



ATTACHMENTS

Planning and Development Committee Meeting

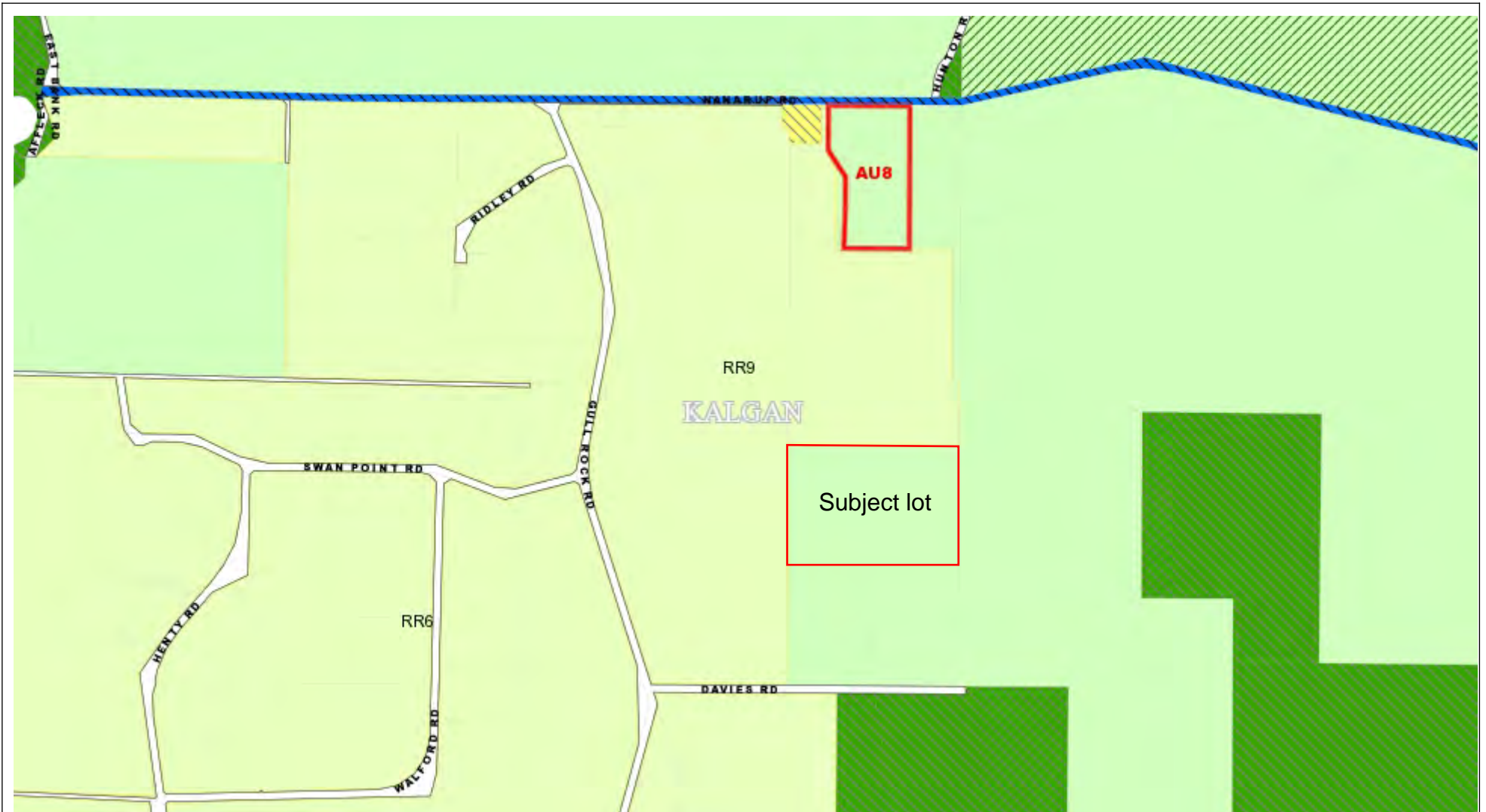
05 August 2015

5.30pm

City of Albany Council Chambers

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Wednesday, 15 July 2015

1:15000



Attachment 2 – Albany Local Planning Strategy Excerpts

Section 8.3.1 Strategic Settlement Direction

Section 8.3.1 *Strategic Settlement Direction* of the *Albany Local Planning Strategy 2010* (ALPS) sets the following strategic objective:

“Facilitate and manage sustainable settlement growth for the urban area in the City of Albany”

The ALPS sets out the following aims to achieve this objective:

“The ALPS aims to contain the spread of fragmented urban and rural living areas in the City by:

- *Providing for growth in urban areas, rural townsites and rural living areas as designated in ALPS.*
- *Minimising the development footprint on the landscape to help protect biodiversity and the environment.*
- *Promoting energy conservation.*
- *Providing greater housing choice.*
- *Minimising journey length from home to work/school/services and encouraging the use of public transport, cycling and walking.*
- *Reducing government expenditure on servicing current and future populations.”*

Section 8.3.5 Rural Living

Section 8.3.5 *Rural Living* of the ALPS sets the following strategic objectives:

“In the long term encourage the efficient use of existing rural living areas, based on land capability to maximise their development potential.”

“Ensure that future rural living areas are planned and developed in an efficient and co-ordinated manner by being located either adjacent to Albany as designated on the ALPS maps, or within existing rural townsites in accordance with Table 5 along with adequate services and community infrastructure.”

The ALPS expands on this by stating that *“The strategy’s objectives for Rural Living areas are to:*

- *Discourage the creation of additional rural townsites for living purposes.*
- *Avoid the development of Rural Living areas on productive agricultural land, other important natural resource areas and areas of high bushfire risk, flooding and environmental sensitivity.*
- *Avoid the development of Rural Living areas on future and potential long-term urban areas.*
- *Provide compact growth of selected existing rural townsites in accordance with Table 4, based on land capability and available services and facilities.*
- *Minimise potential for generating land-use conflicts.”*

Section 8.5.4 Tourism

Section 8.5.4 *Tourism* of the ALPS sets the following strategic objective:

“Encourage sustainable rural tourism uses and developments in location that are compatible with existing land uses, especially agriculture activities”.

The ALPS expands on the matter of tourism as follows:

“The ALPS supports tourism activities in the City’s rural areas because it broadens Albany’s economic base and provides additional jobs, particularly within or near existing townsites and settlements. Tourism developments need to be located, designed and managed in ways that protect and enhance an area’s scenic and environmental attributes”.

The ALPS also recommends the following actions to achieve the above tourism objective:

“Encourage the development of sustainable tourism uses and proposals that integrate with the City’s unique natural and man-made landscape and heritage values”.

“Put in place in the LPS1 necessary mechanisms to accommodate contemporary tourism development proposals”.

CITY OF ALBANY

LOCAL PLANNING SCHEME NO. 1

AMENDMENT No. 12

MINISTER FOR PLANNING

PROPOSAL TO AMEND A LOCAL PLANNING SCHEME

LOCAL AUTHORITY:	CITY OF ALBANY
DESCRIPTION OF LOCAL PLANNING SCHEME:	LOCAL PLANNING SCHEME No. 1
TYPE OF SCHEME:	DISTRICT SCHEME
SERIAL No. OF AMENDMENT:	AMENDMENT No. 12

PROPOSAL:

Rezoning Location 1879 Davies Road, Lower Kalgan from the 'General Agriculture' zone to the 'Rural Residential' zone and 'Parks & Recreation' reserve.

LOCAL PLANNING SCHEME No. 1

AMENDMENT No.12

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2. REPORT
3. EXECUTION
4. PROPOSED ZONING
5. EXECUTION

October 2014

PLANNING AND DEVELOPMENT ACT 2005

**RESOLUTION DECIDING TO AMEND A
LOCAL PLANNING SCHEME**

CITY OF ALBANY

LOCAL PLANNING SCHEME No. 1

DISTRICT SCHEME

AMENDMENT No. 12

RESOLVED that the Council, in pursuance of Section 75 of the Planning and Development Act 2005, amend the above town planning scheme by:

Rezoning Location 1879 Davies Road, Lower Kalgan from the 'General Agriculture' zone to the 'Rural Residential' zone and 'Parks & Recreation' reserve.

Dated this _____ day of _____

CHIEF EXECUTIVE OFFICER

CITY OF ALBANY

LOCAL PLANNING SCHEME NO. 1

AMENDMENT NO. 12

PLANNING REPORT

LOT 1879 DAVIES ROAD, LOWER KALGAN

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1. INTRODUCTION

Lot 1879 is located within a Rural Residential Development Precinct as set out in the City of Albany's Local Planning Strategy.

The policy for the area indicates that Council will generally support proposals for rural residential development subject to compliance with relevant general policies and management of identified issues.

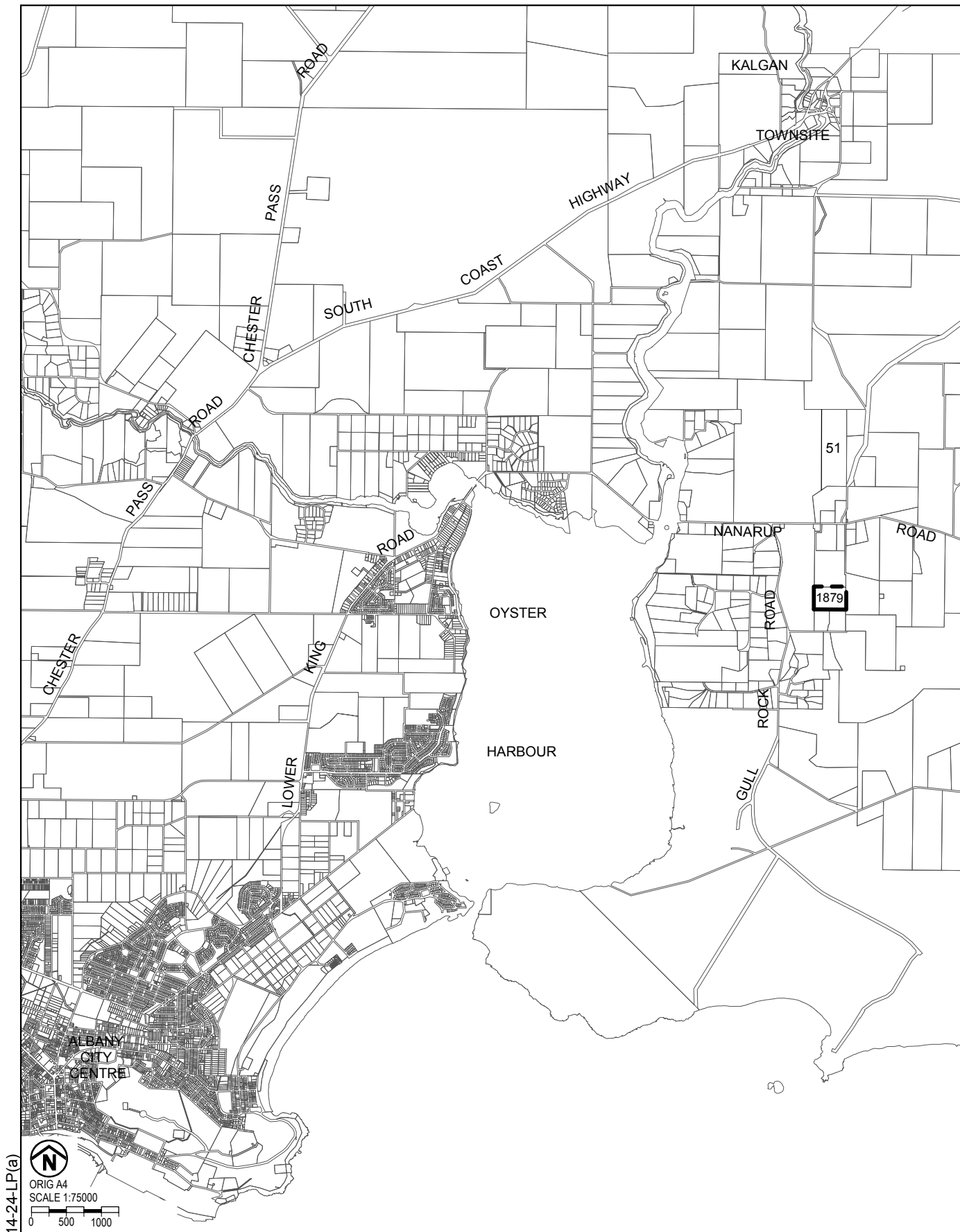
As the adjoining properties to the north and west have already been zoned for rural residential purposes and are currently subject to detailed subdivision application, the owners of Lot 1879 wish to extend that zoning so that infrastructure planning can be co-ordinated with the adjoining developer.

The following report provides background information in support of the rezoning.

2. LOCATION, AREA & ZONING

Lot 1879 is located between Nanarup Road and Davies Road, some 16 kilometres northeast from the Albany City Centre. Refer Location Plan. The site is located on elevated land with outstanding views over Oyster Harbour and King George Sound.

The property is 14.1640ha in area and is currently zoned 'General Agriculture' under the provisions of Council's Local Planning Scheme No. 1.



3. PLANNING CONTEXT

The key planning document within rural areas of the City of Albany is the Local Planning Strategy. As noted in the introduction, the property is located within a precinct identified for Rural Residential zoning, subdivision and landuse.

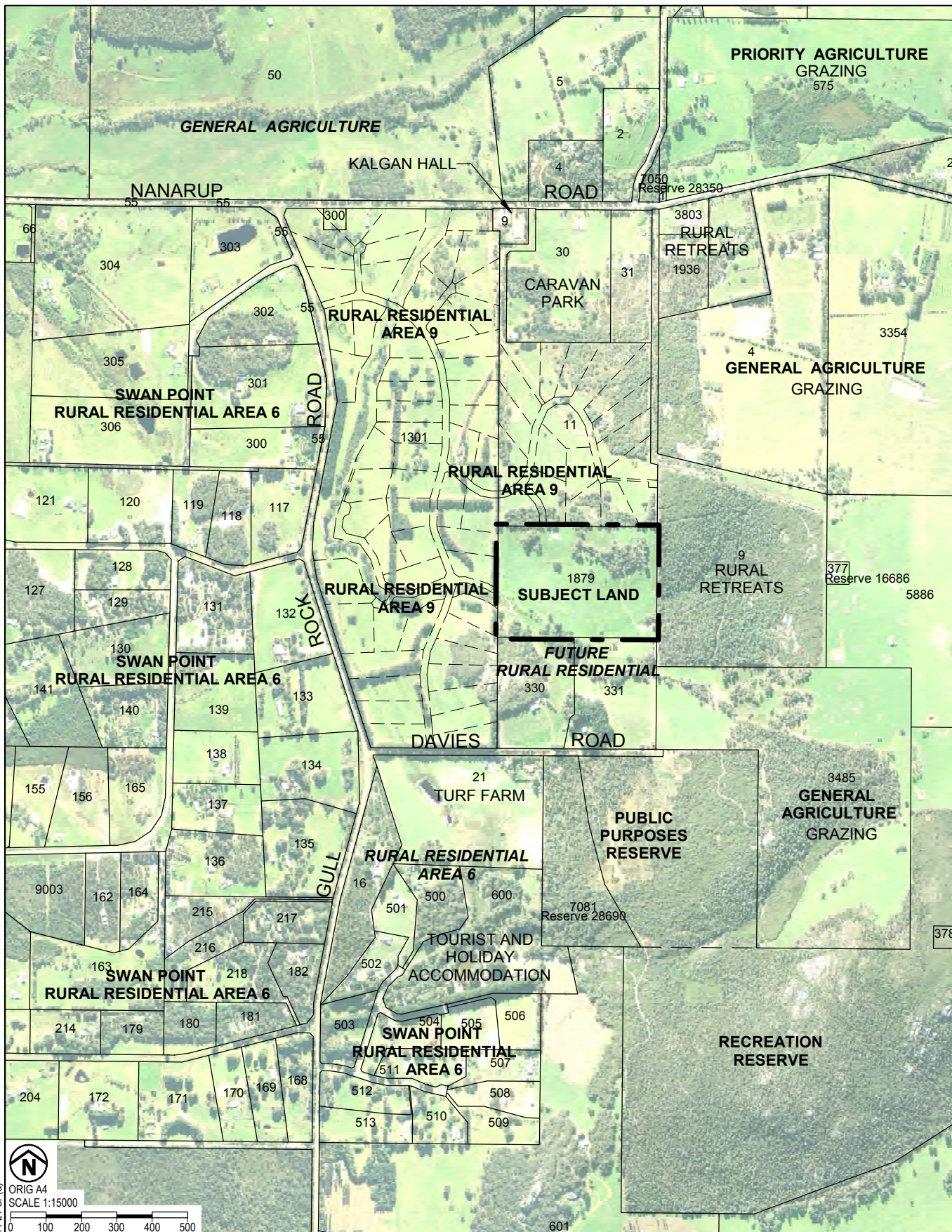
This has followed the rationale and arguments for same contained within the previous Rural Strategy as follows:

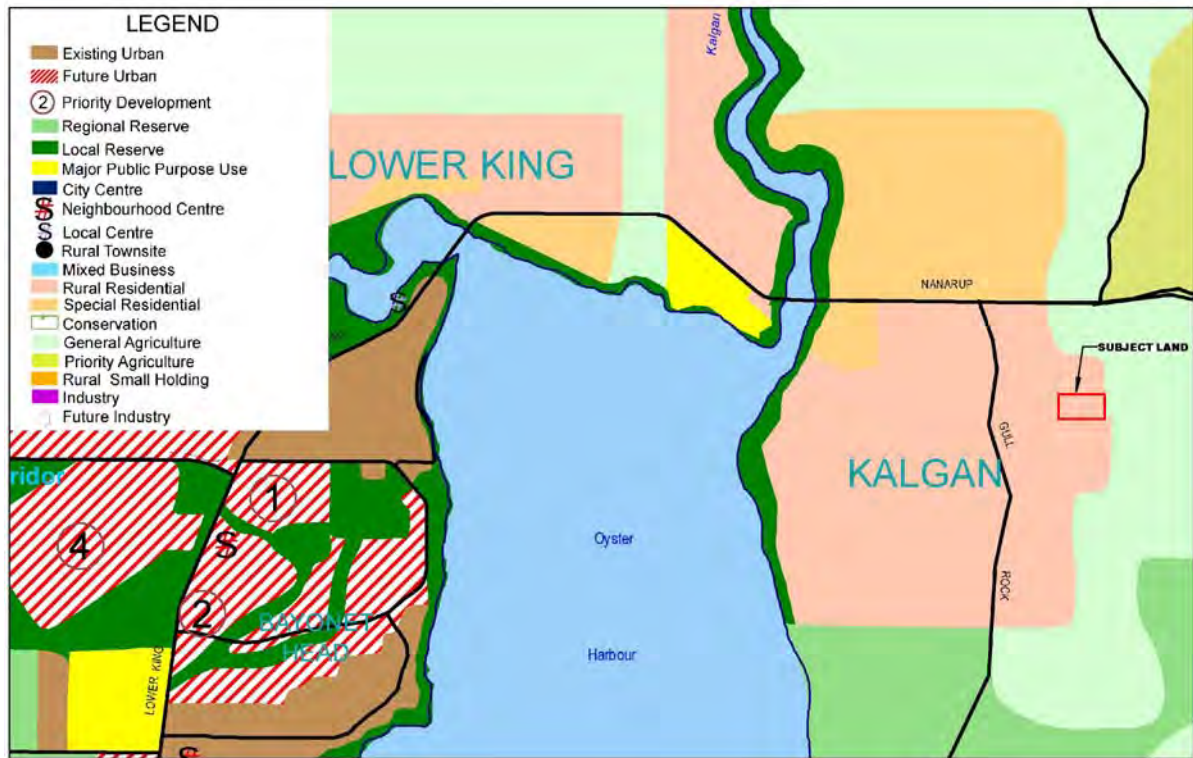
Policy Justification

- a) Due to its undulating topography, scenic quality and the spectacular views it affords, the area has the potential for both rural residential development and small scale tourist development;
- b) Land in the area generally has a high or moderate capability for housing development;
- c) Revegetation of cleared areas and protection of existing remnant vegetation would be achieved as a result of subdivision; and
- d) Sealed road access is available.

Identified Constraints and Land Management Needs

- a) The area generally needs revegetation (particularly that part of the area adjacent to Gull Rock Road) and existing remnant vegetation needs protection from stock;
- b) Low lying areas and creek lines need to be revegetated to prevent further erosion and minimise nutrient runoff;
- c) Land uses need to be established such that nutrient losses to the Kalgan River and Oyster Harbour are prevented;
- d) Some steep slopes are unsuitable for development (or where pole or pier construction may be appropriate);
- e) Some low lying areas may be unsuitable for development.





Excerpt from City of Albany Local Planning Strategy

4. SITE DESCRIPTION

(REFER TO LANDFORM RESEARCH ATTACHMENT I)

Location 1879 lies on the western flanks of Mount Mason North to the east of Oyster Harbour.

The land accommodates a substantial dwelling and associated outbuildings in the north east. Access is provided by a formal Right of Carriageway through to Davies Road.

The general area has been used for agriculture for many years. The more capable soils are cleared, although portions of the more rocky soils in the north of the site remain as grazed remnant vegetation. Properties in this area were first settled in 1834, when Patrick Taylor established a farm to the north of Nanarup Road.

The Lower Kalgan area has experienced changes in land uses in recent years with significant portions of the area being converted to small rural holdings and lots. The adjoining land to the west and north has been subdivided to rural living lots.

Some land use diversification has been locally occurring on a small scale, to orchards, horticulture, small scale tourist accommodation and hobby farms/rural industries.

5. EXISTING ENVIRONMENT

(SOURCE: LANDFORM RESEARCH ATTACHMENT I)

5.1 Geology and Geomorphology

The site lies on the western flanks of Mount Mason North dropping from ≈148 metres AHD in the north eastern corner down to 110 metres in the south western corner. Mount Mason North is a remnant granite/gneiss hill that has been of a similar form during recent geological time.

The granite and gneiss of Proterozoic age, with included occasional dolerite dykes were once covered by a laterite soil profile across the landscape, although this has been largely removed from Location 1879 apart from some gravel in some upper soil profiles.

Weathering of the granite to the east has released medium grained quartz sand that has been deposited in the small valley in the south.

5.2 Soils

Three main soils exist across Location 1879, reflecting the various regolith history of the weathering granite/gneiss basement.

Brown Gravelly Loams occur on the lower slopes in the east. These soils have yellow brown sandy gravel to 400 mm over lighter brown and yellow brown loam and clay subsoils.

These loam soils are developed on the deep weathering profile of the granite/gneiss basement with laterite gravel shed from upslope and degeneration of the laterite soil profile added to the upper horizons.

Slopes are moderate.

Brown Sand over Loam Duplex

These occur on the lower slopes with sand to depths of approximately 300 mm over lighter brown and yellow brown loam and clay subsoils. The sands are medium grained quartz sand shed from weathering of granite up slope. Sand is more prominent at lower elevations along the creek line in the southwest.

These loam soils are developed on the deep weathering profile of the granite/gneiss basement with quartz sand shed from upslope being added to the upper soil horizons.

Slopes are moderate to steep.

Rocky Loam

Where the basement granite has been exposed in the north and northeast, brown loam and yellow brown loam with sandy surface horizons are present.

Basement granite/gneiss rock outcrop is frequent and slopes tend to be steeper.

The key soil types are listed below.

KEY	SOIL TYPE	DESCRIPTION
S/L	Brown Sand over Loam Duplex	Medium grained quartz sand depths of approximately 300 mm over lighter brown and yellow brown loam and clay subsoils. Sand is more prominent at lower elevations along the creek line. Slopes are moderate to steep, becoming steeper upslope.
R	Rocky Soils	Dark brown loam grading to lighter clays between common and frequently large granite outcrops. Steep slopes.
GL	Brown Gravelly Loams	Yellow brown sandy gravel to 400 mm over lighter brown and yellow brown loam and clay subsoils. Slopes are moderate to steep.

5.3 Climate

Weather data is recorded at Albany, but the local climate may be slightly different due to the orographic effects of the slopes of North Mount Mason.

The overall climate however is warm, dry summers with cool, wet winters.

Rainfall at Albany is about 800 mm per year.

Temperatures have summer maxima of 25°C in the hottest months down to just over 15°C in the coldest months, July and August. Minimum temperatures range down to 10 ° C in the coldest months. The cool winter temperatures can assist potential fruit crops that require a chill factor. Frosts are not common.

Annual evaporation is less than 1000 mm per year, with rainfall exceeding evaporation for almost nine months of the year.

5.4 Vegetation

The better soils have been cleared apart from scattered trees which generally remain on the upper slopes in the north which were not suitable for cultivation but have been grazed.

Rare and Priority Species

A search was made of the CALM and WA Herbarium databases prior to the site inspection. The perennial species listed on those databases are generally easily recognised and would be observable at this time of year. Whilst it was the wrong time of the year to observe annual species such as the Orchidaceae, they are unlikely to be present based on the lack of species, understorey and amount and continued grazing.

No Declared Rare or Priority species were observed during the site inspection.

The tree species are Jarrah *Eucalyptus marginata* in one patch in the central north with Marri *E. calophylla* in the remainder and on the slopes. One plant of *Kingia australis* was observed associated with the granite outcrop. The vegetation was probably originally Jarrah-Marri Low Forest. *Agonis linearifolia* Thicket occurs along the creek line, with the introduced Black Wattle *Acacia decurrens* occurring on the creekline in the central south.

Species List

All species noted during the site inspections are listed below:

Family	Genus/Species	Remnant Jarrah-Marri Low Forest	Creek line
Dasygogonaceae	<i>Kingia australis</i>	X	
Mimosaceae	<i>Acacia decurrens*</i>		X
Myrtaceae	<i>Agonis linearifolia</i>		X
	<i>Eucalyptus calophylla</i>	X	
	<i>Eucalyptus marginata</i>	X	

Vegetation Condition

Remnant tree cover only occurs along the creek line and associated with the granite outcrops in the north.

The vegetation condition is classified as "Completely Degraded" with a clump of "Good" condition associated with the creek.

5.5 Surface and Groundwater

Water runoff from the area can be significant during storm events down the steeper slopes to the creek.

The quality of the water in the creek at the time of the site inspection was 70 mSm or 385 mg/L salt, which is fresh (potable <180 mSm).

No seepages were observed on the upper or lower slopes.

5.6 Fauna

The amount of fauna is directly related to the proportion of remnant indigenous vegetation. Even isolated trees have habitat potential and the clumps of remnant trees are correspondingly important. The scattered trees in the north, and the vegetation associated with the creekline, will provide habitat for birds, with some small reptiles likely to be associated with the granite outcrops. Frogs are likely along the creek line.

The survival of fauna is dependent on the retention of habitat, land uses on already cleared areas and education of landholders.

5.7 Heritage

Aboriginal Sites

The Department of Indigenous Affairs database has no known aboriginal sites recorded for the property. Clearing was commenced generally in the area in the mid 1830's and thus much of the site has been disturbed for many years. On the other hand aboriginal sites are known from nearby, such as the stone fish traps in Oyster Harbour. There are many developments in closer proximity to the fish traps than this site.

European Heritage

Whilst the site has been farmed for many years there are no heritage features on site.

6. HYDROLOGICAL ASSESSMENT

(SOURCE: LANDFORM RESEARCH ATTACHMENT I)

Surface water runoff can be significant from sloping land such as this during storm events and in winter when the soils are saturated.

Calculations of runoff can be estimated based on Coles and Moore, 1998, *Runoff and Water Erosion*, in Soil Guide, Agriculture WA, Bulletin 4343 which assumes approximately 70 mm runoff for an 800 mm rainfall and a 90% exceedance rate. Runoff from the granite outcrops is likely to be greater.

Small quantities of water could be captured by dams located on the slopes but without seepages these may not hold water through summer. Water is associated with the creek, and a bore or dam may be possible adjacent to the watercourse.

In general therefore there is only likely to be sufficient water for stock, and with small rural lifestyle lots scheme or other water may be required to supply stock.

A calculation of the quantity of water able to be captured can be made.

Using a conservative figure of 70mm runoff from the loamy slopes and say 100mm for steeper slopes this will generate 700 - 1000 kL/ha/year. Water harvesting techniques may have to be used. These would include:

- Forming contour drains feeding to storage dams in lower elevations. The contour drains will need to be cut into the clayey subsoils.
- Directing the collected water to dams.

Water quality is expected to be good and suitable for all uses.

Potable water can be readily provided by 90 000 - 140 000 litre rainwater tanks.

7. ALTERNATIVE LANDUSES

(SOURCE: LANDFORM RESEARCH ATTACHMENT I)

Whilst the site has some good quality soils, the soils are steep and there is a significant amount of rocky soils with granite outcrop. The site is also restricted by the creek in the south. Land to the and north has been subdivided to rural living. When taking into account all the factors, a change to rural living is possibly a likely and desirable outcome depending on planning issues.

A change of land use could provide reductions in nutrients and help satisfy market demands for lots of this type.

8. GEOTECHNICAL FACTORS

(SOURCE: LANDFORM RESEARCH ATTACHMENT I)

8.1 Foundation Stability

Whilst the site is underlain by granitic rocks, the steeper slopes and subsoil loam and clay require consideration when developed. However the soil conditions are similar to the steeper parts of the Albany townsite.

Restrictions on foundation conditions can be overcome by engineering input and design.

Slopes across the site vary from 10 to 15% with minor localised steeper areas.

Foundation stability is provided in the table below for the soil types present, but is generalised only for those soil types. Depending on the nature of the proposed development, the design and earthworks, Site Class P may apply. For example constructions requiring more than 400 mm natural fill and/or 800mm sand fill should be classified as Site Class P to ensure adequate compaction to prevent differential settling.

Winter rainfall has not been as great over the past few years and the soils are not as wet as they would have been previously. In a sequence of wet years it can be expected that the soils of the lower slopes would have higher moisture levels, based on the duplex nature of the soils.

Management Actions that may be used to improve foundation stability could include but not be limited, to the following. See Australian Geomechanics Journal March 2000 (*Landslide Risk Management*). The following are engineering practices for sloping soils that have been used, for example, in the construction of dwellings within the Albany townsite.

- Provide upslope cut off drains
- Do not load soils with water, up slope of developments.
- Minimise the depth of cut and fill.
- Ensure natural soil fill is adequately compacted, especially where dry clay is used as fill in summer.
- Provide retaining walls and structures for fill.
- Retain trees on steeper slopes and plant further trees.
- Consider the use of flexible or split level structures
- Secure or remove any loose boulders
- In some situations sub-surface drainage may be required.
- Place retaining walls on natural basement rock where possible
- Design for lateral creep pressures on slopes.
- Use rows of piers or strip footings orientated up slope on sloping ground.
- Design drains to minimise erosion.
- Minimise water loading of soils.

Soil Description	Foundation Soil Stability	AS 2870 Site Class	Ease of Excavation	Constraint which may be present. See Table in Appendix 3
Brown Sand over Loam Duplex	Moderate	S - M *	Moderate to high	a c t
Rocky Soils	High	S - M *	Can be very low	a k n r v x
Brown Gravelly Loams	Moderate	S - M *	Moderate to high	----

* Site Class P may apply. For example constructions requiring more than 400 mm natural fill and/or 800mm sand should be classified as Site Class P to ensure adequate compaction to prevent differential settling. Individual site assessments are recommended for developments because soil conditions change laterally.

Geotechnical issue	Management
Foundation Stability	<ul style="list-style-type: none"> • See the above Management Actions for some methods of reducing potential foundation limitations on steeper slopes and more clayey soils. • Compaction of clay fills can be difficult when dry or may potentially expand when wetted. Clay is therefore not recommended for fill. • Foundation stability for developments on the more gentle slopes is high, AS 2870 Site Class S but M on steeper slopes. • Developments requiring more than 400 mm fill may be AS 2870 Site Class P with engineering input into the design and placement of footings. • Clay based fill should not be loaded with water from above as this will decrease stability. • Individual site assessments are recommended for developments because soil conditions change laterally.

8.2 Drainage & Flood Risk

Flood data is not known, but on geomorphological and field evidence, the only risk areas are storm flows from upslope which will be minor and localised and along the creekline for which setbacks will apply.

Geotechnical Issue	Management
Flood Risk	<ul style="list-style-type: none"> Setbacks from the creek will be required.

8.3 Stability of Dams

There is potential for dams to be located on slopes. Construction is recommended to be by an experienced operator because of the risk of slope failure for inadequate structures.

Geotechnical Issue	Management
Stability of Dams	<ul style="list-style-type: none"> Any dam should be constructed by or supervised by an experienced operator. Dwellings should not be located downstream of dams.

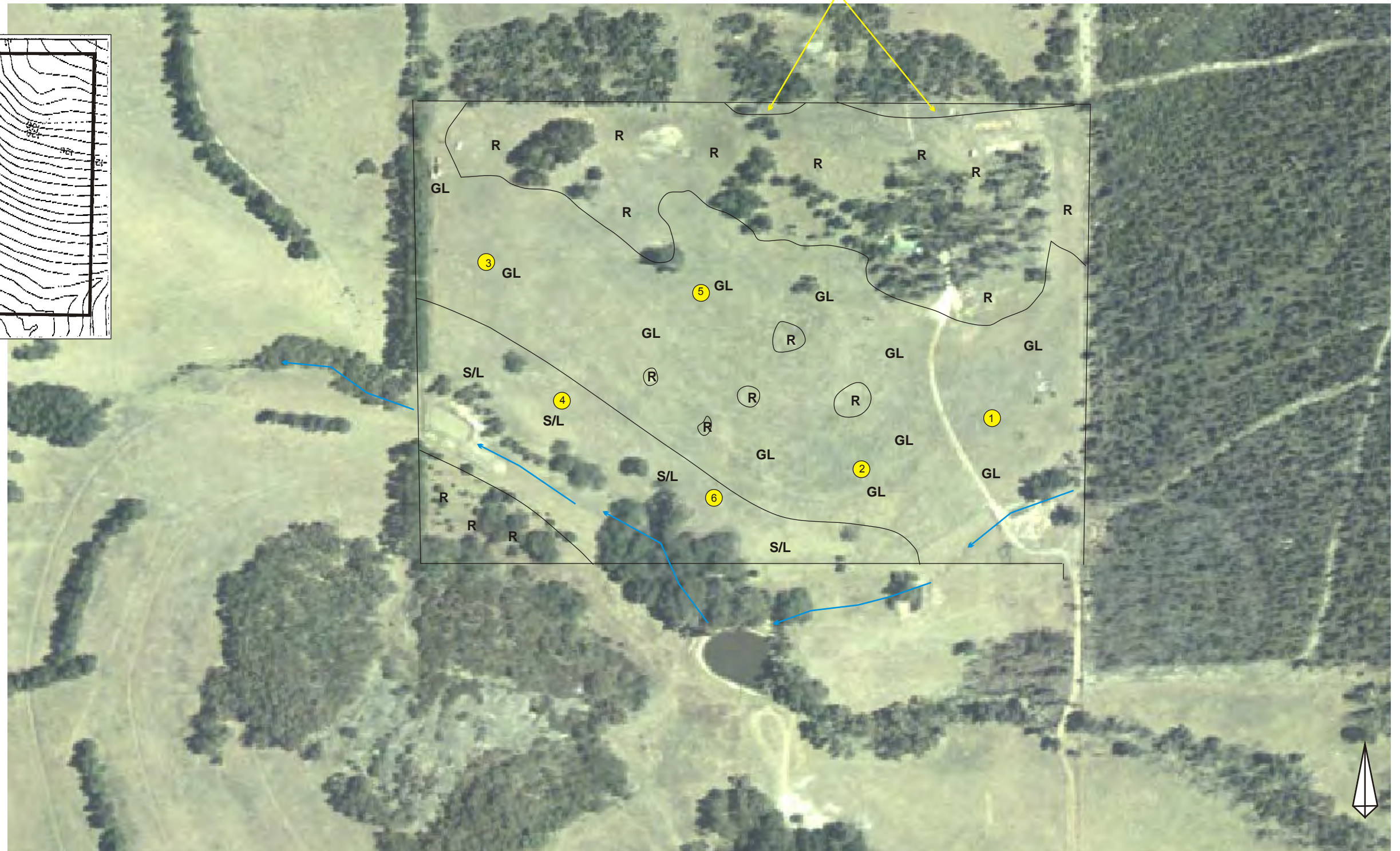
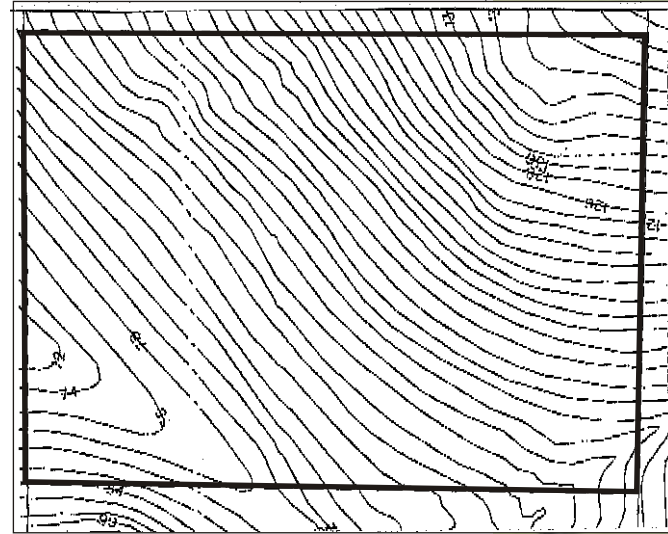
8.4 Capability for On Site Effluent Disposal

Phosphate Retention Indices (PRI) of all soils on site are high when compared to the database of type soils held by Landform Research for PRI and with Chemistry Centre data. However the sandy upper soil horizons that occur on top of some soil units have reduced water retention and therefore lower phosphate retention. For example wastewater could run laterally through the more sandy surface soils especially near the creek and not be retained for sufficient time within the soil profile.

