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TR
JOSHUA
BROOK 11

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JOSHUA BROOK SUB-DIVISION.
RARE FLORA.

Prepared by
Hart, Simpson and Associates Pty Ltd
for
Iluka Resources Limited
December 2001

CRN210426

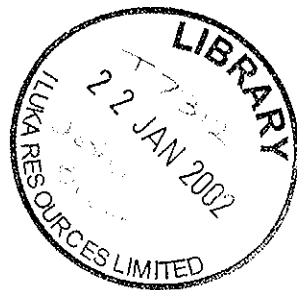
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CONTENTS.

1. SUMMARY.	1
2. INTRODUCTION.	2
3. METHODS.	3
4. RESULTS.	4
5. DISCUSSION.	11
6. REFERENCES.	14
FIGURE 1. LOCATION.	5
FIGURE 2. VEGETATION UNITS.	6
FIGURE 3. LOCATION.	12
PLATES 1-4. VEGETATION.	7-8
APPENDIX 1. LIST OF THE FLORA.	15



1. SUMMARY.

Iluka Resources Limited is carrying out the Joshua Brook sub-division near Boyanup. The site is largely vegetated, and the lots are large with restrictions on clearing. A study of the rare flora was carried out in November 2001.

The site is on private property on the lower slopes of the Whicher Scarp.

The vegetation is mainly Jarrah-Marri on sand over laterite with a smaller area of Banksia woodland on deeper sand, and a highly disturbed unit along Joshua Brook with sand and some alluvial clayey soils. The vegetation varies from reasonably intact in the best of the Jarrah-Marri, partly degraded by partial clearing and grazing in the Banksia woodland, to severely degraded along Joshua Brook. In terms of the floristic units from the Southern Swan Coastal Plain survey, these are probably closest to Community Type 20b (Eastern *Banksia attenuata* and/or *Eucalyptus marginata* woodlands) or Community Type 1a (*Corymbia haematoxylon* - *Eucalyptus marginata* woodlands on Whicher foothills), and Community Type 21b (southern *Banksia attenuata* woodlands) respectively. These are typical of the scarp and adjacent coastal plain, but it is not clear whether they are the same units recorded further north. Community Type 20b was not recorded in the Southern Swan Coastal Plain survey this far south, although the landform is similar (the Guildford complex). These types are relatively well conserved in total except for Community Type 20b, although they are not necessarily well represented in conservation reserves. Community Type 20b has been very heavily cleared further north, as has the lower Whicher Scarp locally. The vegetation along Joshua Brook is probably closer to that seen in the valleys of the plateau rather than that of the coastal plain.

A large native flora of 149 species from 98 genera and 41 families was recorded but there are limited rare flora species. **There are no Declared Rare Flora species**, and only **one Priority 3** and **one Priority 4** species of limited significance were found. Both are widespread on the site. Both of these Priority species are common enough locally and regionally that this site makes little contribution to their total conservation status.

There are no Declared Rare Flora species recorded nearby or expected to occur on the basis of the habitats. A few other Priority species are known in the general area and could occur in these habitats, but none were seen.

There is no need to modify the sub-division in any way on the basis of the limited Priority species present.

2. INTRODUCTION.

Iluka Resources Limited is carrying out the Joshua Brook sub-division near Boyanup. The site is largely vegetated, and the lots are large and there are clearing restrictions. A study of the rare flora was carried out in November 2001.

Specifically the survey was designed to:

- Examine the flora of the site.
- Determine if any rare plant species are present.
- Record the vegetation and its condition, and the potential for rare plant species to be present.

The results of the study are given here.

3. METHODS.

The site was examined on 29/11/01.

The vegetation and flora were examined during extensive foot traverses.

The vegetation type and flora were recorded as far as possible, so that the vegetation community types could be identified in accordance with the results of the Southern Swan Coastal Plain survey (Gibson *et al.* 1994). All species were identified in the field or from keys and reference to material in the W.A. Herbarium. A particular watch was kept for rare species. Considerable information was available on rare species in the general area from previous studies.

The condition of the vegetation was recorded by looking at disturbance, the diversity of species, dieback, weeds, grazing and other factors. The condition was rated on the scale of Keighery (1994) which is a scale of 1 to 6:

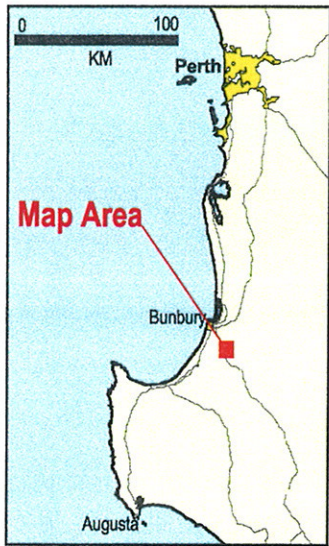
1. Pristine or nearly so.
2. Vegetation structure intact, disturbance affecting individual species, and weeds are non-aggressive species.
3. Vegetation structure altered, obvious signs of disturbance.
4. Vegetation structure significantly altered by very obvious signs of multiple disturbance, retains basic vegetation structure or ability to regenerate it.
5. Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management.
6. The structure of the vegetation is no longer intact and the area is completely or almost without native species.

4. RESULTS.

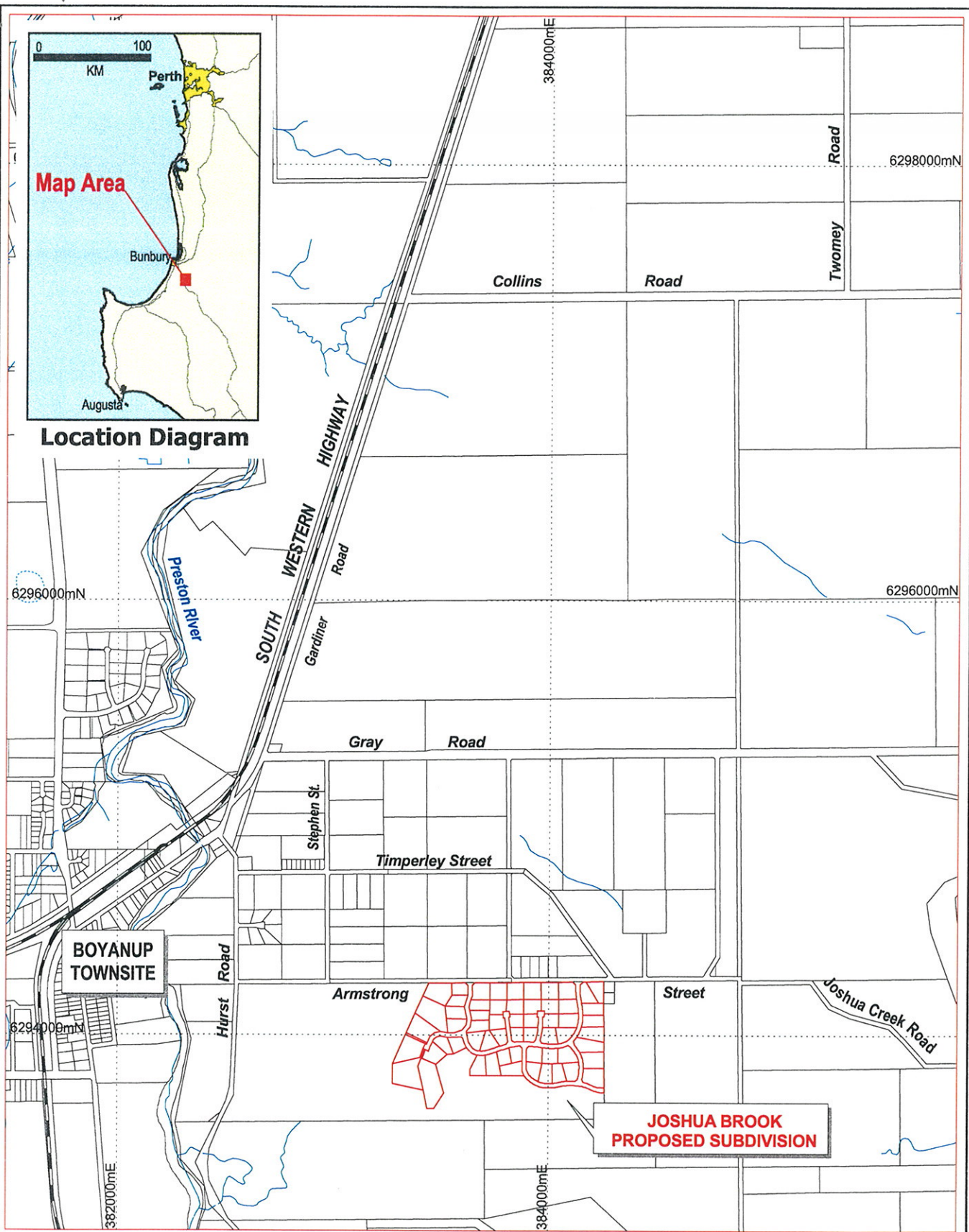
Vegetation.

