advised of the rare flora accordingly.

This Department is endeavouring to protect our State's rare flora, and your assistance to help conserve this population would be appreciated.

Yours faithfully

.....
Syd Shea
EXECUTIVE DIRECTOR

9 November, 1992
enc

cc Peet & Company Ltd
6 Fremantle Road
GOSNELLS
cc D.M. Perth

Appendix 9:
Gibson, N., Keighery, B.J., Keighery, G.J., Burbidge, A. and Lyons, M. (1994) A Floristic survey of the southern Swan Caostal Plain. Unpublished report for the Australian Heritage Commission prepared by department of CALM and the Conservation Council of WA (Inc).

The recommendations of Gibson et al. and descriptions of the floristic community types (7, 8 & 10a) found on the seasonally inundated wetlands on the eastern side of the Plain are attached.

The next four community types are typical clay pan, clay flat and ironstone communities (seasonal wetlands) of the heavy soil of the eastern side of the plain and the heavy soils near the Peel - Harvey estuary. Keighery and Trudgen (1992) describe these communities as a mosaic of structural types. Sites of community type 7 are generally dominated by either *Melaleuca viminea, M. uncinata, M. cuticularis* or *Casuarina obesa* or a mixture of these species. This community occurs on heavy clay soils that are generally inundated from winter into mid summer. Species composition (*Melaleuca cuticularis,* and *Casuarina obesa*) may indicate some saline influence for at least some part of the year.

High frequencies of species in species group J defines community types 7 to 10. Differences between these groups is primarily on proportions of the species shown in Table 12, and in occurrence of a series of less frequent species restricted to each of these four types.

In community type 7, for example, such species as *Brachycome bellidioides, Schoenus* sp 2, *Centrolepis polygyna, Pogonolepis strigosa* and *Cotula coronopifolia* (species group J) are more typical of this community. In addition species such as *Angianthus* aff. *drummondii, Eryngium pinnatifidum* subsp. *palustre* Ms, and *Blennospora* aff. *drummondii* occur in this community in low frequency (<50%) and are absent from community types 8 to 10.

These four clay pan, clay flat and ironstone communities are the most species rich seasonal wetlands (35.5 - type 9 to 53.7 - type 10b), with type 7 having an average of 46.4 species. Much of the species richness in all four communities types comes from geophytes and an annual flora that germinates, grows and flowers sequentially as these areas dry over summer. While the massive sheet ironstone finds surface expression in community type 10b, ironstone is known to occur at varying depth in the other three communities in this group.

In early spring many of the sites in community type 7 are covered by free water up to 30 cm deep. *Cotula coronopifolia* formed yellow floating mats in some pools while others were dominated by *Villarsia submersa*. Aquatic species are common in this community type early in the growing season. As the wetland dries a succession of species such as *Centrolepis* spp. and annual *Stylidium* spp. successively germinate grow and flower, resulting in an extended flowering period of over three months. It is likely that some of these communities would have occurred in the totally altered *Casuarina obesa* woodland south of Serpentine (Keighery and Trudgen 1992). The understorey of these stands have been completely converted to improved pasture. Some sites within community type 7 have significant variation in species composition and it may be that other related communities have been lost due to agricultural development.

Weed frequencies tend to be high in these four communities but given the high species richness the percentage of weeds is low to moderate. Average vegetation condition similarly ranges from 2.1 to 2.7.

Community type 8 are the clay pan communities which can be dominated by *Viminaria juncea, Melaleuca viminea, M. lateritia* or *M. uncinata* but also occasionally by *Eucalyptus wandoo*. They differ in proportions of species from species group E, and occurrence of such species as *Hypocalymma angustifolium, Acacia lasiocarpa* var. *bracteolata* (Long peduncle form), and *Verticordia huegelii* at moderate frequencies (Table 12). Aquatic annuals are again common but pools probably are not inundated to the same depth or for the same length of time as those above. Species richness averages 52 species / plot with weed frequencies of 11 / plot (almost entirely annuals or geophytes). This community had the highest disturbance score of the heavy soil wetland communities (2.7). This community type is distributed from Ellen Brook to Waterloo on small remnants of less than 20 ha (Appendix 1).