PRI tests can frequently be misleading because all materials greater than 2 mm are sieved from the sample prior to testing. This means that a gravelly material will have the phosphate retaining gravel removed from the sample prior to testing, most likely resulting in a PRI value much different to the actual situation. On the other hand clay normally has a high PRI, but in the field duplex soils and reduced permeability means that nutrient enriched water will often not or only slowly penetrate the clay layer. This can show lower phosphate retention in the field than indicated by the PRI. In the case of the subject land interpretations of the nutrient management of the soils is felt to be more valid.

Nitrogen loss will occur in moist soil conditions through denitrification if water is retained for sufficient time. See 9.6 Nutrient Management.

Soil Description	Effluent Disposal	Comment
Brown Sand over Loam Duplex	Low to High	See following Table
Rocky Soils	High where wastewater is contained in loam soils between outcrops, otherwise very low	See following Table
Brown Gravelly Loams	Moderate to High	See following Table

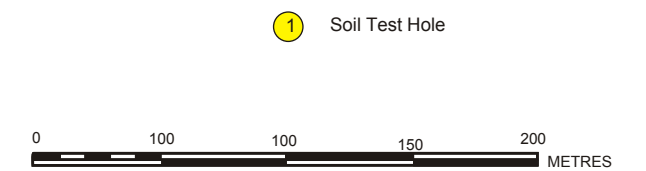


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KEY	SOIL TYPE	Foundation Stability	Effluent Disposal	Constraint See Table
S/L	Brown Sand over Loam Duplex	S-M*	Low to High	act
R	Rocky Soils	S-M*	Generally low but can be High where waste water is confined to loam soils	aknrvx
GL	Brown Gravelly Loams	S-M*	Moderate to High	---

* Site Class P may apply. For example constructions requiring more than 400 mm natural fill and/or 800 mm sand should be classified as Site Class P to ensure adequate compaction to prevent differential settling.

Individual site assessments are recommended for developments because soil conditions change laterally.



SOILS - LAND CAPABILITY
LOCATION 1879, DAVIES ROAD,
LOWER KALGAN

Landform Research November 2004
 Basemap DOLA Air Photo Scale 1 : 3 000 at A3

Permeability and Infiltration Results

No permeability or infiltration tests were conducted on this site. Samples were conducted on the adjoining lots to the north and west in the same soil types and these can be used to indicate the permeability because they were undertaken in winter conditions.

Those infiltration tests were established according to the Health Regulations. However no aggregate was used and the holes were not scraped out the next morning because it was felt that this gives a more realistic reading, with the settled clays being similar to organic sludge that can accumulate in leach drains. Testing soils in this manner cannot compensate for any microspores in the soil due to invertebrate or other soil fauna activity that may not occur under a leach drain.

Based on those tests and soil observations some subsoils with a significant clay content had slow infiltration of greater than 60 minutes for 25 mm. The upper soil horizons were found to be better. Therefore inverted and semi inverted leach drains or alternative wastewater treatment systems are recommended.

Geotechnical Issue	Management
Site Capability for Effluent Disposal	<ul style="list-style-type: none"> • Conventional septic systems are recommended to be inverted or semi inverted, and banded by natural loam or gravel soils on the down slope side or installed with an impermeable membrane setback from the side of the leach drain on the down slope side to assist in waste water penetrating the natural soils. • Alternative effluent systems are with wastewater disposal areas to be sized according to underlying subsoil permeability. 10L/m² is regarded as acceptable. • Appropriate setbacks will be required from water bodies. A buffer of 50 metres for development and alternative wastewater disposal and 100 metres for a conventional septic system to the creek line is recommended. • Stormwater drainage and retention may be required.

8.5 Landscape Risk

The site is underlain by granitic basement close to the surface, with frequent outcrop in the central and northern parts.

An assessment of the Landslip Risk using Australian Geomechanics Guidelines lists a Low to Moderate Risk of minor structural damage such as separations, cracking and minor movements on the steeper slopes.

Potential slippage on slopes relates to foundation stability and is considered under 8.1 Foundation Stability. Under that section a range of potential management actions are listed, based on the Australian Geomechanics Society Guidelines, together with the site classification based on AS2870. Some sites may require a Site Class P where engineering input is required.

Geotechnical Issue	Management
Landscape Risk	<ul style="list-style-type: none"> Covered by the considerations in 5.1 Foundation stability.

9. ENVIRONMENTAL MANAGEMENT

(SOURCE: LANDFORM RESEARCH ATTACHMENT I)

The following items are identified as the most likely to impact on the environment. These items can be managed by the implementation of the management recommendations. Other items are unlikely to impact or the impact is regarded as small.

9.1 Aesthetics

The site lies to the south of Nanarup Road protected visually from Nanarup Road by being located on a south facing slope.

Portion of the site will be able to be seen from Gull Rock and Davies Road, but only as glimpses.

Developments will be partially protected by existing vegetation on site and on adjoining properties.

The colour and style of developments should be visually compatible with the area.

Environmental Issue	Management
Remnant Vegetation	<ul style="list-style-type: none"> Development should include preservation of existing remnant vegetation. Mature trees should be preserved and protected from grazing pressure.
Dwellings, fences and other developments are to be aesthetically compatible with the area.	<ul style="list-style-type: none"> Restrictions can be placed on the use of visually non compatible materials.
Potential Land Uses	<ul style="list-style-type: none"> Scattered dwellings on smaller rural holdings are becoming more common in the Kalgan area, even on sloping sites. For example adjoining subdivisions to the north and west. The existing trees, landform and roadside vegetation provide screening from most of the surrounding areas.

9.2 Preservation of Agricultural Land

Whilst the site has some good quality soils they are steep (for agricultural purposes) and there is a significant amount of rocky soils with granite outcrop. The site is also restricted by the creek in the south. Adjoining land to the north and west has been subdivided to rural living.

The site forms a disjointed smallholding in an area currently experiencing subdivision pressure and therefore this loss of less productive land will not be significant.

Environmental Issue	Management
Protection of Agricultural Land	<ul style="list-style-type: none"> Significant constraints apply to agriculture use on site and the loss of this type of land is not considered significant.
Soil Preservation	<ul style="list-style-type: none"> Restrictions could be placed on stocking rates to Agriculture WA standards, to ensure soil preservation on the soils.

9.3 Landuse Buffers

The adjoining land to the north and west has been subdivided to rural living and thus the land use on site is compatible with those land uses. Dwellings are present to the south and the land to the east is remnant vegetation.

Environmental Issue	Management
Lot Sizes	<ul style="list-style-type: none"> Lot sizes are more related to planning issues than land capability. Most soils are capable of effluent disposal systems on lots as small as 2 000m², although planning and servicing considerations will determine the actual lot sizes, which will be larger than this minimum size.
Buffers	<ul style="list-style-type: none"> No special buffers required.

9.4 Rivers & Streams

There is only one watercourse in the south of the site.

A buffer for development from this creekline is recommended. This could be 50 metres for development and alternative wastewater disposal and 100 metres for a conventional septic system. Natural regeneration (*Agonis linearifolia*) of this buffer would occur from the existing vegetation if stock were excluded and the *Acacia decurrens* are removed.

Environmental Issue	Management
Stream Side Vegetation	<ul style="list-style-type: none"> It is recommended that there be no clearing of the vegetation along the watercourse.
Stream Flows	<ul style="list-style-type: none"> Stream flows entering the site are unlikely to be available to future landholders who may not hold riparian rights. Environmental flows should be maintained, and any dam or bore should be set back from the watercourse.

9.5 Flora & Fauna

The only remnant vegetation are scattered Eucalypt trees (see 5.4 Vegetation).

Stream side vegetation should be retained. There is an opportunity to form a corridor along the creek line to link to the remnant vegetation to the east.

The protection of flora, fauna and biodiversity depends on the maintenance and enhancement of habitat. As the vegetation is recommended to be retained and linkages upgraded, the existing fauna is unlikely to be significantly impacted on by any changes in land use on the existing cleared areas.

Environmental Issue	Management
Flora and Fauna Corridors	<ul style="list-style-type: none"> • Mature trees should be preserved where possible. • Clearing restrictions and the use of building envelopes are recommended to be applied to the remnant trees. • Stream line vegetation and vegetation associated with rock soils and outcrops should be protected. • It may be possible, when considering additional screening belts, to link the vegetation remnants along the creek towards the remnant vegetation to the east.
Remnant Vegetation	<ul style="list-style-type: none"> • See Flora and Fauna corridors above.

9.6 Nutrient Management

Currently potential nutrient export comes from the washing of fertiliser, soil particles and manure down the sloping soils to the creek line during the significant rainfall events. The worst time for nutrient export from grazing is during summer storms and in winter when the soils are saturated.

The presence of dung beetles increases the rate of nutrient recycling and thus reduces the potential for nutrient export.

As the site is proposed for rural smallholdings wastewater disposal will be the main issue.

Effluent Disposal

The capability of the soils for wastewater disposal is considered under 8.4 Capability for Onsite Effluent Disposal. This section considers the fate of nutrients and their potential to be exported from the site.

The main issue with effluent disposal is the design and placement of the system to ensure adequate microbial purification and retention of nutrients. The gravelly loam and loam soils have high capability for wastewater disposal. However the duplex nature of the sandy upper horizons and slower permeability of the subsoils mean that consideration must be given to the potential for lateral leakage.

Research by Gerritse et al 1995A, on leach drains servicing septic tanks in the Perth Hills in gravel soils, shows that under wet conditions nitrogen is effectively lost within 10 metres. Other studies, for example Dawes and Goonetilleke, found that all nitrogen can be lost within 1 metre in damp soil conditions. Moist soils in the Albany area would behave in a similar manner and contribute to nitrogen recycling back to the atmosphere.

Gerritse et al, 1995B, found that all phosphate was adsorbed within 2 metres from a 7 year old leach drain in Yarrigal loam soils that are not unlike the loam clay soils on site, and within 5 metres for a 6 year old leach drain in Dwellingup Gravels which have some similarity with the gravelly loam soils. Gerritse and Adeney 1992, in an analysis of urban areas in the hills of Perth on lot sizes as small as 2000m², found that the export of nutrients in streams was low, in the order of micrograms/litre. Nitrogen losses were only 5% of the input concentrations. These soils are not dissimilar to those on the study site. Thus when properly installed it is not expected that there will be a significant nutrient impact arising from residential and small rural holdings on appropriately sized lots.

Leach drains of conventional septic systems are suitable but should be inverted or semi inverted. Leach drains installed in these soils are recommended to be banded by natural soil to prevent wastewater short circuiting the soils. On the other hand alternative waste water systems are acceptable. When wastewater penetrates the soils, good nutrient management and microbial purification should result.

Nutrient Loadings and Stocking Rates

Stocking rates for soils of the site are estimated to be 10 DSE for dry pasture and where limited supplemental feed is supplied. Stocking rates should be to Department of Agriculture recommendations.

Estimations of the actual nutrient loading at this stage are difficult because the nature of any alternative land uses is not known in addition to the fate of nutrients as a result of denitrification, volatilisation of ammonia, recycling, uptake by vegetation and soil phosphate adsorption.

With a current average stocking rate of 10 DSE, the estimated nutrient loading when fully stocked with sheep or equivalent numbers of stock could be 106 kg/N/ha/year and 14.63 kg/P/ha/year. The likely nutrient loading and its potential export following subdivision and potential changed activities can only be estimated because of the variable nature of the land uses possible.

A typical conventional septic system releases 5.5kg P year and 18 kg N/year. However allowing for six chickens, a dog and cat and a 250m² area of fertilised horticulture, a further loading of 12.3kg N/year and 5.2 kg P/year can be added for the dwelling area. (Data from Select Committee on Metropolitan Development and Groundwater Supplies, Legislative Assembly 1994 and Nitrate management in the Jandakot UWPCA, Dames and Moore, undated). One horse is estimated at 60 kg/N/year and 11 Kg/P/year, and one sheep 10.06 kg/N/year and 1.47 Kg/P/year. Data for cattle from Select Committee on Metropolitan Development and Groundwater Supplies shows cattle as 57.4 kg/N/year and 17.6 kg/P/year. The value for phosphorous may be too high for cattle not fed introduced feed.

Data for typical land uses listed below, which might be used at some stage in the future, show that overall nutrient loading is unlikely to rise with changes in land use, and with continued grazing there will also be no change.

Typical nutrient loadings of some land uses

Possible lot size and activity	Nitrogen loading per hectare	Phosphorous loading per hectare	Likely nutrient scenario
Estimated average current stocking rate over the whole property 10 DSE per hectare	106 kg/N/ha/year	14.63 kg/P/ha/year	Possible nutrient loss through washing of dung down slope during waterlogged conditions and during storms.
2 hectare rural living property, conventional septic system, garden, dog and cat as listed above and 1 horse	45.2 kg/N/ha/year	10.9 kg/P/ha/year	Unlikely to be nutrient export when correctly established.
0.5 hectare rural living property, conventional septic system, no stock, but garden and dog and cat as listed above	60.6 kg/N/ha/year	21.4 kg/P/ha/year	Unlikely to be nutrient export when correctly established.

Environmental Issue	Management
Effluent Disposal	<ul style="list-style-type: none"> • Soil types are suitable for conventional septic systems with some care required in the sand over clay duplex soil types. • See 5.4.
Potential Water Pollutants	<ul style="list-style-type: none"> • Surface run off from hard surfaces should be fed through detention basins and soak wells. • Constructed dams should incorporate sediment traps. • Normal soil management practices such as maintaining adequate pasture filter strips, contour cultivation, contour banks as necessary and sediment traps will reduce potential loss of solid particles. • Dung beetles are active on the site in winter, reducing potential nutrient loss from stock. • A buffer of 50 metres for development and alternative wastewater disposal and 100 metres for a conventional septic system to the creek line is recommended.

9.7 Salinity

There is no evidence of salinity. In granite country such as this where the soils are relative shallow and the rainfall high, the salt is normally already flushed out and there is little risk of significant increases in salinity. Minor salt is added from wastewater but this is not considered significant considering the likely lot sizes.

Surface water tested was less than 70 mSm (potable water < 180 mSm).

The potential impact on salinity is therefore regarded as low and it is unlikely that there will be any changes to salinity as a result of more intensive land uses.

Environmental Issue	Management
Salinity	<ul style="list-style-type: none"> • Unlikely to be any significant changes to the regime.

9.8 Stormwater, Erosion Potential and Soil Management

The potential for wind erosion of the site is minimal in soils such as this.

Potential water erosion is confined to the steeper slopes, drainage lines and gutters which direct and concentrate water. Currently there is minor evidence of water erosion in the eastern gully.

Some management activities that could be used to prevent soil degradation could include:

- constructing roads, fence lines and firebreaks in locations which are less likely to lead to soil erosion.
- planting deep rooted species.
- agricultural practices suited to the retention of adequate vegetation over summer, use of perennial species etc.
- utilisation of grassed waterways, drains and filter strips.
- minimisation of vehicular traffic to prevent compaction.

With subdivision and development there is potential for further planting of trees to assist soil management.

Stormwater from hard surfaces can either be detained on site or directed over broad areas such as swale drains and the like or shallow detention wetlands prior to release to the water course. On the other hand the storm water could be directed to storage dams for use on site. Road drainage and other surface drainage facilities should have baffles and other restraining devices built into them to minimise erosion.

Environmental Issue	Management
Water Erosion	<ul style="list-style-type: none"> • EPA Guidance Number 26, Management of Surface Runoff from Industrial and Commercial Sites (draft) 1999. • See Engineers Australia 2003, Australian Runoff Quality, National Committee on Water Engineering. • Stormwater Management Manual for Western Australia, Department of Environment WA, 2004. • Guidelines for Groundwater Protection in Australia, ARMCANZ, ANZECC, September 1995. • Environmental Protection Authority Victoria/ Melbourne Water, undated, Urban Stormwater, Best Practice Environmental Management Guidelines • Water and Rivers Commission, 1998, Manual for Managing Urban Stormwater Quality in Western Australia. • Surface run off from hard surfaces could be fed through shallow vegetated detention basins that can act as wetlands, prior to emptying to drainage lines • Dung beetles are active on the site in winter, reducing potential nutrient loss from stock. • Swale drains and detention basins could be formed as grassed areas, 300 mm deep, with a 1 : 10 year rainfall event retention time of 20 hours. (See Water and Rivers Commission, 1998, <i>A Manual for Managing Urban Stormwater Quality in Western Australia</i>, Water and Rivers Commission. See 3.17 Grass Swales (BMP14) page 100 and Extended detention Basins (BMP17) page 108 of that document). • Stormwater from roofs could be used as a potable water source or should be retained on each lot. • Agricultural practices should reflect the sloping nature of some soils • Maintenance of adequate vegetation through summer is normal best practise to reduce the potential for soil erosion.
Wind Erosion	<ul style="list-style-type: none"> • No special recommendations required.

See the Local Water Management Plan (Attachment II) for management strategies.

9.9 Fire Management

A detailed Fire Management Plan has been prepared and is included as Attachment III.

9.10 Social Impacts

The social impact of possible changes to rural living will be similar to the impacts arising from the subdivisions to the north and west. This subdivision is much smaller and therefore any changes are likely to be minor. Location 1879 is only 14 hectares.

Diversification of land uses can be of significant benefit to the local community through the provision of additional tourist facilities, and the introduction of more residents to the area.

Environmental Issue	Management
Social Impact	<ul style="list-style-type: none">No action necessary apart from protection measures.

10. PROPOSED DEVELOPMENT

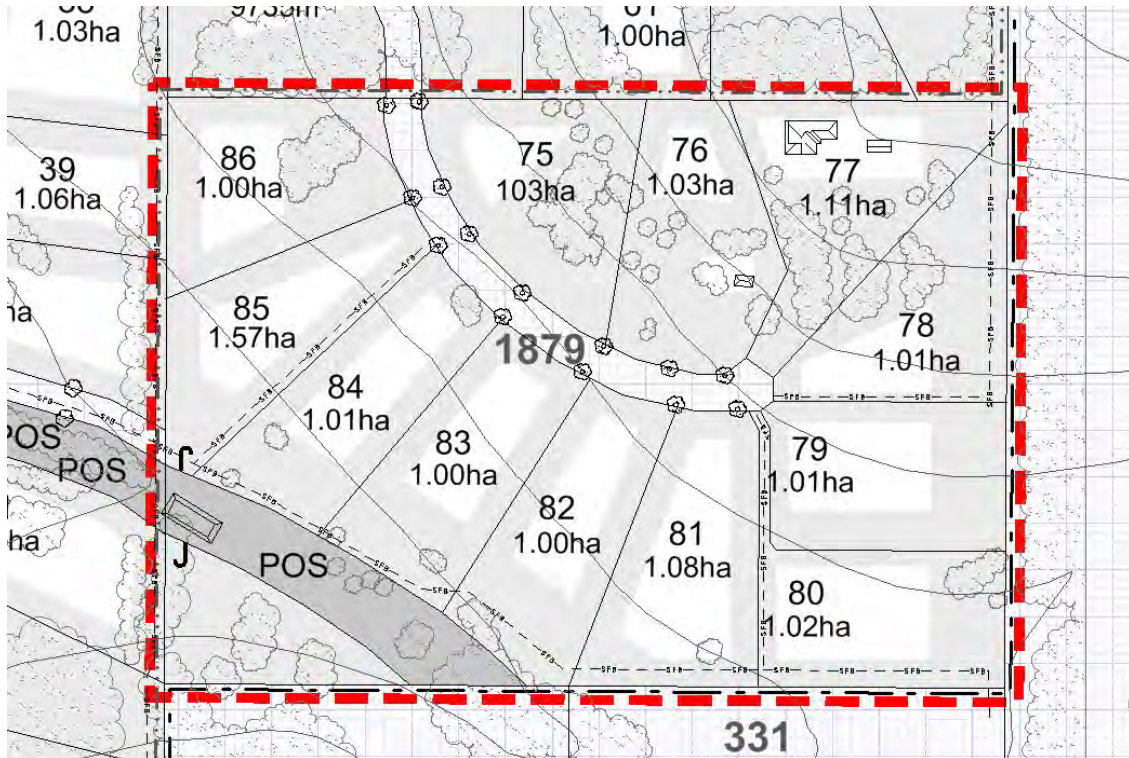
Based on the environmental assessment carried out by Landform Research, the most appropriate use of the land is for rural retreat purposes. This is in contrast to larger hobby farms which would encourage the agistment of stock and possible horticultural activities. Given the steeper slopes, such activities would have the potential for nutrients to be exported to the creekline in the southwest corner of the property and ultimately into Oyster Harbour.

Smaller retreat lots based on the minimum lot size of 1ha are recommended and will conform with applicable strategy and the rural residential development to the north and west.

A following plan has been prepared to indicate how the property may be subdivided for rural retreat/lifestyle purposes.

One of the constraints associated with this property is the lack of a gazetted road frontage. Currently road access is made via a Right of Carriageway (ROCW) across the eastern boundary of the adjoining property to the south through to Davies Road.

Road access for the development will be provided via Lot 11 to the north and for emergency purposes through Lot 1301 to the west. The ROCW to Davies Road can also be retained for emergency access purposes.



Excerpt from Subdivision Guide Plan

Key elements of the subdivision and development proposal are outlined below.

Public Open Space

An area of public open space is designated to protect the creekline which runs through the southeast corner of the property. This area will link up with the POS on Lot 1301 to the west thereby providing a vegetated corridor which runs down to Gull Rock Road, Nanarup Road, across into Candyup, with proposed links to Mount Boyle and down to the Kalgan River. The POS can also ultimately link through Lots 330 & 331 to the south and then east into the reserves on Mt Mason. Revegetation associated with this extensive corridor will provide a strategic buffer helping to minimise nutrients washing into the creek as well as a corridor for local fauna.

Protection of Remnant Vegetation

Building envelopes are designated for each lot and will ensure building does not occur within areas of existing remnant vegetation. Due to the lack of understorey and open nature of parkland cleared areas (noted as completely degraded), boundary fencing for Lots 77 & 78 can be provided without impact.

The small area of good quality remnant vegetation associated with the drainage line is protected by being located outside of identified building envelopes and being located within the public open space network.

Access

Provision of access from Lot 11 to the north will enable the subdivisional road to be constructed along the contour as far as possible. This will help to minimise the impact of drainage flowing downslope to the creekline. The road and associated swales will act as an interceptor drains managing overland flow during heavy rain events, also helping to minimise erosion and reduce the export of nutrients.

While an additional access point has been provided from Lot 1301 to the west, this is not required for subdivisional purposes for lots of 1ha in area. It will however provide an alternate emergency access and egress point and access along the creekline.

Services

Scheme water will be provided to each lot with fire hydrants provided as per policy. Underground power and telecommunications will also be provided to each lot. Effluent disposal will be carried out on site taking into account the detailed recommendations outlined in Section 8.4 of the environmental assessment. Drainage management will follow the recommendations in the Local Water Management Plan (Attachment II).

Management Provisions

Comprehensive management provisions have been incorporated into Council's Local Planning Scheme for the Rural Residential development on and to the north and west of the subject land and apply in addition to the Policy Plan. A copy of the existing provisions and policy plan are included in Attachment IV.

As the landform and management issues are similar it is proposed that this development be included into the same zone area. This action removes the need for a separate Policy Plan for Lot 1879 by including provisions specific to the requirements of Lot 1879; requirements such as fire safe construction standards, assessment of foundation zone to inform foundation design, hazard separation area requirements and creekline protection.

11. CONCLUSION

Lot 1879 is located within an area specifically identified for the proposed form of subdivision and development. Land to the north and west has already been zoned Special Rural and an approval for the initial stage has issued. This proposal has been designed to integrate with the adjoining development, particularly in relation to roads, emergency access and creekline/vegetation corridor protection. Similar lot sizes are proposed which are designed to maximise the enjoyment of the exceptional views over Oyster Harbour and King George Sound.

Due to the comparatively steep slopes for agricultural use, remnant vegetation, granite outcrops and the creekline, Rural uses are not considered viable in the main and would present ongoing concern in terms of nutrient runoff into the waterways.

Rural retreat development, coupled with the proposed comprehensive management provisions is recommended and is in conformity with Albany Local Planning Strategy and associated policies.

Attachment I

Landform Research

Land Capability & Geotechnical Assessment

Land Capability and Geotechnical Assessment

Location 1879,
Davies Road,
Lower Kalgan

November 2004



Land Capability and Geotechnical Assessment

Location 1879,
Davies Road,
Lower Kalgan

November 2004



Landform Research

Land Systems - Quarries - Environment
ABN 29 841 445 694

SUMMARY AND LAND CAPABILITY

Land Capability is the recognition of the suitability of a site for a proposed land use. An integral part of this process is the identification of issues and the way they can be managed to ensure that the proposed land use is sustainable and does not lead to significant environmental impacts.

Capability is also very much tied up with the creativity and determination of the planner and future land holders.

The Site

The site study is based on Location 1879, Davies Road, east of Oyster Harbour and south of Nanarup Road.

Current Land Use

Location 1879 has been used for broad acre agriculture for many years with the area being first settled in the 1830's. The more capable soils are cleared, although scattered Eucalypts remain on portions of the more rocky soils in the north.

The Lower Kalgan area has experienced changes in land uses in recent years with significant portions of the area being converted to small rural living. The adjoining land to the north and west has been subdivided for this purpose.

Some land use diversification has also been occurring locally on a small scale to orchards, horticulture, small scale tourist accommodation and hobby rural industries.

Opportunities and Constraints

Opportunities

- The sloping nature of the site with views to the south and west across to Oyster Harbour.
- The local area is increasingly being considered to be a tourist and rural living area
- The views and landscapes that can be obtained from parts of the site.
- Proximity to Albany and other tourist locations in the area such as the Porongurup and Stirling Ranges.
- The nearby land is increasingly being used for small scale diversified land uses and small rural residential holdings.
- Good reliable rainfall of about 800 mm with rainfall exceeding evaporation for 8 months of the year.
- The site is well drained.
- Remnant trees that can provide visual screening.
- Good quality water is available from the stream in the south.

Constraints

- Most parts of the site have limitations on ground and surface water availability.
- Water from the stream in the south may only be available to southern portions of the site.
- Some steeper slopes and rock outcrops occur in the north.
- Developments located on steeper slopes may require engineering input at the design and construction stages.

Potential and Likely Landuses

Whilst the land has some good Gravelly Loam soils other factors such as the steeper slopes combined with an existing small lot size and adjoining land that has been subdivided for rural living, all combine to mean that the best land use will most likely be rural living, depending on planning issues.

Environmental and other issues that have been identified for the proposed land use.

There are minimal significant environmental issues for small rural holdings on Location 1879.

Issue	Comment and Proposed Management	Conclusions and Reference
Nutrient export	<ul style="list-style-type: none"> • The soils have generally high nutrient retention capability, with some reduction in capability in sand over loam duplex soils. The soils are capable of accepting waste water from dwellings when waste water systems are correctly installed. • Setbacks from the existing creek will help reduce the potential for nutrient export. 	Nutrient management is discussed in 6.6 Nutrient Management.
Remnant vegetation	<ul style="list-style-type: none"> • The existing remnant trees are recommended for protection. • Stream line vegetation and vegetation associated with the rocky granite outcrops are recommended for protection and could form linkages to the remnant vegetation to the east. • Any additional planting of vegetation should provide linkages between the areas of remnant vegetation. 	Most of the remnant vegetation on site can be protected.

CONCLUSIONS

The soils have been assessed and the environmental issues considered.

The site is capable of accepting rural living lots. The soils are suitable for waste water disposal and the site joins approved small rural lots.

Environmental issues are not generally significant and can be readily managed.

Lindsay Stephens

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1.0 INTRODUCTION

A site study was carried out on Location 1879, Davies Road, Lower Kalgan on 31 March 2004 to map the soils and hydrology and provide geotechnical and land systems assessment, to determine the suitability of the land systems to support alternative land uses.

During this study auger holes were drilled as necessary to confirm soil type or gain information on the soils, the geology, and hydrology. A backhoe was used to obtain soil logs at six locations. The salinity of all water courses and water bodies was determined. In addition to field observations interpretations were made from aerial photography and research.

Site Description

Location 1879 lies on the western flanks of Mount Mason North to the east of Oyster Harbour. Whilst high scenic values can be obtained generally faces south.

The site is some 12 km north east from Albany town centre.

The general area has been used for agriculture for many years. The more capable soils are cleared, although portions of the more rocky soils in the north of the site remain as grazed remnant vegetation. Properties in this area were first settled in 1834, when Patrick Taylor established a farm to the north of Nanarup Road.

The Lower Kalgan area has experienced changes in land uses in recent years with significant portions of the area being converted to small rural holdings and lots. The adjoining land to the west and north has been subdivided to rural living lots.

Some land use diversification has been locally occurring on a small scale, to orchards, horticulture, small scale tourist accommodation and hobby rural industries.

2.0 EXISTING ENVIRONMENT

2.1 Geology and Geomorphology

The site lies on the western flanks of Mount Mason North dropping from 350 metres AHD in the north eastern corner down to 110 metres in the south western corner. Mount Mason North is a remnant granite/gneiss hill that has been of a similar form during recent geological time.

The granite and gneiss of Proterozoic age, with included occasional dolerite dykes were once covered by a laterite soil profile across the landscape, although this has been largely removed from Location 1879 apart from some gravel in some upper soil profiles.

Weathering of the granite to the east has released medium grained quartz sand that has been deposited in the small valley in the south.

2.2 Soils

Three main soils exist across Location 1879, reflecting the various regolith history of the weathering granite/gneiss basement.

Brown Gravelly Loams occur on the lower slopes in the east. These soils have yellow brown sandy gravel to 400 mm over lighter brown and yellow brown loam and clay subsoils.

These loam soils are developed on the deep weathering profile of the granite/gneiss basement with laterite gravel shed from upslope and degeneration of the laterite soil profile added to the upper horizons.

Slopes are moderate to steep.

Brown Sand over Loam Duplex

These occur on the lower slopes with sand to depths of approximately 300 mm over lighter brown and yellow brown loam and clay subsoils. The sands are medium grained quartz sand shed from weathering of granite up slope. Sand is more prominent at lower elevations along the creek line in the south west.

These loam soils are developed on the deep weathering profile of the granite/gneiss basement with quartz sand shed from upslope being added to the upper soil horizons.

Slopes are moderate to steep, becoming steeper upslope.

Rocky Loam

Where the basement granite has been exposed in the north and north east, brown loam and yellow brown loam with sandy surface horizons are present.

Basement granite/gneiss rock outcrop is frequent and slopes tend to be steeper.

The key soil types are listed below.

KEY	SOIL TYPE	DESCRIPTION
S/L	Brown Sand over Loam Duplex	Medium grained quartz sand depths of approximately 300 mm over lighter brown and yellow brown loam and clay subsoils. Sand is more prominent at lower elevations along the creek line. Slopes are moderate to steep, becoming steeper upslope.
R	Rocky Soils	Dark brown loam grading to lighter clays between common and frequently large granite outcrops. Steep slopes.
GL	Brown Gravelly Loams	Yellow brown sandy gravel to 400 mm over lighter brown and yellow brown loam and clay subsoils. Slopes are moderate to steep.

2.3 Climate

Weather data is recorded at Albany, but the local climate may be slightly different due to the orographic effects of the slopes of North Mount Mason.

The overall climate however is warm, dry summers with cool, wet winters.

Rainfall at Albany is about 800 mm per year.

Temperatures have summer maxima of 25°C in the hottest months down to just over 15°C in the coldest months, July and August. Minimum temperatures range down to 10 °C in the

coldest months. The cool winter temperatures can assist potential fruit crops that require a chill factor. Frosts are not common.

Annual evaporation is less than 1000 mm per year, with rainfall exceeding evaporation for almost nine months of the year.

2.4 Vegetation

The better soils have been cleared apart from scattered trees which generally remain on the upper slopes in the north which were not suitable for cultivation but have been grazed.

Rare and Priority Species

A search was made of the CALM and WA Herbarium databases prior to the site inspection. The perennial species listed on those data bases are generally easily recognised and would be observable at this time of year. Whilst it was the wrong time of the year to observe annual species such as the Orchidaceae, they are unlikely to be present based on the lack of species, understorey and amount and continued grazing.

The CALM and WA Herbarium databases are shown in Appendix 2. No Declared Rare or Priority species were observed during the site inspection.

The tree species are Jarrah *Eucalyptus marginata* in one patch in the central north with Marri *E. calophylla* in the remainder and on the slopes. One plant of *Kingia australis* was observed associated with the granite outcrop. The vegetation was probably originally Jarrah-Marri Low Forest.

Agonis linearifolia Thicket occurs along the creek line, with the introduced Black Wattle *Acacia decurrens* occurring on the creekline in the central south.

A few minor weeds were noticed such as Ink Weed *Phytolacca octandra* around the granite outcrops.

Species List

All species noted during the site inspections are listed below:

Family	Genus/Species	Remnant Jarrah-Marri Low Forest	Creek line
Dasygogonaceae	<i>Kingia australis</i>	X	
Mimosaceae	<i>Acacia decurrens*</i>		X
Myrtaceae	<i>Agonis linearifolia</i>		X
	<i>Eucalyptus calophylla</i>	X	
	<i>Eucalyptus marginata</i>	X	

Vegetation Condition

Remnant vegetation only occurs along the creek line and associated with the granite outcrops in the north.

The vegetation condition is classified as "Completely Degraded" with a clump of "Good" condition associated with the creek.

2.5 Surface and Groundwater

Water runoff from the area can be significant during storm events down the steeper slopes to the creek.

The quality of the water in the creek at the time of the site inspection was 70 mSm or 385 mg/L salt, which is fresh (potable < 180 mSm).

No seepages were observed on the upper or lower slopes.

2.6 Fauna

The amount of fauna is directly related to the proportion of remnant indigenous vegetation. Even isolated trees have habitat potential and the clumps of remnant trees are correspondingly important. The scattered trees in the north, and the vegetation associated with the creekline, will provide habitat for birds, with some small reptiles likely to be associated with the granite outcrops. Frogs are likely along the creek line.

The survival of fauna is dependant on the retention of habitat, land uses on already cleared areas and education of landholders.