The site is on the lower slopes of the Whicher Scarp (Figure 1, next page). It is mostly vegetated, and the vegetation can be divided into three units (Figure 2, page 6):

1. Jarrah-Marri woodland, with a lower tree stratum dominated by *Banksia grandis* and a diverse shrub and perennial herb understorey (Plates 1 and 2, page 7). The eucalypt trees may originally have been 15-20m tall and been a forest but most trees have been cut down and the existing trees are mostly regrowth or clumps of coppiced stems, while the understorey is mainly less than 1m tall with some taller shrubs to 2m, with a cover of about 30% for the shrubs and a little more at 30-50% for the perennial herbs. The soils are sand over laterite, with some exposed laterite in the lower parts, and clayey soil along Joshua Brook. Most of this vegetation is rated at Condition 2-3 despite the extent of past tree removal, with the best areas closer to Joshua Brook. There are more disturbed areas due to tracks, grazing, tree removal, past clearing including an old and large gravel pit, and other smaller impacts. The old gravel pit has been rehabilitated with a limited range of species including native species not indigenous to the site but these were not recorded. There is some weed invasion but this is largely restricted to the more disturbed sites, and weeds are rare in the better areas. These other disturbed areas are variously down to as poor as Condition 5.
2. A woodland along Joshua Brook. This was probably originally Flooded Gums (*Eucalyptus rudis*) and possibly a few paperbarks over a shrub, perennial herb and grass/herb ground stratum, with fringing Peppermints. It has been severely disturbed by partial clearing and grazing, and is now reduced to trees of Flooded Gums and Peppermint over scattered native plants of limited species range with many weeds or even old pasture now dominated by weeds (Plate 3, page 8). The soils are mainly sandy but there are some alluvial clayey areas along the Brook. This vegetation is in poor condition, and rated at 4-6, with few areas as high as 4. The clayey areas are severely disturbed because they are prime land and have been developed into pasture.
3. Banksia woodland (Plate 4). Jarrah is present but severely reduced, and Marri is present but rare. The trees are dominated by *Banksia attenuata* 5-8m tall, over a diverse shrub and perennial herb understorey but of reduced quality due to disturbance. This vegetation is on deeper grey sand. It is in moderate condition and rated at Condition 3, due to a history of grazing, tree removal (and possibly even chaining down or partial clearing at some time), possibly excessive burning and other minor disturbances. Despite this degree of disturbance and thinning of the understorey there is limited weed invasion.



Location Diagram



Legend:

 Proposed subdivision



MGA Coordinates, GDA94



ORIG : N.McMULKIN

DRAWN : D.G.S.

SCALE : 1:25,000

DATE : 7 NOV 2001

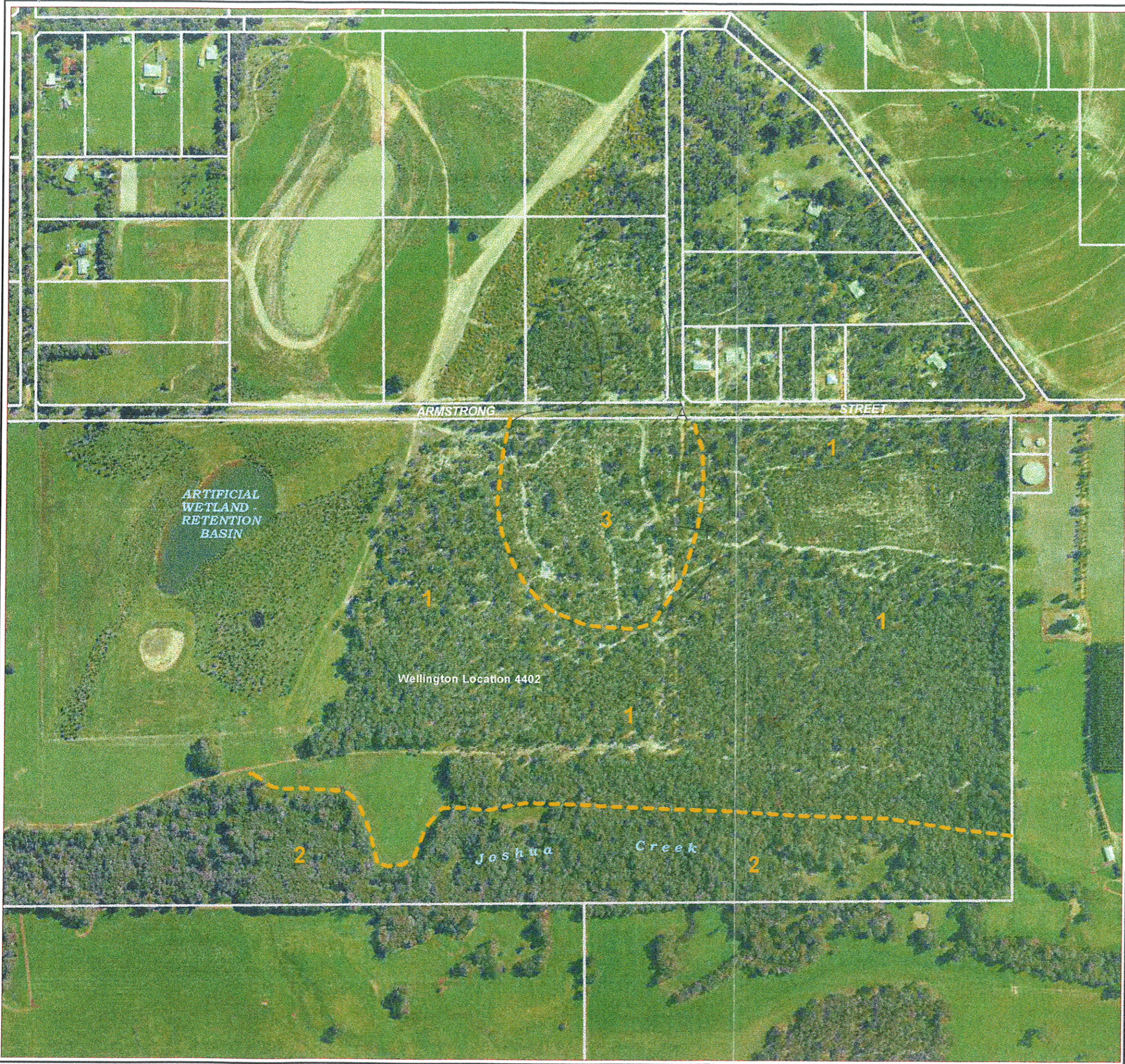
BOYANUP

JOSHUA BROOK SUBDIVISION

LOCATION PLAN

DWG No : YNL01110A

FIGURE : 1



REVISIONS

No	ORIG.	DESIGN	DATE	COMMENTS

Vegetation units

1. Jarrah - Marri woodland
2. Joshua Creek vegetation
3. Banksia woodland



Date of photography: 2 Oct 2000



**BOYANUP
JOSHUA BROOK SUBDIVISION**

VEGETATION UNITS

ORIG : N.McMULKIN

DRAWN : D.G.S.

SCALE : 1:5 000

DATE : 7 DEC 2001

DWG No: YNR0091A

FIGURE : 2

Notes 10/03/05



PLATE 1. Jarrah-Marri woodland on sand, showing small trees.



PLATE 2. Jarrah-Marri woodland on exposed laterite, with some larger remnant trees.



PLATE 3. Joshua Brook, showing the highly disturbed alluvial soils and trees in the Brook behind.



PLATE 4. Banksia woodland, with disturbed understorey.

Dieback appears to be scarce or absent, but there are a few small highly disturbed areas along the northern and western edges which could be infected. It is likely that Joshua Brook is infected from further upstream, but the vegetation along the Brook is not assessable and there is no evidence of infection.

Flora.

The species recorded in the three areas of vegetation are listed in Appendix 1. The largest flora is in the Jarrah-Marri unit, partly because this is the largest area and in the best condition. A few of the species listed for this unit were found only along the most lateritic and clayey areas near Joshua Brook. These species include *Darwinia citriodora*, *Hemigenia incana* and *Acacia urophylla*. The Joshua Brook unit has very limited native species, although others from the adjacent areas are present in small numbers and are not listed. Most of the additional native species are riverine species including the Flooded Gums and ferns. Most of the species recorded there are weeds. The Banksia woodland has a diverse flora but this was limited by the small area and poorer condition, and this unit is typically more diverse. Appendix 1 lists a native flora of 149 species in 98 genera and 41 families, and a weed flora of 24 species in 24 genera and 17 families. The total flora recorded on the site is 173 species in 115 genera and 52 families.

Appendix 1 will not be a complete list of the native or of the weed flora because it was compiled on a single visit in early summer, and the annual and ephemeral spring flora was virtually absent. The great majority of the perennial flora will have been recorded.

Rare flora.

No Declared Rare Flora species were found, and there are no species likely to be present in these habitats.