Average species richness in community type 9 fell dramatically to 35.5 (significantly lower than other heavy soil wetland communities) (Table 13). This community represents shrublands or open woodlands of clay flats that are inundated for long periods. Sedges are more apparent in this community (moderate frequencies of *Chorizandra enodis, Cyathochaeta avenacea, Lepidosperma longitudinale* and *Leptocarpus coangustatus*) and weed frequencies (2.2 / plot) drop significantly lower than other heavy soil wetlands, presumably because of the long inundation times.

The most rapidly drying of the clay flats form community type 10. These generally have shallower microtopography than the previous three community types or else have thin skeletal soils. Indeed two distinct subgroups are recognisable for this community. Both subgroups are differentiated from the other clay pan community types by the almost complete lack of low frequency species in species group H. This species group includes aquatic annuals and geophytes typical of the other clay pan and flat communities (eg. *Schoenus natans, Crassula natans, Eryngium pinnatifidum* subsp. *palustre* Ms, *Wurmbea dioica* subsp. aff. *alba* and *Amphibromus neesii*). Community type 10b occurs on small areas of ironstone with thin skeletal soils in the Busselton area. Much of this land unit has been cleared. These sites have an endemic flora which can be seen in species group G. These endemics include *Petrophile latericola* Ms, *Andersonia* aff. *latiflora, Dryandra* sp 30, *Hakea* aff. *varia* (Yellow flowered form with an earlier flowering period), *Loxocarya magna,* and *Lepyrodia* aff. *macra.* These communities are very rich with large numbers of annuals and geophytes.

Community type: 7

Herb rich saline shrublands in clay pans

Reservation Status: Well reserved
Conservation Status: Vulnerable

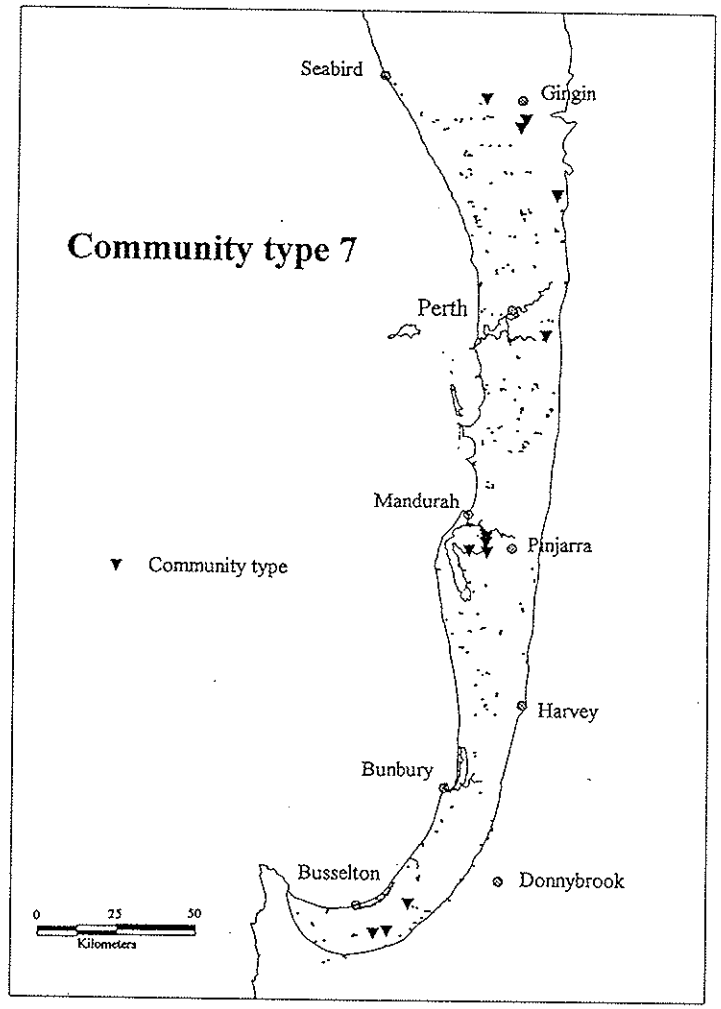
Typical Species:

Trees	Shrubs	Herbs
		**Briza minor*
		Centrolepis aristata
		Philydrella pygmaea

Other common species:

Trees	Shrubs	Herbs
	Melaleuca viminea	*Brachyscome bellidioides*
		**Briza maxima*
		Centrolepis polygyna
		**Cicendia filiformis*
		Goodenia micrantha
		**Hypochaeris glabra*
		Pogonolepis stricta
		Polypompholyx multifida
		Schoenus odontocarpus
		Schoenus sp. 2 (GJK 5739)
		Siloxerus humifusus
		Thysanotus manglesianus/ patersonii complex

		Structural units
Mean species richness:	46.4	
Mean weed frequency:	8	low woodland A
		low woodland B
Mean vegetation condition:	2.3	open low woodland A
		dense heath A
Number of quadrats:	18	heath A
		thicket
		scrub
		low scrub A
		open scrub
		open herbs



Community type: 8

Herb rich shrublands in clay pans

Reservation Status: Well reserved
Conservation Status: Vulnerable

Typical Species:

Trees	Shrubs	Herbs
		**Briza maxima*
		**Briza minor*
		Centrolepis aristata
		**Cicendia filiformis*
		**Cyperus tenellus*
		**Romulea rosea*

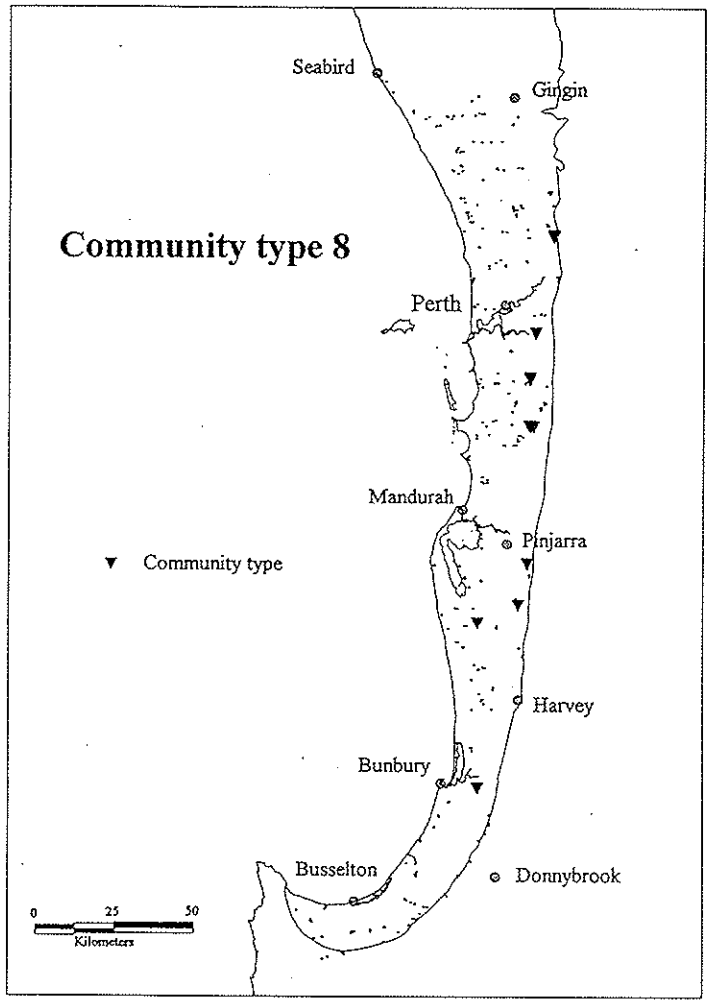
Other common species:

Trees	Shrubs	Herbs
	Viminaria juncea	**Aira caryophyllea*
		Chorizandra enodis
		Drosera menziesii subsp. *menziesii*
		Drosera rosulata
		Goodenia micrantha
		Haemodorum simplex
		Hyalosperma cotula
		** Hypochaeris glabra*
		** Juncus capitatus*
		** Monopsis debilis*
		** Parentucellia viscosa*
		Schoenus odontocarpus

Mean species richness:	52
Mean weed frequency:	11
Mean vegetation condition:	2.7
Number of quadrats:	21

Structural units

woodland
low woodland B
dense thicket
dense low heath D
thicket
scrub
low scrub A
low scrub B
open scrub
open low scrub B
herbs



Community type: 10a

Shrublands on dry clay flats

Reservation Status: Well reserved
Conservation Status: Vulnerable

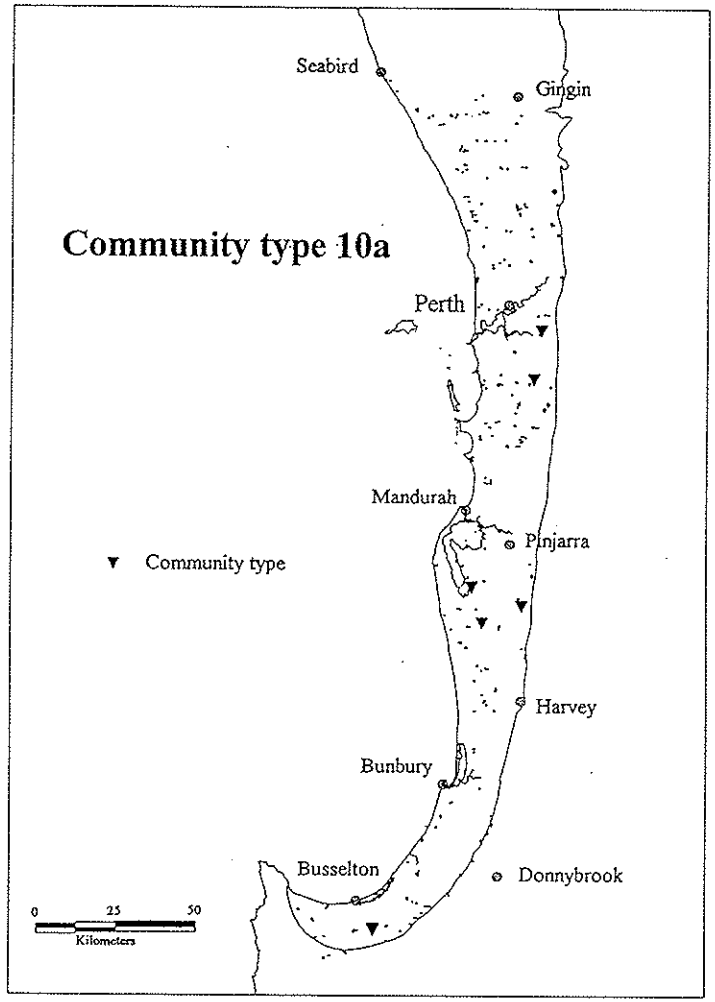
Typical Species:

Trees	Shrubs	Herbs
	Hakea sulcata	*Aphelia cyperoides*
	Verticordia densiflora	*Centrolepis aristata*
		**Cyperus tenellus*
		Drosera gigantea subsp. *gigantea*
		Drosera menziesii subsp. *menziesii*
		Schoenolaena juncea
		Schoenus rigens

Other common species:

Trees	Shrubs	Herbs
	Hakea varia	*Burchardia multiflora*
	Pericalymma ellipticum	**Briza minor*
	Viminaria juncea	*Centrolepis drummondiana*
		**Cicendia filiformis*
		Conostylis aculeata
		**Hypochaeris glabra*
		**Juncus capitatus*
		Patersonia occidentalis
		Polypompholyx multifida
		Schoenus odontocarpus
		Stylidium calcaratum
		Thelymitra antennifera
		Thysanotus thyrsoideus
		Philydrella pygmaea
		Siloxerus humifusus

Mean species richness:	51.8	Structural units
Mean weed frequency:	5.8	dense heath B
		thicket
Mean vegetation condition:	2.1	heath B
		scrub
Number of quadrats:	8	dwarf scrub C
		open scrub
		open low scrub B



RECOMMENDATIONS

This study of the plant communities of the Swan Coastal Plain between Seabird and the foothills of the Whicher Range has lead to the following recommendations:

1) Eleven taxa should be proposed for listing as Declared Rare Flora and the priority listing for 13 taxa should be changed as detailed (Table 6).