2.7 Heritage

Aboriginal Sites

The Department of Indigenous Affairs database has no known aboriginal sites recorded for the property. Clearing was commenced generally in the area in the mid 1830's and thus much of the site has been disturbed for many years. On the other hand aboriginal sites are known from nearby, such as the stone fish traps in Oyster Harbour.

There are many developments in closer proximity to the fish traps than this site.

European Heritage

Whilst the site has been farmed for many years there are no heritage features on site.

3.0 HYDROLOGICAL ASSESSMENT - WATER AVAILABILITY

Surface water runoff can be significant from sloping land such as this during storm events and in winter when the soils are saturated.

Calculations of runoff can be estimated based on Coles and Moore, 1998, *Runoff and Water Erosion*, in Soil Guide, Agriculture WA, Bulletin 4343 which assumes approximately 70 mm runoff for an 800 mm rainfall and a 90% exceedance rate. Runoff from the granite outcrops is likely to be greater.

Small quantities of water could be captured by dams located on the slopes but without seepages these may not hold water through summer. Water is associated with the creek, and a bore or dam may be possible adjacent to the watercourse.

In general therefore there is only likely to be sufficient water for stock, and with small rural lifestyle lots scheme or other water may be required to supply stock.

A calculation of the quantity of water able to be captured can be made.

Using a conservative figure of 70 mm runoff from the loamy slopes and say 100 mm for steeper slopes this will generate 700 - 1000 kL/ha/year. Water harvesting techniques may have to be used. These would include

- Forming contour drains feeding to storage dams in lower elevations. The contour drains will need to be cut into the clayey subsoils.
- Directing the collected water to dams.

Water quality is expected to be good and suitable for all uses.

Potable water can be provided by 90 000 - 140 000 litre rainwater tanks.

4.0 ALTERNATIVE LANDUSES

Whilst the site has some good quality soils, the soils are steep and there is a significant amount of rocky soils with granite outcrop. The site is also restricted by the creek in the south. Land to the east and north has been subdivided to rural living. When taking into account all the factors, a change to rural living is possibly a likely and desirable outcome depending on planning issues.

A change of land use could provide reductions in nutrients and help satisfy market demands for lots of this type.

5.0 GEOTECHNICAL FACTORS

5.1 Foundation Stability

Whilst the site is underlain by granitic rocks, the steeper slopes and subsoil loam and clay require consideration when developed. However the soil conditions are similar to the steeper parts of the Albany townsite.

Restrictions on foundation conditions can be overcome by engineering input and design.

Slopes across the site vary from 10 to 15% with minor localised steeper areas.

Foundation stability is provided in the table below for the soil types present, but is generalised only for those soil types. Depending on the nature of the proposed development, the design and earthworks, Site Class P may apply. For example constructions requiring more than 400 mm natural fill and/or 800 mm sand fill should be classified as Site Class P to ensure adequate compaction to prevent differential settling.

Winter rainfall has not been as great over the past few years and the soils are not as wet as they would have been previously. In a sequence of wet years it can be expected that the soils of the lower slopes would have higher moisture levels, based on the duplex nature of the soils.

Management Actions that may be used to improve foundation stability could include but not be limited, to the following. See Australian Geomechanics Journal March 2000 (*Landslide Risk Management*). The following are engineering practices for sloping soils that have been used, for example, in the construction of dwellings within the Albany townsite.

- Provide upslope cut off drains
- Do not load soils with water, up slope of developments.
- Minimise the depth of cut and fill.
- Ensure natural soil fill is adequately compacted, especially where dry clay is used as fill in summer.
- Provide retaining walls and structures for fill.
- Retain trees on steeper slopes and plant further trees.
- Consider the use of flexible or split level structures
- Secure or remove any loose boulders
- In some situations sub-surface drainage may be required.
- Place retaining walls on natural basement rock where possible
- Design for lateral creep pressures on slopes.
- Use rows of piers or strip footings orientated up slope on sloping ground.
- Design drains to minimise erosion.
- Minimise water loading of soils.

Soil Description	Foundation Soil Stability	AS 2870 Site Class	Ease of Excavation	Constraint which may be present. See Table in Appendix 3
Brown Sand over Loam Duplex	Moderate	S - M *	Moderate to high	a c t
Rocky Soils	High	S - M *	Can be very low	a k n r v x
Brown Gravelly Loams	Moderate	S - M *	Moderate to high	---

* Site Class P may apply. For example constructions requiring more than 400 mm natural fill and/or 800 mm sand should be classified as Site Class P to ensure adequate compaction to prevent differential settling.

Individual site assessments are recommended for developments because soil conditions change laterally.

	GEOTECHNICAL ISSUE	MANAGEMENT
5.1.1	Foundation stability	<ul style="list-style-type: none"> • See the above Management Actions for some methods of reducing potential foundation limitations on steeper slopes and more clayey soils. • Compaction of clay fills can be difficult when dry or may potentially expand when wetted. Clay is therefore not recommended for fill. • Foundation stability for developments on the more gentle slopes is high, AS 2870 Site Class S but M on steeper slopes. • Developments requiring more than 400 mm fill may be AS 2870 Site Class P with engineering input into the design and placement of footings. • Clay based fill should not be loaded with water from above as this will decrease stability. • Individual site assessments are recommended for developments because soil conditions change laterally.

5.2 Drainage and Flood Risk

Flood data is not known, but on geomorphological and field evidence, the only risk areas are storm flows from upslope which will be minor and localised and along the creekline for which setbacks will apply.

	GEOTECHNICAL ISSUE	MANAGEMENT
5.2.1	Flood risk	<ul style="list-style-type: none"> Setbacks from the creek will be required.

5.3 Stability of Dams

There is potential for dams to be located on slopes. Construction is recommended to be by an experienced operator because of the risk of slope failure for inadequate structures.

	GEOTECHNICAL ISSUE	MANAGEMENT
5.3.1	Stability of dams	<ul style="list-style-type: none"> Any dam should be constructed by or supervised by an experienced operator. Dwellings should not be located downstream of dams.

5.4 Capability for On Site Effluent Disposal

Phosphate Retention Indices (PRI) of all soils on site are high when compared to the database of type soils held by Landform Research for PRI and with Chemistry Centre data. However the sandy upper soil horizons that occur on top of some soil units have reduced water retention and therefore lower phosphate retention. For example waste water could run laterally through the more sandy surface soils especially near the creek and not be retained for sufficient time within the soil profile.

PRI tests can frequently be misleading because all materials greater than 2 mm are sieved from the sample prior to testing. This means that a gravelly material will have the phosphate retaining gravel removed from the sample prior to testing, most likely resulting in a PRI value much different to the actual situation. On the other hand clay normally has a high PRI, but in the field duplex soils and reduced permeability means that nutrient enriched water will often not or only slowly penetrate the clay layer. This can show lower phosphate retention in the field than indicated by the PRI. In the case of the subject land interpretations of the nutrient management of the soils is felt to be more valid.

Nitrogen loss will occur in moist soil conditions through denitrification if water is retained for sufficient time. See 6.6 Nutrient Management.

Soil Description	Effluent Disposal	Comment
Brown Sand over Loam Duplex	Low to High	See 5.4.1 below
Rocky Soils	High where waste water is contained in loam soils between outcrops, otherwise very low	See 5.4.1 below
Brown Gravelly Loams	Moderate to High	See 5.4.1 below

Permeability and Infiltration Results

No permeability or infiltration tests were conducted on this site. Samples were conducted on the adjoining lots to the north and west in the same soil types and these can be used to indicate the permeability because they were undertaken in winter conditions.

Those infiltrations tests were established according to the Health Regulations. However no aggregate was used and the holes were not scraped out the next morning because it was felt that this gives a more realistic reading, with the settled clays being similar to organic sludge that can accumulate in leach drains. Testing soils in this manner cannot compensate for any

micropores in the soil due to invertebrate or other soil fauna activity that may not occur under a leach drain.

Based on those tests and soil observations some subsoils with a significant clay content had slow infiltration of greater than 60 minutes for 25 mm. The upper soil horizons were found to be better. Therefore inverted and semi inverted leach drains or alternative waste water treatment systems are recommended.

	GEOTECHNICAL ISSUE	MANAGEMENT
5.4.1	Site Capability for Effluent Disposal	<ul style="list-style-type: none"> • Conventional septic systems are recommended to be inverted or semi inverted, and banded by natural loam or gravel soils on the down slope side or installed with an impermeable membrane setback from the side of the leach drain on the down slope side to assist in waste water penetrating the natural soils. • Alternative effluent systems are with waste water disposal areas to be sized according to underlying subsoil permeability. 10L/m² is regarded as acceptable. • Appropriate setbacks will be required from water bodies. A buffer of 50 metres for development and alternative waste water disposal and 100 metres for a conventional septic system to the creek line is recommended. • Stormwater drainage and retention may be required.

5.5 Landslip Risk

The site is underlain by granitic basement close to the surface, with frequent outcrop in the central and northern parts.

An assessment of the Landslip Risk using Australian Geomechanics Guidelines lists a Low to Moderate Risk of minor structural damage such as separations, cracking and minor movements on the steeper slopes.

Potential slippage on slopes relates to foundation stability and is considered under 5.1 Foundation Stability. Under that section a range of potential management actions are listed, based on the Australian Geomechanics Society Guidelines, together with the site classification based on AS2870. Some sites may require a Site Class P where engineering input is required.

	GEOTECHNICAL ISSUE	MANAGEMENT
5.5.1	Landslip Risk	<ul style="list-style-type: none"> • Covered by the considerations in 5.1 Foundation stability.

6.0 ENVIRONMENTAL MANAGEMENT

The following items are identified as the most likely to impact on the environment. These items can be managed by the implementation of the management recommendations. Other items are unlikely to impact or the impact is regarded as small.

6.1 Aesthetics

The site lies to the south of Nanarup Road protected visually from Nanarup Road by being located on a south facing slope.

Portion of the site will be able to be seen from Gull Rock and Davies Road, but probably only as glimpses.

Developments will be partially protected by existing vegetation on site and on adjoining properties.

The colour and style of developments should be visually compatible with the area.

	ENVIRONMENTAL ISSUE	MANAGEMENT
6.1.1	Remnant vegetation	<ul style="list-style-type: none"> Development should include preservation of existing remnant vegetation. Mature trees should be preserved and protected from grazing pressure.
6.1.2	Dwellings, fences and other developments are to be aesthetically compatible with the area.	<ul style="list-style-type: none"> Restrictions can be placed on the use of visually non compatible materials.
6.1.3	Potential land uses	<ul style="list-style-type: none"> Scattered dwellings on smaller rural holdings are becoming more common in the Kalgan area, even on sloping sites. For example adjoining subdivisions to the north and west. The existing trees, landform and roadside vegetation provide screening from most of the surrounding areas.

6.2 Preservation of Agricultural Land

Whilst the site has some good quality soils the soils are steep and there is a significant amount of rocky soils with granite outcrop. The site is also restricted by the creek in the south. Adjoining land to the north and west has been subdivided to rural living.

The site forms a disjointed small holding in an area currently experiencing subdivision pressure and therefore this loss of less productive land will not be significant.

	ENVIRONMENTAL ISSUE	MANAGEMENT
6.2.1	Protection of agricultural land	<ul style="list-style-type: none"> Significant constraints apply to agriculture use on site and the loss of this type of land is not considered significant.
6.2.2	Soil Preservation	<ul style="list-style-type: none"> Restrictions could be placed on stocking rates to Agriculture WA standards, to ensure soil preservation on the soils.

6.3 Land Use Buffers

The adjoining land to the north and west has been subdivided to rural living and thus the land use on site is compatible with those land uses. Dwellings are present to the south and the land to the east is remnant vegetation.

	ENVIRONMENTAL ISSUE	MANAGEMENT
6.3.1	Lot sizes	<ul style="list-style-type: none"> Lot sizes are more related to planning issues than land capability. Most soils are capable of effluent disposal systems on lots as small as 2 000 m², although planning and servicing considerations will determine the actual lot sizes, which will be larger than this minimum size.
6.3.2	Buffers	<ul style="list-style-type: none"> No special buffers required.

6.4 Rivers and Streams

There is only one watercourse in the south of the site.

A buffer for development from this creekline is recommended. This could be 50 metres for development and alternative waste water disposal and 100 metres for a conventional septic system. Natural regeneration (*Agonis linearifolia*) of this buffer would occur from the existing vegetation if stock were excluded and the *Acacia decurrens* are removed.

	ENVIRONMENTAL ISSUE	MANAGEMENT
6.4.1	Stream side vegetation	<ul style="list-style-type: none"> It is recommended that there be no clearing of the vegetation along the watercourse.
6.4.2	Stream flows	<ul style="list-style-type: none"> Stream flows entering the site are unlikely to be available to future land holders who may not hold riparian rights. Environmental flows should be maintained, and any dam or bore should be set back from the watercourse.

6.5 Flora and Fauna

The only remnant vegetation are scattered Eucalypt trees (see 2.4 Vegetation).

Stream side vegetation should be retained. There is an opportunity to form corridors along the north and along the creek line to link to the remnant vegetation to the east.

The remnant vegetation to the east outside the site is in good or better condition and the subdivision should not impact on that vegetation. A 10 metre buffer of planted local vegetation can be used to provide a buffer to the remnant vegetation. The buffer can provide a means of trapping and controlling weeds before they enter the adjoining remnant vegetation. This needs to be balanced against the need to provide for low fuel buffers.

The protection of flora, fauna and biodiversity depends on the maintenance and enhancement of habitat. As the vegetation is recommended to be retained and linkages upgraded, the existing fauna is unlikely to be significantly impacted on by any changes in land use on the existing cleared areas.

	ENVIRONMENTAL ISSUE	MANAGEMENT
6.5.1	Flora and fauna corridors	<ul style="list-style-type: none"> • Mature trees should be preserved where possible. • Clearing restrictions and the use of building envelopes are recommended to be applied to the remnant trees. • Stream line vegetation and vegetation associated with rock soils and outcrops should be protected. • It may be possible, when considering additional screening belts, to link the vegetation remnants along the creek and across the north of the site, towards the remnant vegetation to the east. • A 10 metre vegetated buffer to the remnant vegetation to the east could be considered. This needs to be balanced against the need to provide for low fuel buffers.
6.5.2	Remnant vegetation	<ul style="list-style-type: none"> • See Flora and Fauna corridors above.

6.6 Nutrient Management

Currently potential nutrient export comes from the washing of fertiliser, soil particles and manure down the sloping soils to the creek line during the significant rainfall events. The worst time for nutrient export from grazing is during summer storms and in winter when the soils are saturated.

The presence of dung beetles increases the rate of nutrient recycling and thus reduces the potential for nutrient export.

As the site is proposed for rural small holdings waste water disposal will be the main issue.

Effluent Disposal

The capability of the soils for waste water disposal is considered under 5.4 Capability for Onsite Effluent Disposal. This section considers the fate of nutrients and their potential to be exported from the site.

The main issue with effluent disposal is the design and placement of the system to ensure adequate microbial purification and retention of nutrients. The gravelly loam and loam soils have high capability for waste water disposal. However the duplex nature of the sandy upper horizons and slower permeability of the subsoils mean that consideration must be given to the potential for lateral leakage.

Research by Gerritse et al 1995A, on leach drains servicing septic tanks in the Perth Hills in gravel soils, shows that under wet conditions nitrogen is effectively lost within 10 metres. Other studies, for example Dawes and Goonetilleke, found that all nitrogen can be lost within 1 metre in damp soil conditions. Moist soils in the Albany area would behave in a similar manner and contribute to nitrogen recycling back to the atmosphere.

Gerritse et al, 1995B, found that all phosphate was adsorbed within 2 metres from a 7 year old leach drain in Yarrigal loam soils that are not unlike the loam clay soils on site, and within 5 metres for a 6 year old leach drain in Dwellingup Gravels which have some similarity with the gravelly loam soils. Gerritse and Adeney 1992, in an analysis of urban areas in the hills of Perth on lot sizes as small as 2 000m², found that the export of nutrients in streams was low, in the order of micrograms/litre. Nitrogen losses were only 5% of the input concentrations. These soils are not dissimilar to those on the study site. Thus when properly installed it is not expected that there will be a significant nutrient impact arising from residential and small rural holdings on appropriately sized lots.

Leach drains of conventional septic systems are suitable but should be inverted or semi inverted. Leach drains installed in these soils are recommended to be banded by natural soil to prevent waste water short circuiting the soils. On the other hand alternative waste water systems are acceptable. When waste water penetrates the soils, good nutrient management and microbial purification should result.

Nutrient Loadings and Stocking Rates

Stocking rates for soils of the site are estimated to be 10 DSE for dry pasture and where limited supplemental feed is supplied. Stocking rates should be to Department of Agriculture recommendations.

Estimations of the actual nutrient loading at this stage are difficult because the nature of any alternative land uses is not known in addition to the fate of nutrients as a result of denitrification, volatilisation of ammonia, recycling, uptake by vegetation and soil phosphate adsorption.

With a current average stocking rate of 10 DSE, the estimated nutrient loading when fully stocked with sheep or equivalent numbers of stock could be 106 kg N/ha/year and 14.63 kg P/ha/year. The likely nutrient loading, and its potential export following subdivision and potential changed activities can only be estimated because of the variable nature of the land uses possible.

A typical conventional septic system releases 5.5 kg P year and 18 kg N/year. However allowing for six chickens, a dog and cat and a 250 m² area of fertilised horticulture, a further loading of 12.3 kg N/year and 5.2 kg P/year can be added for the dwelling area. (Data from Select Committee on Metropolitan Development and Groundwater Supplies, Legislative Assembly 1994 and Nitrate management in the Jandakot UWPCA, Dames and Moore, undated). One horse is estimated at 60 kg N/year and 11 Kg P/year, and one sheep 10.06 kg N/year and 1.47 Kg P/year. Data for cattle from Select Committee on Metropolitan Development and Groundwater Supplies shows cattle as 57.4 kg N/year and 17.6 kg P/year. The value for phosphorous may be too high for cattle not fed introduced feed.

Data for typical land uses listed below, which might be used at some stage in the future, show that overall nutrient loading is unlikely to rise with changes in land use, and with continued grazing there will also be no change.

Typical nutrient loadings of some land uses

Possible lot size and activity	Nitrogen loading per hectare	Phosphorous loading per hectare	Likely nutrient scenario
Estimated average current stocking rate over the whole property 10 DSE per hectare	106 kg N/ha/year	14.63 kg P/ha/year	Possible nutrient loss through washing of dung down slope during waterlogged conditions and during storms.
2 hectare rural living property, conventional septic system, garden, dog and cat as listed above and 1 horse	45.2 kg N/ha/year	10.9 kg P/ha/year	Unlikely to be nutrient export when correctly established.
0.5 hectare rural living property, conventional septic system, no stock, but garden and dog and cat as listed above	60.6 kg N/ha/year	21.4 kg P/ha/year	Unlikely to be nutrient export when correctly established.

	ENVIRONMENTAL ISSUE	MANAGEMENT
6.6.1	Effluent disposal	<ul style="list-style-type: none"> • Soil types are suitable for conventional septic systems with some care required in the sand over clay duplex soil types. • See 5.4.
6.6.2	Potential water pollutants.	<ul style="list-style-type: none"> • Surface run off from hard surfaces should be fed through detention basins and soak wells. • Constructed dams should incorporate sediment traps. • Normal soil management practices such as maintaining adequate pasture filter strips, contour cultivation, contour banks as necessary and sediment traps will reduce potential loss of solid particles. • Dung beetles are active on the site in winter, reducing potential nutrient loss from stock. • A buffer of 50 metres for development and alternative waste water disposal and 100 metres for a conventional septic system to the creek line is recommended.

6.7 Salinity

There is no evidence of salinity. In granite country such as this where the soils are relative shallow and the rainfall high, the salt is normally already flushed out and there is little risk of significant increases in salinity. Minor salt is added from waste water but this is not considered significant considering the likely lot sizes.

Surface water tested was less than 70 mSm (potable water < 180 mSm).

The potential impact on salinity is therefore regarded as low and it is unlikely that there will be any changes to salinity as a result of more intensive land uses.

	ENVIRONMENTAL ISSUE	MANAGEMENT
6.7.1	Salinity	<ul style="list-style-type: none"> • Unlikely to be any significant changes to the regime.

6.8 Stormwater, Erosion Potential and Soil Management

The potential for wind erosion of the site is minimal in soils such as this.

Potential water erosion is confined to the steeper slopes, drainage lines and gutters which direct and concentrate water. Currently there is minor evidence of water erosion in the eastern gully.

Some management activities that could be used to prevent soil degradation could include;

- constructing roads, fencelines and firebreaks in locations which are less likely to lead to soil erosion.
- planting deep rooted species.
- agricultural practices suited to the retention of adequate vegetation over summer, use of perennial species etc.
- utilisation of grassed waterways, drains and filter strips.
- minimisation of vehicular traffic to prevent compaction.

With subdivision and development there is potential for further planting of trees to assist soil management.

Stormwater from hard surfaces can either be detained on site or directed over broad areas such as swale drains and the like or shallow detention wetlands prior to release to the water course. On the other hand the storm water could be directed to storage dams for use on site. Road drainage and other surface drainage facilities should have baffles and other restraining devices built into them to minimise erosion.

	ENVIRONMENTAL ISSUE	MANAGEMENT
6.8.1	Water erosion	<ul style="list-style-type: none"> • <i>EPA Guidance Number 26, Management of Surface Runoff from Industrial and Commercial Sites (draft) 1999.</i> • <i>See Engineers Australia 2003, Australian Runoff Quality, National Committee on Water Engineering.</i> • <i>Stormwater Management Manual for Western Australia, Department of Environment WA, 2004.</i> • <i>Guidelines for Groundwater Protection in Australia, ARMCANZ, ANZECC, September 1995.</i> • <i>Environmental Protection Authority Victoria/ Melbourne Water, undated, Urban Stormwater, Best Practice Environmental Management Guidelines</i> • <i>Water and Rivers Commission, 1998, Manual for Managing Urban Stormwater Quality in Western Australia.</i> <ul style="list-style-type: none"> • Surface run off from hard surfaces could be fed through shallow vegetated detention basins that can act as wetlands, prior to emptying to drainage lines • Dung beetles are active on the site in winter, reducing potential nutrient loss from stock. • Swale drains and detention basins could be formed as grassed areas, 300 mm deep, with a 1 : 10 year rainfall event retention time of 20 hours. (See Water and Rivers Commission, 1998, <i>A Manual for Managing Urban Stormwater Quality in Western Australia</i>, Water and Rivers Commission. See 3.17 Grass Swales (BMP14) page 100 and Extended detention Basins (BMP17) page 108 of that document). • Stormwater from roofs could be used as a potable water source or should be retained on each lot. • Agricultural practices should reflect the sloping nature of some soils • Maintenance of adequate vegetation through summer is normal best practise to reduce the potential for soil erosion.
6.8.2	Wind erosion	<ul style="list-style-type: none"> • No special recommendations required.

6.9 Fire Control

Fire Control falls under the Bush Fires Control Act (as amended) and the City of Albany.

Any constructed dams and water tanks on properties can be used as a water source for fire fighting.

Planning For Fire, 2001 (WAPC and FESA) provides guidance on the management of the subdivision-bushland interface in Part 3. Guidelines on the acceptable road designs are incorporated into Part 3 of the document. In general the conditions require a 100 metre fuel

reduction zone and good vehicular access and escape for adjoining vegetation such as that to the east. The 100 metres could, for example, consist of the fuel reduction zone of say 60 metres, a 20 metre road reserve and road, and 20 metres setback on individual lots or 40 metres setbacks. Discussions with the local fire officer are recommended.

	ENVIRONMENTAL ISSUE	MANAGEMENT
6.9.1	Fire Risk	<ul style="list-style-type: none"> • See Planning For Fire, 2001 (WAPC and FESA) Part 3. • Access and fire management should be discussed with the relevant fire control officer. A Fire Management Plan may be required to sufficiently address all issues.

6.10 Social Impacts

The social impact of possible changes to rural living will be similar to the impacts arising from the subdivisions to the north and west. This subdivision is much smaller and therefore any changes are likely to be minor. Location 1879 is only 14 hectares.

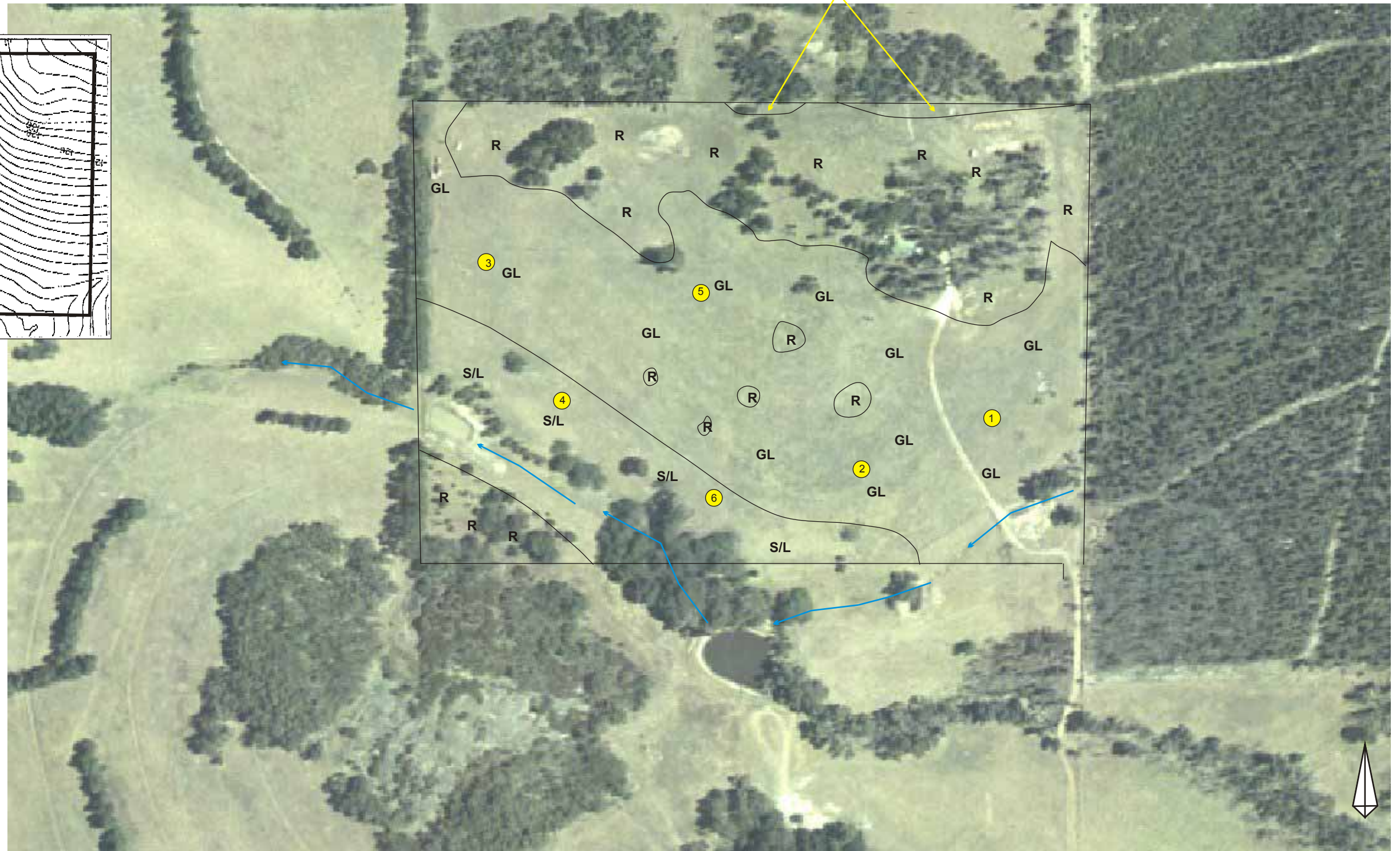
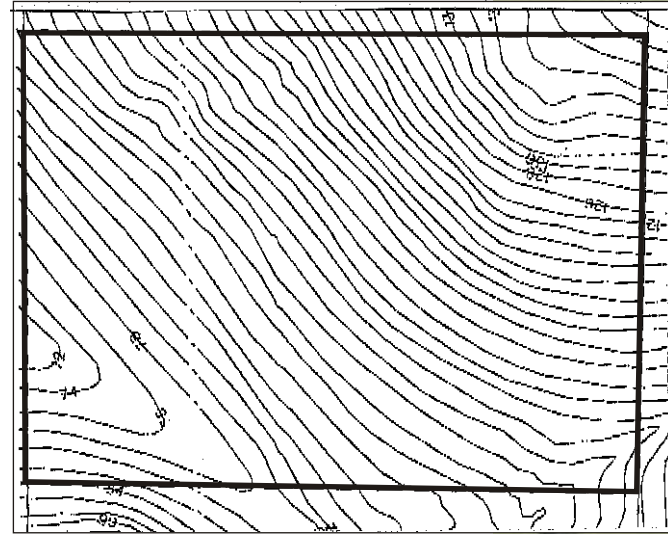
Diversification of land uses can be of significant benefit to the local community through the provision of additional tourist facilities, and the introduction of more residents to the area.

Heritage areas of the site can be better protected and linked to future developments.

	ENVIRONMENTAL ISSUE	MANAGEMENT
6.10.1	Social impact	<ul style="list-style-type: none"> • No action necessary apart from protection measures and incorporation of heritage into planning for the site.

REFERENCES

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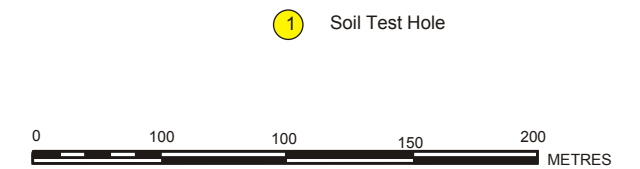


KEY	SOIL TYPE	DESCRIPTION
S/L	Brown Sand over Loam Duplex	Medium grained quartz sand depths of approximately 300 mm over lighter brown and yellow brown loam and clay subsoils. Sand is more prominent at lower elevations along the creek line. Slopes are moderate to steep, becoming steeper upslope.
R	Rocky Soils	Dark brown loam grading to lighter clays between common and frequently large granite outcrops. Steep slopes.
GL	Brown Gravelly Loams	Yellow brown sandy gravel to 400 mm over lighter brown and yellow brown loam and clay subsoils. Slopes are moderate to steep.

KEY	SOIL TYPE	Foundation Stability	Effluent Disposal	Constraint See Table
S/L	Brown Sand over Loam Duplex	S-M*	Low to High	act
R	Rocky Soils	S-M*	Generally low but can be High where waste water is confined to loam soils	aknrvx
GL	Brown Gravelly Loams	S-M*	Moderate to High	---

* Site Class P may apply. For example constructions requiring more than 400 mm natural fill and/or 800 mm sand should be classified as Site Class P to ensure adequate compaction to prevent differential settling.

Individual site assessments are recommended for developments because soil conditions change laterally.



SOILS - LAND CAPABILITY
LOCATION 1879, DAVIES ROAD,
LOWER KALGAN

Landform Research November 2004
 Basemap DOLA Air Photo Scale 1 : 3 000 at A3



View from north western corner to the south east



View from the central north to the south west



Soil test hole 3



View from the central west up slope towards the north eastern corner



Rocky soils in the central north with *Eucalyptus calophylla*



Soil test hole 5, looking towards the rocky soils

PHOTOGRAPHS	
LOCATION 1879, DAVIES ROAD, LOWER KALGAN	
Landform Research	March 2004

Your Ref:
 Our Ref: 2001F001173V07
 Enquires: John Riley
 Phone: (08) 9334 0123
 Fax: (08) 9334 0278
 Email:



Landform Research
 25 Heather Road
 ROLESTONE WA 6111

Dear Mr Stephens

REQUEST FOR RARE FLORA INFORMATION

I refer to your request of 19 March 2003 for information on rare flora in the Kalgan area. The search co-ordinates used were 34° 54' - 34° 59' S and 117° 52' - 118° 3' E.

A search was undertaken for this area of (1) the Department's *Threatened (Declared Rare) Flora* database (for results, if any, see "Summary of Threatened Flora Data" – coordinates are GDA94), (2) the *Western Australian Herbarium Specimen* database for priority species opportunistically collected in the area of interest (for results, if any, see "WAHERB Specimen Database General Enquiry" – coordinates are AGD84) and (3), the Department's *Declared Rare and Priority Flora List* [this list, which may also be used a species target list, contains species that are declared rare (Conservation Code R or X for those presumed to be extinct), poorly known (Conservation Codes 1, 2 or 3), or require monitoring (Conservation Code 4) – for results, if any, see "Declared Rare and Priority Flora List"].

Attached also are the conditions under which this information has been supplied. Your attention is specifically drawn to the seventh point which refers to the requirement to undertake field investigations for the accurate determination of rare flora occurrence at a site. *The information supplied should be regarded as an indication only of the rare flora that may be present and may be used as a target list in any surveys undertaken.*

An invoice for \$200 (plus GST) to supply this information will be forwarded.

It would be appreciated if any populations of rare flora encountered by you in the area could be reported to this Department to ensure their ongoing management.

If you require any further details, or wish to discuss rare flora management, please contact my Principal Botanist, Dr Ken Atkins, on (08) 9334 0425.

Yours faithfully

.....
 for Keiran McNamara
 ACTING EXECUTIVE DIRECTOR

19 March, 2003

ATTACHMENT

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

RARE FLORA INFORMATION

CONDITIONS IN RESPECT OF SUPPLY OF INFORMATION

1. All requests for data to be made in writing to the Executive Director, Department of Conservation and Land Management, Attention: Administrative Officer Flora, Wildlife Branch.
2. The data supplied may not be supplied to other organisations, nor be used for any purpose other than for the project for which they have been provided, without the prior written consent of the Executive Director, Department of Conservation and Land Management.
3. Specific locality information for Declared Rare Flora is regarded as confidential, and should be treated as such by receiving organisations. Specific locality information for DRF may not be used in public reports without the written permission of the Executive Director, Department of Conservation and Land Management. Publicly available reports may only show generalised locations or, where necessary, show specific locations without identifying species. The Department is to be contacted for guidance on the presentation of rare flora information.
4. Note that the Department of Conservation and Land Management respects the privacy of private landowners who may have rare flora on their property. Rare flora locations identified in the data as being on private property should be treated in confidence, and contact with property owners made through the Department of Conservation and Land Management.
5. Receiving organisations should note that while every effort has been made to prevent errors and omissions in the data provided, they may be present. The Department of Conservation and Land Management accepts no responsibility for this.
6. Receiving organisations must also recognise that the database is subject to continual updating and amendment, and such considerations should be taken into account by the user.
7. It should be noted that the supplied data do not necessarily represent a comprehensive listing of the rare flora of the area in question. Its comprehensiveness is dependant on the amount of survey carried out within the specified area. The receiving organisation should employ a botanist, if required, to undertake a survey of the area under consideration.
8. Acknowledgment of the Department of Conservation and Land Management as source of the data is to be made in any published material. Copies of all such publications are to be forwarded to the Department of Conservation and Land Management, Attention: Principal Botanist, Wildlife Branch.

THE DEPARTMENT OF CONSERVATION AND LAND
MANAGEMENT

DECLARED RARE AND PRIORITY FLORA LIST

for Western Australia

CONSERVATION CODES

R: Declared Rare Flora - Extant Taxa

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

X: Declared Rare Flora - Presumed Extinct Taxa

Taxa which have not been collected, or otherwise verified, over the past 50 years despite thorough searching, or of which all known wild populations have been destroyed more recently, and have been gazetted as such.

1: Priority One - Poorly known Taxa

Taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat, e.g. road verges, urban areas, farmland, active mineral leases, etc., or the plants are under threat, e.g. from disease, grazing by feral animals, etc. May include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.

2: Priority Two - Poorly Known Taxa

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

3: Priority Three - Poorly Known Taxa

Taxa which are known from several populations, and the taxa are not believed to be under immediate threat (i.e. not currently endangered), either due to the number of known 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.