Despite the large flora recorded, only two Priority species were encountered. These were:

- The Priority 3 species *Acacia semitrullata*, a small shrub. It was found to be widespread in small numbers in both the Jarrah-Marri and Banksia woodland units, mainly in the more open areas. This species is widespread on the southern coastal plain and in jarrah forest, typically in and around low-lying areas and on low dunes in Banksia woodland. It is widespread but not usually common. This site is expected habitat.

- The Priority 4 species *Jacksonia sparsa*, a medium-sized to tall shrub. It was found in small numbers in the Banksia woodland, mainly near the edge with the Jarrah-Marri unit. It is widespread in the southern Swan Coastal Plain and southern forest areas. It is an unpublished species only recently recognised and has probably been confused in many cases with other similar species. It is widespread and common in places. It typically occurs in and around low-lying areas and on low dunes in Banksia woodland. This site is expected habitat.

Priority 3 species are defined by CALM as "Poorly known taxa. Taxa which are known from several populations, and the taxa are not believed to be under immediate threat (ie. not currently endangered), either due to the number of populations (generally >5), or known populations being large, and either widespread or protected. Such taxa are under consideration for declaration as 'rare flora' but are in need of further survey".

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

5. DISCUSSION.

Vegetation.

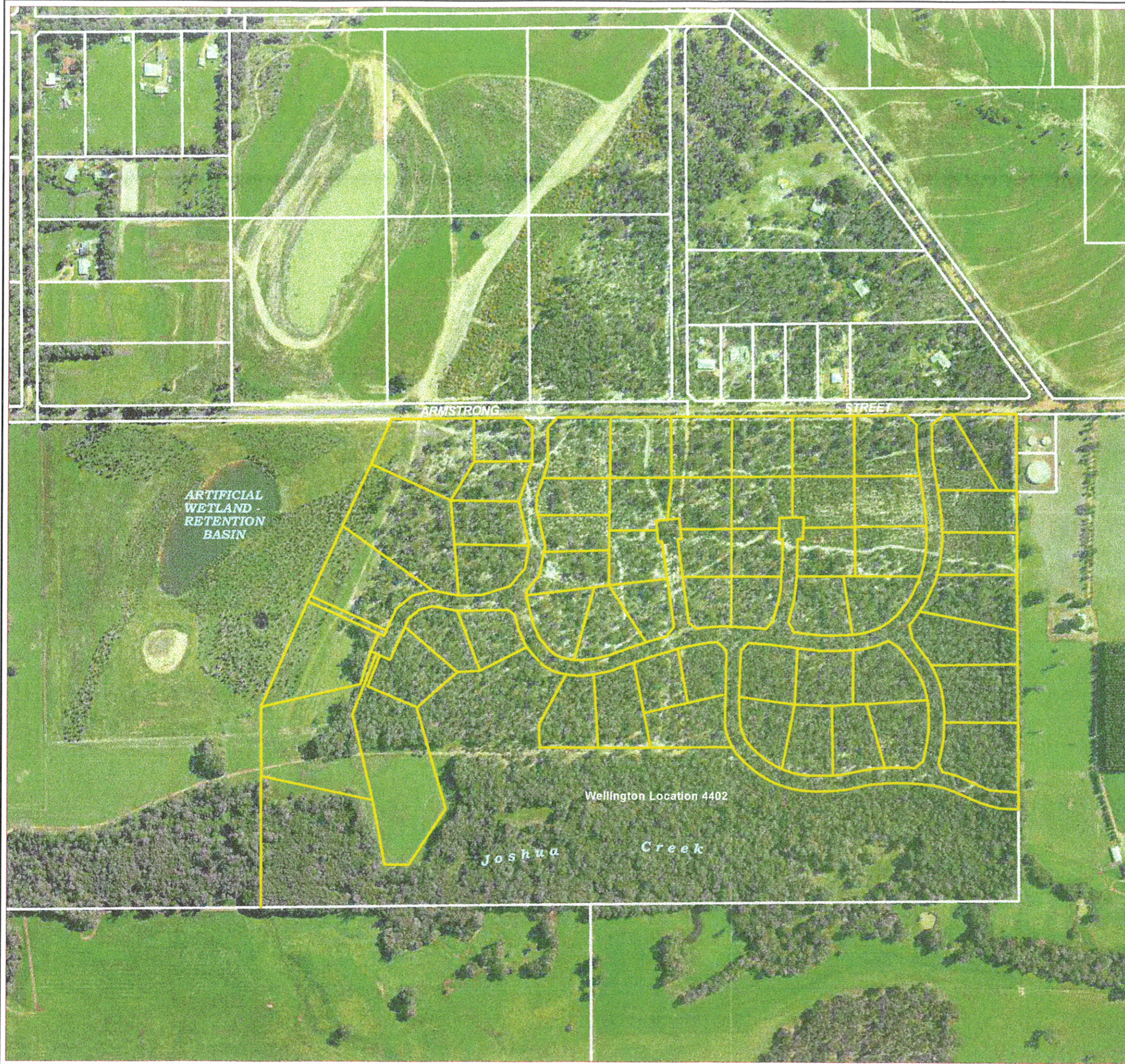
The Joshua Brook area is on the lower slopes of the Whicher Scarp. The site is private property but largely vegetated, and accordingly the proposed sub-division includes substantial areas which will not be cleared and there are restrictions on clearing within the blocks. The proposed site layout is given in Figure 3 (next page).

The vegetation is mainly Jarrah-Marri on sand over laterite with a smaller area of Banksia woodland on deeper sand, and a highly disturbed unit along Joshua Brook. In terms of the floristic units from the Southern Swan Coastal Plain survey, these are probably closest to Community Type 20b (Eastern *Banksia attenuata* and/or *Eucalyptus marginata* woodlands) or Community Type 1a (*Corymbia haematoxylon* - *Eucalyptus marginata* woodlands on Whicher foothills), and Community Type 21b (southern *Banksia attenuata* woodlands) respectively. These are typical of the scarp and adjacent coastal plain, although it is not clear whether the units along the Whicher Scarp are all the same as those recorded further north. Community Type 20b was not recorded in the Southern Swan Coastal Plain survey this far south, although the landform is similar (Guildford complex). These types are relatively well conserved in total except for Community Type 20b, although they not necessarily well represented in conservation reserves. Community Type 20b has been very heavily cleared further north, as has the lower Whicher Scarp. The Banksia units are also susceptible to dieback. The vegetation seen along Joshua Brook was probably not covered in the Southern Swan Coastal Plain but it is probably part of the Preston complex seen higher up in the plateau.

Flora.

Appendix 1 lists a large native flora of 149 species from 98 genera and 41 families. Despite this there are limited rare flora species. There are no Declared Rare Flora species, and only two Priority species of limited significance were found. Both *Acacia semitrullata* (Priority 3) and *Jacksonia sparsa* (Priority 4) are common enough locally and regionally that this site makes little contribution to their total conservation status, and their presence is not sufficient reason to modify the sub-division in any way.

There are no Declared Rare Flora species recorded nearby or expected to occur on the basis of the habitats.



REVISIONS

No	ORIG	DESIGN	DATE	COMMENTS



**BOYANUP
JOSHUA BROOK SUBDIVISION**

PROPOSED DESIGN

ORIG : N.McMULKIN
 DRAWN : D.G.S.
 SCALE : 1:5 000
 DATE : 7 DEC 2001

DWG No: YNL0111A

FIGURE : 3

There are no previous known records of Priority species in the immediate area but a few other Priority species are known in the general area, and could occur in these habitats. These are:

Caustis sp. Boyanup (Priority 1).
Drosera marchantii ssp. *marchantii* (Priority 4).
Franklandia triaristata (Priority 4).
Pultenaea skinneri (Priority 4).

All of these would have been seen if they were present except for the *Drosera*, which would have been dead or dying back by the end of November.

There are no species which are triggers for the federal Environmental Protection and Biodiversity Conservation (EPBC) Act.

In summary, very limited rare flora were found and there is no need to modify the subdivision in any way on the basis of the few Priority species present.

6. REFERENCES.

Gibson, N., B.J. Keighery, G.J. Keighery, A.H. Burbidge and M.N. Lyons (1994). A Floristic Survey of the Southern Swan Coastal Plain. Report for the Australian Heritage Commission.

Keighery, B. (1994). Bushland Plant Survey. Wildflower Society of W.A., Perth.

- APPENDIX 1. List of all plant species recorded in the three habitats:
1. Jarrah-Marri woodland.
 2. Joshua Brook.
 2. Banksia woodland.

Introduced species are identified by an asterisk (*).