2) The three most threatened community types need urgent reservation. The following areas should be declared as A class Nature Reserves for the protection of flora and fauna:

a) the southern ironstone communities from the five small areas of State Forest and the road and rail reserve east of Ruabon Nature Reserve. (This road and rail reserve is also of regional significance as it is one of the last two remaining continuous vegetated transects in the study area showing the catena of original vegetation types on the eastern side of the plain.)

b) the sedgeland in Holocene dune swales in the Point Becher area (M106) and the north west corner of Lake Walyungup (M103).

c) the eastern *Banksia attenuata* woodlands over species rich dense shrublands from Koondoola open space, Landsdale Rd, M12, and M 53.

3) Final selection of areas for reservation of the 10 poorly reserved community types should be made in conjunction with species reservation data currently being collected.

4) The road and drain reserve on the southern side of Mundijong Road be declared as an A class Nature Reserve. (This area is of regional significance being the second catena of vegetation types across the eastern side of the plain).

5) As a consequence of the small amount of remnant vegetation on the eastern side of the plain, all such remnants in the study area with the basic vegetation intact or able to be regenerated are of high conservation value.

6) A further analysis of reservation status is needed since the present definition does not consider the area of communities reserved.

7) A similar analysis needs to be undertaken to determine conservation values of remnants not covered in this study since floristic community types are not well correlated to presently available geomorphological or vegetation mapping.

8) Additional work on the Swan Coastal Plain is required to determine, more precisely, the nature of floristic variation in the seasonal wetlands (because of their high levels of heterogeneity).

Appendix 10:
Description of sites located in Lot 139.

Site 1 (poorly drained flat), Photo 2
***Melaleuca viminea* Tall Open Scrub over scattered *Actinostrobus pyramidalis* over *Hypocalymma angustifolium* Open Heath over *Leptocarpus canus* Sedgeland**
Shrubs: *Melaleuca viminea* , *Actinostrobus pyramidalis*, *Hypocalymma angustifolium*, *Acacia lasiocarpa* var. *bracteolata* (long peduncle form), *Acanthocarpus canaliculatus*
Grasses: **Briza maxima*
Herbs: *Pogonolepis gracilis* (swamp form), *Buchardia ?multiflora*, * *Romulea rosea*
Sedges: *Leptocarpus canus*
CONDITION
Rating Very Good to Good
Comments: Spot deaths of shrubs and sedges in the site and area of the site, possibly effects long summer drought. Patches of * *Romulea rosea.* The area has been long unbrunt and the shubs are fully grown and gnarled with age.
Soil: grey clayey sand over clay
Drainage: moderate

Site 2 (poorly drained flat), Photo 3
***Melaleuca leptoclada* Tall Shrubland over Mixed Open Low Heath over *Leptocarpus canus* Sedgeland**
Shrubs: *Melaleuca leptoclada*, *Hypocalymma angustifolium*, *Acacia lasiocarpa* var. *bracteolata* (long peduncle form), *Acanthocarpus canaliculatus*, *Verticordia ?plumosa*, *Grevillea thelemanniana*, *Petrophile seminuda.*
Area: scattered samphires, *Melaleuca bracteosa*
CONDITION
Rating Very Good to Good
Comments: The area has been long unburnt and the shubs are fully grown and gnarled with age. Adjacent areas appear to have been ?grazed, partially cleared significant weed invasion, miscellaneous grasses, *Sparaxis bulbifera* patch and *Lolium* species. Condition good to degraded.
Soil: grey clayey sand over clay
Drainage: moderate