4: Priority Four - Rare Taxa

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

REPORT ITEM PD087 REFERS

ABBREVIATIONS USED IN THREATENED FLORA DATABASE PRINTOUTS

VESTING

AGR Chief Exec Dept of Agriculture
 ALT Aboriginal Land Trust
 BAP Baptist Union of WA Inc
 BSA Boy Scouts Association
 CC Conservation Commission -NPNCA
 CGT Crown Grant in Trust
 COM Commonwealth of Australia
 CRO Crown Freehold-Govt Ownership
 DOL Dept of Land Administration
 DPU Ministry for Planning
 EXD Exec Direc CALM
 FRE Freehold
 HOW Homeswest
 ILD Industrial Lands Develop. Auth
 JOI Joint Vesting-NPNCA & Shire
 LAC LandCorp
 LFC Lands and Forests Commission
 MAG Minister for Agriculture
 MED Ministry of Education
 MHE Minister for Health
 MIN Minister for Mines
 MPL Ministry for Planning
 MPR Minister for Prisons
 MRD Main Roads WA
 MTR Minister for Transport
 MWA Minister for Water Resources
 MWO Minister for Works
 NAT Natural Trust of Australia WA
 NON Not Vested
 NPN NPNCA
 OTH Other
 PRI Private
 RAI Westrail
 SEC Western Power
 SHI Shire
 SPC State Planning Commission
 TEL Telstra
 TGR Timber Govt Requirement
 TOW TOWN
 UNK Unknown
 WAT Water Corporation
 WEL Minister Community Welfare
 WRC Water & Rivers Commission
 XPL Ex-Pastoral Lease

PURPOSES

ABR Aboriginal Reserve
 AER Aerodrome
 CAM Camping
 CAR Caravan park
 CEM Cemetery
 CFA Conservation of Fauna
 CFF Conservation Of Flora & Fauna
 CFL Conservation of Flora
 CHU Church
 CPK Car Park
 COM Common
 CON Conservation Park
 DEF Defence
 DRA Drain
 EDE Educational Endowment

EDU Educational purposes UWA
 ENE Enjoyment of Natural Environ.
 EXC Excepted from sale
 EXL Exploration Lease
 EXP Experimental Farm
 FIR Firing Range
 FOR State Forest
 GHA Grain Handling
 GOL Golf
 GRA Gravel Pit
 GRE Green Belt
 GVT Government Requirements
 HAR Harbour Purposes
 HEP Heritage Purposes
 HER Heritage trail
 HOS Hospital
 KEN Kennels
 MIN Mining lease
 MUN Municipal Purposes
 NPK National Park
 NRE Nature Reserve
 OTH Other
 PAC Public access
 PAR Parkland (& Recreation)
 PAS Pastoral lease
 PFL Protection of Flora
 PIC Picnic ground
 PLA Plantation
 POS Public Open Space
 PPA Public parkland
 PRS Prison site
 PUT Public Utility
 QUA Quarry
 RAD Radio Station
 RAC Racecourse
 REC Recreation
 REH Rehabilitation
 RNP Re-establish Native Plants
 RRE Railway Reserve
 RUB Rubbish
 SAN Sand
 SCH School-site
 SET Settlers requirements
 SHI Shire Requirements
 SHO Showgrounds
 SNN Sanitary
 STO Stopping place
 TIM Timber
 TOU Tourism
 TOW Town-site
 TRA Training Ground
 TRI Trig station
 TVT Television transmitting
 UNK Unknown
 UTI Utilities
 VCL Vacant Crown Land
 VER Road Verge
 VPF Vermin Proof Fence
 WAT Water
 WCO Water & Conservation of F & F
 WOO Firewood

REPORT ITEM PD087 REFERS

19-MAR-03

Summary of Threatened Flora Data

Page

Taxon Name -----	Cons. -----	Pop ID -----	Latitude -----	Longitude -----	Purpose -----	Vest -----
Banksia brownii	R	4B	34^54'00.6"	117^54'05.5"	REC	SHI
Banksia brownii	R	6	34^55'01.6"	117^52'14.5"	VER	SHI
Banksia goodii	R	27	34^55'55.6"	117^56'35.5"	SHI	SHI
Bossiaea divaricata	3	3	34^55'13.6"	117^58'41.5"		SHI
Caladenia plicata	4	18	34^54'11.6"	117^58'02.5"	CFF	CC
Chorizema reticulatum	3	9	34^54'55.6"	117^54'05.5"	GRA	SHI
Chorizema reticulatum	3	13	34^54'32.6"	117^55'10.5"	RUB	SHI
Chorizema reticulatum	3	15	34^56'03.6"	117^56'02.5"	VER	SHI
Drakaea micrantha ms	R	2	34^54'47.6"	117^56'40.5"	CFF	CC
Hakea tuberculata	3	6A	34^56'16.6"	118^00'32.5"	VER	SHI
Hakea tuberculata	3	6B	34^56'16.6"	118^00'30.5"		PRI
Laxmannia jamesii	R	1	34^57'04.6"	118^01'59.5"	VER	SHI
Laxmannia jamesii	R	5A	34^58'20.6"	117^55'24.5"	VER	SHI
Laxmannia jamesii	R	5B	34^58'20.6"	117^55'24.5"	REC	SHI
Laxmannia jamesii	R	5C	34^58'20.6"	117^55'24.5"		PRI
Laxmannia jamesii	R	15	34^58'56.6"	117^54'43.5"	OTH	MAG
Lysinema lasianthum	4	4	34^55'37.6"	117^54'46.5"	NRE	CC
Melaleuca diosmifolia	3	3	34^58'55.6"	117^56'05.5"	UNK	UNK
Microtis globula	R	4A	34^54'17.6"	117^58'07.5"	CFF	CC
Microtis globula	R	4B	34^54'17.6"	117^58'07.5"		PRI
Microtis globula	R	6A	34^54'41.6"	117^57'08.5"	CFF	CC
Microtis globula	R	6B	34^54'49.6"	117^56'49.5"	CFF	CC
Microtis globula	R	7	34^55'15.6"	117^56'10.5"	CFF	CC
Stylidium plantagineum	4	2	34^57'46.6"	118^02'19.5"	GRA	SHI
Stylidium plantagineum	4	8	34^58'59.6"	117^54'51.5"	EDU	MED

A total of 25 records were printed.

SPECIES / TAXON	CONS CODE	CALM REGION	DISTRIBUTION	FLOWER PERIOD
Acacia declinata	3	SC	Borden, Boxwood Hill, Kalgan	Aug-Oct
Cymbonotus preissianus	2	SC,(?SW),*	Mt Barker, Borden, ?Fremantle, Kalgan, Eastern States	-
Hakea lasiocarpa	3	SC,WB	Kalgan River, Kamballup, Kojaneerup, Stirling Range, Lake Bryde	
Hakea tuberculata	3	CF,SC	Scott River, Gingilup Swamp, Stirling Range NP, Moodiarup, Kalgan River	Apr
Rumex drummondii	4	MW,SC,SW	Regan's Ford, (Gingin), Kalgan River, Manypeaks,Pinjarra	
Spyridium oligocephalum	3	SC	Pingrup, Jerramungup, Kalgan River, Fitzgerald River NP	Mar,Jul-Oct
Verticordia harveyi	4	SC	Cape Riche, Manypeaks, Lower Kalgan, Stirling Range NP	Mar

WAHERB SPECIMEN DATABASE
GENERAL ENQUIRY

Andersonia auriculata
L. Watson (Epacridaceae)
CONSERVATION STATUS:P2
Coll.: E.M. Sandiford s.n. Date: 22 07 1988 (PERTH 1178385)
LOCALITY Old Quarrum Townsite, c. 2.5 km E of Bow Bridge on South Coast Highway WA
LAT 34 Deg 58 Min 20.000 Sec S LONG 117 Deg 53 Min 50.000 Sec E
Dwarf shrub-spreading. Flowers pale blue and white. Sandy soil, very gentle slope periodically swampy.
Allocasuarina fraseriana open woodland over scrub <1.5m : Kunzea recurva, Melaleuca thymoides, Jacksonia horrida, Adenanthos obovatus, Anarthria scapra, Dasypogon bromliifolius, Leucopogon distans.

Banksia brownii
R.Br. (Proteaceae)
CONSERVATION STATUS:R
Coll.: A. Cochrane JAC 421 Date: 21 08 1993 (PERTH 03199894)
LOCALITY S verge of Hazzard Road, 100 m from Dougle Road turnoff, Albany shire WA
LAT 34 Deg 55 Min 6.000 Sec S LONG 117 Deg 52 Min 9.000 Sec E
Large spreading to 7 m tall with clear trunk, branching at 2 m.
Undulating low hills. Grey sand clay loam, pH: 6.0. Remnant road verge vegetation with Eucalyptus marginata, E. calophylla, Acacia sp., Conospermum sp., Dryandra serra.
Abundance: 11 plants/10 sq. m. in area 2-5 m.

Banksia goodii
R.Br. (Proteaceae)
CONSERVATION STATUS:R
Coll.: A. Gray s.n. Date: 26 06 1963 (PERTH 0997935)
LOCALITY Millbrook Road and near King River Bridge. [Ca 0.5 km S of King River]. WA
LAT 34 Deg 56 Min 30.000 Sec S LONG 117 Deg 54 Min 0.000 Sec E
Prostrate species with leaves and spikes larger than other prostrate banksias.
Almost extinct.
Previous det.: *Banksia Goodii*

Banksia goodii
R.Br. (Proteaceae)
CONSERVATION STATUS:R
Coll.: A. Gray s.n. Date: 26 06 1963 (PERTH 0997900)
LOCALITY Mill Brook Road & Baker's Property, King River Bridge. [Ca 0.5 km S of King River]. WA
LAT 34 Deg 56 Min 30.000 Sec S LONG 117 Deg 54 Min 0.000 Sec E
A prostrate species with leaves and spikes larger than other prostrate banksias.

Appears now almost extinct. Confined to this locality.
Previous det.: *Banksia goodii*

Boronia crassipes
Bartl. (Rutaceae)
CONSERVATION STATUS:P3
Coll.: E. Hickman EJM 431 Date: 17 01 2001 (PERTH 05846064)
LOCALITY Creekline S of Warrangoo Road, E of Lound Street, Bayonet Head, Albany, WA
LAT 34 Deg 58 Min 59.999 Sec S LONG 117 Deg 57 Min 0.000 Sec E
Erect shrub 1.5 m high, 40 cm wide; few, pink flowers.
Creekline. Surface not visible due to mass of Empodisma. Grey/brown sand/loam over peat. Sedgeland with *Leptospermum firmum* and *Empodisma* sp.
Frequency:50+ plants.

Boronia crassipes
Bartl. (Rutaceae)
CONSERVATION STATUS:P3
Coll.: B.E. Hall 158 Date: 15 09 1982 (PERTH 04369386)
LOCALITY Link Road, off South Coast Highway, Albany, WA
LAT 34 Deg 56 Min 30.000 Sec S LONG 117 Deg 52 Min 47.000 Sec E
1.5 m high, with pink flowers. Peaty swamp.
In association with *Callistemon* sp.

Chorizema reticulatum
Meisn. (Papilionaceae)
CONSERVATION STATUS:P3
Coll.: E.J. Croxford 2042 Date: 13 09 1982 (PERTH 04462920)
LOCALITY Rubbish Dump, Chester Pass Road, WA
LAT 34 Deg 54 Min 37.000 Sec S LONG 117 Deg 54 Min 41.000 Sec E
40 cm high, with yellow and pink flowers.
Sand over laterite.
In association with *Casuarina* sp. and *Eucalyptus* sp.

Chorizema reticulatum
Meisn. (Papilionaceae)
CONSERVATION STATUS:P3
Coll.: K.R. Newbey 1848 Date: 16 09 1965 (PERTH 03550370)
LOCALITY 8 miles N of Albany WA
LAT 34 Deg 54 Min 57.000 Sec S LONG 117 Deg 52 Min 47.000 Sec E
2 ft high. Sand.
Previous det.: *Chorizema reticulatum* Meissner

Chorizema reticulatum
Meisn. (Papilionaceae)
CONSERVATION STATUS:P3
Coll.: J.M. Taylor & P. Ollerenshaw JMT 1803 Date: 14 09 1983 (PERTH 02933837)
LOCALITY 3 km along Mulbrook road from Chester Pass road, Napier, c. 12 km by road from Albany, Darling District WA
LAT 34 Deg 55 Min 0.000 Sec S LONG 117 Deg 54 Min 0.000 Sec E

REPORT ITEM PD087 REFERS

Flat, clay. Open Eucalyptus forest with *E. calophylla*, *Melaleuca* and small shrubs.
Abundance: single clump.

Dampiera sericantha
Benth. (Goodeniaceae)
CONSERVATION STATUS:P1
Coll.: E.J. Croxford 2134 Date: 25 10 1982 (PERTH 04334620)
LOCALITY Elizabeth Street, Lower King River, E of Albany, WA
LAT 34 Deg 57 Min 0.000 Sec S LONG 117 Deg 56 Min 0.000 Sec E
40 cm high, with light blue flowers. Sandy gravel soil. In association with *Eucalyptus* sp. and *Persoonia* sp.

This specimen is housed at Albany.

Drakaea elastica
Lindl. (Orchidaceae)
CONSERVATION STATUS:R
Coll.: M. Sherwood 61 Date: 15 09 1978 (PERTH 04528395)
LOCALITY Lower King Road, opposite cemetery, E of Albany, WA
LAT 34 Deg 59 Min 0.000 Sec S LONG 117 Deg 54 Min 9.000 Sec E
20-30 cm plant with red brown flowers. Soil, sand, coastal.
In association with *Eucalyptus* sp. and *Casuarina* sp.
This specimen is housed at Albany.

Drakaea elastica
Lindl. (Orchidaceae)
CONSERVATION STATUS:R
Coll.: M. Sherwood 534 Date: 09 10 1981 (PERTH 04528328)
LOCALITY Private property, off Lower King Road, E of Albany, WA
LAT 34 Deg 59 Min 0.000 Sec S LONG 117 Deg 54 Min 9.000 Sec E
40 cm plant with burgundy green flowers. Soil, sand. In association with *Eucalyptus* sp. and *Casuarina* sp.

This specimen is housed at Albany.

Drakaea micrantha
Hopper & A.P.Br. ms (Orchidaceae)
CONSERVATION STATUS:R
Coll.: S.D. Hopper 2694 Date: 21 10 1982 (PERTH 232181)
LOCALITY 2 km E of King River settlement, 10 km NNE of Albany, Bakers Junction Nature Reserve WA
LAT 34 Deg 56 Min 0.000 Sec S LONG 117 Deg 55 Min 0.000 Sec E
No odours, leaves withered but predominantly veined, glabrous. In deep white sand on hill slope with SW aspect.
Growing in *Eucalyptus marginata*, *Casuarina fraseriana* open low woodland over dwarf scrub-tall sedges.

Abundance: three plants, two in full flower, one withered. Two leaves present also.
Frequency: three plants, two in full flower, one withered. Two

Drosera fimbriata
DeBuhr (Droseraceae)
CONSERVATION STATUS:P4
Coll.: E.J. Croxford 1635 Date: 09 10 1981 (PERTH 04408853)
LOCALITY King Road, off Gibb Reserve, WA
LAT 34 Deg 57 Min 0.000 Sec S LONG 117 Deg 56 Min 0.000 Sec E
5 cm high, with white flowers. Grey sandy soil. In association with *Kingia* sp. and *Melaleuca* sp.

This specimen is housed at Albany.
Previous det.: *Drosera fimbriata* DeBuhr

Drosera fimbriata
DeBuhr (Droseraceae)
CONSERVATION STATUS:P4
Coll.: S. Barrett 822 Date: 08 12 1999 (PERTH 05569559)
LOCALITY Lower King Road, W side, N of Bayonet Road, WA
LAT 34 Deg 58 Min 25.000 Sec S LONG 117 Deg 55 Min 19.000 Sec E
Herb to 15 cm. Slope to S. White sand. Heath/sedgeland with *Evandra aristata*, *Laxmannia jamesii* and *Agonis parviceps*.
Frequency: occasional.

Dryandra preissii
Meisn. (Proteaceae)
CONSERVATION STATUS:P4
Coll.: D. Davidson s.n. Date: 17 06 1982 (PERTH 04150570)
LOCALITY Lower Mount Mason, off Nanarup Road, Albany E, WA
LAT 34 Deg 57 Min 0.000 Sec S LONG 118 Deg 0 Min 0.000 Sec E
30 cm high, with pale yellow flowers. Sandy soil. In association with *Eucalyptus* sp. and *Allocauarina* sp.

This specimen is housed at Albany.

Dryandra serra
R.Br. (Proteaceae)
CONSERVATION STATUS:P4
Coll.: A.S. George 9486 Date: 03 08 1969 (PERTH 05040205)
LOCALITY Mount Willyung, N of Albany WA
LAT 34 Deg 57 Min 0.000 Sec S LONG 117 Deg 56 Min 0.000 Sec E
Shrub with few erect branches to 5 m tall; flowers pale yellow. In lateritic clay loam.

Hakea lasiocarpa
R.Br. (Proteaceae)
CONSERVATION STATUS:P3
Coll.: K. Newbey 1292 Date: 02 08 1964 (PERTH 06150969)
LOCALITY 20 miles E of Mount Barker WA
LAT 34 Deg 58 Min 0.000 Sec S LONG 118 Deg 0 Min 0.000 Sec E
7 ft high. In sand.
Previous det.: *Hakea dolichostyla* Diels

Hakea tuberculata
R.Br. (Proteaceae)
CONSERVATION STATUS:P3

REPORT ITEM PD087 REFERS

Coll.: N. Gibson 2502 Date: 28 03 1997 (PERTH 04679741)

LOCALITY Creekline beside Hunton Road, ca 500 m N of Nananup Road, ca 15 km WNW of Albany WA

LAT 34 Deg 56 Min 15.000 Sec S LONG 118 Deg 0 Min 27.000 Sec E

Shrub 2.5 m high. With typical columnar branching habit. Winter wet flat. Red loam over massive ironstone.

Marri - Bullich Open Woodland over *Agonis parviceps* Dense Heath A with

Hakea varia, *Sphenotoma* sp., *Pericalymma ellipticum*, *Boronia* sp. over Tall Open Sedgeland.

Abundance: common.

Previous det.: *Hakea tuberculata* R.Br.

Laxmannia jamesii

Keighery (Anthericaceae)

CONSERVATION STATUS:R

Coll.: C.J. Robinson 912 Date: 03 09 1992 (PERTH 03134067)

LOCALITY Two Peoples Bay road, S verge at intersection with Nananup road WA

LAT 34 Deg 57 Min 0.000 Sec S LONG 118 Deg 2 Min 0.000 Sec E

Herb 50 mm high, flowers white. Flat, sand.

Agonis parviceps heath.

Abundance: 22 plants (this one dislodged and out of soil).

Laxmannia jamesii

Keighery (Anthericaceae)

CONSERVATION STATUS:R

Coll.: C.J. Robinson 1011 Date: 13 11 1992 (PERTH 03134024)

LOCALITY Lower King road, 800 m E of unfenced Bayonet Head road, N side uncleared WA

LAT 34 Deg 57 Min 0.000 Sec S LONG 117 Deg 56 Min 0.000 Sec E

Stilted rambling perennial herb up to 100 mm. Old flowers only - fruits. Gentle slope, sandy grey peaty.

Low heath over sedges, scattered trees.

Abundance: common under sedges.

Laxmannia jamesii

Keighery (Anthericaceae)

CONSERVATION STATUS:R

Coll.: L. Anderson s.n. Date: 25 04 1990 (PERTH 04475186)

LOCALITY Corner of Two Peoples Bay and Nananup Roads, E of Albany, WA

LAT 34 Deg 55 Min 36.000 Sec S LONG 118 Deg 2 Min 13.000 Sec E

10-20 cm plant with white flowers. Soil, grey sand.

In association with *Eucalyptus marginata*, *Agonis parviceps* and *Beaufortia decussata*.

Laxmannia jamesii

Keighery (Anthericaceae)

CONSERVATION STATUS:R

Coll.: C.J. Robinson 957 Date: 13 10 1992 (PERTH 03134059)

LOCALITY Lower King road, 800 m N of Bayonet Head road on uncleared, unfenced land, W side WA

LAT 34 Deg 57 Min 0.000 Sec S LONG 117 Deg 56 Min 0.000 Sec E

Rambling stilted herb 100 mm high, flowers white. Sloped, grey sand. Sedge - heath.

Abundance: common

Laxmannia jamesii

Keighery (Anthericaceae)

CONSERVATION STATUS:R

Coll.: G.J. Keighery 2824 Date: 20 05 1972 (PERTH 1041231)

LOCALITY 6 miles E of Albany on Borden Road (Chester Pass Road) at turnoff to Two Peoples Bay. WA

LAT 34 Deg 57 Min 0.000 Sec S LONG 117 Deg 54 Min 0.000 Sec E

Rambling perennial herb, flowers under tepals white, outer striped red. Grey sand swamp.

Melaleuca/Nuytsia/Banksia.

Common.

Previous det.: *Laxmannia* sp. nov.

Laxmannia jamesii

Keighery (Anthericaceae)

CONSERVATION STATUS:R

STATUS: HOL

TYPE

Coll.: G.J. Keighery 196 Date: 20 05 1975 (PERTH 1041258)

LOCALITY Turnoff to Two Peoples Bay from Albany to Nananup Road. [Ca 17 km ENE of Albany] WA

LAT 34 Deg 57 Min 0.000 Sec S LONG 118 Deg 2 Min 0.000 Sec E

Small erect perennial herb, flowers red/white outer perianth, white inside, self compatible. Black swampy sand.

Banksia overstorey.

Previous det.: *Laxmannia sessiliflora* Decne.

Laxmannia jamesii

Keighery (Anthericaceae)

CONSERVATION STATUS:R

STATUS: ISO

TYPE

Coll.: G.J. Keighery 196 Date: 20 05 1975 (PERTH 1152262)

LOCALITY Turnoff to Two Peoples Bay from Albany to Nananup Road. [Ca 17 km ENE of Albany] WA

LAT 34 Deg 57 Min 0.000 Sec S LONG 118 Deg 2 Min 0.000 Sec E

Small erect perennial herb, flowers red/white outer perianth, white inside, self compatible. Black swampy sand.

Banksia overstorey.

Lysinema lasianthum

R.Br. (Epacridaceae)

CONSERVATION STATUS:P4

Coll.: E.J. Croxford 3206 Date: 19 07 1984 (PERTH 04307690)

LOCALITY Baker's Junction, E off Hassell Highway, WA

LAT 34 Deg 55 Min 42.000 Sec S LONG 117 Deg 54 Min 41.000 Sec E

30 cm high, with white flowers. Sandy peat soil. In association with *Cosmelia* sp. and *Hakea* sp.

Lysinema lasianthum
R.Br. (Epacridaceae)
CONSERVATION STATUS:P4
Coll.: G.J. Keighery 11692 Date: 13 10 1986 (PERTH 05121922)
LOCALITY Bakers Junction Reserve, 12 km NE of Albany, WA
LAT 34 Deg 57 Min 19.000 Sec S LONG 117 Deg 58 Min 0.000 Sec E
Slender erect shrub 20-40 cm. Flowers white, calyx pale brown. Drainage line, black sand over clay.
Banksia quercifolia heath.
Abundance: common.

Lysinema lasianthum
R.Br. (Epacridaceae)
CONSERVATION STATUS:P4
Coll.: R.D. Royce 4265 Date: 30 07 1953 (PERTH 1017799)
LOCALITY 2 miles E of King River WA
LAT 34 Deg 55 Min 0.000 Sec S LONG 117 Deg 56 Min 0.000 Sec E
Swampy sand. Heath.

Lysinema lasianthum
R.Br. (Epacridaceae)
CONSERVATION STATUS:P4
Coll.: R.J. Cranfield 4957 Date: 30 09 1984 (PERTH 1017780)
LOCALITY 1 km SE of Ledge Beach turnoff along Gull Rock Road, Albany WA
LAT 34 Deg 57 Min 0.000 Sec S LONG 117 Deg 58 Min 0.000 Sec E
Erect open spindly shrub 45 cm high. Flowers cream-white. Swamp. Black sandy peat. Closed sedgeland.
Abundant.

Lysinema lasianthum
R.Br. (Epacridaceae)
CONSERVATION STATUS:P4
Coll.: R.D. Royce 4265 Date: 30 07 1953 (PERTH 1018256)
LOCALITY 2 miles E of King River WA
LAT 34 Deg 55 Min 0.000 Sec S LONG 117 Deg 56 Min 0.000 Sec E
Swamp sand. Heath.

Lysinema lasianthum
R.Br. (Epacridaceae)
CONSERVATION STATUS:P4
Coll.: C.J. Robinson 952 Date: 12 10 1992 (PERTH 03134903)
LOCALITY Bakers Junction Nature Reserve, 150 m N of Hassell Highway, 1st creekline E of junction WA
LAT 34 Deg 55 Min 42.000 Sec S LONG 117 Deg 54 Min 41.000 Sec E
Spindly shrub 4-500 mm, flowers yellowish - white. Flat, wey grey sands.
Wet heath, *Homalospermum firmum* and sedges.
Abundance: + 50 plants

Lysinema lasianthum
R.Br. (Epacridaceae)
CONSERVATION STATUS:P4
Coll.: R. Melville & R.D. Royce 4410 Date: 30 07 1953 (PERTH 1018221)
LOCALITY 2 miles E of King River on Albany - Mount Many Peaks Road. WA
LAT 34 Deg 55 Min 0.000 Sec S LONG 117 Deg 56 Min 0.000 Sec E
Shrub 12-18 inches high, corolla tube white, lobes cream, bracts brown. Sandy margin of swamp. Scattered Jarrah merging into Jarrah forest; Cyperaceae, Restionaceae and Cephalotus.

Lysinema lasianthum
R.Br. (Epacridaceae)
CONSERVATION STATUS:P4
Coll.: R.D. Royce 4265 Date: 30 07 1953 (PERTH 1018205)
LOCALITY 2 miles E of King River WA
LAT 34 Deg 55 Min 0.000 Sec S LONG 117 Deg 56 Min 0.000 Sec E
Swampy sand. Heath.

Melaleuca diosmifolia
Andrews (Myrtaceae)
CONSERVATION STATUS:P3
Coll.: E.J. Croxford 6522 Date: 21 05 1991 (PERTH 04314239)
LOCALITY Bayonet Head, Oyster Harbour, E of Albany, WA
LAT 34 Deg 59 Min 0.000 Sec S LONG 117 Deg 56 Min 0.000 Sec E
1.5 m plant with greenish yellow flowers. Soil, sandy.
In association with *Eucalyptus* sp. and *Allocasuarina* sp. This specimen is housed at Albany.

Microtis globula
R.J.Bates (Orchidaceae)
CONSERVATION STATUS:R
Coll.: A.P. Brown 2303 Date: 06 12 1997 (PERTH 04912268)
LOCALITY Hassell Highway, 1.9 km E of Chester Pass Road on N side, ca 30 m in from road on edge of winter wet swamp WA
LAT 34 Deg 55 Min 20.000 Sec S LONG 117 Deg 56 Min 5.000 Sec E
Flat. Swamp. Permanently wet grey peaty soil.
Regenerating thicket (from fire last summer) with *Homalospermum firmum*, *Callistemon speciosa*, *Acacia* spp., *Thelymitra tigrina* and *Dampiera* sp.
Abundance: 50+ plants in area 10 x 10 m, plants healthy.

Microtis pulchella
R.Br. (Orchidaceae)
CONSERVATION STATUS:P4
Coll.: R. Heberle DLJ 5416 Date: 17 11 1989 (PERTH 05861160)
LOCALITY Bakers Junction, Eyre District, WA
LAT 34 Deg 55 Min 0.000 Sec S LONG 117 Deg 54 Min 0.000 Sec E

Flowers greenish-white, fragrant. Plants very slender. Black peaty soil. Burnt swamp. Fluid.
Previous det.: *Microtis alba*
Frequency: common.

Olax scalariformis
A.S. George (Olacaceae)
CONSERVATION STATUS: P3
Coll.: K.H. Rechinger 60303 Date: 11 12 1982 (PERTH 03191281)
LOCALITY Along Hassell Highway, 15 km NE Albany WA
LAT 34 Deg 56 Min 10.000 Sec S LONG 117 Deg 59 Min 19.000 Sec E
Previous det.: *Olax* sp.

Spyridium spadiceum
(Fenzl) Benth. (Rhamnaceae)
CONSERVATION STATUS: P2
Coll.: E.J. Croxford 360 Date: 10 06 1979 (PERTH 04118766)
LOCALITY Top of a hill above Gull Rock Beach Road, Albany, WA
LAT 34 Deg 59 Min 0.000 Sec S LONG 118 Deg 1 Min 0.000 Sec E
Sandy soil. In association with coastal heath and *Agonis*.
Previous det.: *Spyridium rotundifolia* F. Muell.

Stylidium plantagineum
Sond. (Stylidiaceae)
CONSERVATION STATUS: P4
Coll.: S. James 71.12/6 Date: 12 1971 (PERTH 1031686)
LOCALITY 4 km W of Nanarup. Where the dirt road to Two People Bay branches off the bitumen road to Nanarup WA
LAT 34 Deg 57 Min 0.000 Sec S LONG 118 Deg 2 Min 0.000 Sec E

Stylidium plantagineum
Sond. (Stylidiaceae)
CONSERVATION STATUS: P4
Coll.: E.J. Croxford 5757 Date: 04 12 1987 (PERTH 04548264)
LOCALITY Below lookout, Bayonet Head, off Lower King Road, Albany, WA
LAT 34 Deg 59 Min 0.000 Sec S LONG 117 Deg 56 Min 0.000 Sec E
40 cm plant with pale mauve flowers. Soil, red loam. In association with *Allocasuarina* sp. and *Banksia* sp.

This specimen is housed at Albany.
ALB. 10275

Stylidium pseudohirsutum
Mildbr. (Stylidiaceae)
CONSERVATION STATUS: P3
Coll.: R.J. Chinnock 3240 Date: 05 10 1976 (PERTH 03173054)
LOCALITY 16 km NNE of Albany off the Chester Pass Road WA
LAT 34 Deg 54 Min 0.000 Sec S LONG 117 Deg 55 Min 0.000 Sec E

Grasslike tufted herb, with large cream flowers. Orange-brown on margins and back. White sandy loam.
Casuarina woodland.
Previous det.: *Stylidium* sp.
Frequency: rare.

Thysanotus gageoides
Diels (Anthericaceae)
CONSERVATION STATUS: P3
Coll.: N.H. Brittan 74/52 Date: 15 10 1974 (PERTH 1122436)
LOCALITY Chester Pass Road, 0.2 miles S of 54 mile peg opposite truck bay on W side road WA
LAT 34 Deg 54 Min 0.000 Sec S LONG 117 Deg 55 Min 0.000 Sec E
In gravel.
Previous det.: *Thysanotus gageoides* Diels

APPENDIX 2

SOIL SUMMARY

Soil Characteristics	Brown Gravelly Loams	Brown Sand over Loam Duplex	Rocky Loam
Location	Central south facing slopes	Drainage line	Granite dome
Origin	Developed on granite/gneiss	Outwash of sediments soil from the granite dome	Weathered granite/gneiss
Top soil Texture	Gravelly sandy loam	Medium to coarse grey to brown sand	Yellow brown and brown sandy loam between basement outcrop
Sub soil Texture	Yellow brown loam sandy and clay	Light coloured sands over clay subsoils at 400 - 1000 mm	Basement granite with loam patches grading to light yellow to brown loam with saprolite.
Stone in profile	Uncommon	Uncommon	Common basement outcrop
Bedrock	Generally more than 2 metres	Generally more than 3 metres	0 - 2 metres
Gravel	Common	Minor	Nil
Hardpan	Traffic hardpan can develop	Minor traffic hardpan can develop	Granite basement
PH	Weakly acidic	Weakly acidic	Neutral to acidic
Salinity	Nil	Nil	Nil
Soil Permeability	Moderate to high in upper horizons reducing in subsoils	High in upper horizons	Generally low, moderate in loam areas
Soil Shrinkage	Some minor potential for soil shrinkage	Little soil shrinkage	Some minor potential for soil shrinkage in patches of loam

LAND QUALITIES

Land Qualities	Brown Gravelly Loams	Brown Sand over Loam Duplex	Rocky Loam
Slope	Moderate to steep	Gentle	Steep
Slope Stability	Moderate	Moderate	High
Wind Erosion Risk	Low	Low	Very low
Water Erosion Risk	Moderate to high	Moderate to high	Low
Drainage	Good	Good	Good
Moisture Availability	Moderate	Moderate	Low
Water Logging	Nil	Nil	Nil
Flood Risk	Nil	Restricted to drainage lines	Nil
Surface Water Availability/ Quality	Unlikely	Adjacent to watercourse	Dam sites not available
Ground Water Availability/ Quality	Low	Some water will be available for dams and bores	Nil
Salinity Risk	Very low	Very low	Very low
Microbial Purification	Moderate to high if waste water is contained within the soil	Moderate to high if waste water is contained within the soil	Very low
Water Pollution Risk	Low	Moderate	High
Phosphate Retention - profile	Moderate to high if waste water is contained within the soil	Low to high if waste water is contained within the soil	Low
Nitrogen loss - Profile	High, based on the interpreted degree of anoxic conditions and estimated microbial activity	Moderate if waste water is contained within the soil	Low

AGRICULTURE CAPABILITY

Agriculture Capability	Brown Gravelly Loams	Brown Sand over Loam Duplex	Rocky Loam
Soil Workability/Trafficability	Low to moderate because of slopes	Moderate to high	Not suitable
Rooting Conditions	Moderate Restricted by clay subsoils for perennial crops	Moderate Restricted by clay subsoils for perennial crops	Very low
Grazing	Moderate	Moderate, too small and adjacent to watercourse	Low
Grain/hay Crops	Not suitable	Low, too small and adjacent to watercourse	Not suitable
Annual Horticulture	Not suitable	Low, too small and adjacent to watercourse	Not suitable
Perennial Horticulture	Moderate Restricted by clay subsoils for perennial crops	Low, too small and adjacent to watercourse	Not suitable
Intensive Livestock	Not suitable	Not suitable	Not suitable

REPORT ITEM PD087 REFERS



Regolith and Hydrological Logs

Lindsay Stephens BSc (Geology) MSc (Botany) MElANZ
25 Heather Road Roleystone 6111
Phone 9397 5145 Fax 9397 5350

Project	Davies Road, Lower Kalgan	Site Assessed by	L Stephens
Location	Location 1879, Davies Road, Lower Kalgan	Date of Inspections	31 March 2004

Test Hole Number	1	Natural Surface	
Location	south east corner	Base of Hole	
Test Hole Type	backhoe	Depth	
Diameter		Depth of static water level	
Depth	Description	Comments	
0 - 60 mm	grey loam slightly gravelly		
60 - 350 mm	yellow brown sandy gravel		
350 - 630 mm	yellow brown loamy clay with yellow brown and brown mottles		
630 - 830 mm	yellow brown clay with reddish and brown mottles		
Groundwater	Not intersected		
Comment			

Test Hole Number	2	Natural Surface	
Location	central west	Base of Hole	
Test Hole Type	backhoe	Depth	
Diameter		Depth of static water level	
Depth	Description	Comments	
0 - 70 mm	dark grey sandy loam		
70 - 420 mm	yellow brown sandy gravel		
420 - 800 mm	yellow brown loamy clay, slightly gravelly		
800 - 1150 mm	yellow brown clay with minor red brown and brown mottles		
Groundwater	Not intersected		
Comment			

Test Hole Number	3	Natural Surface	
Location	central west	Base of Hole	
Test Hole Type	backhoe	Depth	
Diameter		Depth of static water level	
Depth	Description	Comments	
0 - 90 mm	gravelly sandy loam		
90 - 360 mm	yellow brown coarse loam		
360 - 1180 mm	reddish yellow to dark yellow clay, with red brown and dark yellow mottles		
Groundwater	not intersected		
Comment			

Test Hole Number	4	Natural Surface	
Location	south west	Base of Hole	
Test Hole Type	backhoe	Depth	
Diameter		Depth of static water level	
Depth	Description	Comments	
10 - 70 mm	dark grey sand		
70 - 230 mm	light grey sand, medium grained	subangular - weathered granite origin	
230 - 300 mm	light brown medium grained sand	subangular - weathered granite origin	
300 - 480 mm	light brown sand	subangular - weathered granite origin	
480 - 1050 mm	yellow sandy clay with weathered feldspar relicts. Sandy with minor red and yellow stringers and mottles		
Groundwater	not intersected		
Comment			

REPORT ITEM PD087 REFERS



Regolith and Hydrological Logs

Lindsay Stephens BSc (Geology) MSc (Botany) MEIANZ
 25 Heather Road Roleystone 6111
 Phone 9397 5145 Fax 9397 5350

Project	Davies Road, Lower Kalgan	Site Assessed by	L Stephens
Location	Location 1879, Davies Road, Lower Kalgan	Date of Inspections	31 March 2004

Test Hole Number	5	Natural Surface	
Location	central	Base of Hole	
Test Hole Type	backhoe	Depth	
Diameter		Depth of static water level	
Depth	Description	Comments	
0 - 300 mm	dark grey sandy loam		
300 - 340 mm	gritty light brown sand		
340 - 1200 mm	yellowish brown clay with red and lighter yellow brown mottles		
1200 mm	light greyish brown saprock of granite		
Groundwater	not intersected		
Comment			

Test Hole Number	6	Natural Surface	
Location	central south	Base of Hole	
Test Hole Type	backhoe	Depth	
Diameter		Depth of static water level	
Depth	Description	Comments	
0 - 70 mm	dark grey sandy loam	could not penetrate	
70 - 330 mm	Brownish yellow loam sand, medium grained		
330 - 850 mm	yellow mottled clay with red, darker and lighter mottles composed of material from a granite base.		
Groundwater	not intersected		
Comment			

LIMITATIONS TABLE LAND CAPABILITY FOR RURAL LOTS AND DWELLINGS

KEY	Capability for Selected Land use
I	Very high capability with few physical limitations.
II	High capability with some physical limitations that can be overcome by planning and minor site modifications.
III	Fair capability with moderate physical limitations which may affect development. Careful planning and site modification may be required.
IV	Low capability with many physical limitations.
V	Very low physical capability or with significant limitations.
X	Development not acceptable because of significant or Government Policy. (Includes Conservation Category or EPP Wetlands and remnant vegetation).