	1	2	3
CYCADS			
FERNS			
ADIANTACEAE			
<i>Adiantum aethiopicum</i>		X	
DENNSTAEDTIACEAE			
<i>Pteridium esculentum</i>		X	
LINDSAEACEAE			
<i>Lindsaea linearis</i>	X		
CYCADS			
ZAMIACEAE			
<i>Macrozamia riedlei</i>	X		X
DICOTYLEDONS			
APIACEAE			
<i>Daucus glochidiatus</i>	X		
<i>Eryngium pinnatifidum</i>	X		
<i>Platysace anceps</i>	X		X
<i>Xanthosia huegelii</i>			X
ASCLEPIADACEAE			
* <i>Gomphocarpus fruticosus</i>		X	
ASTERACEAE			
<i>Lagenifera huegelii</i>	X		
* <i>Hypochaeris glabra</i>	X	X	X
<i>Podolepis gracilis</i>	X		
<i>Rhodanthe citrina</i>	X		X
* <i>Ursinia anthemoides</i>	X		X
<i>Waitzia suaveolens</i>			X
BRASSICACEAE			
* <i>Brassica</i> sp.		X	
* <i>Sisymbrium</i> sp.		X	

	1	2	3
CAESALPINIACEAE			
Labichea punctata	X		
CARYOPHYLLACEAE			
* Spergula sp.		X	
DILLENIACEAE			
Hibbertia amplexicaulis	X		
Hibbertia commutata	X		
Hibbertia ferruginea	X		
Hibbertia huegelii	X		
Hibbertia hypericoides	X		X
Hibbertia racemosa			X
Hibbertia vaginata	X		X
DROSERACEAE			
Drosera sp.	X		
EPACRIDACEAE			
Astroloma pallidum	X		
Conostephium pendulum			X
Leucopogon sp.			X
Styphelia tenuiflora			X
EUPHORBIACEAE			
Phyllanthus calycinus	X		
GENTIANACEAE			
* Centaurium sp.		X	
GERANIACEAE			
* Geranium sp.		X	
GOODENIACEAE			
Dampiera linearis			X
Goodenia eatoniana	X		
Lechenaultia biloba	X		
Scaevola calliptera	X		
LAMIACEAE			
Hemiandra pungens	X		X
Hemigenia incana	X		

	1	2	3
LAURACEAE			
Cassytha sp.	X		X
LOBELIACEAE			
Lobelia tenuior	X		X
LORANTHACEAE			
Nuytsia floribunda	X		X
MIMOSACEAE			
Acacia alata			X
Acacia extensa	X		X
Acacia huegelii	X		X
Acacia obovata	X		
Acacia pulchella	X		X
Acacia semitrullata	X		X
Acacia stenoptera	X		
Acacia urophylla		X	
MYRTACEAE			
Agonis flexuosa		X	X
Calothamnus sanguineus	X		
Calytrix flavescens			X
Corymbia calophylla	X		X
Darwinia citriodora	X		
Darwinia vestita	X		
Eremaea pauciflora			X
Eucalyptus marginata	X		X
Eucalyptus rudis		X	
Hypocalymma angustifolium		X	
Hypocalymma robustum	X		X
Kunzea glabrescens	X		X
Melaleuca thymoides	X		X
Pericalymma elliptica	X		
OROBANCHACEAE			
* Orobanche minor		X	
OXALIDACEAE			
* Oxalis pes-caprae		X	

	1	2	3
PAPILIONACEAE			
Bossiaea eriocarpa	X		X
Daviesia divaricata	X		X
Daviesia inflata	X		
Daviesia physodes	X		X
Gastrolobium spinosum	X		
Gompholobium polymorphum	X		
Gompholobium tomentosum	X		X
Jacksonia horrida			X
Jacksonia lehmannii	X		
Jacksonia sparsa	X		X
Kennedia coccinea	X		
Kennedia prostrata	X		X
* Clover		X	
PITTOSPORACEAE			
Pronaya fraseri	X		
POLYGALACEAE			
Comesperma calymega	X		
Comesperma virgatum	X		
POLYGONACEAE			
* Acetosa sp.		X	
* Rumex sp.		X	
PROTEACEAE			
Adenanthos barbiger	X		
Adenanthos meisneri	X		X
Adenanthos obovatus	X		
Banksia attenuata			X
Banksia grandis	X		X
Banksia ilicifolia	X		
Dryandra lindleyana	X		
Dryandra pteridifolia	X		
Grevillea trifida	X		
Hakea amplexicaulis	X		
Hakea lissocarpha	X		
Persoonia elliptica	X		
Persoonia longifolia	X		
Petrophile linearis	X		

	1	2	3
<i>Stirlingia latifolia</i>	X		X
<i>Synaphea floribunda</i>	X		
<i>Synaphea petiolaris</i>	X		
<i>Xylomelum occidentale</i>	X		X
RANUNCULACEAE			
<i>Clematis pubescens</i>	X		
RUBIACEAE			
<i>Opercularia vaginata</i>	X		
RUTACEAE			
<i>Boronia dichotoma</i>	X		X
SCROPHULARIACEAE			
* <i>Verbascum virgatum</i>		X	
SOLANACEAE			
* <i>Solanum linnaeanum</i>		X	
STACKHOUSIACEAE			
<i>Tripterococcus brunonis</i>	X		
STERCULIACEAE			
* <i>Brachychiton</i> sp.		X	
<i>Thomasia</i> sp.	X		
STYLIDIACEAE			
<i>Levenhookia pusilla</i>			X
<i>Stylidium brunonianum</i>	X		X
<i>Stylidium repens</i>	X		X
<i>Stylidium piliferum</i>			X
<i>Stylidium schoenoides</i>	X		
<i>Stylidium</i> sp. 1 ? <i>carnosum</i>	X		
<i>Stylidium</i> sp. 2	X		
THYMELAEACEAE			
<i>Pimelea</i> sp.	X		X
TREMANDRACEAE			
<i>Tetratheca hirsuta</i>	X		
<i>Tremandra diffusa</i>	X		

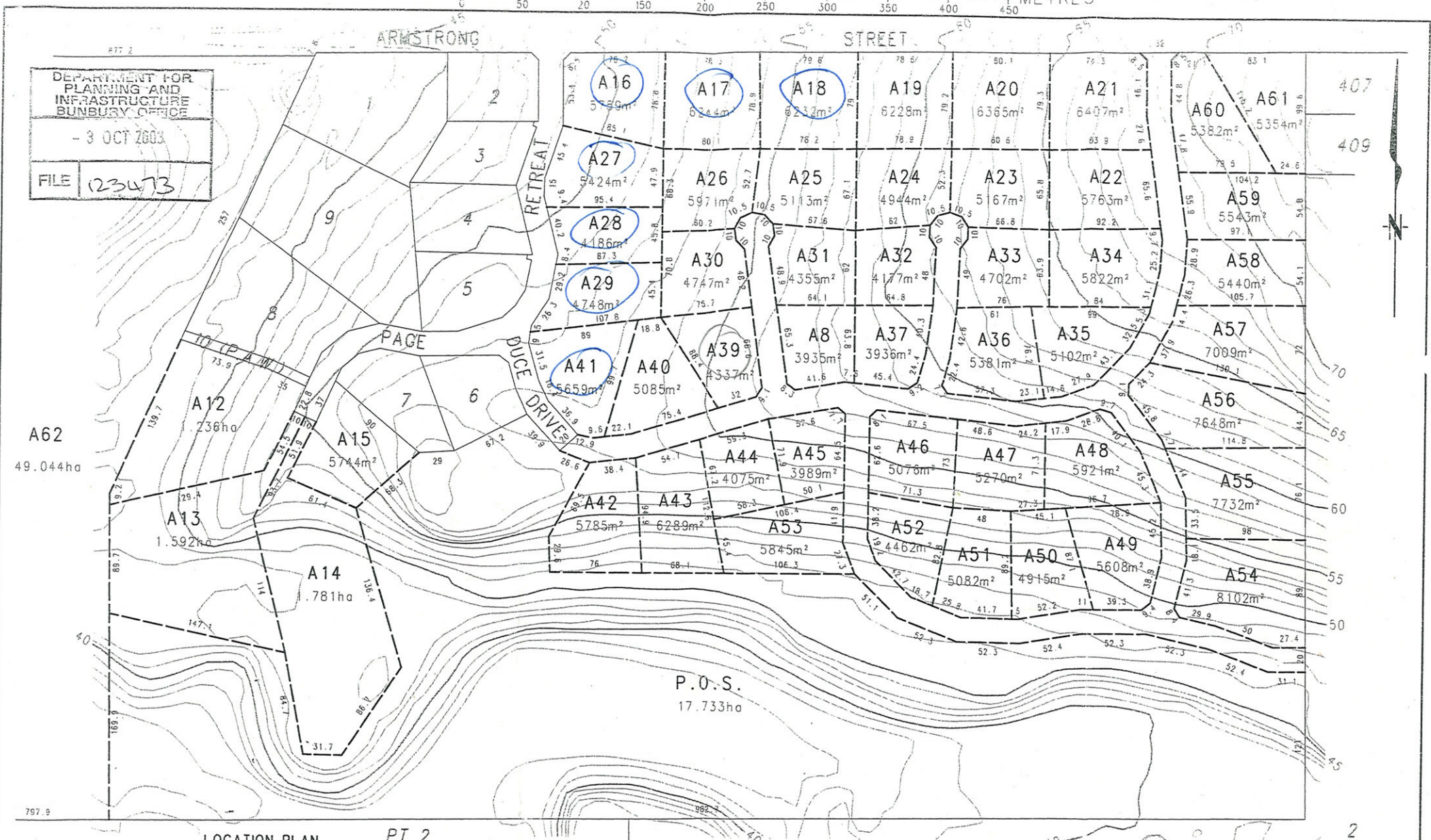
	1	2	3
MONOCOTYLEDONS			
ANTHERICACEAE			
<i>Agrostocrinum scabrum</i>	X		
<i>Caesia micrantha</i>	X		
<i>Chamaescilla corymbosa</i>			X
<i>Johnsonia pubescens</i>			X
<i>Thysanotus dichotomus</i>	X		
<i>Thysanotus manglesianus/patersonii</i>	X		X
<i>Thysanotus multiflorus</i>	X		X
<i>Thysanotus</i> sp.	X		X
<i>Tricoryne elatior</i>	X		
ASPARAGACEAE			
<i>Asparagus asparagoides</i>		X	
COLCHICACEAE			
<i>Burchardia congesta</i>	X		X
CYPERACEAE			
<i>Lepidosperma</i> sp. aff. <i>squamatum</i>	X		X
<i>Mesomelaena tetragona</i>	X		
<i>Schoenus curvifolius</i>			X
<i>Tetraria capillaris</i>	X		
<i>Tetraria octandra</i>	X		X
DASYPOGONACEAE			
<i>Dasyogon bromeliifolius</i>	X		X
<i>Lomandra hermaphrodita</i>			X
<i>Lomandra preissii</i>	X		
<i>Lomandra sericea</i>	X		
<i>Lomandra</i> sp.	X		
HAEMODORACEAE			
<i>Anigozanthos manglesii</i>	X		X
<i>Conostylis aculeata</i>	X		X
<i>Conostylis serrulata</i>			X
<i>Haemodorum spicatum</i>	X		
<i>Haemodorum</i> sp. aff. <i>paniculatum</i>	X		
<i>Phlebocarya ciliata</i>	X		X
<i>Phlebocarya filifolia</i>			X