Site 3 (poorly drained flat), Photo 4
Herbland and Annual Sedgeland
Herbs: *Tribonanthes ?australis*, *Tribonanthes brachypetala*, *Drosera* species, *Bracycome* sp, *Pogonolepis gracilis* (swamp form)
Sedges: *Centrolepis aristata*
Grasses: miscellaneous exotic species

Site 4 (slight sandier rise), Photo 4
Scattered *Viminaria juncea* and *Actinostrobus pyramidalis* over Mixed Closed to Open Heath over Open Sedgeland
Shrubs: *Viminaria juncea*, *Actinostrobus pyramidalis*, *Hypocalymma angustifolium*, *Banksia telmatiaea*, *Calothamnus hirsutus*, *Petrophile seminuda*, *Jacksonia restioides*, *Acacia stenoptera*
Sedges: *Gahnia trifida, Schoenus rigens*
CONDITION
Rating Very Good
Soil: grey clayey sand over clay
Drainage: moderate
Aspect: NA

Site 5 (poorly drained flat), Photo 4

Herbland and *Leptocarpus aristatus* Sedgeland

Site 6 (margins poorly drained flat), Photo 4
***Verticordia* Low Open Heath over Herbland over Open Sedgeland**
Shrubs: *Verticordia ?acerosa, Verticordia ?plumosa, Verticordia densiflora, Calytrix breviseta* ssp *breviseta , Hypocalymma angustifolium,*
Grasses: *Neurachne alopecuroidea, *Briza maxima*
Herbs: *Stylidium divaricatum, Borya scirpoidea,*Romulea rosea*
Sedges: *Leptocarpus* sp, *Centroplepis aristata,*
CONDITION
Rating **Very Good to Good**
Aerial Photo: Run 13 5179
Soil: brown grey clay over clay, ironstone nodules on the surface
Drainage: poor

The Herblands and Sedgelands of the area are variable in their species composition and tend to contain a few species in large numbers. These species are predominantly annual and geophytic herbs and sedges. The two associations merge over small areas. At the time of this study most herbs were at such an early stage of growth that in general they could not be identified. In some cases dead plants from the previous years growth indicated the species present. However previous work on the land to the north of Brook Road has identified the following taxa and many of these would be expected to occur in the area.
Fresh
Herbs: *Anigozanthos viridus, Burchardia bairdii, Brachycome iberidifolia, Polypompholyx multifida, Pogonolepis gracilis* (swamp form), *Drosera menziesii* 'swamp', *Stylidium ecorne, Stylidium dichotomum, Stylidium divaricatum, Tribonanthes australis, Tribonanthes brachypetala, Drosera glanduligera, Stylidium guttatum, Stylidium utricularioides, Stylidium ecorne, Bulbine semibarbata, Helipterum ?demisium, Wurmbea* species, *Calandrinia composita, Apium annum, Haemodorum simplex,* Velleya trinervis, Drser tubaestylis, *Samolus juncea, Isotoma scapigera, Apium annuum, Wilsonia backhousei, Tribonanthes australis, Pogonolepis stricta, Wilsonia humilis, Schoenolaena juncea*

Sedges: *Leptocarpus aristatus, Leptocarpus canus, Leptocarpus coangustatus, Triglochin procera, Triglochin minutissima, Centrolepis aristata, Aphelia cyperoides, Schoenus andrewsii, Centrolepis aristata, Centrolepis polygyna, Schoenus humilis, Leptocarpus aristatus, Lepidosperma londnitudinale, Schoenus rigens, Juncus bufonis*
Grasses: miscellaneous exotic species