	Constraints Identified	Possible Environmental Management Strategies
a	Soil permeability limitations	<ul style="list-style-type: none"> • Provide appropriate waste water disposal systems.
b	Foundation soundness	<ul style="list-style-type: none"> • Requires house pads of sufficient depth to counteract potential clay or expanding sub-soils. • Organic subsoils may need to be removed if present.
c	Potential slope instability	<ul style="list-style-type: none"> • AS 2870 Site Class P generally applies to cut and fill. • Provide appropriate foundation design. • Upslope cutoff drains recommended. • Upslope water loading to be avoided • Trees to be retained/planted
e	Water erosion risk	<ul style="list-style-type: none"> • Maintain soil cover. • Use contour drains and agricultural practices. • Stormwater to be controlled.
f	Potential flooding	<ul style="list-style-type: none"> • Requires sand pad to be set sufficiently (0.5m) above highest known water level to minimise capillary effects. • Locate developments outside areas of flooding.
i	Subject to water logging risk	<ul style="list-style-type: none"> • Alternative waste water treatment systems likely to be required. • Raise waste water disposal areas. • Drainage may reduce potential for inundation. • Floor elevations to have clearance above water risk levels.
k	Soil workability	<ul style="list-style-type: none"> • Avoid rock, clay subsoils or other restrictions.
m	Low moisture availability of soil	<ul style="list-style-type: none"> • Reduce stock. • Restrict clearing to building envelopes.
n	Low nutrient retention ability	<ul style="list-style-type: none"> • Alternative waste water treatment systems may be required. • Leach drains may need to be inverted or semi-inverted, banded by natural soil or impermeable membrane on downslope side. • Setback developments appropriate distances from water bodies/wetlands. • Feed stormwater through detention basins and swale drains. • Reduce nutrient loading by land use change or reduced stock. • Restrict clearing to building envelopes. • Restrict the density of development.
o	Water pollution risk by overland flow	<ul style="list-style-type: none"> • Retain surface water in basins, use swale and grass filters. • Reduce stock and potentially polluting land uses.
p	Potentially low microbial purification	<ul style="list-style-type: none"> • Alternative waste water treatment systems may be required. • Correctly install waste water systems. • Bund waste water disposal areas sufficiently.
r	Restricted rooting conditions	<ul style="list-style-type: none"> • Avoid rock, hardpan or other restrictions.
s	Water pollution risk by subsurface flow	<ul style="list-style-type: none"> • See (n) above.
t	Low topsoil nutrient retention	<ul style="list-style-type: none"> • See (n) above.
v	Remnant vegetation	<ul style="list-style-type: none"> • Restrict clearing to building envelopes. Maintain linkages.
w	Wind erosion risk	<ul style="list-style-type: none"> • Reduce stock, irrigate and improve pasture • Restrict clearing to building envelopes.
x	Reduced ease of excavation	<ul style="list-style-type: none"> • Remove rock or avoid constrained areas.
y	Salinity risk	<ul style="list-style-type: none"> • Provide drainage and reduce ponding. • Plant deep rooted species.
z	Wetland conservation	<ul style="list-style-type: none"> • Exclude building envelopes and developments. • Provide appropriate buffer distances. • Place conservation covenants on wetlands and/or vegetation.
&	Potential for acid sulfate conditions	<ul style="list-style-type: none"> • Minimise deep excavations or bulk earthworks. • Neutralise removed affected soils. • Minimise or exclude dewatering and lowering of groundwater.
\$	Restricted water	<ul style="list-style-type: none"> • Water will be restricted for some horticulture land uses
#	Semi-inverted leach drains	<ul style="list-style-type: none"> • Leach drains should be semi-inverted, banded by natural soil or impermeable membrane on the downslope side.
@	Alternative waste water treatment system required	<ul style="list-style-type: none"> • Unsuitable for conventional septic systems. All lots will be required to use alternative waste water treatment systems to comply with Health Act and Department Guidelines.
?	Restricted water availability	<ul style="list-style-type: none"> • Horticulture land uses may have insufficient water for all activities.

Attachment II

Landform Research

Local Water Management Plan

Local Water Management Plan

Lot 1879,
Davies Road,
Lower Kalgan

February 2012



BACKGROUND

Subdivision

It is proposed to subdivide Lot 1879 Davies Road, Lower Kalgan into lots with areas of 1 hectare.

Lot 1879 lies on the western flanks of Mount Mason North, to the east of Oyster Harbour, dropping from 146 metres AHD in the north eastern corner down to 110 metres in the south western corner. A creek line runs across the south western corner.

The site has been used for rural living and grazing. It is cleared, with one dwelling in the north east.

It is a rectangular lot, with a proposed subdivision to 12 lots arranged around a ridge in the north eastern corner, with an access road along contour from the north.

Of the 14 plus hectares of Lot 1879, the total hard surface for the subdivision represents 4.6% of the surface area, which is a very small addition to the site.

All lots are to be connected to scheme water.

Stormwater from Dwellings

It is proposed that stormwater from the one hour 1 in 1 year return event will be retained within rainwater tanks and soakwells on site. Excess water from rainfall events greater than this will flow onto the ground for broad area infiltration. The large lot sizes with a minimum of 1 hectare provide sufficient area for excess infiltration.

Soak wells are recommended to be installed on sand with a sand buffer of 600 mm placed around the soakwells. Geofabric is recommended to minimise sand inflow.

Road Drainage

There are 310 metres of internal roads that will be installed with a single swale drain. The road is located along contour and will collect flows from the road in addition to driveways and from the sloping ground above the road.

The runoff from the existing land surface would normally flow downslope during a storm event and enter the creek. The drainage is designed to allow this volume of water to continue to flow to the creek to maintain the pre-subdivision hydrology of the creek.

The design of the road drainage is to include;

- A swale drain on the upslope side of the road,
- Riprap or slowing detention features,
- A small concrete covered sump with a volume in the order of 1m³ to collect water and sediment.
- A pipe to direct water to an open drain along an easement on the boundary of Lots 9 or 10.

- A shallow two stage detention basin with each stage having a volume of 12.5 m³ plus freeboard. The basins will be vegetated with reeds and a hard surface spillway to the creek.

Drainage and Flood Risk

The only watercourse is the creek which is retained in public open space. The channel is deeply incised and any flood will be retained within the current bed or adjacent to it.

Dwellings will be located 5 plus metres elevation above the public open space.

Some replanting of the public open space with strategically planted native shrubs and trees is recommended provided they do not compromise flood flows and raise the elevation of the flood peaks.

Groundwater

There is no evidence of winter wet soils in the areas selected for development.

Winter wet areas near the creek have been excluded from development.

Calculations show that the recharge will not change significantly as a result of subdivision and therefore there is not likely to be any change to groundwater elevations.

Water Quality

There is no evidence of salinity of soils on site. No change to salinity is anticipated as a result of subdivision.

There is no evidence of acid sulfate conditions, and unlikely to be, other than a minimal risk based on geological and regolith considerations. No deep excavations are expected to be required that are likely to introduce at risk conditions.

See the Land Capability and Geotechnical Assessment dated November 2004.

Nutrient Impacts

The site complies with the Draft Country Sewerage Policy (22 September 2002, SOCWM meeting) which permits waste water disposal on any soil type on lots in excess of 1 hectare, with some site modification.

The soils are capable of accepting and retaining all waste water, however either Alternative/Nutrient adsorbing waste water systems are recommended or leach drains be installed to the City of Albany guidelines for soils such as these. The clay soils horizon between 600 – 1000 should be breached or removed and the underlying soil horizons deep ripped. See City of Albany Guidelines.

See the Land Capability and Geotechnical Assessment dated November 2004.

Lindsay Stephens
Landform Research

LOCAL WATER MANAGEMENT PLAN SUMMARY

SECTION	ITEM	REFERENCE	COMMENTS
Executive Summary			
Introduction	Context	1.0 page 1	
Proposed Development	Site Context	2.0 page 2	
	Proposal Plan	Figure 2 2.0 page 2	
	Landscape Plan	Figures 1 and 2	
Design Criteria	Design Criteria	3.0 page 3 Figures 1 and 2	
Pre-Development Environment	Site Assessments	4.0 page 3	See the Land Capability and Geotechnical Assessment dated November 2004.
	Site Condition	4.0 page 3 -7 Figures 1 - 2	See the Land Capability and Geotechnical Assessment dated November 2004.
	Geotechnical Conditions	4.0 pages 4 – 7 Figures 1 - 3	See the Land Capability and Geotechnical Assessment dated November 2004.
	Environmental Issues	Pages 4 – 7 Figure 1	No wetlands, one watercourse.
	Existing Surface Water Flows	4.5 pages 6 - 7	
	Groundwater	4.6.6 page 7	
Water Use Sustainability Initiatives	Water efficiency	5.0 page 7	
	Water Supply	2.0 page 3	Scheme
	Wastewater Management	4.3.4 page 12	See the Land Capability and Geotechnical Assessment dated November 2004.
Stormwater Management Strategy	Flood Parameters	4.5.3 page 7	No watercourses on development area. Located in POS.
	100 Year Event	Pages 9 - 17	
	10 Year Event	above	
	1 Year Event	above	
	Groundwater Management	7.0 page 16	No groundwater impact
Acid Sulfate		4.3.5 page 5	No acid sulfate
Future Water Management			Detailed designs will be required after approvals are gained
Implementation	Developer		This document is to support application for subdivision.
	Roles - Funding		
	Review		

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- Figure 1 Stormwater Management
- Figure 2 Aerial Photograph
- Figure 2 Contour Plan

LOCAL WATER MANAGEMENT PLAN

1.0 Introduction

1.1 Background to a Water Management Plan

In recent years Urban Water Management has received greater attention during the design phase to ensure that water resources are maximised and that environmental flows are maintained. The considerations and design are also directed towards minimising impact during storm events.

The Department of Water, 2008, *Better Urban Water Management* documents the issues.

This is also considered in Department of Planning, *Planning Bulletin 92, Urban Water Management*.

The focus of this local urban water planning is to provide for surface and groundwater management at all stages of the Planning and Development process to ensure that the management of water works at a Regional and Local level and that as land is progressively developed, a situation does not arise where a satisfactory solution or management cannot be found in the later stages of development.

In other words drainage and water management is to be considered up front in the broad scale and from there considered in progressively more detail until the final design at the local level is achieved.

With consideration of water issues up front and through the process there is much more potential to design better management of water. The main trends of the *Better Urban Water Management* are summarised below.

- to increase the potential for sustainability,
- maintain environmental flows,
- maintain and enhance water quality
- minimise the potential impact on the surface and groundwater hydrology both onsite and offsite,
- maintain biodiversity
- provide nutrient retention and management,
- minimise flood risk
- encourage water conservation

The key design objectives are to

- maintain the one year one hour average recurrence interval (ARI) event so that the peak post development flow rates are similar to the pre-development conditions.
- manage the catchment runoff from post development for up to the 1 in 100 year ARI event with runoff similar to the pre-development conditions.

- Try to minimise water use within the proposed subdivision to 100 kL per person/year including not more than 40 – 60 kL per person per year of scheme water.

The water planning outlined in *Better Urban Water Management, 2008* is;

1. Regional or subregional land and water planning

Water planning at a whole of catchment level.

2. District water planning document

Water planning at the local catchment level or within a planning precinct

3. Local water planning

Water planning within part of a catchment or at a subdivision level. This is normally conducted using a **Local Water Management Strategy**. For large subdivisions, or in catchments, more detailed water management is considered in an **Urban Water Management Plan** which is completed once the development catchments are known and the flow rates calculated.

4. Detailed engineering design with technical calculations

This is to accompany the site specific design for the subdivision and follows subdivision approval.

At each stage of the water planning, the water balance, design and considerations would integrate both upwards and downwards. In other words the regional or district planning should not preclude development at a local level and in turn development at a local level should not place unacceptable impacts on district or regional water attributes.

In *Better Urban Water Management* the Local Water Management Strategy is submitted as part of the subdivision application process. It is not a detailed design document with complex calculations and pipe widths and the like, but rather a consideration that sufficient land and management is available to manage the water post development.

Local Water Management Strategy

In the case of the proposed subdivision, a Local Water Management Strategy is required by the City of Albany and Department of Water, even though the subdivision is not urban and the lots are over 1.0 hectare.

An **Urban Water Management Plan** will be prepared once the development catchments are known and the flow rates calculated.

2.0 Proposed Development - Subdivision

It is proposed to subdivide Lot 1879 Davies Road, Lower Kalgan into lots with areas of 1 hectare.

Location 1879 lies on the western flanks of Mount Mason North, to the east of Oyster Harbour.

The site is some 12 km north east from Albany town centre.

The proposed subdivision consists of 12 lots arranged around a ridge in the north eastern corner, with an access road along contour from the north.

All lots are to be connected to scheme water.

A site plan of the proposed subdivision is attached. Figure 2.

3.0 Design Criteria

A Local Water Management Strategy, through a stormwater drainage system, is used to provide information on the potential impact of road and other drainage on the local creek network.

The water management will consider potential changes to recharge on individual lots and overall.

It will also consider the management of stormwater from roads in 1, 5, 10 and 100 one hour events, disposal of stormwater, and recommendations on the size and form of on site stormwater drainage and detention basins,

Department of Water seek to retain on site rainfall from a 1 in 1 year ARI 1 hour event with the excess directed to stormwater. Also directed to stormwater is the runoff from hard surfaces such as roads.

4.0 Pre-development Environment

4.1 Existing Information

A site study was carried out on Lot 1879, Davies Road, Lower Kalgan on 31 March 2004 to map the soils and hydrology and provide geotechnical and land systems assessment, to determine the suitability of the land systems to support alternative land uses.

During this study auger holes were drilled as necessary to confirm soil type or gain information on the soils, the geology, and hydrology. A backhoe was used to obtain soil logs at six locations. The salinity of all water courses and water bodies was determined. In addition to field observations interpretations were made from aerial photography and research.

The site work was listed in the Land Capability and Geotechnical Assessment dated November 2004 prepared by Landform Research.

The layout, landform and site features are readily obvious from viewpoints across the site.

4.2 Site Description

The general area has been used for agriculture for many years. The more capable soils are cleared, although portions of the more rocky soils in the north of the site remain as grazed remnant vegetation. Properties in this area were first settled in 1834, when Patrick Taylor established a farm to the north of Nanarup Road.

The Lower Kalgan area has experienced changes in land uses in recent years with significant portions of the area being converted to small rural holdings and lots. The adjoining land to the west and north has been subdivided to rural living lots.

Lot 1879 has been used for rural living and grazing. It is cleared, with one dwelling in the north east.

A creek line runs across the south western corner.

4.3 Geotechnical Attributes

4.3.1 Geology and Regolith

Lot 1879 lies on the western flanks of Mount Mason North, dropping from 146 metres AHD in the north eastern corner down to 75 metres in the south western corner. Mount Mason North is a remnant granite/gneiss hill that has been of a similar form during recent geological time.

The slopes are therefore moderate, dropping from the north eastern corner.

The granite and gneiss of Proterozoic age, with included occasional dolerite dykes, were once covered by a laterite soil profile across the landscape, although this has been largely removed from Location 1879 apart from some gravel in some upper soil profiles.

Weathering of the granite to the east has released medium grained quartz sand that has been deposited in the small valley in the south.

4.3.2 Soils

Three main soils exist across Lot 1879, reflecting the various regolith history of the weathering granite/gneiss basement. The loam soils are developed on the deep weathering profile of the granite/gneiss basement with laterite gravel shed from upslope and degeneration of the laterite soil profile added to the upper horizons.

Brown Gravelly Loams occur on the lower slopes in the east. These soils have yellow brown sandy gravel to 400 mm over lighter brown and yellow brown loam and clay subsoils.

Slopes are moderate to steep.

Brown Sand over Loam Duplex

These occur on the lower slopes with sand to depths of approximately 300 mm over lighter brown and yellow brown loam and clay subsoils. The sands are medium grained quartz sand shed from weathering of granite up slope. Sand is more prominent at lower elevations along the creek line in the south west.

Slopes are moderate to steep, becoming steeper upslope.

Rocky Loam

Where the basement granite has been exposed in the north and north east, brown loam and yellow brown loam, with sandy surface horizons are present.

Basement granite/gneiss rock outcrop is frequent and slopes tend to be steeper.

4.3.3 Soil Permeability

No permeability or infiltration tests were conducted on this site. Samples were conducted on the adjoining lots to the north and west in the same soil types and these can be used to indicate the permeability because they were undertaken in winter conditions.

Those infiltration tests were established according to the Health Regulations.

Based on those tests and soil observations some subsoils with a significant clay content had slow infiltration of greater than 60 minutes for 25 mm. The upper soil horizons were found to be better.

Soils on the lower slopes and valley floor have a layer of overlying quartz sand.

4.3.4 Nutrient Retention Capability

The soils on Lot 1879 are capable of accepting and retaining all waste water in areas nominated for dwellings.

Site investigations were conducted by Landform Research and described in the Land Capability and Geotechnical Assessment dated November 2004.

The gravelly and loam soils have high phosphate retention capability and are highly capable of retaining nutrients. On this site, with lot sizes of over 1 hectare, the loading from waste water systems is light compared to small lot urban subdivisions and more than complies with the Government Country Sewerage Policy which permits on site waste water disposal on lots as small as 0.2 hectares.

The critical issues are that the waste water should be disposed of into dry conditions and the waste water should infiltrate into the natural soils and not be able to move laterally and short circuit the disposal area. When this is undertaken good nutrient retention can be achieved.

4.3.5 Acid Sulfate Soils

Acid sulfate conditions normally only develop where saturated soil conditions occur in estuarine or peaty environments, in the presence of organic matter, sources of sulfur and under reducing conditions.

All soils observed on site are high in the landscape, well drained and oxidised with the iron minerals being oxides. No reducing conditions were observed at the surface or at depth in the test holes. Any reducing conditions will be temporary due to waterlogging.

No organic pyritic, peat, gley or highly saline conditions were evident in any test hole. The site lies well above estuarine or saline conditions.

No soils, from the descriptions or the geomorphology, that have physical or compositional characteristics of acid sulfate conditions, were recorded in the soil test holes.

4.4 Climate

Weather data is recorded at Albany, but the local climate may be slightly different due to the orographic effects of the slopes of Mount Mason North.

The climate of Albany consists of cool winters followed by warm summers.

Weather data is recorded at Albany and Albany Airport.

The overall climate however is warm, dry summers with cool, wet winters. Drizzle from onshore winds is common during summer nights and mornings.

Rainfall at Albany Airport is 798 mm per year and 932 mm in the town, and 794 per year at Kalgan River. Rainfall on site will therefore be likely to be equivalent to the town at say 932 mm. Mean monthly rainfall varies from near 20 mm in summer months to 130 mm in the winter months.

For the Albany area the rainfall storm event is taken as 14 mm per one hour event with a one year return (Department of Water) and Engineers Australia 2007, Australian Rainfall and Runoff. The City of Albany uses 13.48 mm for the 1 year return, 22.05 mm for the 5 year return, 24.94 mm for the 10 year return and 40.21 mm for the 100 year return event.

For a 5 year one hour ARI event the amount of rainfall is 22.5 mm, for a 10 year event 24.0 mm and for a 100 year one hour event the figure is 34.5 mm.

Temperatures could be expected to have a summer average maxima of 25°C in the hottest months down to just over 15°C in the coldest months, July and August. Minimum temperatures range down to 10 ° C in the coldest months.

Annual evaporation is less than 1000 mm per year, with rainfall exceeding evaporation for almost nine months of the year.

4.5 Hydrology

4.5.1 Soil Moisture

Soils are generally moist throughout the year, with loam soils and a location on the south coast where rainfall is received in all months. The winter months are wetter and therefore the levels of soil moisture increase at that time.

Being elevated, the soils drain well and there is no evidence of saturated soils or seepages.

4.5.2 Surface Water

The site drops from the north eastern corner to the creekline in the south east. Slopes are generally moderate and approach steep in some areas particularly associated with the granite outcrops in the north eastern corner.

Surface water runoff drains downslope to the creekline in the south western corner.

Water runoff from the area can be significant during storm events, down the steeper slopes to the creek.

No seepages were observed on the upper or lower slopes.

A summary of the surface water is;

- The slopes are moderate with some steeper areas.
- The site drops from Mount Mason North in the north east at 146 metres AHD down to 110 metres in the south western corner
- All water currently drains to the south west to the creekline across cleared pasture land.

- There is one dam on site in the creekline in the area potentially allocated to Public Open Space.
- The soils appear sufficiently permeable for on site stormwater retention.
- The addition of scheme water will increase water loading but will be offset by trees that will be planted by landowners. See 6.2 Changes to Soil Moisture as a Result of Subdivision.

4.5.3 Flood Risk

The dwellings are elevated well above the existing creekline which is some 10 metres above the locations where dwellings will be constructed.

There is no flood risk for dwellings, and the creek is small with a small catchment and an incised channel. Storm flows will be contained within the current creek channel.

4.5.4 Wetlands

Apart from the creek there are no wetlands on site. The creek is proposed to be included in Public Open Space.

4.5.5 Salinity

There is no evidence of salinity. The quality of the water in the creek at the time of the site inspection, 31 March 2004, was 70 mSm or 385 mg/L salt, which is fresh (potable <180 mSm). Winter flows are likely to be fresher.

4.3 Groundwater

The regional groundwater is deeper than the base of the creekline.

There are no surface seeps of water leaking out from the top of the granite basement.

5.0 Water Use and Sustainability Initiatives

The main water use initiatives rely on the individual landholders. The best way is not to mandate the water saving devices but rather to encourage the public on the best water saving management.

Department of Health Draft, 2002, Guidelines for the Reuse of Greywater in Western Australia provides the following water use. The figures for an average dwelling in Albany using 220 kL scheme water per year are included.

Garden watering	47%	103.4 kL
Swimming Pool	2%	4.4 kL
Leaks	2%	4.4 kL
Taps	8%	17.6 kL
Shower	16%	35.2 kL
Washing machine	13%	28.6 kL
Toilet	10%	22.0 kL

The education of the purchasers is achieved in literature attached to Water Corporation accounts, Department of Water and City of Albany awareness information.

The main water use initiatives for each lot are potentially;

- Potential use of rainwater tanks with a minimum of 5000 kL capacity. Saving 15.6 kL per year.
- Recovery and reuse of water from nutrient adsorbing waste water systems. Saving 103.4 kL – (Note only one of nutrient adsorbing or grey water systems is possible).
- The recommended use of grey water recovery and use on gardens. Savings 81.4 kL – (Note only one of nutrient adsorbing or grey water systems is possible).
- The use of native or low water requiring street trees. Savings relate to soil moisture and in this South Coast area the savings are likely to be minimal.
- The encouragement for the use of low water requirement gardens. Savings estimated to be 10 – 20 kL per year.
- Encouragement for use of water saving four star and dual flush toilets. These are assumed to be used in the estimated average of 220 kL per year and therefore no additional savings are likely.
- Encouragement for the use of water saving shower heads and appliances. These are assumed to be used in the estimated average of 220 kL per year. Therefore no additional savings are likely apart from education of the public to take shorter showers and use water saving habits in the home.

If the average dwelling holds 2.5 persons and yearly water use is 220 kL per year the average use per person is 88 kL per year, without any savings. To achieve an 80 kL per person use per year, a reduction of 20 kL per year per dwelling is required, and to drop to 60 kL per year a drop of 70 kL per dwelling per year is required.

To achieve the target of 80 kL per person per year, then the use of water wise gardening and plants, combined with rainwater tanks, will achieve the outcome.

To achieve the ideal target of 60 kL per person per year, the use of water recovery and recycling through either a nutrient adsorbing waste water system or a dedicated greywater system will be required and/or changed or aware water use habits will be required.

With the level of public information now available it is likely that some initiatives will be taken up by new landholders. The Water Corporation has ongoing water savings advertising, education and community awareness initiatives.

If half the dwellings installed the water saving initiatives then the Department of Water and Water Corporation recommended target of between 60 – 80 kL per person per year will be met.

For water savings to be made, when compared to an older subdivision, such as the mandating of rainwater tanks, such conditions will need to be placed on the subdivision approval.

6.0 Stormwater Management Strategy

6.1 Post Subdivision Water Input

The proposed subdivision of Lot 1879 will be connected to scheme water. The amount of scheme water used per dwelling will depend on the number of persons, the amount of water added to gardens and whether there is a swimming pool. The volume is normally in the range 250 – 350 kL per year for a family, with Albany trending towards the lower figures because of rainfall throughout the year.

For a 1 hectare lot with a scheme water use of say 220 kL per year this additional loading represents approximately 220 kL per hectare after allowing for roads, and a slightly larger average lot size, which is equivalent to an additional 22 mm rainfall.

The other loading is from rainfall, at near 850 mm per year (see 3.0 Climate above), of which most falls from April to October inclusive.

For 12 lots at 220 kL per lot, the total scheme water added to the location is 2 640 kL per year. The scheme water will be spread generally over the whole subdivision.

There is potential for rainwater tanks on all lots. On lots connected to scheme water, a small tank for gardens will effectively attenuate rainfall for summer but not in winter when the tank will be full. On the other hand a small tank used for potable water will help attenuate rainfall throughout the year, but will still depend on the amount of water used daily.

The mandating of a 5 000 L rainwater tank and the use of water from that tank could account for a use of 20 plus kL per year per house depending on use patterns, that would reduce the input from scheme water. As the data is generalised, relatively small, and it is uncertain whether rainwater tanks will be used, this use of rainwater is ignored in the calculations.

Greywater disposal on site will potentially offset some scheme water use by replacing the need for scheme water for gardens.

For these calculations and considerations, the potential for some rainwater use by lots connected to scheme water and greywater reuse cannot be guaranteed, so the volumes of such use are not considered in the calculations. (See treatment of Stormwater below).

6.2 Changes to Soil Moisture as a Result of Subdivision

In order to determine the effects of development, and what should be designed for and considered, an assessment of the likely recharge now and after development is considered.

This provides an indication of what effect the construction of hard surfaces on the proposed lots and road drainage will have in drying or draining the soils. The changes can be summarised by the following.

Scheme water + increased recharge from roofs to soakwells + increased loading from roads and driveways – drainage from roads removed offsite (this includes the recharge from the roads and driveways plus the water running off the sloping land that is collected by the roads) – any water substituted for scheme water use from greywater recovery or rainwater tanks – increased evapotranspiration due to additional trees and landscaping.

For a dwelling a hard surface area of 350 m² is assumed, including the dwelling, driveways, sheds and garages.

Engineers Australia 2007 rainfall design criteria is normally used to provide the ARI hourly one year design flow volume. At that criteria 93% of all water will be retained on site. (Department of Water Information). This is the design volume that Department of Water seeks to retain on site, with the excess being directed to stormwater runoff.

With development the amount of hard surface will increase, with dwellings, driveways and roads on the site.

Currently rainfall which falls on the subject land either soaks into the soils or runs from the site.

Apart from scheme water, loading from rainwater that is collected from roofs and not used in rainwater tanks, will be directed to soakwells. For individual lots this is assumed to represent an area of 300 m² hard surface. The recharge from soils rises because the runoff from the roofs increases and there is no pasture or other vegetation on that footprint to lead to evapotranspiration of the water. Normal recharge for pasture is assumed to be 40% and recharge from roofs and roads is rated at 90%. That is there will be an additional recharge of 50% for the area of hard surfaces on lots connected to scheme water, as a result of subdivision, because the evapotranspiration of pasture and vegetation is replaced by hard surface.

For a 12 lot subdivision a hard surface area of 350 m² is assumed including dwellings, driveways, sheds and garages.

Surface area as a result of dwellings is 350 x 12 = 4 200 m².

To this is added 310 metres of internal road at say 6 m² hard surface per linear metre.

The total area of road hard surface is 310 x 6 = 1 860 m²

Of the 13 plus hectares of Lot 1879, the total hard surface for the subdivision is therefore estimated to be;

$$4\,200\text{ m}^2 + 1\,860\text{ m}^2 = 6\,060\text{ m}^2.$$

This represents 4.6 % of the surface area which is a very small addition to the site.

For the 12 (approx) lots connected to scheme water the additional recharge as a result of hard surfaces for buildings that will not use rainwater is as shown below. Local rainfall is assumed to be 932 mm per year.

12 lots x 350 m² roofs x 0.932m rainfall x 50% increase in recharge = 1 957 m³ or kL per year (increase).

To this must be added the runoff from driveways and sheds etc that cannot be directed to soakwells at say 50 m² per lot; that is 25 m² of the hardstand and 25m² of the driveway. This hardstand is rated as having a reduced runoff on average as not all driveways will be sealed. An average of 70% runoff is assumed.

$$12\text{ lots} \times 50\text{ m}^2 \times 0.932\text{ m rainfall} \times 30\% = 168\text{ m}^3\text{ or kL per year (increase)}$$

There is 310 metres of internal road at 8 metres wide, allowing for pavements, gutters and the like. This forms 2 480 m² hardstand.

The additional recharge associated with the roads, at 90% runoff from hard surfaces less the probable 40% originally from pasture is;

$$2\,480\text{ m}^2 \times 0.932\text{ m rainfall} \times 50\% = 1\,202\text{ m}^3\text{ or kL per year (increase)}$$

The total recharge is $1\,957\text{ m}^3 + 168\text{ m}^3 + 1\,202\text{ m}^3 = 256\text{ kL}$ per hectare per year spread over an area of 13 ha. This equates to an increase in rainfall of 25.6 mm.

On the other hand increased evapotranspiration as a result of additional tree planting is likely. On this site, with the proposed lot sizes, gardens, additional landscaping and tree planting, the recharge of the whole subdivision may potentially fall by say 5% from pasture before subdivision to parkland pasture after subdivision.

Without counting the public open space, the change as a result of landscaping, tree planting and gardens at 5% on 13 hectares, is shown by;

$14\text{ ha} \times 10\,000\text{ m}^2 \times 0.932\text{ m rainfall} \times 5\% \text{ change in recharge} = 6\,524\text{ kL}$ per year for the subdivision (decrease) or 466 kL per hectare.

- *The overall soil moisture as a result of subdivision will therefore remain similar or reduce slightly when compared to the pre-subdivision condition.*

In the calculations the use of rainwater tanks is ignored because the potential savings are 7% when compared to individual water use by landholders. The mandating of rainwater tanks, if the water is substituted for scheme water, is considered in 6.3.3 Rainwater Tanks.

6.3 Stormwater Design

6.3.1 Design Criteria - Volumes

Department of Water seek to retain on site rainfall from a 1 in 1 year ARI 1 hour event with the excess directed to stormwater, which represents 93% of the rainfall events.

The one hour one year return storm event that is to be retained is 13.48 mm. The 5 year event is 22.05 mm, the 10 year return event is 24.94 mm and for a 100 year event the figure is 40.5 mm.

6.3.2 Roof Drainage and the Size of Soakwells

For a dwelling on a subdivision a hard surface area of 350 m^2 is assumed, including dwelling, driveways, sheds and garages.

As the lots will be connected to scheme water, the surface area directed to soakwells is assumed to be 300 m^2 , because of sheds and driveway runoff not being collected, and the rainfall criteria is 13.48 mm with a 0.9 runoff coefficient from hard surfaces, which result in a volume of up to

$$300\text{ m}^2 \times 0.9 \times 13.48/1000\text{ mm} = 3.64\text{ m}^3 \text{ or } 1.21\text{ m}^3 \text{ per } 100\text{ m}^2 \text{ roof area}$$

Typical soakwells of 1300 mm diameter x 1200 mm depth hold a volume of 1.59 m^3 and are capable of holding the runoff from each 100 m^2 with an excess capacity of 26%. This does not take into account any seepage of water into the soils that will occur during the one hour.

With two such soakwells a total storage volume will be 3.18 m^3 or 73% of the 300 m^2 roof area used. Therefore, to round the figure off, a roof area of 300 m^2 will require three 1300 x 1200 mm soakwells with a larger roof area requiring correspondingly more soakwells to achieve a 1 in 1 hour ARI rainfall event.

Excess water from rainfall events greater than this will flow onto the ground for broad area infiltration. The large lot sizes with a minimum of 1 hectare provide sufficient area for excess infiltration.

On house sites where silt or reduced permeability subsoils are encountered it is preferable that the infiltration surface area of the soak wells be increased. This can be achieved by removing the clay enriched horizon from under the soakwell to a depth of say 1.5 to 2 metres and backfilling with sand. The soakwells should then be placed on the sand base and surrounded with 600 mm sand. More soakwells could be used. Geofabric may be required to prevent sand from flowing into the soakwell when full.

On a sloping site such as this there is little likelihood of the soakwells not draining well.

The volume of water directed to soak wells can be reduced correspondingly for dwellings with rainwater tanks in excess of say 5 000 litres.

6.3.3 Rainwater Tanks

If a minimum 5 000 litre rainwater tank is recommended for lots with scheme water, provided it is plumbed into a system that is used all year round, such as potable water, washing, toilet use or a combination, for toilet use alone, at say a volume of 2.5 L per average flush with 6 flushes per person, the daily use will be $2.5 \times 6 = 15$ L per person per day.

For an average 2.5 person family over a month this amounts to 1 300 L per month or 1.3 m³ kL per month. Even piping rainwater for toilet use represents a water saving, but is not sufficient alone in any month to effectively attenuate a storm event. The use of the rainwater tank to attenuate stormwater flows is therefore not included in the calculations because at this stage the actions of individual owners cannot be anticipated.

The total savings are in the order of 15.6 kL per year for a 2.5 person average family. With an estimated average use of water of 220 kL per year per dwelling in Albany this represents a saving of 7% if the water is substituted for scheme water.