	1	2	3
IRIDACEAE			
Patersonia occidentalis	X		X
Patersonia umbrosa xanthina	X		
* Romulea rosea	X		
JUNCACEAE			
Juncus sp.		X	
ORCHIDACEAE			
Caladenia flava	X		
Caladenia sp.	X		
Cryptostylis ovata	X		
* Disa bracteata	X		X
Microtis ?media			X
Thelymitra sp.	X		X
POACEAE			
* Aira sp.		X	
Amphipogon sp.			X
Austrostipa sp.	X		X
* Avena sp.		X	
* Briza maxima	X	X	X
* Bromus sp.		X	
* Holcus lanatus		X	
Tetrarrhena laevis	X		
RESTIONACEAE			
Anarthria prolifera	X		X
Desmocladius flexuosus	X		X
Hypolaena exsulca	X		X
Lyginia imberbis	X		X
XANTHORRHOEACEAE			
Xanthorrhoea gracilis	X		
Xanthorrhoea preissii	X		X

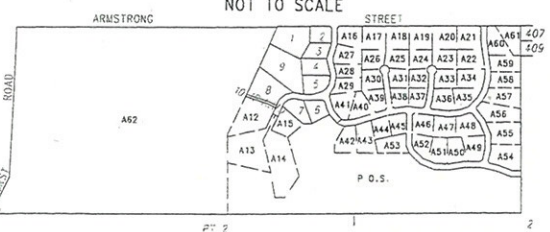
DEPARTMENT FOR
PLANNING AND
INFRASTRUCTURE
BUNBURY OFFICE

- 3 OCT 2003

FILE 123473



LOCATION PLAN PT 2
NOT TO SCALE

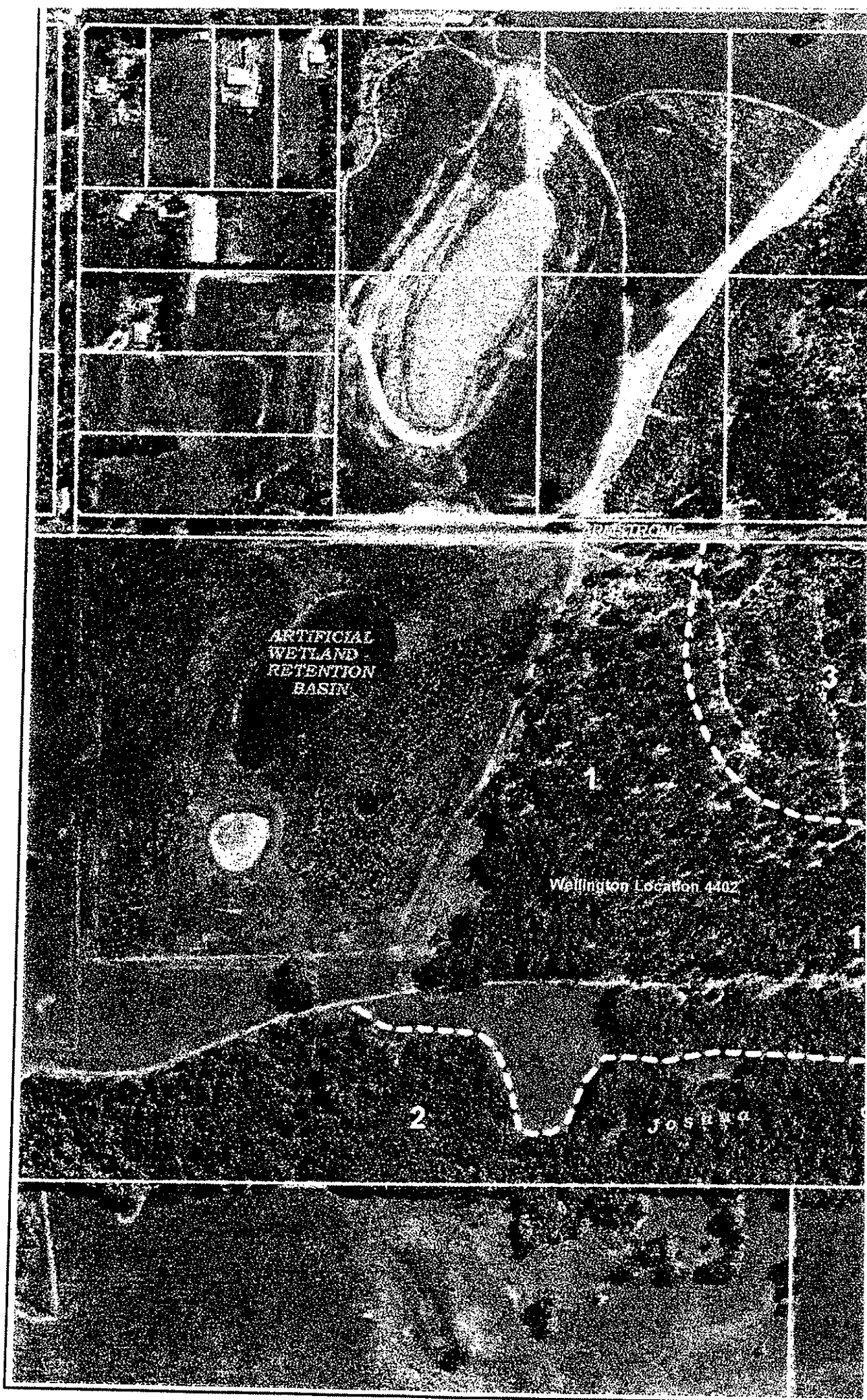


LEGEND	STATISTICS	Scale	PROPOSED:
Exist. Boundaries ———	Total Area 100.46ha	1 : 3000	Subdivision
Prop. Boundaries - - - - -	No. of exist. lots 1	Applicable to original A3 drawing	Land Description
LIScad CAD File Name 11850-01A.LCD	No. of prop. lots 52	Date 24-09-03	LOT 11 ON DP 31457 - BOYANUP
NOTES: ALL AREAS AND DISTANCES ARE APPROXIMATE AND ARE SUBJECT TO SURVEY. CONTOURS ARE SUPPLIED BY ILUKA RESOURCES AND ARE NOT INTENDED FOR DESIGN & CONSTRUCTION PURPOSES.		MAP(S) BG30 (2) 07.14, 07.15, 08.15 BG30 (10) 2.3	Owner(s) ILUKA RESOURCES LIMITED (CT 2224-197)
		HARLEY SURVEY GROUP PTY LTD CONSULTING LICENSED SURVEYORS P.O. BOX 121 8 BURNBURN ROAD BURNBURN W.A. 6280 Phone 9752 4400	DRAWING No 11850-01 VER'N A