Original

HYDROLOGICAL STUDY OF THE GREATER BRIXTON STREET WETLANDS

Full document available on request

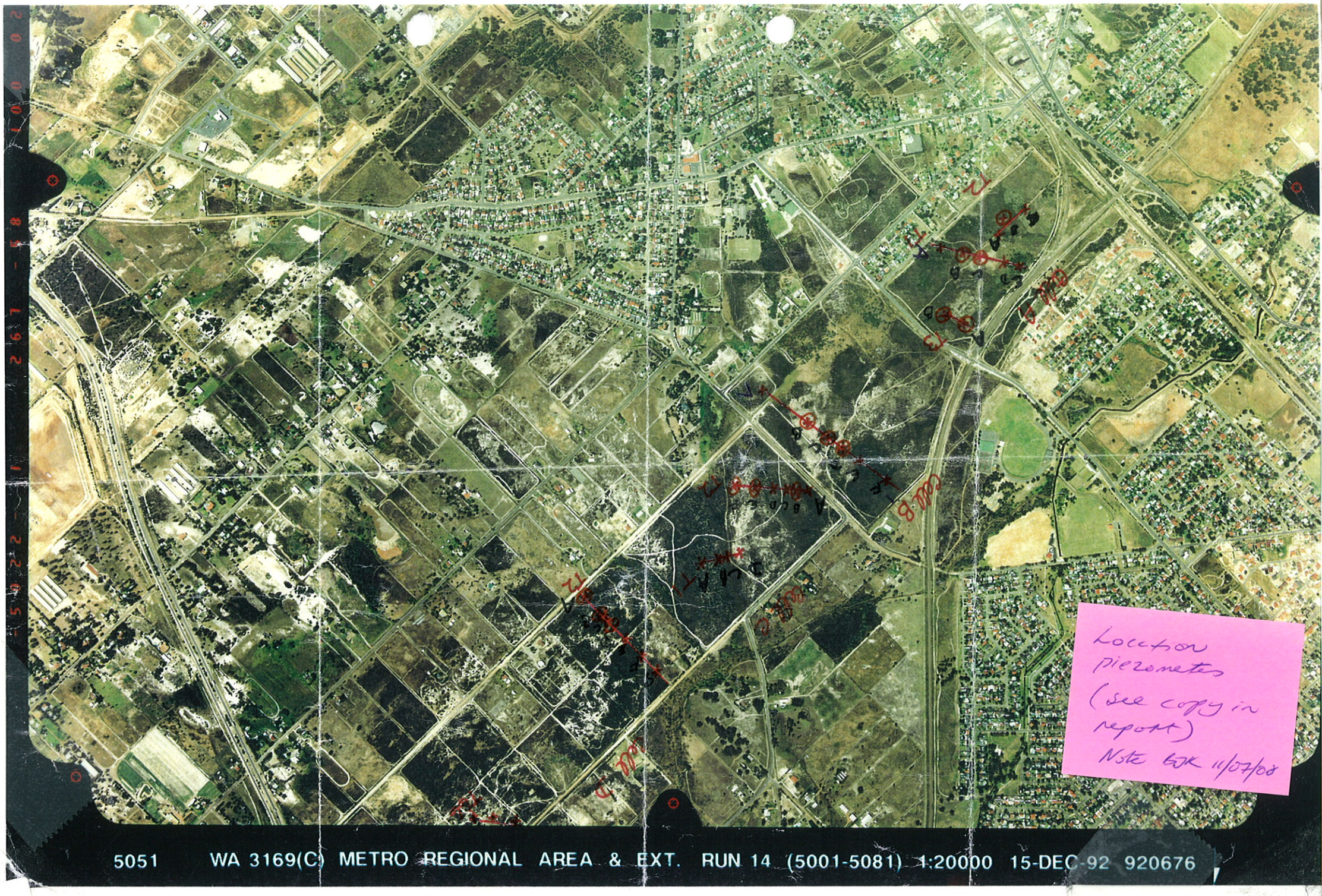
Report to:

Friends of Brixton St Inc.
87 Kenwick Rd
Kenwick
WA 6

Report from:

V & C Semeniuk Research Group
21 Glenmere Rd
Warwick
WA 6024

January 2001


Location piezometers (see copy in report) Note EJK 11/07/08
5051 WA 3169(C) METRO REGIONAL AREA & EXT. RUN 14 (5001-5081) 1:20000 15-DEC-92 920676