6.3.4 Waste Water Management

Nutrient retention is high on this site. This is discussed in the Land Capability and Geotechnical Assessment dated November 2004 prepared by Landform Research.

The site complies with the Draft Country Sewerage Policy (22 September 2002, SOCWM meeting) which permits waste water disposal on any soil type on lots in excess of 2 000 m² and allows for some site modification. See also 4.3.4 Nutrient Retention Capability.

The soils on Lot 1879 are capable of accepting and retaining all waste water.

Any fertiliser applied to gardens will similarly be strongly adsorbed onto the soil particles.

The critical issues are that the waste water should be disposed of into dry conditions and the waste water should infiltrate into the natural soils and not be able to move laterally and short circuit the disposal area.

The majority of the site will require nutrient adsorbing waste water treatment systems.

The City of Albany normally requires either a conventional septic system, installed with semi inverted leach drains to their specifications, or an alternative waste water system.

On sloping sites such as this a terraced waste water disposal area is likely to be required, with an upslope cutoff drain. This is capable of achieving a dry suitable waste water disposal area. Volume can be reduced by using greywater reuse systems.

When this is undertaken good nutrient retention can be achieved

To increase infiltration and comply with the Health Act Regulations, the City of Albany requires that a 3 metre wide area around the leach drain of a conventional septic system be deep ripped and then the leach drain covered with calcareous sand.

The proposed waste water disposal complies with the Government Country Sewerage Policy and City of Albany Requirements.

6.3.5 Size of Road Drainage

Prior to subdivision any storm event will lead to some intermittent and discontinuous surface sheet wash, the location of which is unclear. However post subdivision this flow will be intersected by the proposed road.

The road will pick up all of the flow and it will be directed along the swale drains as per DOW and City of Albany requirements.

It is recommended that the drain be located on the upslope side only because of the steep slopes.

It is assumed that all stormwater on each lot is retained on site. For the lower lots, and those in the east not above the road surface, water runoff will not change and will continue to flow unimpeded as it currently does.

Surface water runoff from above the road will be captured by the road and will have to be treated as road stormwater.

The designed road will require a sump to collect the stormwater from the swale drain on the upslope edge. The sump is proposed to be installed at the low point of the road and then piped under the road to a pipe/ open drain located in an easement on Lots 9/10 as shown on the Plan in Figure 1.

- **Runoff from land surface catchments**

This flow occurs now and cutting it off will reduce the natural environmental flows to the creek. Therefore, whilst this flow will be captured by the road, retaining it all on site, is not desirable based on maintaining environmental flows. What is desirable is to capture the additional flow from the hard surfaces whilst providing filtration for the surface water runoff.

The coefficient of runoff for pasture on steeper rocky slopes such as this is 0.75, from Engineers Australia. For medium slopes a coefficient of runoff is 0.2. Based on the contours an average coefficient of runoff of 0.35 is assumed.

For the mm 1 year 1 hour rainfall event, the volume of the potential surface water from the pasture above the road is calculated as below.

The area of catchment is 2.6 hectares (26 000 m²) above the road. Therefore the runoff from the catchment above the road that will be collected by the road in a 1 in 1 year event will be;

$$26\,000\text{ m}^2\text{ (area)} \times 0.01348\text{ m (rainfall)} \times 0.35\text{ (coefficient of runoff)} = 122.7\text{ m}^3$$

Although this volume of water will be intersected by the road, its collection reduces the environmental flows and therefore it is not proposed to capture this volume of water.

The volume increases for the other storm events are summarised below.

Upslope catchment - Upslope of roads, runoff from driveways

Storm Event	Volume of stormwater generated in one hour from above the road by the natural land surface.
One hour one year return event	122.7 m ³
One hour 5 year return event	200.7 m ³
One hour 10 year return event	227.0 m ³
One hour 100 year return event	366.0 m ³

Downslope of the road there will be no changes to surface water flows as a result of subdivision.

The runoff from the existing land surface would normally flow downslope during a storm event and enter the creek.

To retain this on site would be to change the pre-subdivision hydrology of the creek. In order to maintain the same environmental flows this volume of water should be permitted to flow through the detention basins.

In addition to the surface water runoff there will also be potential for capture of water from hard surfaces such as driveways upslope of the road.

It is likely that on any particular lot only 300 m² of water from hard surfaces will be able to be retained because of the slopes and driveways to roads. This is the likely maximum volume that will be able to be captured on sloping land such as this and directed to rainwater tanks or soakwells. The remaining 50 m² will either drain onto the lots or end up running down the driveways to the road. To allow for a small amount of runoff from the driveways an additional volume is required for the 3 affected driveways on Lots 1 – 3. Other driveways will drain to the creek.

$$150\text{ m}^2 \times 0.01348\text{ mm} \times 0.9 = 1.82\text{ m}^3. \text{ For a one hour 1 year return event}$$

The data for other return events is shown.

Storm Event	Volume of stormwater generated in one hour from above the road by driveways.
One hour one year return event	1.82 m ³
One hour 5 year return event	2.98 m ³
One hour 10 year return event	3.37 m ³
One hour 100 year return event	5.43 m ³

It is noted that that whilst these two tables represent the amount of runoff generated during a one hour storm event, the runoff from the driveways will arrive first and that from the land surface will be attenuated and take longer to reach the drain.

The degree of attenuation will direct the calculations of the pipework required and these calculations will be made during the engineering phase of the design during the road design. Any changes to the catchments will be taken into account at that time.

At the time of the preparation of the Urban Water Management Plan, when detailed engineering calculations will be made, the runoff data will be adjusted as necessary, taking into account any changes to catchments in the post developed environment.

- **Runoff from road pavements**

The Department of Water has guidelines on stormwater management for roads and drains which can be incorporated into the detailed design of the stormwater management (*Guidelines for Development and Subdivision of Land*) for the detention of stormwater.

As noted previously the volume of water coming from roads is given by;

There are 310 metres of internal road at say 6 m² hard surface per linear metre.

The total area of road hard surface is 310 x 6 = 1 860 m²

For a one hour one year return event the calculation is;

$$1\,860\text{ m}^2\text{ (area)} \times 0.01348\text{ m (rainfall)} \times 0.90\text{ (coefficient of runoff)} = 22.57\text{ m}^3$$

CATCHMENT ROADS – Generated from road surface

Storm Event	Volume handled by road drainage
One hour one year return event	22.57 m ³
One hour 5 year return event	36.9 m ³
One hour 10 year return event	41.76 m ³
One hour 100 year return event	67.32 m ³

DOW require that the 1 in 1 year one hour event is retained in a detention basin, but that other flows are directed through an overflow to the creek.

The road drainage will have to deal with the natural surface water from lots 1 2 and 3, the driveways and the road surface.

To maintain environmental flows to the creek it is recommended that only the increased water as a result of the introduction of hard surfaces is detained on site and the natural surface water be directed to the creek.

The total 1 in 1 year storm event that the road drainage and detention basin will need to deal with is;

$$122.7\text{ m}^3\text{ (natural surface)} + 1.82\text{ m}^3\text{ (driveways)} + 22.57\text{ m}^3\text{ (road)} = 145.94\text{ m}^3\text{ or kL}$$

However as noted above retaining the volume of water from up slope will change the pre-subdivision flows in the creek and therefore only the 1 hour one year return storm event from hard surfaces should be retained with the natural surface runoff volume being permitted to flow through.

The drainage system will however need to be designed to cope with the 1 in 100 year storm events.

The volume to be retained in the detention basin is therefore;

$$1.82 \text{ m}^3 \text{ (driveways)} + 22.57 \text{ m}^3 \text{ (road)} = 24.39 \text{ m}^3 \text{ or kL}$$

- A series of small riffles is recommended to be installed along the flow path to accept some of the volume and to slow the flow. There will be space for 13 riffles adsorbing perhaps 2 m^3 each. The use of a series of small riffles will negate the need for a detention basin and is therefore recommended. The use of riffles on the upslope side of the road, as opposed to a detention basin, will assist visual management, remove the need for a basin in that location and its inherent potential construction and safety issues.
- A small concrete covered sump with a volume in the order of 1 m^3 is recommended to be installed at the low point in the road to collect any excess water from road drainage.

See Figure 1.

- From the sump a pipe is recommended to direct water along an easement on the boundary of Lot 9 or 10 to the POS.

The water flow could then be an open drain installed with riprap or riffles, which will make maintenance easier. The volume of the drain will be calculated during the detailed engineering design, based on the capability to handle the 1 in 100 year storm event.

- From the drain the slowed water flow is recommended to feed to a shallow two stage detention basin in public open space.

The maximum volume required to be retained within the detention basin is 24.39 m^3 or kL.

In the interests of safety and environmental management it is recommended that this be a two stage small shallow basin with a volume of 12.5 m^3 plus freeboard. Water will enter from one end, be slowed and then feed to the second stage from which water will leave to travel to the creek.

Rather it is recommended that the basin be shallow and installed with reeds to slow and attenuate the flows and allow them to overflow through a hard surface spillway to the creek. This will maintain natural water flows in the creek.

In the detailed engineering stage the volume may be adjusted for flow rates and catchment attenuation. If any small alteration to the alignment of the road is required to ensure a suitable location for the low point, it will be made at that time.

See Figure 1.

7.0 Groundwater Management Strategy

The water recharge is not anticipated to change, therefore no changes are anticipated to groundwater regimes.

8.0 Future Design Considerations

An additional stage of detailed engineering design, to accompany the site specific design for the subdivision, follows subdivision approval. In this case, with a relatively small

number of large lots, the detailed design will be related to road design, swale drainage design and the design of the stormwater detention basins.

An Urban Water Management Plan will be required as part of the next stage of the progress of the subdivision, after approval of the subdivision and prior to construction. The Urban Water Management Plan will be prepared by the engineers who will incorporate any conditions and changed circumstances into the subdivision design and provide the detailed design drawings of the road network and drainage. At that time detailed calculations will be made to confirm and refine the drainage system.

The engineers will provide revised catchment calculations based on any changes to the catchments as a result of development. Flow rates and attenuation will also be considered, including even the 6 minute duration when designing pipework as recommended by the City of Albany.

At that time any adjustments to the alignment of the road will be made to ensure free flow of stormwater from the road as shown on Figure 1.

9.0 Monitoring

Monitoring of water quality is not seen as not necessary unless actions following from the monitoring are conditioned on the subdivision.

However the DOW normally requires monitoring.

If monitoring is required, it is recommended that water flowing to the creek be monitored quarterly when flowing.

A total of 2 - 3 years monitoring on a quarterly basis is suggested for the following parameters, TSS, TP, TN, EC DO and pH.

10.0 Implementation

Implementation will only occur at the construction stage following the full engineering calculations for the roads and stormwater management.

At this stage, the Local Water Management Strategy is enough to provide sufficient assessment to ensure that there is provision within the subdivision guide plan to enable the required detention basins and drainage systems to be provided for.

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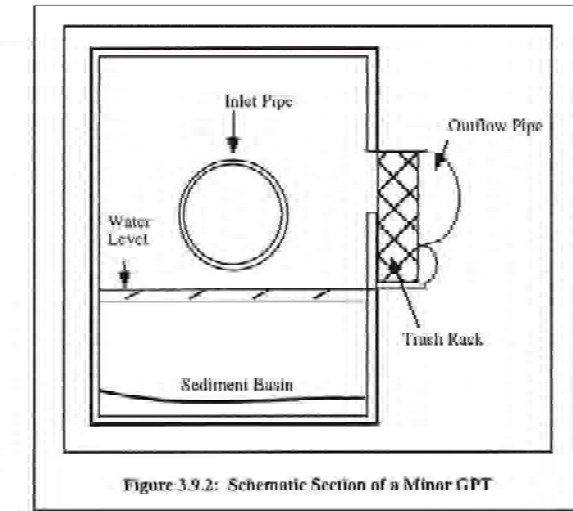
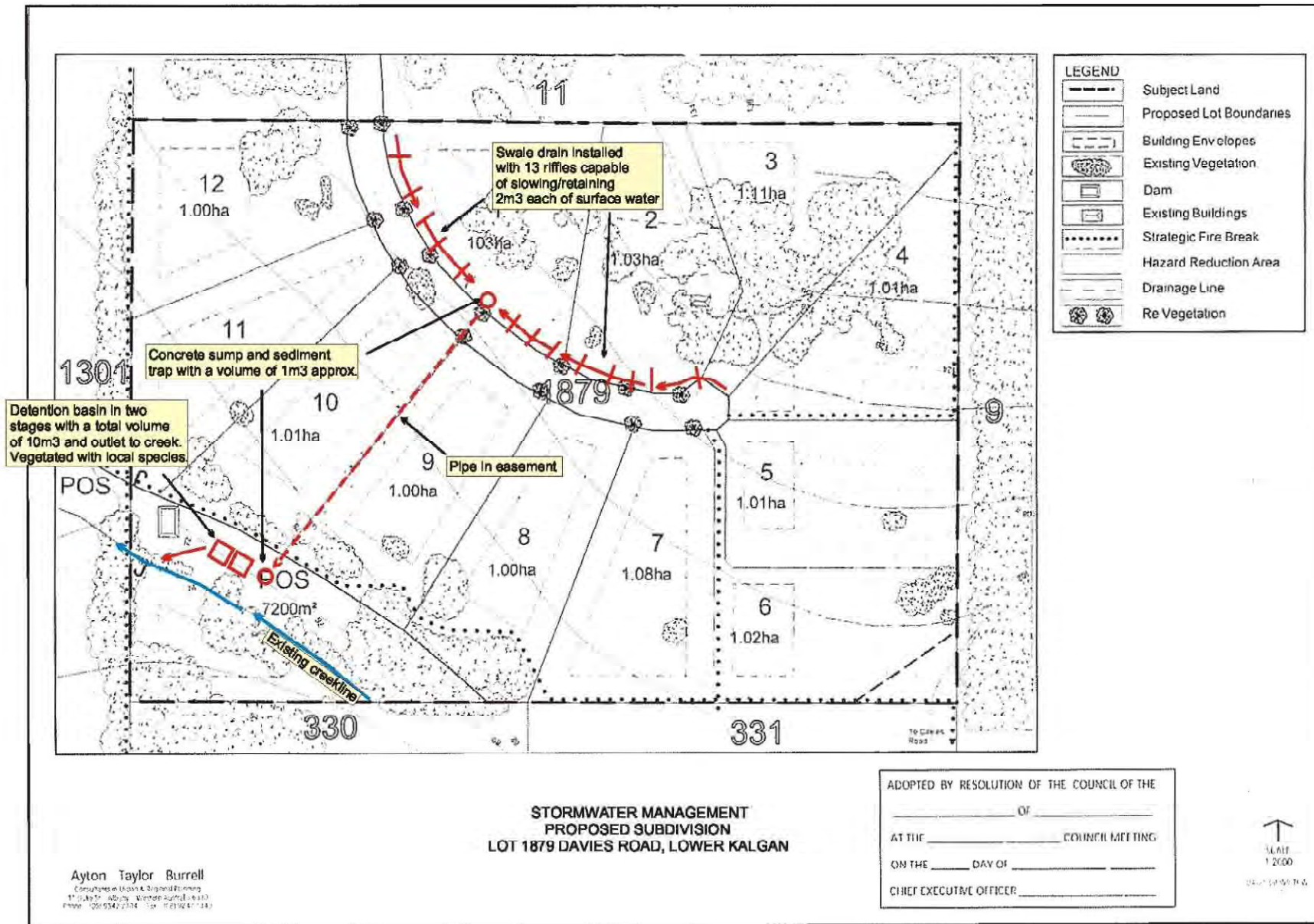
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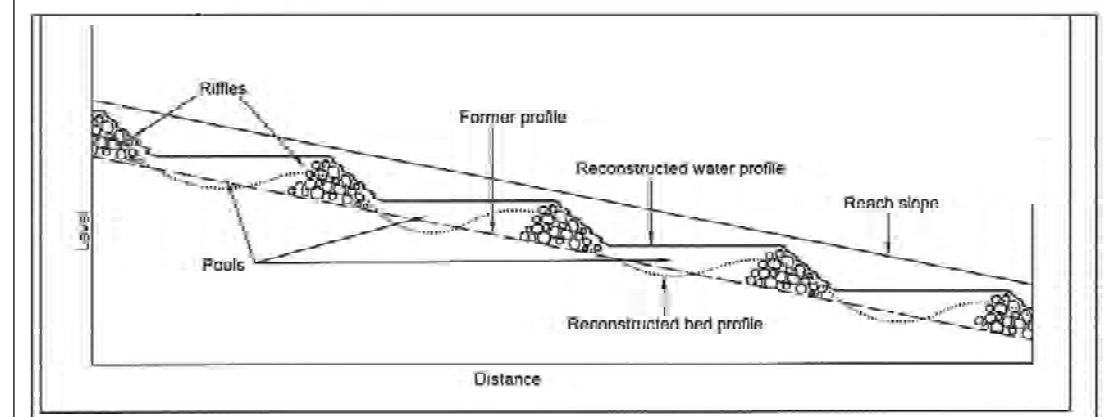
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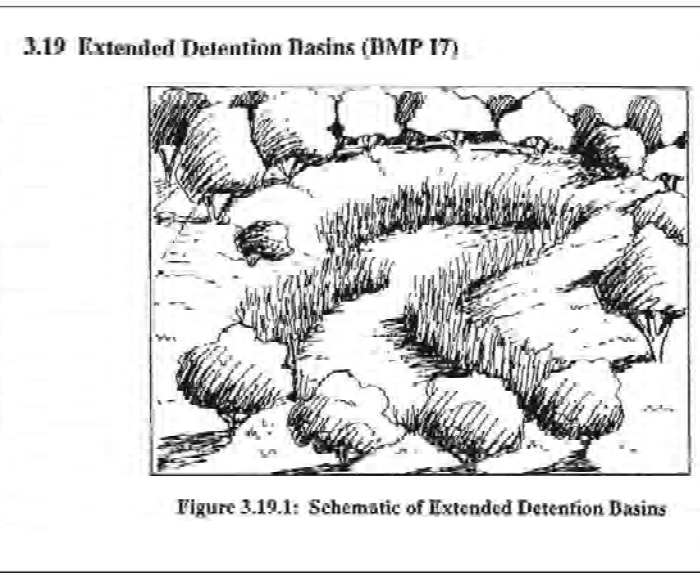
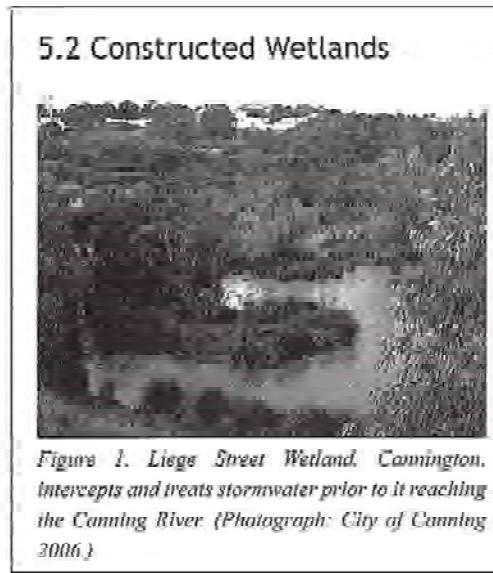
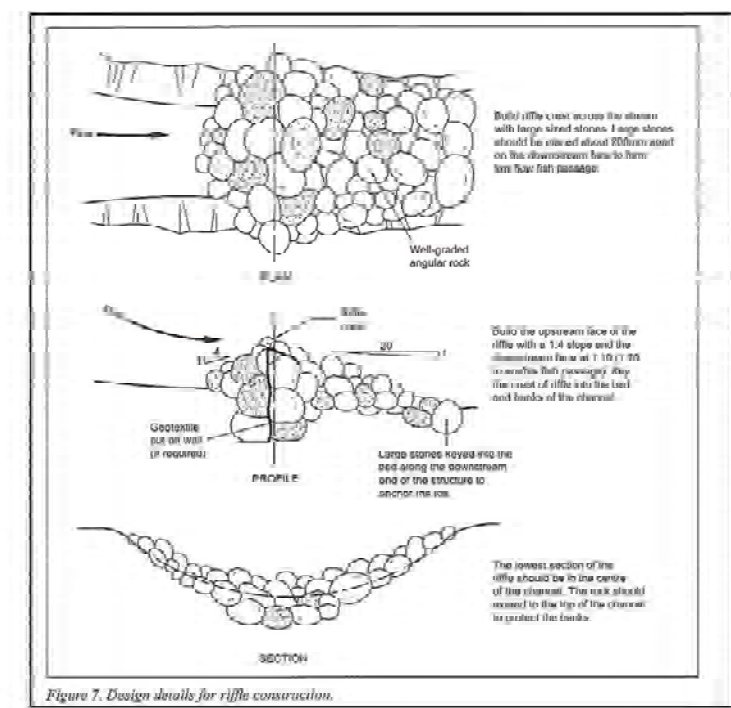
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CONCEPT SEDIMENT TRAP



CONCEPT RIFFLE SYSTEM IN OPEN DRAIN



Diagrams from Department of Water Documentation

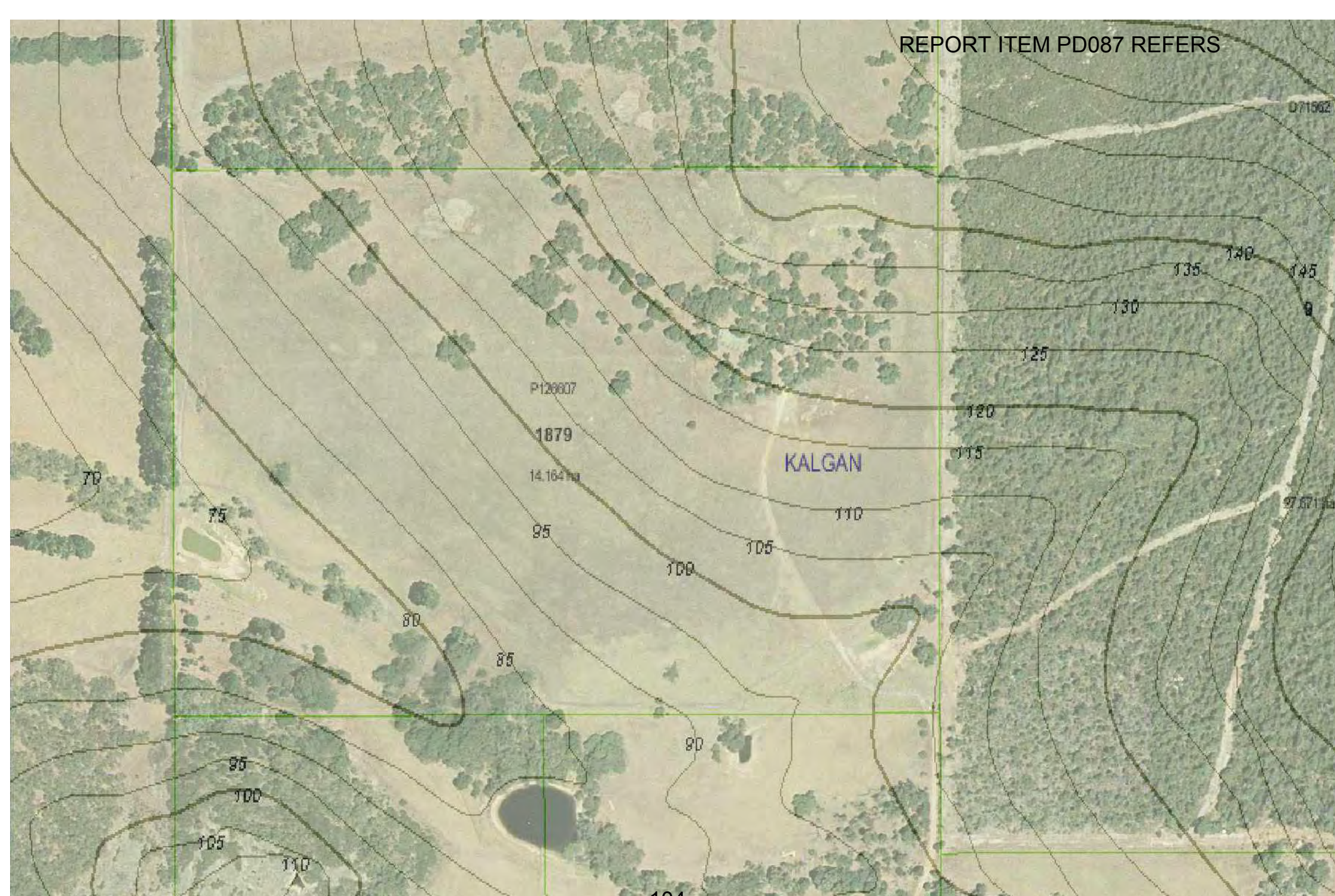
STORMWATER MANAGEMENT PROPOSED SUBDIVISION LOT 1879 DAVIES ROAD, LOWER KALGAN

CONCEPT VEGETATED DETENTION BASINS

Figure 1



FIGURE 2



104
LOT 1879 DAVIES ROAD, LOWER KALGAN

Figure 3

Attachment III
Fire Management Plan

FIRE MANAGEMENT PLAN

**LOT 1879 DAVIES ROAD
KALGAN**

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1. INTRODUCTION

Lot 1879 is located 16 km from the Albany City Centre via Lower King Road, Nanarup Road, Gull Rock Road and Davies Road.

The site comprises cleared pasture with areas of parkland clearing along the creekline in the south west and surrounding the existing dwellings.

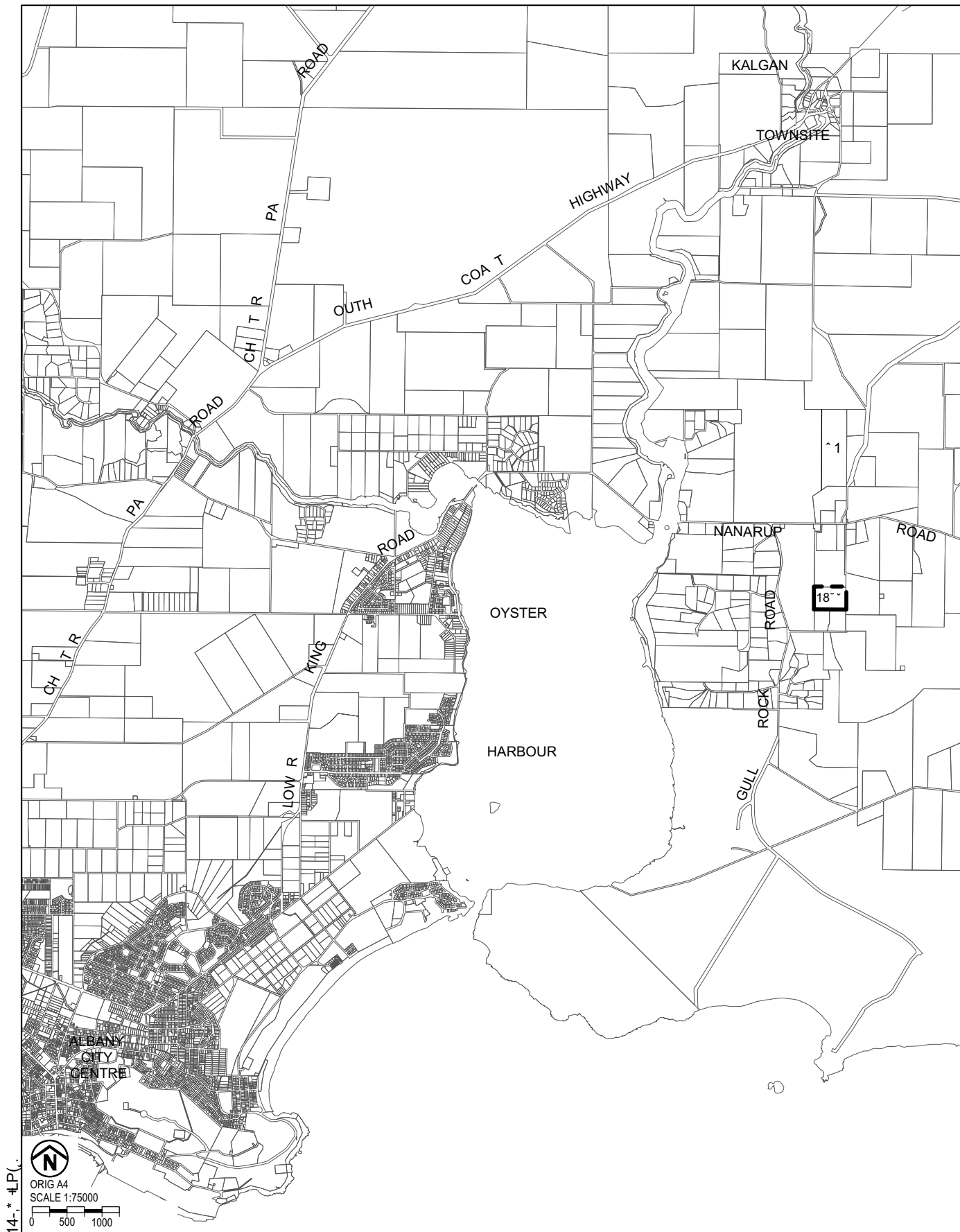
The purpose of this Fire Management Plan is to outline fire hazards, fire risks and following that, propose measures to address the hazards and reduce the risks as well as outlining an implementation plan to see those measures applied.

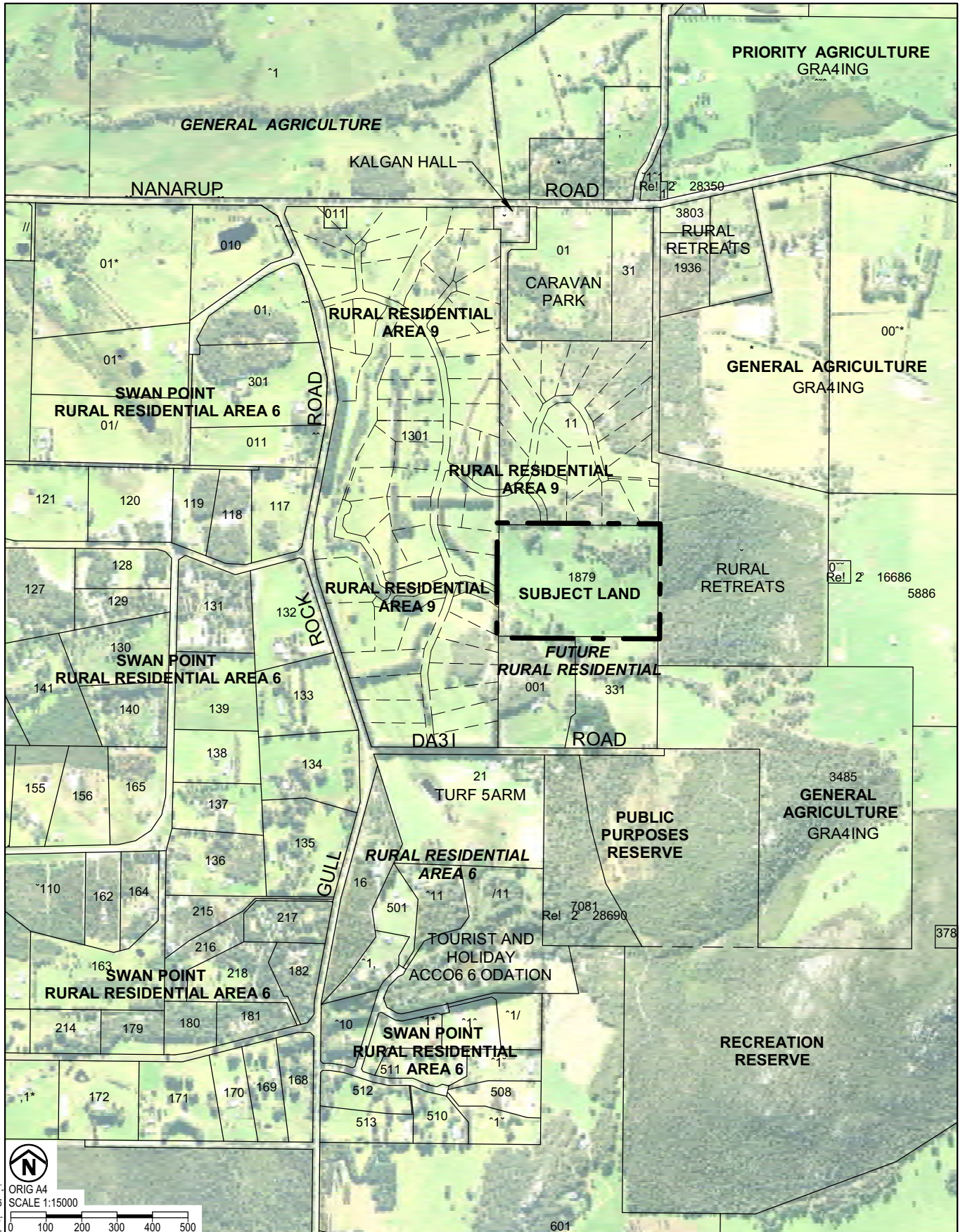
2. BACKGROUND & SUBDIVISION PROPOSAL

Lot 1879 is mostly cleared grazed pasture. There are two separate areas of parkland cleared tree cover of approximately 4000m² each, one to the east of the existing dwelling and the other in the south west along the minor drainage line in this area.

The land is surrounded to the north and east by Rural Residential zoned, cleared land which will be subdivided to lots of 1ha. To the south is cleared and parkland cleared grazing land whilst to the west is a rural lots, uncleared apart from a significant firebreak network along the boundaries (10m wide) and fire breaks which compartmentalise the site into approximately 5ha blocks.

Lot 1879 will be included within the adjoining Rural Residential zone to provide for 1ha lots. As future strategies are further implemented, this zoning will also expand over the lots to the south.





Although the land currently has no gazetted legal road frontage practical side access is made via a formal Right of Carriageway over an adjoining property through to Davies Road.

In addition road and firebreak connections will be provided in two positions via the adjoining special rural zone.

The Subdivision Guide Plan and this plan, can make use of these connection points by using one to provide road access to the Rural Residential lots and the others can provide alternative/secondary access ways as needed.

As the lots will be within a Rural Residential zone, subdivision, development and ongoing land management provisions can be used to implement and ensure the maintenance of effective fire safety mechanisms.

The lot is in an area long identified for such subdivision and development and as a result the strategic implications of this move have been assessed and supported. The purpose then of this Fire Management Plan is to detail the local or lot scale hazard, risk and safety mechanisms to be applied.