Boyanup Urban Preferred

Boyanup East - Joshua Brook



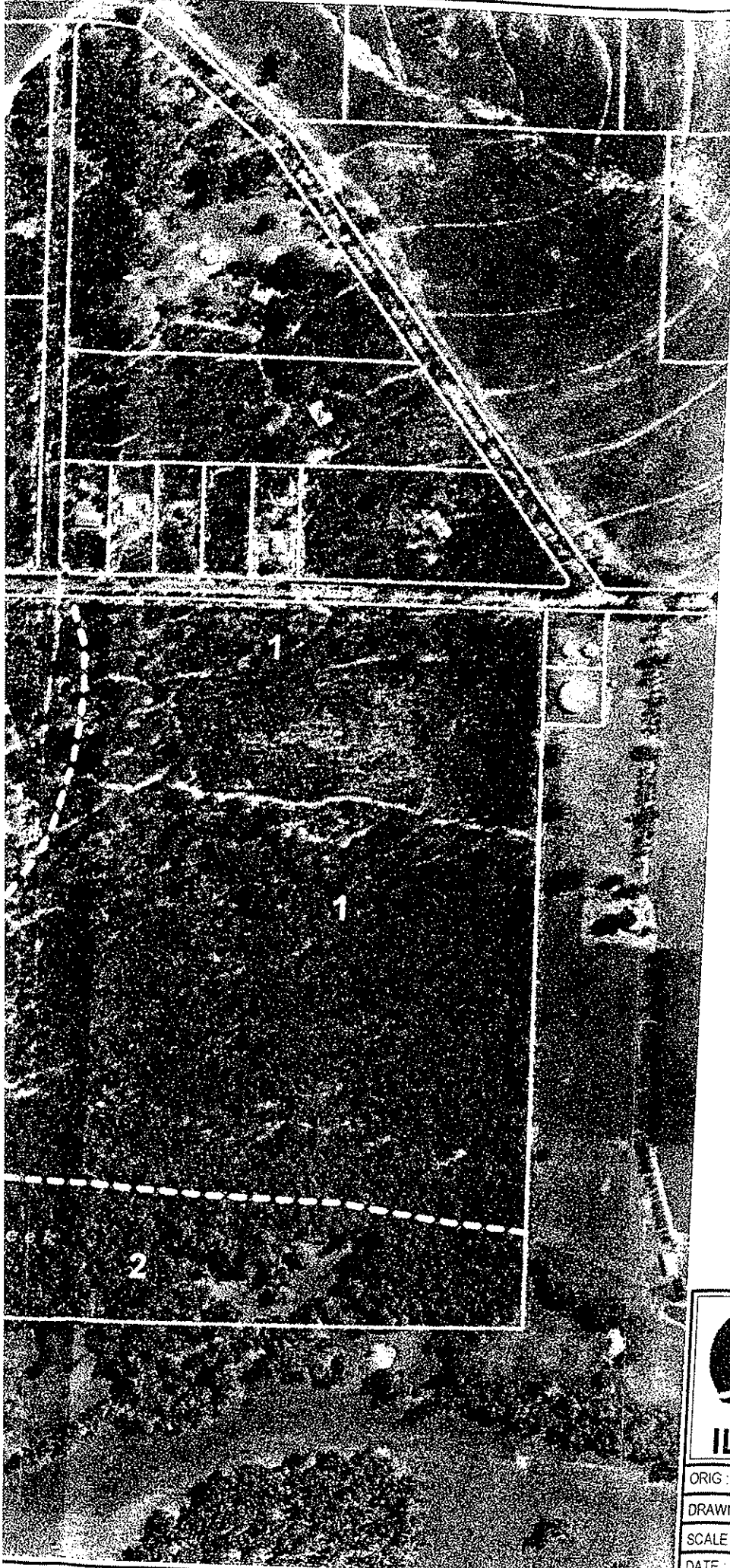
ARTIFICIAL
WETLAND
RETENTION
BASIN

Wellington Location 4402

2

JOSHUA

3



REVISIONS

No	ORIG	DESIGN	DATE	COMMENTS

Vegetation units

1. Jarrah - Marri woodland
2. Joshua Creek vegetation
3. Banksia woodland



Date of photography: 2 Oct 2000



ILUKA

ORIG : N.McMULKIN

DRAWN : D.G.S.