3. BUSHFIRE HAZARD ASSESSMENT

See following figure for Bush Fire Hazard Ratings. In summary:

Vegetation Type	Rating
Pasture	Low
Isolated Paddock Trees	Low
Parkland Cleared Areas	Moderate
Adjoining Low Forest	Extreme

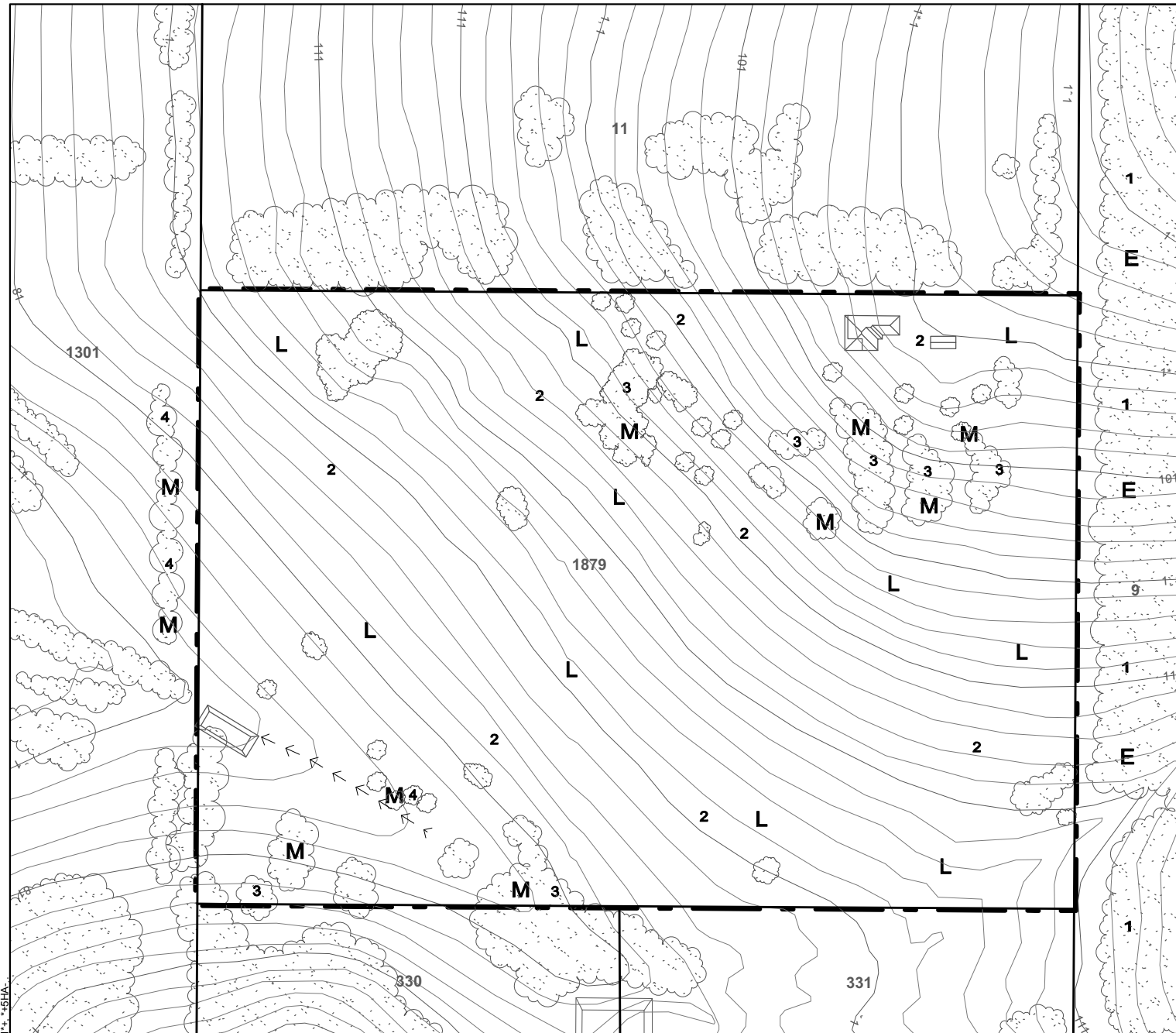
4. BUSHFIRE ATTACK LEVEL

From the ratings in the Hazard Assessment the following maximum bushfire attack levels apply on the basis a 20m building protection zone is implemented, buildings are contained to the identified building envelope and Hazard Separation Areas (as outlined in following sections) are maintained.

LOT	BAL
Lot 75	BAL 19
Lot 76	BAL 19
Lot 77	BAL 19
Lot 78	BAL 19
Lot 79	BAL 12.5 – 19
Lot 80	BAL 12.5 – 19
Lot 81	BAL 12.5
Lot 82	BAL 12.5
Lot 83	BAL 12.5
Lot 84	BAL 12.5
Lot 85	BAL 12.5
Lot 86	BAL 12.5

The above Bushfire Attack Levels require specific construction requirements under AS3959. Refer to as 3959 Sections 3 & 5 for BAL 12.5 or sections 3 & 6 for BAL 19.

**FIRE HAZARD
ASSESS6 NT**
Lot 1879 Davies Road
Kalgan, City of Albany



LEGEND

- Subject Land
- Existing Vegetation
- Existing Buildings
- Existing Dams
- Drainage Line

ORIG A4
SCALE 1:3000

1	A	Low open forrest (04)	Extreme
2	G	Pasture (26)	Low
3	B	Low woodlands (06)	Moderate
4	B	Open woodlands / Shelter belt	Moderate

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5. BUSHFIRE MITIGATION AND PROTECTION

See the following plan and the notes below for Bushfire Mitigation and Protection requirements. These combine to ensure the site and future dwellings enjoying a low to moderate hazard level.

5.1 Location

The subdivision/development is located on the land **that is not** subject to either an extreme bush fire hazard classification or requires construction standards to BAL – 40 or BAL – FZ. (A1.1)

5.2 Vehicular Access

Two different vehicular access routes, both of which connect to the public road network, will be available to all residents/the public at all times. (A2.1)

5.3 Water for Fire Fighting

The development is to be provided with a reticulated water supply, together with fire hydrants, in accordance with the specifications of the relevant water supply authority and FESA. (A3.1)

5.4 Siting of Development

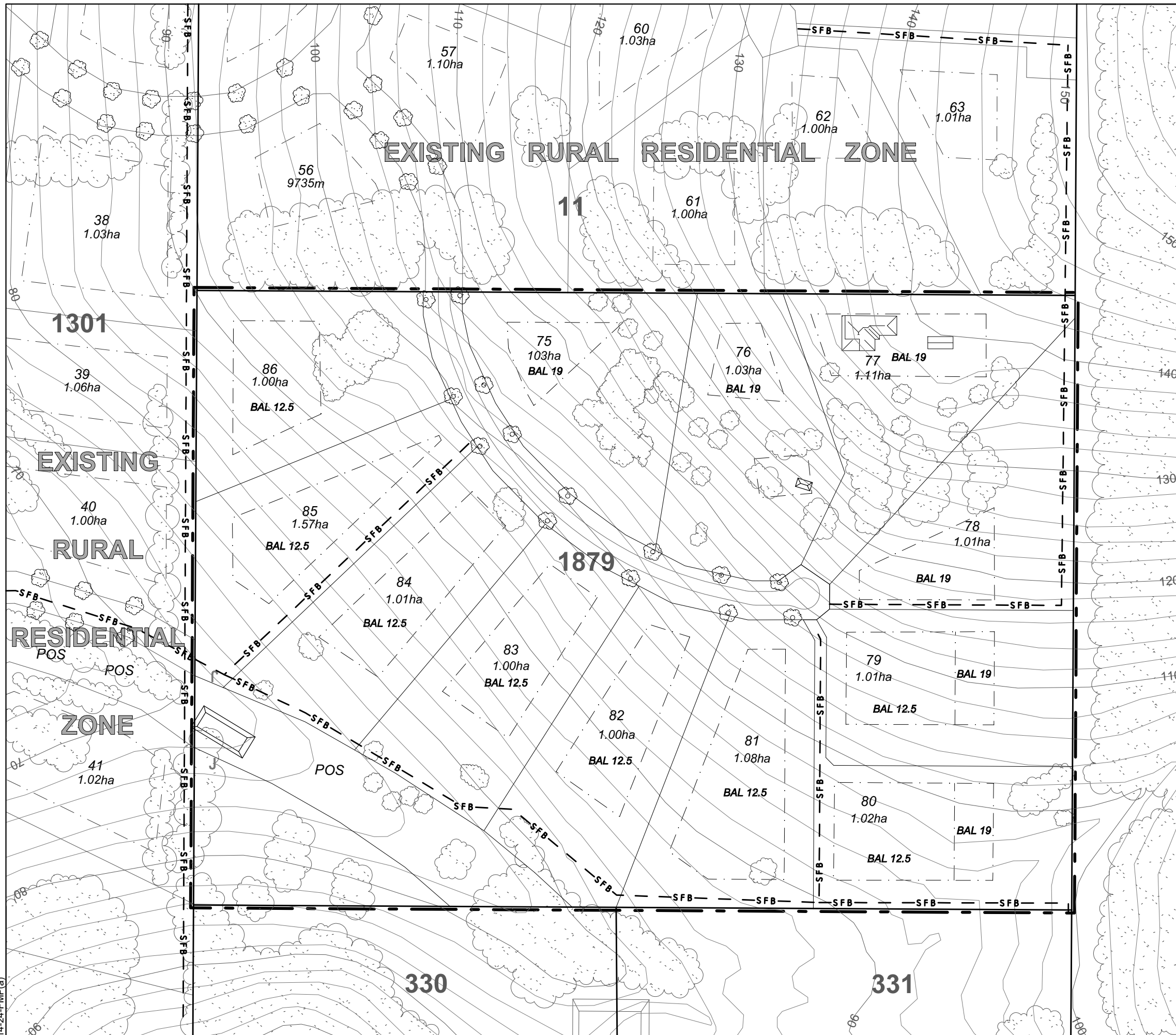
Every building is to be provided with a maintained Building Protection Zone not less than 20m in width and where adjacent to a parkland cleared area, an additional width of at least 10m managed as a Hazard Separation Area.

In addition, a minimum setback of 40m containing managed pasture is provided to the adjoining Lot 9.

Every dwelling will require an appropriate construction standard as per the assessed Bushfire Attack Level.

FIRE MANAGEMENT PLAN

Lot 1879 Davies Road
Kalgan, City of Albany



LEGEND

- Subject Land
- Existing Vegetation
- Existing Buildings
- Existing Dams
- Indicative Building Envelopes
- Strategic Fire Break
- Proposed Vegetation

N
ORIG A3
SCALE 1:2000

0 10 20 30 40 50

- SFBs to be provided at the time of subdivision and maintained by landowners.
- Buildings to be constructed to the noted Bushfire Attack Level (BAL) as per AS3959.
- Hydrants for firefighting to be provided at the time of subdivision.
- Building Protection Zones and Hazard Separation Areas to be implemented and maintained around buildings.

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14-24-FMP(e)

5.5 Development Design

Development Design including compliance with AS3959 under the relevant noted Bushfire Attack Levels and consequential building requirements meets development design requirements.

6. SUBDIVISIONAL & DEVELOPMENT REQUIREMENTS

6.1 Building & Location

Building and Construction requirements are set on a lot by lot basis and for a number of lots vary according to the buildings location within the building envelope (Refer to Plan):

Construction Standard	Lot
BAL 12.5	81 - 86
BAL 12.5 or 19	79, 80
BAL 19	75-78

Buildings to be located within the identified building envelope.

Within building envelopes with a split BAL construction standard (Lots 79 & 80), where any dwelling partially or wholly intrudes into the BAL 19 area, the entire building is to be designed and constructed to meet this higher standard.

6.2 Access

Access is provided by a combination of public roadways, battleaxe legs, driveways and strategic fire access tracks as shown on the plan. Standards for the differing access way types are noted in Planning for Bushfire Protection (Edition 2). No locked gates are permitted on this network.

The access network is circular and ensures three different access routes connecting to the public road network are available at all times.

6.3 Water for Firefighting

Hydrants to be installed at the time of subdivision in accord with development policy.

6.4 Building Protection Zones and Hazard Separation

A width not less than 20m from all buildings shall be maintained as a Building Protection Zone as follows:

- Minimum 20m width measured from building wall;
- Fuel load reduced to and maintained at 2 tonnes/ha;
- Trees to be a minimum of 10m apart with no dead material;
- Branches are pruned from trunks for at least the first 2m;
- No tall shrubs or trees overhang buildings; and
- Fences and other structures within the Bushfire Protection Zone are built of non combustible materials.

In addition to these minimums, it remains an option for landowners to create and maintain wider building protections zones in existing cleared areas outside of the nominated building envelopes.

All pasture and parkland clearings within 10m (or 20m in the case of the eastern boundary of Lots 78 - 80) of a Building Protection Zone to be maintained as a Hazard Separation Area as follows:

- Fuel load to be reduced to and maintained at between 5-8 tonnes per ha;
- Trees to be a minimum of 10m apart; and
- Trees to be maintained devoid of dead materials (branches etc).

7. IMPLEMENTATION

7.1 Developer

On a stage by stage basis at the time of subdivision developer/subdivider is to:

- Construct roading, battleaxe legs and strategic fire access tracks;
- Prepare cleared, parkland cleared and hazard separation areas to hazard separation area standards and maintain same till time of transfer;
- Install street fire hydrants; and
- Advise prospective purchasers of management provisions, fire management responsibilities and the Homeowners Bushfire Survival Manual.

7.2 City of Albany

The City of Albany will be responsible for:

- Issuing Annual Fire Break/Fire Safety Notice;
- Maintaining Public Roads;
- Monitoring and enforcing compliance with Annual Fire Break/Fire Safety Notice, Special Provisions (Maintenance of Strategic Fire Access Tracks, Bushfire Protection Zone & Hazard Separation Area etc); and
- Applying AS3959 Bushfire Attack Level conditions to building approval and ensuring driveways are constructed and maintained as appropriate.

7.3 Landowners

On transfer of lots landowners become responsible for individual holdings. Landowners are responsible for:

- Maintaining any battleaxe legs and/or strategic fire access tracks on their property;
- Constructing and maintain required Building Protection Zones, Hazard Separation Areas and individual driveways;
- Constructing buildings in accord with the noted Bushfire Attack Level under AS3959; and
- Complying with Council's annual Fire Break/Fire Safety Notice.

8. CONCLUSION

This Fire Management Plan meets the guidelines contained within Planning for Bushfire Protection by meeting most of the acceptable solutions noted and where alternative responses are necessary (P4) appropriate responses (AS3959 Construction) are provided.

Attachment IV

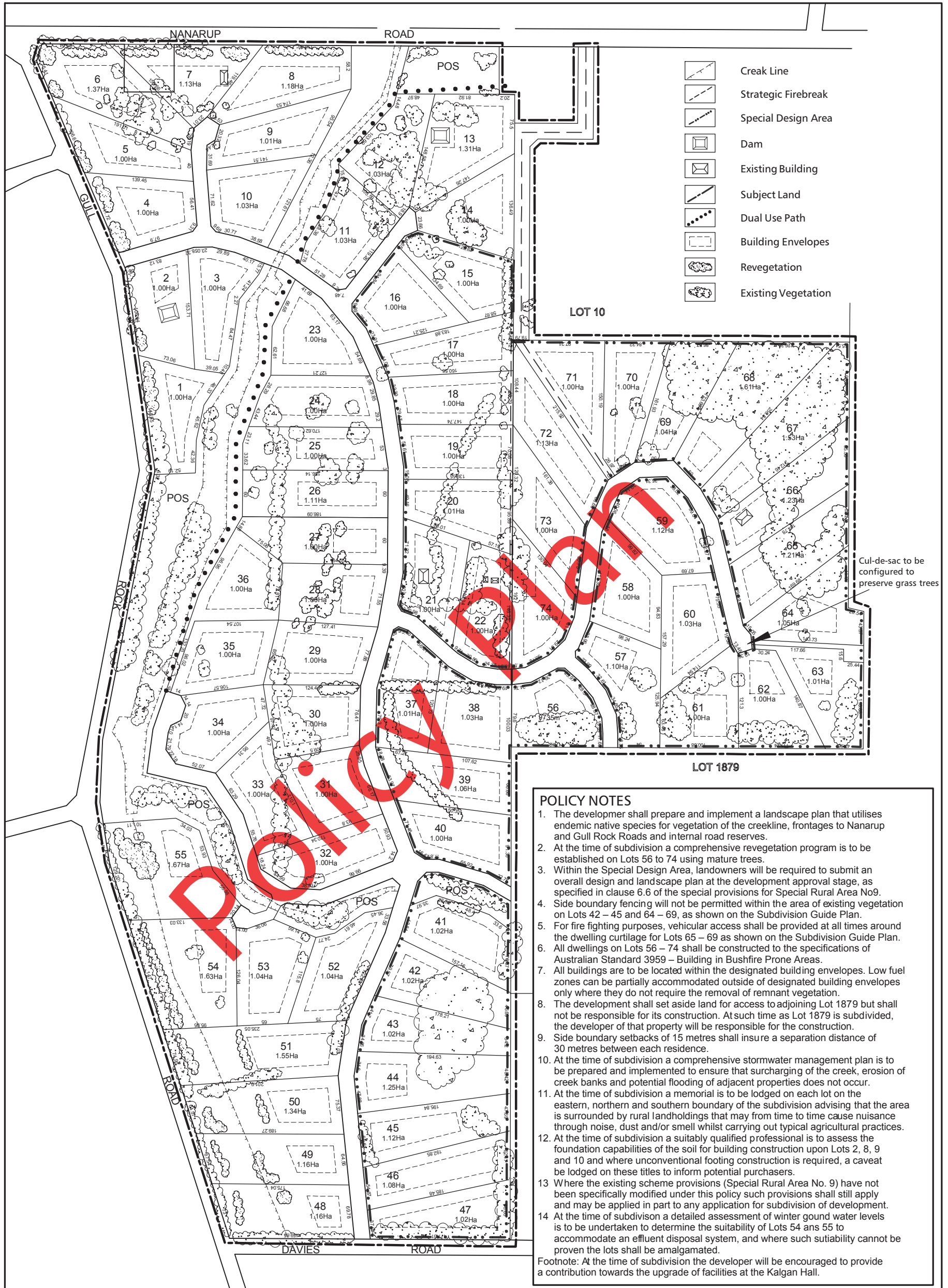
City of Albany

Rural Residential Area No. 9

**Special Provisions, Subdivision Guide Plan
& Policy Plan**

No.	Specified Rural Residential Zone	Special Provisions Applying to Specified Rural Residential Zone
RR9	Nanarup Road, Kalgan Rural Residential zone	<ol style="list-style-type: none"> 1. Subdivision of RR9 shall generally be in accordance with the Subdivision Guide Plan <i>RR9</i> endorsed by the CEO, with any minor variations approved by the Western Australian Planning Commission. 2. The minimum lot size shall be one hectare. 3. The following land uses are 'P' permitted uses— <ul style="list-style-type: none"> • Single House 4. The following land uses are 'D' discretionary uses— <ul style="list-style-type: none"> • Ancillary Accommodation; • Bed and Breakfast/Farmstay; • Home Occupation; • Industry—Cottage; • Public Utility; and • Rural Pursuit (which shall be limited to existing cleared and pastured land only). 5. All development (including dwelling and outbuildings) and any low fuel zones shall be located outside of any development exclusion area, revegetation area and/or creekline protection area as shown on the Subdivision Guide Plan and shall achieve the following minimum setbacks— <ol style="list-style-type: none"> i. 15 metres from Gull Rock or Nanarup Roads; ii. 15 metres from all other lot boundaries; and iii. 25 metres from any lot boundary with Location 1462 6. No new access/egress points onto Nanarup Road will be permitted. 7. Within Special Design Areas (Lots 15-22, 37-47 & 56-74 as shown on the Subdivision Guide Plan), applicants will be required to submit an overall design and landscape plan which addresses— <ol style="list-style-type: none"> (a) setbacks from property boundaries and creeklines; (b) existing and proposed vegetation/revegetation; (c) low lying, flood prone and stormwater disposal areas; (d) low fuel zones; (e) that cut and fill of the site shall be kept to a minimum with preference given to split level development and the breaking up of building mass; (f) that only one out building shall be permitted with a maximum size of 65m² and maximum size of 65m² and maximum height to the eaves of 3 metres; (g) driveways shall be designed to minimise visual impact and erosion by being aligned with the contours of the site and planted with trees and shrubs. Stormwater runoff shall be attenuated to ensure erosion does not occur; and (h) the landscape plan shall indicate the number, type and location of shrubs and trees to be planted and maintained as a condition of Development Approval to effectively minimise the visual impact of all development on the site.

ALL AREAS AND DIMENSIONS ARE SUBJECT TO SURVEY



SUBDIVISION GUIDE PLAN

Lots 11, 300, 1301 Nanarup Road / Gull Rock Road

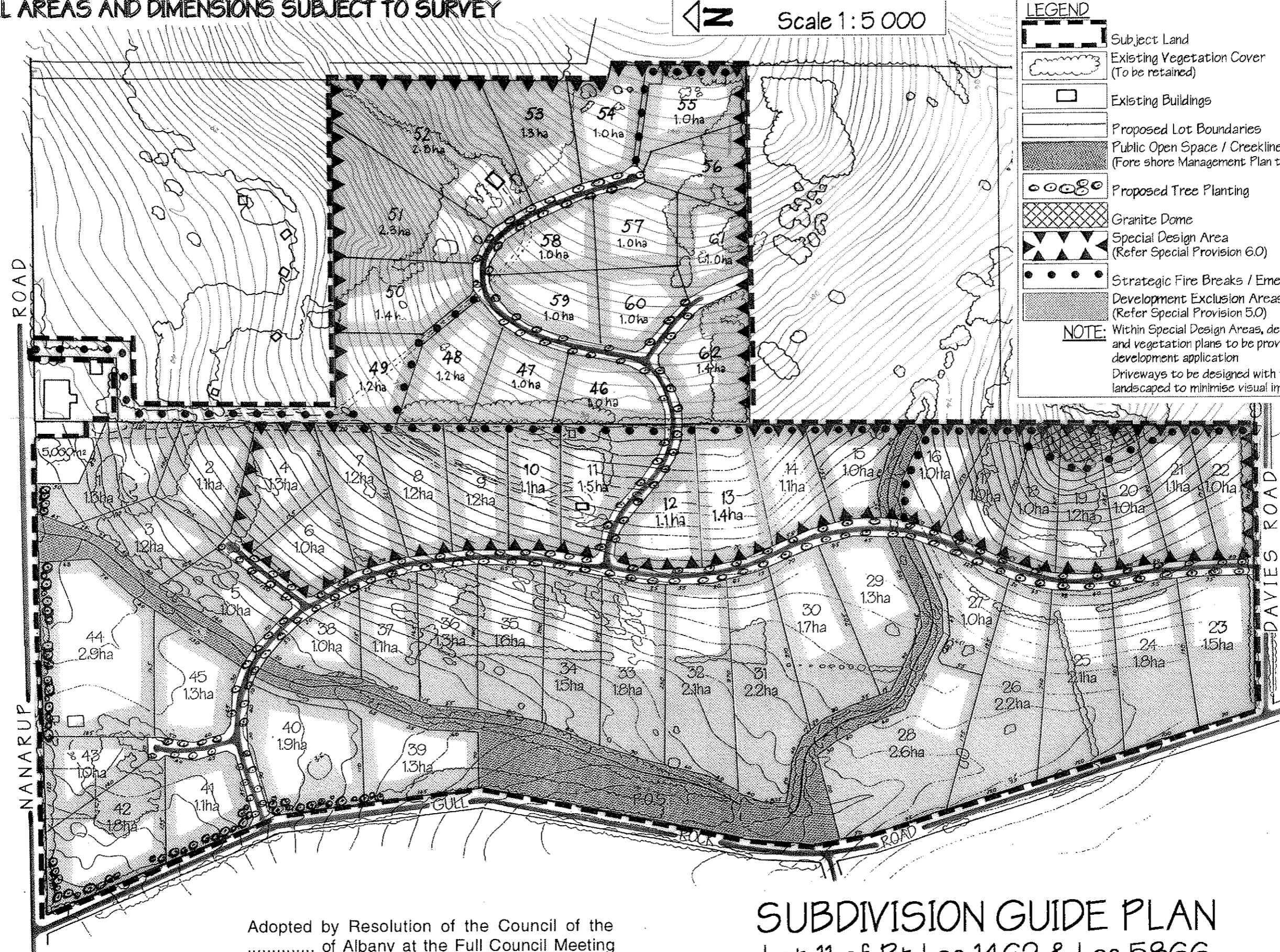
ALL AREAS AND DIMENSIONS SUBJECT TO SURVEY

Scale 1:5 000

LEGEND

- Subject Land
- Existing Vegetation Cover (To be retained)
- Existing Buildings
- Proposed Lot Boundaries
- Public Open Space / Creepline Protection Area (Fore shore Management Plan to be prepared)
- Proposed Tree Planting
- Granite Dome
- Special Design Area (Refer Special Provision 6.0)
- Strategic Fire Breaks / Emergency Access
- Development Exclusion Areas (Refer Special Provision 5.0)

NOTE: Within Special Design Areas, detailed landscape and vegetation plans to be provided with development application
Driveways to be designed with the contours and landscaped to minimise visual impact and erosion.



Adopted by Resolution of the Council of the of Albany at the Full Council Meeting held on the day of 19.....

Chief Executive Officer.....

SUBDIVISION GUIDE PLAN

Lot 11 of Pt Loc 1462 & Loc 5866
Nanarup Road and
Pt Loc 1569 Gull Rock Road.

AYTON, TAYLOR & BURRELL
Consultants in Town Planning and Civic Design
11 Duke Street, Albany, Western Australia 6330
Phone 08 9842 2304 Fax 08 9842 1340

Figure 3

PLANNING AND DEVELOPMENT ACT 2005

CITY OF ALBANY

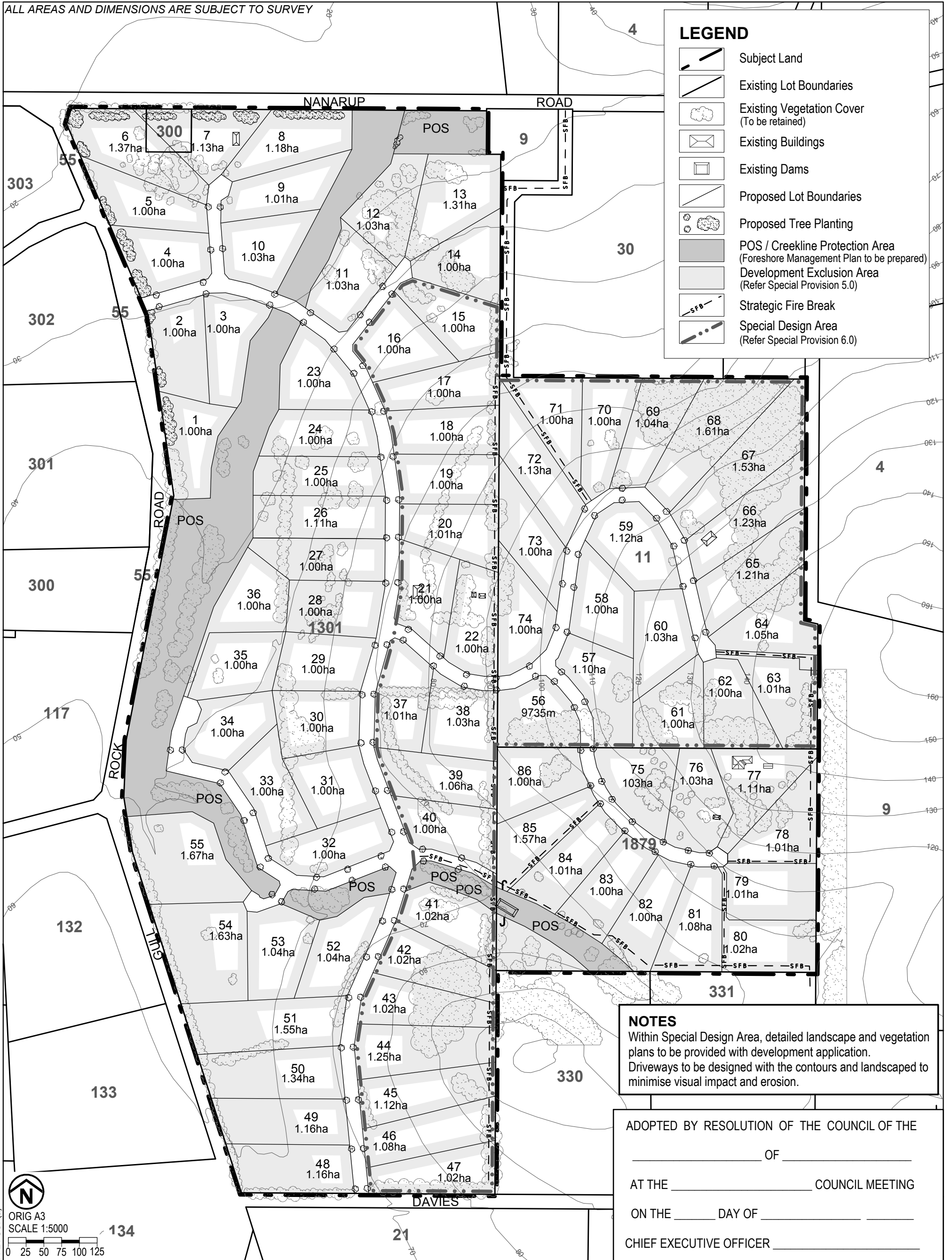
LOCAL PLANNING SCHEME No. 1

AMENDMENT No. 12

The Albany City Council under and by virtue of the powers conferred upon it in that behalf by the Planning and Development Act 2005 hereby amends the above Local Planning Scheme by:

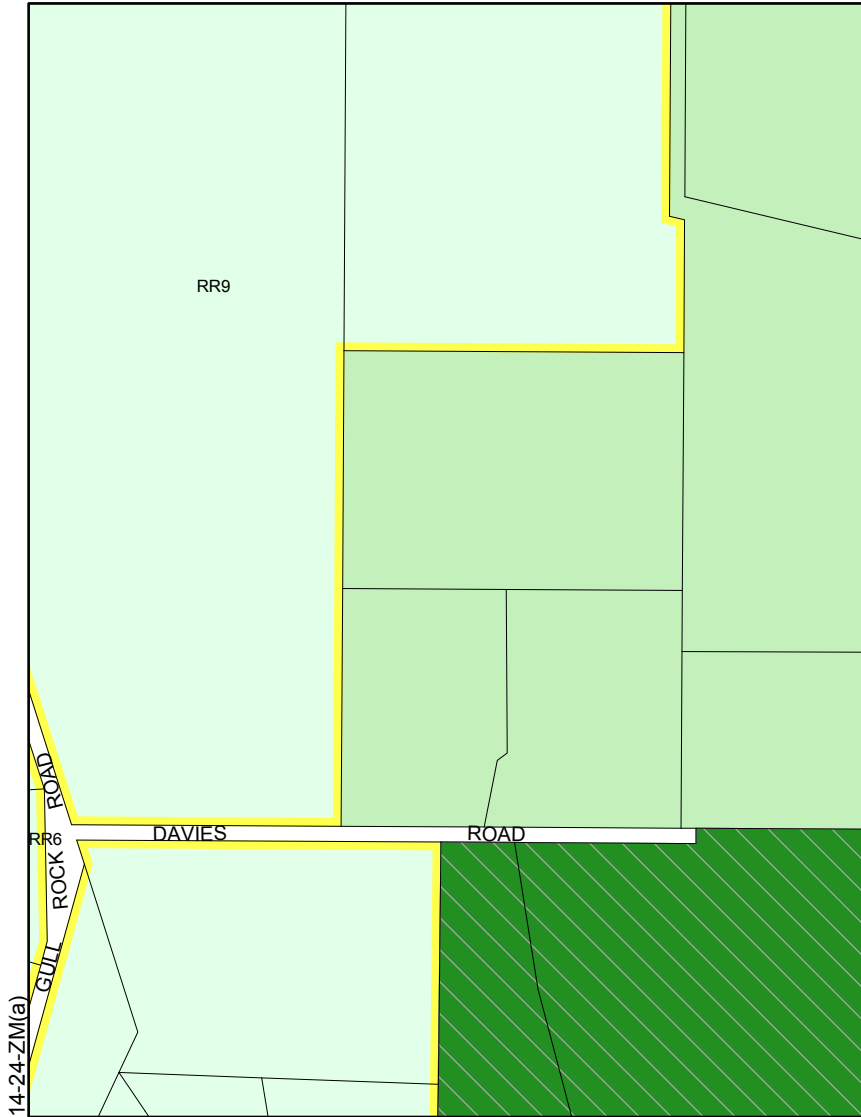
- i) Rezoning Lot 1879 Davies Road, Lower Kalgan, Albany from the 'General Agriculture' zone to the 'Rural Residential' zone and 'Parks & Recreation' reserve.
- ii) Incorporating Lot 1879 into Rural Residential Area No. 9, as set out in Schedule 14 – Rural Residential zones of the Scheme Text.
- iii) Including a new provision within Rural Residential Area No. 9, as follows:
 8. For Lots 75-86, building plans shall include an assessment of the foundation zone of the building area and include full details of proposed foundations to adequately accommodate foundation zone conditions.
- iv) Including a new provision within Rural Residential Area No. 9, as follows:
 9. For Lots 56-74, as shown on the Subdivision Guide Plan, all areas including pasture, parkland clearing, replanting and landscape areas shall be maintained as a Hazard Separation Area (refer to the Fire Management Plan).
- v) Including a new provision within Rural Residential Area No. 9, as follows:
 10. All dwellings on Lots 56-86 shall be constructed to the specifications of Australian Standard 3959 – Building in Bushfire Prone Areas. In the instance of lots 75-86, construction shall be to the requirements of the relevant Bushfire Attack Level (BAL) per the Fire Management Plan (BAL 12.5 or BAL 19).
- vi) Applying the following Subdivision Guide Plan to Rural Residential Area No. 9 as follows.
- vii) Amending the Scheme Maps accordingly.

ALL AREAS AND DIMENSIONS ARE SUBJECT TO SURVEY

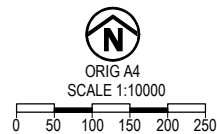


14-24-SGP(a)
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 SCALE 1:5000
 0 25 50 75 100 125

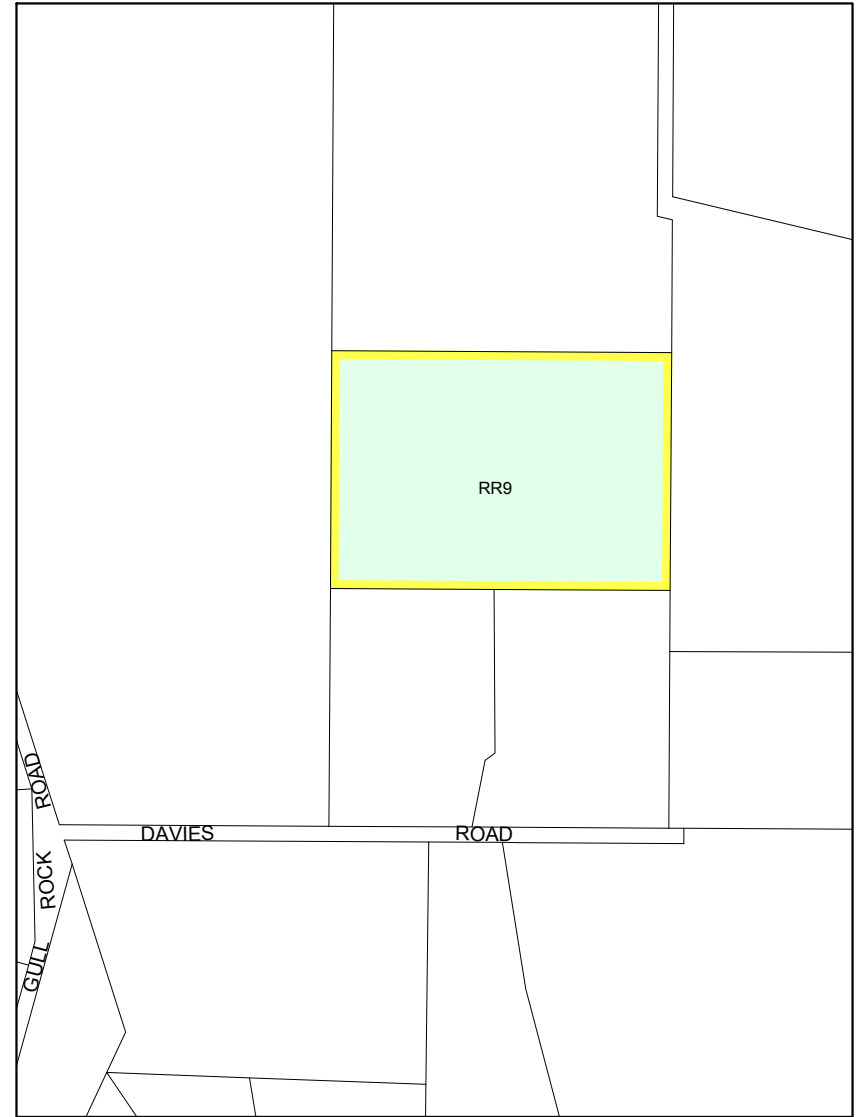
Existing Zoning



- RESERVES**
- Parks and Recreation
- ZONES**
- General Agricultural
 - Rural Residential



REPORT ITEM PD087 REFERS Proposed Zoning



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CITY OF ALBANY
LOCAL PLANNING SCHEME 1
AMENDMENT No. 12

REPORT ITEM PD087 REFERS

ADOPTION

Adopted by resolution of the Council of the City of Albany at the meeting of the Council held on the _____ day of _____ 20_____.