SCALE : 1:5 000

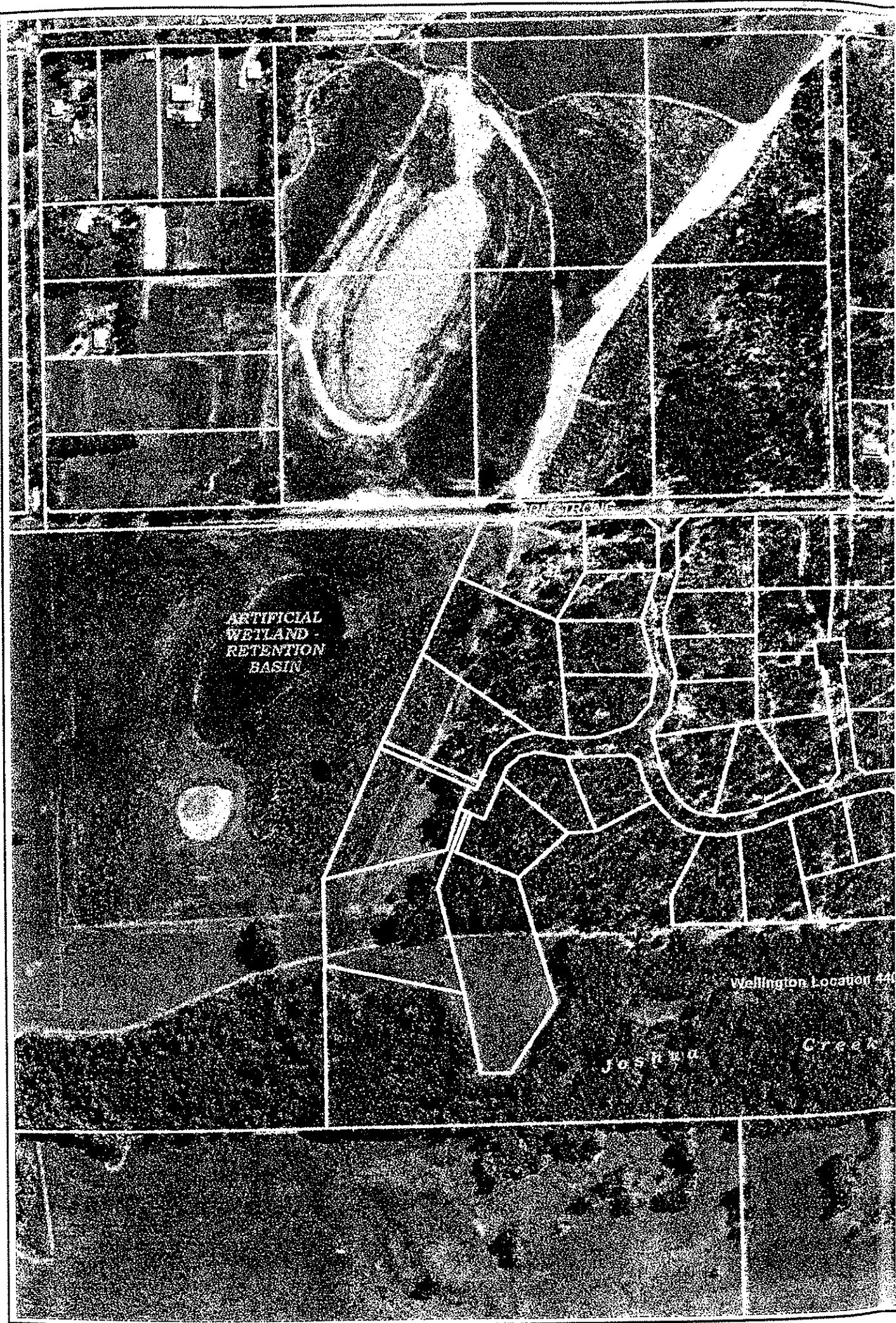
DATE : 7 DEC 2001

**BOYANUP
JOSHUA BROOK SUBDIVISI**

VEGETATION UN

DWG No : YNR0091A

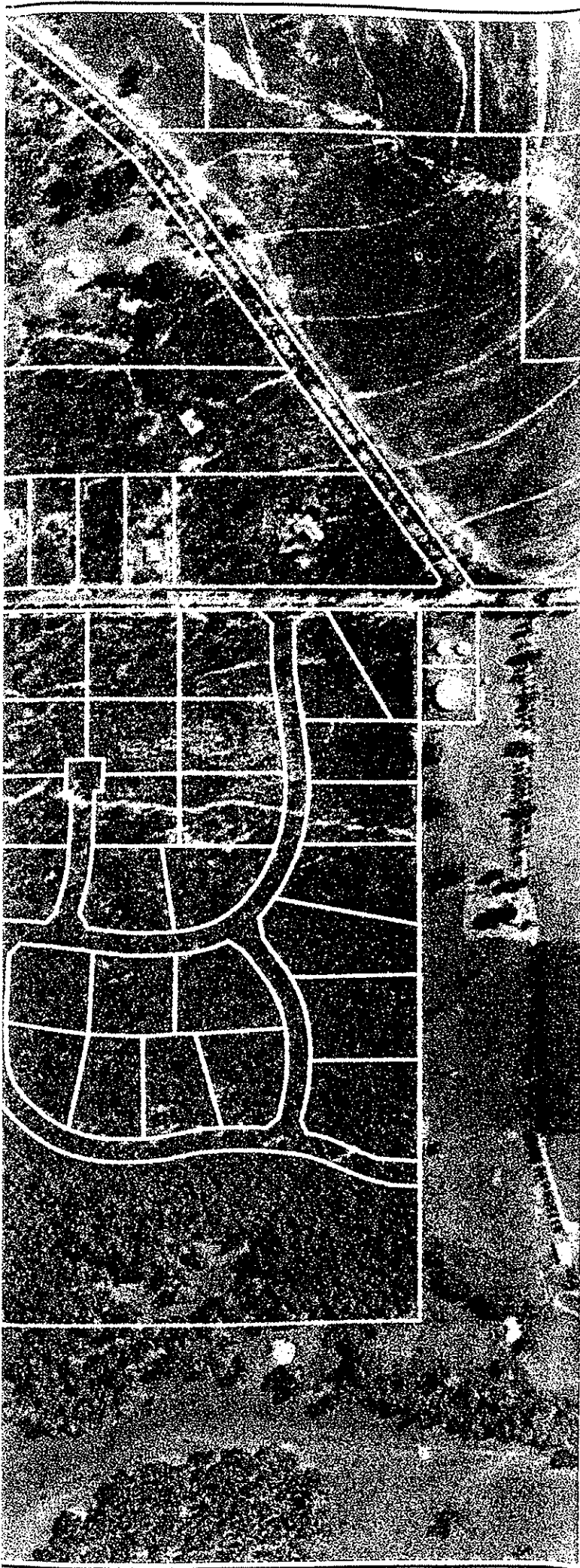
FIGUR



ARTIFICIAL
WETLAND -
RETENTION
BASIN

Wellington Location 440

Joshua Creek



REVISIONS

No	ORIG.	DESIGN	DATE	COMMENTS



100 0 100 200 Meters



ILUKA

ORIG: N.McMULKIN

DRAWN: D.G.S.

SCALE: 1:5 000

DATE: 7 DEC 2001

**BOYANUP
JOSHUA BROOK SUBDIVISION**




PROPOSED DESIGN

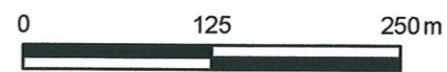
DWG No: YNL0111A

FIGURE : 3



Legend:

-  Lots - proposed and existing
-  Proposed area of bushland to be retained
-  Proposed area to be revegetated



Date of photography: 18 Oct. 2004



ORIG: R.Harvie

DRAWN: D.G.S.

SCALE: 1:5 000

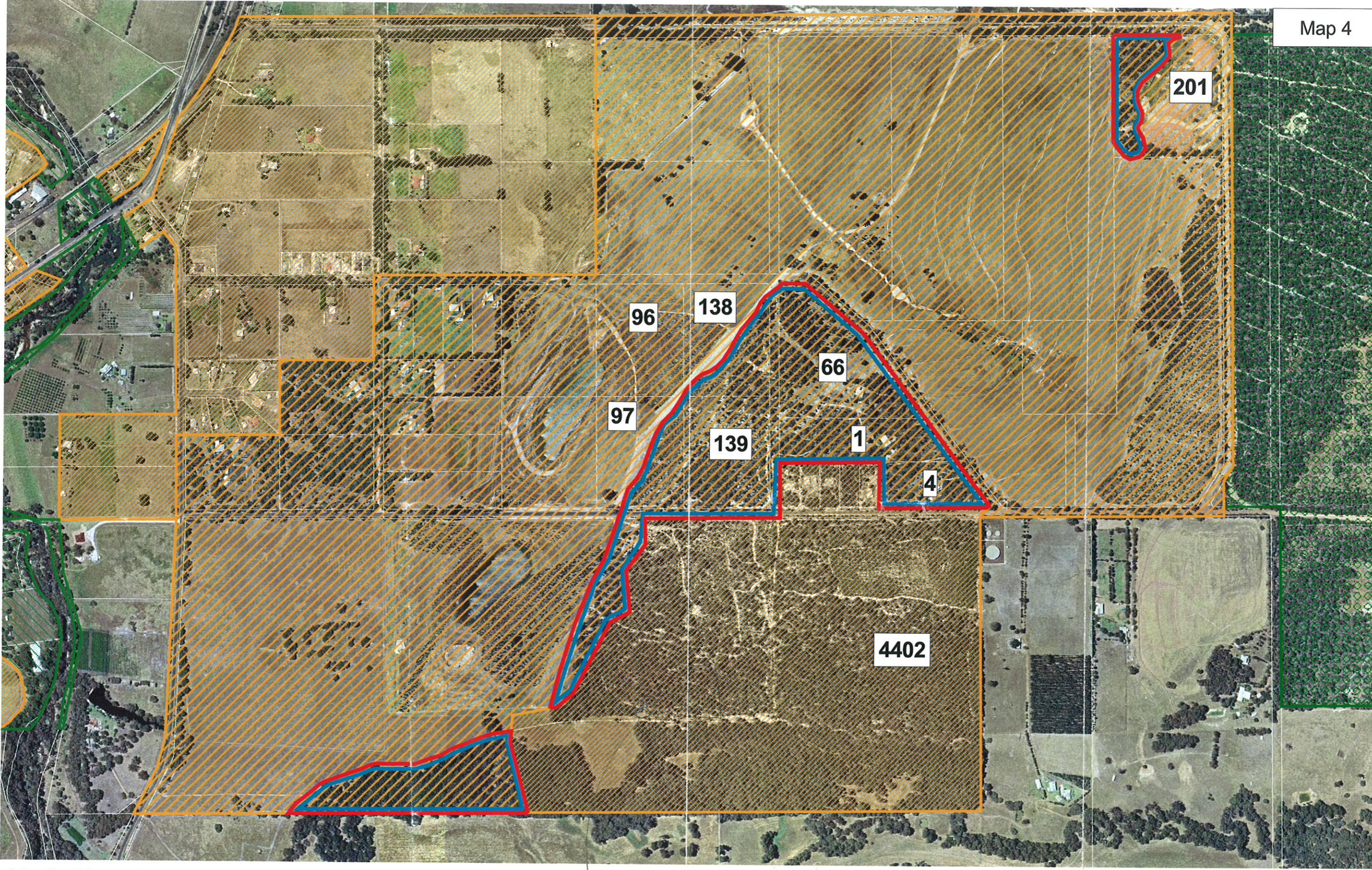
DATE: 7.2.2005

BOYANUP

JOSHUA BROOK
Proposed subdivisional amendment

DWG No: 143869 ver.01



FIGURE: 1



Advertised Greater Bunbury Region Scheme

-  Urban Deferred
-  Urban
-  Regional Open Space
-  State Forest
-  Cadastral boundaries

EPA Recommendations

-  Regionally significant natural area - Should be protected
-  Conserve

Part Lot 201 Gray Rd, Part Lot 4402, Part Lot 97,
 Lot 139 Armstrong St, Lot 1a, 4a, 66 and
 Part Lot 138 Timperley Rd, Boyanup



This map has been produced using various data from other agencies. No responsibility is accepted for any error or omission.

Terrestrial Ecosystems Branch
DEPARTMENT of ENVIRONMENT
Draft Memorandum

ATTENTION:	Gary Williams
FROM:	Bronwen Keighery/John Dell/Gary Whisson
DATE:	19 th March 2005
SUBJECT:	Comment on adequacy of the proposed retained bushland area in the Iluka Joshua Brook Subdivision

General Values of the Iluka Joshua Brook Subdivision

Studies in 2002 for the Draft Greater Bunbury Region Scheme identified the Boyanup (east) bushland remnants to be regionally significant natural areas meeting four criteria, being: *Representation of Ecological Communities, Rarity, Maintaining Ecological Processes and Natural Systems* and *General Criteria for the Protection of Wetland, Streamline and Estuarine Fringing Vegetation and Coastal Vegetation*; and partially meets *Diversity* (see Attachment 1). A significant issue in this ranking was that Remnants 2, 3 and 4 are contiguous with each other through a regionally significant naturally vegetated area, the Iluka Joshua Brook Subdivision.. Studies by Hart, Simpson and Associates Pty Ltd (2001), HGM (2202) and DoE (2002, 2004, 2005) in the area of the Iluka Joshua Brook Subdivision establish that this area meets these same criteria but has added regional value as it contains a significant creekline and is of larger size.

The Iluka Joshua Brook Subdivision contains five principal vegetation units, two being found on the level land, one on the level land and the slopes and two on the slopes down to the creek and the creek bed and immediate banks as outlined below.

Level land

- *Eucalyptus marginata* and *E. haematoxylon* Woodland (north-east corner, not mapped in Hart, Simpson and Associates Pty Ltd 2001)
- *Banksia attenuata* Low Woodland with scattered *Eucalyptus marginata*, *Agonis flexuosa* and *Xylomelum occidentale*

Level land/ Slopes

- *Eucalyptus marginata*- *E. calophylla* Woodland over *Banksia grandis* Low Woodland with scattered *Agonis flexuosa*

Slopes/creek

- *Eucalyptus marginata*- *E. calophylla* Woodland to Open Forest over *Agonis flexuosa* Low Open Forest to woodland and scattered *Agonis flexuosa* (wetland /upland unit, occurring on banks creek and into slopes)

- *Eucalyptus rudis*- *E. calophylla* Woodland over *Agonis flexuosa* Low Woodland to scattered *Agonis flexuosa* (wetland unit)

This vegetation is generally in Excellent/Very Good Condition with some Good to Degraded areas*. An area of *Kunzea glabrescens* Tall Shrubland is also present being regrowth on a previously disturbed area. It would be expected that the following significant flora would be in the area: *Acacia flagelliformis* (P4), *Acacia semitrullata* (P3), *Caladenia speciosa* (P4), *Drosera marchantii* subsp. *marchantii* (P4), *Jacksonia sparsa* (P4); *Dryandra squarrosa* subsp. *squarrosa*, *Acacia pulchella* var. *goadbyi*, *A. urophylla*, *Johnsonia lupulina*, *Styphelia tenuiflora*, *Kennedia coccinea*, *Adiantum aethiopicum* and *Eucalyptus haematoxylon* (underlined species have been observed, others should be present based on spring survey in same units in adjacent area).

The slope area is the principal identified habitat for the Western Ring-tailed Possum.

Comment on the Current Proposal

The original protected area identified in the subdivision included the creekline and part of the slope while the current proposal includes the slope area and the creekline. This proposal has significant advantages over the initial subdivision as it contains

- greater consolidated area, with much larger core;
- majority habitat area for the Western Ring-tailed Possum and largest observed numbers of scats; and
- three of the principal vegetation units.

The values not protected in this proposal are listed below.

- Units on the level land - *Banksia attenuata* Low Woodland and *Eucalyptus marginata* and *E. haematoxylon* Woodland are not included. While both of these units are present in bushland to the north, they are not part of consolidated block and the *Banksia attenuata* Low Woodland in the northern area is in lesser condition (Good with patches in Very Good and Degraded condition). These two units provide significantly different habitat to those in the area proposed to be protected.
- Connection with northern bushland. Four alternatives could be presented to retain this - protection of the entire remnant, selection of a corridor in the *Banksia* Woodland area or on the north-east boundary, or covenanting of bushland areas on each lot. All but the first option have significant problems eg width of corridors, maintaining native vegetation within subdivisions.
- Significant flora species *Dryandra squarrosa* subsp. *squarrosa* not protected (this taxon has only been observed at one other location in similar positions in the landscape). Only one plant was observed. Seed could be collected and used to rehabilitate *Banksia* area in northern block.

*It appears that the best quality *Banksia* Woodland is in the already agreed subdivision area.

ATTACHMENT 1: Summary Regional Significance - Assessment against the Criteria Part Lot 201 Gray Road, Part Lot 4402, Part Lot 97, Lot 139 Armstrong Street, Lots 1, 4, 66 and Part Lot 138 Timperley Road, Boyanup

The Boyanup (east) bushland remnants are considered to be regionally significant natural areas meeting four criteria, being: *Representation of Ecological Communities, Rarity, Maintaining Ecological Processes and Natural Systems* and *General Criteria for the Protection of Wetland, Streamline and Estuarine Fringing Vegetation and Coastal Vegetation*; and partially meets *Diversity*. The natural attributes that contribute to meeting these criteria are listed below.

- Contains areas of vegetation representative of Kingia, Swan, Guildford and Cartis Complexes
- All of native vegetation in the study area is significant, some remnants are small (Remnant 1) and Remnants 2, 3 and 4, are contiguous with each other through a regionally significant naturally vegetated area. Vegetated creeklines of this quality with contiguous upland area rare on the Swan Coastal Plain/Foothills/Plateau interface.
- Diversity of significant flora: *Acacia flagelliformis* (P4), *Acacia semitrullata* (P3), *Caladenia speciosa* (P4), *Drosera marchantii* subsp. *marchantii* (P4), *Jacksonia sparsa* (P3); *Acacia pulchella* var. *goadbyi*, *A. urophylla*, *Johnsonia lupulina*, *Styphelia tenuiflora*, *Kennedia coccinea*, *Adiantum aethiopicum*. Only location of *Eucalyptus haematoxylon* within the present study sites
- This area is significant in the McLarty/Kemerton/Twin Rivers/Preston River/Gwindinup Ecological Linkage and Capel/Boyanup Ecological Linkage containing the only area of its type known to occur in the linkage not already developed for housing or with subdivision approval.
- Contains significant habitat for bird species which have declined elsewhere on the Swan Coastal Plain between Perth and Bunbury and are of regional conservation significance.
- Significant linkage value for species moving between the different habitats of the Capel/Boyanup Ecological Linkage and the McLarty/Kemerton/Twin Rivers/Preston River/Gwindinup Ecological Linkage.

DELL John

From: DELL John
Sent: Monday, 21 June 2004 4:06 PM
To: THORNING Natalie

Hi Nat

I visited Lot 4402 Armstrong Road Boyanup with Bronwen on 13 March 2003. We didnt spend a great deal of time there but noted that it contained very good habitat for vertebrate fauna and was likely to be of regional significance for fauna with the State and EPBC listed Western Ringtailed Possum recorded. Additionally it is likely be a significant ecological linkage with upland and riverine habitats present. Among the 8 bird species recorded on the short visit 3 (Yellow Robin, Golden Whistler and Broad-tailed Thornbill) were listed as regionally significant by Bush Forever as declining species on the Coastal Plain and therefore the site is also likely to be regionally significant for its bird assemblage.

Hope this is useful.

Cheers John

John Jell's field notes.

10/03/05 Koombana Bay.
cloudy raining.

S Gull ca 8.

B Swan 4.

P. Oystercatcher 1.

Wagtail 2.

W Cuckoo ca 6.

W. Swallow ca 10

♂ Teal 5 on inlet

B / Horn g.

Court Hearing 0830

1145. finished leaving Koombana Bay.
rain finished now ca 80% cloud
cool, windy from west

"old" Ptilostyles. site at
reundabent on Armstrong Rd.

Ptilostyles flowers on Jarrah
phygodes.

JOSHUA BROOK Proposed subdivision

Heading south thru lot.

regrowth Jarrah over P. longipetala

B. grandis. + some Mani & Aponis.

lots of food logs.

RIBC g.

at E/W. old track (Junction)

walking.

below E/W track. top of river
slope. Y Robin g.

- ①. Kingbird 14 seats on logs etc
in 5 minutes search;
damp so hard to predict age.
under Aponis / Mani / Jarrah.

ARKI

② Rightail 6 seats in
Rivers Agonis / K rudi
in 5 mins.
Lygona 2

③ East of N/S track 50m up
from E/W track in Jarrah / Manni Reserve.
outside main Agonis only
few scattered trees.
Brushtail 16 seats } 5 mins
Rightail 2 seats }

④ W. of N/S track 50m up
from E/W track
Lygona 1
Whitethroats
Raven 1

Brushtail 18 }
Rightail 4 } in 5 mins

⑤ Rightail 12 } 5 mins
Brush 14 }
ca 100 euc on W. of N/S.
Jarrah / Manni + occ clumps
of Agonis. Rightail are under Agonis
C. piper 1 int
P. chonk 2

⑥ 100m further up on E of N/S Jarrah some Manni
no Agonis. Transition sand
top develops to Banksia

Brush 23 } 5 mins
Rightail 8 }

⑦ Same to W of N/S track
Brush 2 in 5 mins

⑧ 100 looks up Jarrah
B. atten few logs & stumps
NIL in 5 min.

Spinelid eg.
RTBC eg
A.F. eg

⑨ Same to east of N/S
Brush 21 in 5 min
Spinelid eg

Back to Dilochyles block
reworked Marni + some Jarrah
on laterite/sand.
= reworked after bulldozing
ca 20-30 yrs.
Q Roo 7
BT eg
Lerysone eg

to work now into B. atten on
Sand then Jarrah on site
SI eg.
Lerysone in Jarrah
PLP.

10x10 m quadrat near Dilochyles cas

YTT3. }
A.F. } Dilochyles cone
Lerysone }

Spinelid 1 between Bamswick
Tuck & Benge.

Freeway / Mandjany per Tunc (M)
& Regent Parrots.

Freeway opp Zoo 75
Carriway's going SE