Mayor

Chief Executive Officer

FINAL APPROVAL

Adopted for final approval by resolution of the City of Albany at the Meeting of the Council held on the _____ day of _____ 20_____ and the Common Seal of the City of Albany was hereunto affixed by the authority of a resolution of the Council in the presence of:

Mayor

Chief Executive Officer

Recommended/Submitted for Final Approval

Delegated Under S.16
of the PD Act 2005

Date

Final Approval Granted

Minister for Planning

Date

ALL AREAS AND DIMENSIONS ARE SUBJECT TO SURVEY

LEGEND

- Subject Land
- Existing Vegetation
- Existing Buildings
- Western Power Underground

ORIG A3
SCALE 1:750

0 5 10 15 20 25

COOMBES ROAD

Existing Entrance To Be Closed

37
2.104ha

E
69m²

Overflow Car Parking Area

SHELLEY BEACH ROAD

Proposed New Driveway (exit only)

Exit Only

Entrance Only

100
1.438ha

400
4.834ha

Existing Driveway (entry only)

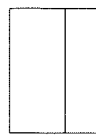
Bus Bay

Disabled Car Bay

Drop Off Area

Function Centre

101
1.666ha



15-24-CP(a)

REPORT ITEM PD088 REFERS

**TORBAY HILL FUNCTION CENTRE
SITE PLAN**

Lot 100 Combes Road
Kronkup, City of Albany

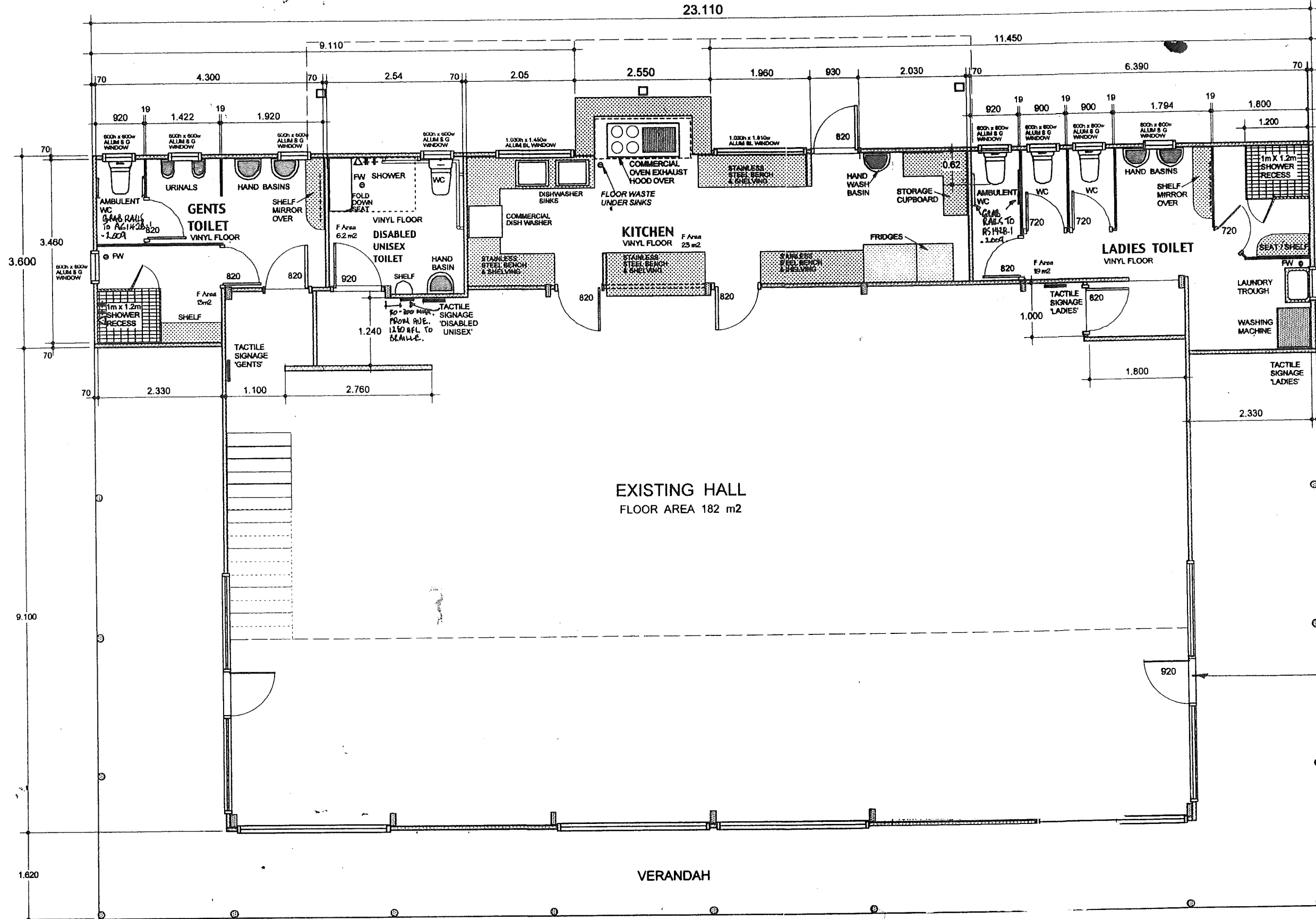
AYTON BAESJOU
P L A N N I N G

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Albany WA 6330
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NOTES

1. ALL TOILETS & KITCHEN AREAS ARE AN UPGRADE OF EXISTING TOILETS & KITCHEN. **SET-OUT ONLY (NO INCREASE IN FLOOR AREA)**
2. ALL DISABLED AREA & AMBULENT AREAS TO COMPLY WITH AS 1428.1 - 2009
3. ALL PARTITIONING IN TOILET & SHOWER AREAS TO BE SUPPLIED BY "RYNAT INDUSTRIES PTY LTD" AND FIXED BY CONTRACTOR IN ACCORDANCE WITH SUPPLIERS SPECIFICATION.
4. ALL FLOOR COVERS IN TOILET, KITCHEN & DISABLED AREA TO BE NCI SLIP VINYL (NOT LESS THAN 2.2 kw / m²) Critical radiant Flux FIXED TO CONCRETE FLOOR, EDGES TURNED UP 150mm ONTO SURROUNDING WALLS
5. ALL TOILET & URINAL SPLASH BACK WALLS TO BE WATER RESISTANT LAMINATE SHEETING FIXED TO CCA TREATED STUDS AT 450mm CENTRES
6. AIR EXTRACTION IN KITCHEN IS TO BE DUCTED 400mm Ø EXTRACTOR FAN WITH GRILL ABOVE COMMERCIAL STOVE
7. VENTILATION TO ALL TOILET AREAS WITH NOMINAL 50 WINDOWS & WIND DRIVEN EXTRACT FANS.

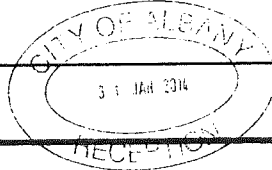
NOTE:- SECCA HAS ONLY BEEN ASKED TO ASSESS THE 'FIT OUT' WORK. THIS CERTIFICATION DOES NOT INCLUDE AN ASSESSMENT OF THE EXISTING HALL SUBJECT OF PREVIOUS BUILDING LICENCES ISSUED BY THE SHIRE AND/OR CITY OF ALBANY.



NOTE ONLY:-
CONSIDER THAT A 'BABY CHANGE TABLE' IS USUALLY EXPECTED / DESIRABLE IN HALLS AVAILABLE TO THE PUBLIC. 'IF' INSTALLED MAX HEIGHT IS 820 AFL WITH MIN CLEARANCE UNDERNEATH OF 720 MIN. WHEN IN OPEN POSITION.

'EXISTING'
• MAIN ENTRY DOOR & ACCESS TO IT FROM CAR-PARKING AREA 'MUST' SATISFY AS 1428.1-2009 (NO VERTICAL LIP > 5mm BETWEEN ADJOINING SURFACES).
• WALKWAYS (ACCESS PATH OF TRAVEL) MUST NOT HAVE A GRADIENT STEEPER THAN 1:20.

STATEWIDE BUILDING CERTIFICATION WA
DAVID THOMAS MEXSON
BUILDING SURVEYOR
LEVEL 1 REG# 11
[Signature] 22/12/2013



Larry Boston Design
PHONE (08) 98 416618
36 FESTING STREET. design@omninet.net.au
ALBANY, 6350 WESTERN AUSTRALIA

LLD
4 DEC '13

PROPOSED RENOVATIONS TO DAVIS HALL
FOR FEMIC PTY LTD
LOT 41 Hse 1 SHELLEY BEACH RD, KRONKUP

FLOOR PLAN scale 1:50

SHEET 1 OF 3

Management Plan Torbay Hill Function Centre
1 Shelley Beach Rd Kronkup

1. Operating hours

- Weddings Fri or Sat 2pm – 1am
- All other night functions 6pm – 12am
- Day functions 9am – 5pm

2. Noise

- Bands & Dj's till midnight, 12-1 pre recorded music to be kept to a minimum with doors closed.
- Guest to be considerate of our neighbours, keeping noise to a minimum when leaving the property.
- There will signs on exit doors and in the toilets reminding patrons of the above.

3. Entrance & Exit

- Are on Shelley beach road & will be signed appropriately.
- No parking behind venue, drop of point only.
- All parking to be angled.

4. The Hirer

- To ensure responsible service of alcohol, when serving.
- To ensure guest remain within the property boundary.
- To ensure guests/patrons are aware of emergency exits and emergency evacuation point.
- To request guests/patrons to be mindful of the 60km zone on and around Torbay Hill.
- Will be shown all fire extinguishers & fire blanket locations.
- To acknowledge the many neighbours surrounding the venue.
- To ensure guests/patrons do not enter the school grounds of Woodbury Boston Primary School.
- Will be responsible for waste removal unless other arrangements have been made with the manager.

5. Fire

- There are no fires to be lit outside at any time of the year.
- No candles outside.
- Smoking outside, please use receptacles provided.
- In the event of an approaching fire the evacuation point will be the overflow carparking area. (please see site plan map)
- The use of gas heaters outside & in are permitted.

6. In an emergency

- Contact venue manager Annie Car on 0468 325 780 or 9845 1535. I live on Forsythe Glade (4 minute drive from venue) and am able to attend any emergency or nuisance issues within 5-10 minutes of a call coming in.
- Neighbours will also have my number to contact me should they have any concerns or complaints regarding a function.
- As manager I will be available throughout the function.

PLANNING REPORT

**PROPOSED CHANGE OF USE
LOT 100 SHELLEY BEACH ROAD,
KRONKUP. CITY OF ALBANY**

1. INTRODUCTION

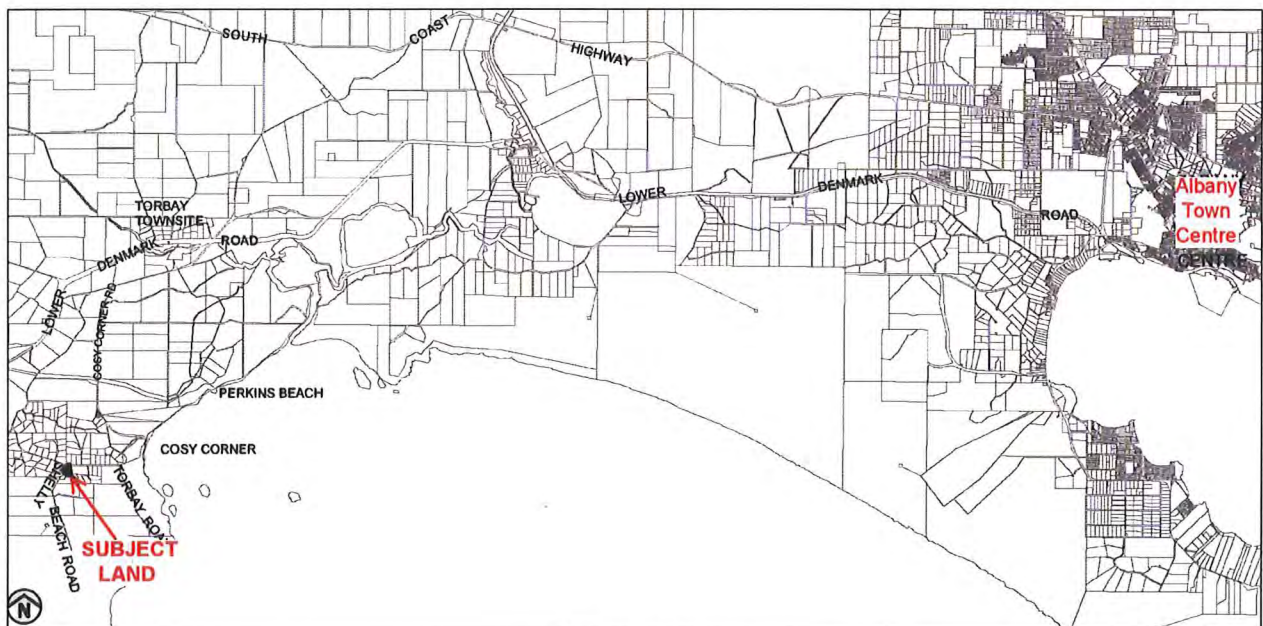
The existing hall on Lot 100 was originally incorporated with the Woodbury Boston School and was used as a school hall for many years. It was also used regularly for a variety of functions and community activities over the same period. The hall was subsequently excised from the school and is now located on a separate lot and was acquired by the current owner Femic Pty Ltd.

In 2013 and 2014 the hall facilities were upgraded and building, health and planning approval issued so that the hall could be used as a private function centre. However, it is understood that a change of use from school hall to private function centre has not been formally issued by Council. Consequently, this application has been lodged in response to Council's advice.

The owners of the adjoining Lot 101 have signed the Consent to Apply form (attached) as a small portion of the entrance road crosses into their property. This access road is used for service access by the school on lot 101.

2. LOCATION & ZONING

The hall is located on the south west corner of Shelley Beach Road and Coombes Road. Refer Location Plan below.



Location Plan

Under the provisions of the City of Albany's Town Planning Scheme No.3, the site was zoned 'Clubs and Institutions', a zone entirely appropriate for the activities on the site. Under the new Local Planning Scheme No. 1 (LPS1), it is now zoned 'General Agriculture', a zone that is not generally compatible with the current land use and surrounding land use. As the proposed function centre is a use not listed within the zoning table within the 'General Agriculture' zone in LPS1, the application will need to be considered under clause 4.4.2 of the scheme, whereby a use that is not specifically listed may be considered.

3. SITE PLAN

Following preparation of the Traffic Assessment Study by Paul Robertson, refer attached report, the site plan has been modified as follows.

- The current entrance which is located at the Coombes Road / Shelley Beach Road intersection has been closed as it is not considered suitable from a traffic safety aspect.
- A one way system of access and egress is proposed utilising the existing entrance off Shelley Beach Road, currently sign posted as a service access, and a new point of egress located approximately 50 metres north towards Coombes Road. Refer Site Plan.
- A one way system will ensure that service vehicles and coaches will not cause a disturbance with their reverse 'beeping'.
- A total of 25 car bays are proposed, which based on one bay per four people will allow up to 100 seated guests. For stand up functions which may cater for more people, there is an overflow grassed parking area. It should be noted that coaches are invariably used for functions, which reduces the number of car bays required.

4. MANAGEMENT PLAN

A management plan for the function centre is attached which outlines the hours of operation and responsibilities relating to noise mitigation, fire and emergency guidelines.

5. CONCLUSION

The Torbay Hall is an important venue for the Torbay community and now that it is privately owned and run, it will continue to perform much the same function. The manager lives in the Torbay Hill locality and is well known and placed to manage the facility and respond to any community concerns.

A considerable investment has recently been made and received approval to upgrade the environmental health and building requirements. This application to change the use will allow the owners to upgrade the access and parking arrangements which will also improve safety and address potential noise concerns.

Council's support to facilitate this significant local facility is respectfully requested.

PAUL G ROBERTSON & ASSOCIATES

Consulting Civil and Municipal Engineers

A.I.T. (WASM), B App Sc., B.E. (Civil), C P Eng., MIE (Aust), FIPWE(Aust).

To: The Executive Director, Planning. CITY OF ALBANY

TRAFFIC ACCESS STUDY REPORT

Torbay Hill Function Centre.

Introduction: This Practice has been requested to recommend amendments to vehicle access and parking for the Torbay Hill Function Facility which is located at the southeast corner of the intersection between Coombes Road and Shelley Beach Road, Kronkup (Torbay).



The current entrance to the Hall site is from the inside of the Shelley Beach Road intersection turn-out. This current situation creates confusion in determining where westbound vehicles on Coombes Road may turn left, thus increasing the risk of rear-end collisions and loss of vehicle control.

IT IS PROPOSED TO CLOSE THIS ENTRANCE TO THE HALL SITE AND THEN TO HAVE A SEPARATE ENTRY AND EXIT OFF SHELLEY BEACH ROAD.

Proposals for Access: The existing access depicted above (off Coombes Road?) is deemed unsuitable on the grounds of safety, being so close to the intersection resulting in confusion to motorists, loss of traction on the unsealed and poorly drained road verge and being on the higher trafficked road.

It is proposed that two formal unsealed accesses be created from Shelley Beach Road, one formal **exit-only** being located approximately 50m from the intersection and one formal **in-only** being located at an existing school service drive, located approximately 100m from the intersection. The proposed access locations are depicted hereunder:



Proposals for Access (continued)

The owner of the house opposite the proposed exit position (Mal) has already given approval to the exit location as it is to be positioned so that vehicle lights do not directly point into his lounge or bed rooms and, due to his previous service in the WA Police, he is supportive of the closure of the previous access.

We share his concerns for the current intersection of Shelley Beach Road with Coombes Road and this matter will be the subject of a separate report to the City of Albany

One-way ENTRY.

Negotiations are being undertaken to formalise approval to use the existing School service drive for the entry to the function centre.



The good visibility southwards to vehicles turning left into the service entry located opposite the power pole. It is recommended that a streetlight be installed by the City to illuminate the entry and to provide warning of the coming intersection with Coombes Road.

This photo is taken from the proposed EXIT location from the function centre.



*The existing service entry crossover and access from Shelley Beach Rd.
The access is gravel paved at least 3m wide.*



Existing service drive signage.

*The school steps to the right are now only rarely used by school students during daylight hours.
The tree to the left is proposed to be removed to ease access for buses.*



The detail of the tree on the left to be removed to facilitate buses, looking north.



The service drive entry to the function centre area looking south. The LH branch of the small tree will need to be removed.



The drive entry to the function centre. There is room for dropping off of patrons in the LHS at the foreground, with sufficient paved width for continuing one way access available on the RHS.

One-Way EXIT



The route of the proposed new exit drive. The tree in the centre of the photo will require removal. The exit will be "squared-up" to the Shelley Beach Road at the proposed cross-over. A cross-over permit will be obtained from the City before work commences within the road reserve.



*The view from the extremity of the proposed EXIT turn-outs towards the intersection with Coombes Road. Removal of the vegetation to the right would improve the visibility from the exit. **IT IS STRONGLY RECOMMENDED THAT THE CITY INSTALL A STREETLIGHT ON THE POLE AT THE INTERSECTION IN ORDER TO ILLUMINATE IT, REINFORCE THE 60KM/HR SPEED LIMIT AT NIGHT, AND TO PROVIDE ADDITIONAL NIGHT WARNING OF THE INTERSECTION FROM OVER THE COOMBES Rd APPROACH CREST.***

PARKING



Looking south from the widening of the paved area proposed for angle parking.



Looking north from the end of the angle parking area. The existing access in the background is to be closed and replaced by a one-way EXIT-only which will commence after the small tree in front of the bus. The large grassed area to the right is available for overflow parking.

Taylor Gunn

From: Planning (External Use ONLY)
Sent: Tuesday, 7 July 2015 8:59 AM
To: Taylor Gunn
Subject: FW:Comment Submission - EF15186599 - A182155 - a182155/pa54853/p2150296 Shelley Beach

SynergySoft: EF15186599 - A182155

PO Box 484 | Albany | WA | 6331 (102 North Road Yakamia)
Web: www.albany.wa.gov.au

Please consider the environment before printing this email.

-----Original Message-----

From:
Sent: Tuesday, 7 July 2015 8:47 AM
To: Planning (External Use ONLY)
Subject: EF15186599 - A182155 - a182155/pa54853/p2150296 Shelley Beach

Hi Taylor

In regards to the above application for planning as function centre , we have the following comments and concerns

- when we purchased this block 10 years ago we did so because it was a quiet rural housing area with a small school accross the road , and although we dont have a house there yet we plan to do so in the future,

- we think that the application for a function centre with loud music to lam totally out of line with the existing community structure in that area, with housing and schooling nearby to be greatly affected especially by loud music to lam , and think 10pm would be better suited in a residential area . The big draw card of this centre is the views , best viewed during daylight hours ! We have controlled nightclubs in Albany for people who want to carry on partying after hours.

- we beleive that the increased possibility of traffic and fire incidents and the delayed responses from fire and emergency services from Albany a problem in this vulnerable and quiet area

We would like to see some extra use restrictions added and closing times adjusted down significantly for this proposal to be better suited within the existing area that it is located in ,

The Chief Executive Officer
City of Albany
P.O. Box 484
Albany WA 6331

RE: Your reference A182155/PA54853/P2150296, change of use at 1 Shelley Beach Rd Kronkup

Dear Sir/Madam

Thank you for providing the opportunity to comment on this proposal.

General Comments

As the owners have already operated this venue as a function centre (without approval) we can comment from experience on the negative impacts that this venue creates.

Over the past 35 years a number of subdivisions of rural land on the Torbay Hill have occurred. The various subdivisions reflect the prevailing planning wisdom at the time approval was granted. Looking back, council is stuck with a number of planning outcomes, such as dead-end streets and a variety of bush fire requirements, that we have little doubt the council would not allow if approval was now sought.

Equally, we hope councils understanding of good planning has now improved beyond accepting the creation of a noisy venue in a residential area adjacent to a school. More so given the other planning issues associated with this proposal. We assume that the Town Planning Scheme released by the City of Albany (CoA) in 2014 is an attempt to put in place a cohesive planning regime for the shire, which in part we assume seeks to ensure that incompatible land uses are not co-located. We believe that the proposal is incompatible with the surrounding land uses.

Non home based tourism/commercial endeavours already exist in the area, all currently co-located on Cosy Corner Road. It seems poor design to not continue to group additional commercial endeavours in that zone. Having said that I doubt people staying at the Best Western Eco Village would enjoy having this venue next door.

The venue was formerly the Woodbury Boston school hall and is thus well integrated into the adjacent school area. As a school hall, we accepted that periodic school functions in conjunction with school activities would be held in this building. Changing this building to a commercial function centre will, and already has, resulted in excessive noise from music, people and vehicle movement. A school hall is not the same as a commercial function centre.

People choose to live in areas like Torbay Hill, even though fewer public amenities are provided, because of the quiet rural nature of the environment. This proposal changes this environment in a negative way.

Specific Comments

The following comments on the planning and traffic assessment reports seek to highlight some of the other issues associated with this intended venue.

Comments on the Planning Report

The Planning Report contains reference to some of the issues that must be considered. The report also contains statements that don't stand scrutiny.

The primary concerns raised in the Planning Report are;

1. containment of noise
2. access to the site
3. proximity to a primary school
4. bush fire risk

To which we would add

1. impact on traffic on local roads
2. impact on traffic flow within the school
3. impact on local kangaroo population
4. needless additional drivers who have had a few drinks on country roads

The Planning Report suggests that the existing "old school hall" is an important venue for the local community. We would suggest that this is an exaggeration. Rather the hall has been used because it is there. Other local facilities, particularly the Bornholm-Kronkup Community Centre provide the key infrastructure for the area. Situated on Lower Denmark Rd adjacent to large rural properties it provides a much more suitable site for local functions without all the problems of the subject site.

This location being a rural residential area has a low ambient noise level. Putting up signs and asking people to be considerate is a nice ideal, but in practice is ineffective if individuals or groups desire a different outcome. Even with doors and windows shut the predominate bass of modern music creates a problem. It should come as no surprise that any noise from this site generated by traffic movement, music and people outside of the venue has already had a noticeable impact on us.

Although the proponents have suggested how these issues will be reduced, what is suggested is impractical and in reality not readily controllable by the manager/owners. People will open doors and windows, after a few drinks people outside smoking or when leaving do yell to each other. Likewise asking people to serve alcohol responsibly is doomed to eventual failure. Many Australians will always choose driving their own vehicle rather than taking a bus irrespective of the amount of alcohol they consume so traffic noise is a problem.

Traffic noise will impact not only residents near the proposed venue but also all of those that live along Coombes Rd and to a lesser extent Horton Rd. The steep gradient of Coombes Road means that vehicles make more noise using it than if the road was flat. I doubt that any residents would desire more unnecessary vehicles using these road at night, particularly if the driver has had a few drinks. The functions to date show that some people are dropped off and then collected later. Which helps with people drinking but creates double the traffic movements.

As a high fire risk area the work to reduce the risk is ongoing. As people drink many also smoke

creating a potential increased fire risk, as acknowledged in the Planning Report. Unless you are constantly policing where people are gathering and what they are doing your ability to manage this risk is limited.

The “Planning Report” suggests that vehicles would enter the site via the access road currently used as both an entry and exit way by the school. This road crosses both the subject lot and the adjoining school lot yet the proposed Management Plan suggests that attendees will be asked to not enter the school property. These aims are clearly mutually exclusive. Accepting a planning arrangement that has a school and entertainment venue share a driveway that crosses both properties is nonsensical.

Comments on the Traffic Assessment Report

The Traffic Assessment report fails in a number of regards, particularly by omitting numerous potentially negative issues that should have been considered. Strangely the report only considers traffic flowing in one direction. The issues which were not mentioned include;

1. how service vehicles entering Woodbury-Boston will exit this school
2. the need to “square up” the existing entry and the impact on vegetation/power pole
3. restriction of line of sight caused by vehicles parked outside the school/subject lot
4. speed and poor line of sight of vehicles travelling north along Shelley Beach Rd
5. other users of Shelley Beach Rd
6. how the over-flow parking would be made suitable for use

The conversion of the existing school service entrance into a one way access road clearly impacts traffic flows within the Woodbury-Boston. Service vehicles leaving the school, assuming the proposed entry way will become a “shared” one way road will be forced to exist via the driveway at the south-west corner of the school site. The suitability of this exit is questionable (see picture 1 below).

No mention is made of the re-aligning of the entry way. The proposed entry would need to be “squared up” to Shelley Beach Rd to allow for patrons arriving from either the north or south along Shelley Beach Rd. Entry from the south could occur, for example, should a wedding party decide to tie the knot on Shelley Beach then proceed to the function centre. This entry needs significant modification including the removal of vegetation and possible relocation of an existing power pole to work as indicated.

The road verge in front of Woodbury-Boston and the subject site are used for parking by parents and visitors attending the school. At times vehicles park along the road to the suggested new exit point. This clearly impacts the visibility shown as a clear line of sight in the photos of the Traffic Assessment. Additionally, particularly during the tourist and fishing season (which probably coincides with the peak times this venue would be attractive), vehicles exiting West Cape Howe National Park (WCHNP) use this same roadside parking area to re-inflate their tyres. It is not uncommon late in the afternoon or early evening to have convoys of vehicles doing this. It is not an empty static bit of roadway.

Approximately 150m south of the existing school service entrance Shelley Beach Rd becomes a gravel road. As you are probably aware Main Roads does not post speed limits on gravel roads which means that people can drive at whatever speed they consider is safe. Dennis Coombes, further south along Shelley Beach Road, is continually repairing damage to his fences cause by speeding vehicles failing to stay on the road. Further, Shelley Beach Rd has a poor line of sight to

the suggested entry point when travelling from the national park (see picture 2). With the stated "opening" times coinciding with the time people tend to leave the national park the proposal creates a dangerous traffic issue which does not currently occur (time people leave WCHNP doesn't appear to conflict with school drop-off and pick up times). Council may be surprised by the large number of vehicles that access WCHNP.

Finally, it is worth noting that kangaroos congregate roughly twice a month on the vacant lot to our south (opposite Woodbury Boston). We've watched their behaviour as we attempt to minimise the damage they cause by young plants we are nurturing. When gathered the mob numbers over 65 roos. At dusk the roos spread out with some of them, often in groups of up to 8, crossing Shelley Beach Rd and head into the school and the subject site. This adds to the traffic risk.. The number of dead roos seen on Shelley Beach, Horton and Coombes Roads is testament to the presence of a large number of roos on Torbay Hill. Currently there are two dead roos visible, one on Shelley Beach Rd and one on Coombes Rd.

In addition to the peace and quiet, one of the lovely benefits of living in a rural location is being able to see the night sky. Adding unnecessary street lights purely for the benefit of this venue will detract from this. Local residents have and can survive quite happily without them. Without adding street lights at all the other potentially dangerous points along Coombes, Hortons and possibly on Cosy Corner Rd's installing two street lights as suggested would have marginal benefit for road safety in this area.

Other Comments

As demonstrated by the recent vandalism of schools in Albany, schools are a target for anti-social behaviour. Co-locating an entertainment centre next to a school in a remote area must increase the risks to the school. As an example, bored adolescences attending a wedding will wander, with the road network through the adjacent school providing an obvious place to go. The potential for damage to school property and increased fire risk within the school is created by the proposed venue. No matter how large or small the risk, the risk is unnecessary.

Without wishing to comment on the personal relationships that currently exist it needs to be stated that should a commercial endeavour be approved for this site, *future* owners and managers of the proposed function centre may have little regard for the needs of the school. Any good will that exists because of existing personal relationships could easily disappear when commercial considerations take over.

It is understandable that the proponents of this development have sought to paint a positive picture of their plan. Sadly it is not all positive and will and has had a negative impact on nearby residents.

Should you require further information or clarification of the above please do not hesitate to contact us.

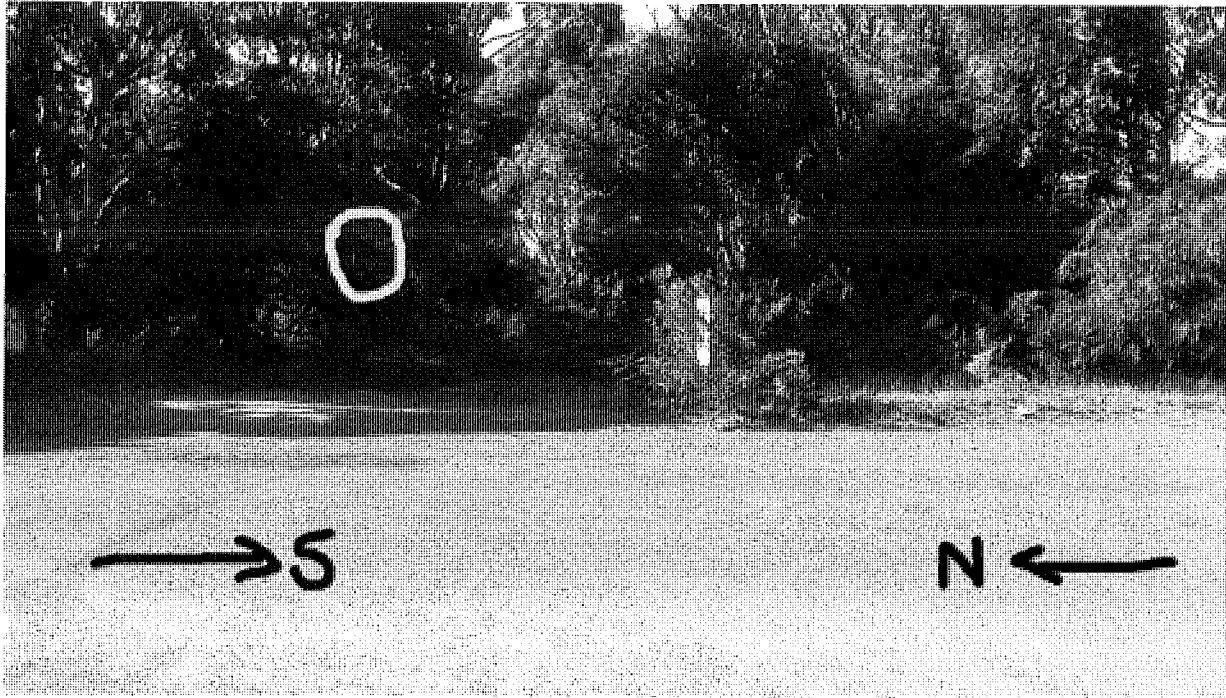
Additional Photos



The south-west exit from Woodbury-Boston joins Shelley Beach Road at approximately 45 degrees. There is little line of sight of vehicles travelling south along Shelley Beach Rd because of the trees and bushes apparent to the left of the picture..



This picture is taken approximately 150m south of the proposed entry which is not visible. The picture also shows the transition from gravel to bitumen which occurs just south of the school off-site parking.



This picture shows the suggested access route into the site. The route leaves Shelley Beach Rd at approximately 30 degrees. The item circled is a power pole that is likely in a dangerous position should buses or cars be entering whilst travelling northward along Shelley Beach Rd. Rectification of this entry way would require the removal of vegetation both on the road verge and on the subject site.

The Chief Executive Officer
City of Albany
PO BOX 484
Albany
WA 6330.

Re your reference A182155/PA54853/P2150296. "NOTICE OF APPLICATION FOR PLANNING CONSENT."

Dear Sir

As per your letter 16th of June 2015 concerning the "Change of Use to Private Function Centre situated at 1 Shelley Beach Road Kronkup.

Our purpose in buying this house and moving to this area was to retire to some peace and quiet. Before buying the property we made certain inquiries as to what was located in the area with a view to seeing if the area was suitable for our use. We were advised that the "school hall" just across from our property was just that, a school hall only used occasionally for school functions.

Apart from the traffic increase during the holiday seasons, the area has lived up to our wishes for some peace and quiet in a quiet Special Rural area. There are some serious problems with the road layout but I will address that in another report to the Albany City Council.

A short time ago, to our surprise, a wedding reception took place at the "school hall." This reception continued well on into the night with the noise reminiscent to that expected in the Metropolitan area, with one difference. I expected to hear that noise in the metropolitan area but not here.

As it is so quiet here, noise, especially loud music and people yelling, buses reversing etc tend to be amplified somewhat and are extremely disturbing to those trying to sleep.

I have perused the included SITE PLAN and note that a new driveway system is to be put in place should this application be successful. At present all traffic going into and out of the school hall enters from the driveway to the North of our property and does not affect us. It is proposed to make traffic entering the school hall enter from a driveway to the South of us causing traffic to transit past our property. Traffic leaving will be required to exist from a new proposed driveway

just to the South of our property, again transiting closer to our property. This will significantly impact on the noise of traffic travelling along Shelley beach Road.

The exact location for the exit driveway has been provided and I am concerned that traffic leaving the school hall at night will cause the headlights to shine on my home etc, further disturbing me. The exit driveway is directly across from my property.

Another problem that has not been considered is the large number of 4x4 vehicles that stop on both sides of Shelley Beach road to inflate their tyres. These drivers use the area where people attending the functions will pass both at the beginning of the function times and more importantly when the guest will be leaving. This is an ongoing and frequent occurrence.

There was an incident just the other night where 9 4x4 vehicles stopped on Shelley Beach road at 12.30am to inflate tyres directly where the new proposed exit driveway will be constructed. Having had to speak to these people it was apparent that the majority of the passengers were heavily affected by alcohol.

It would only take such an incident to occur at the end of a function for a volatile situation to develop requiring police attendance.

It is also noted that numbers in excess of 100 persons can be expected at seated events with more people expected at "stand up" functions.

I can assure you, that number of that magnitude will severely impact on noise levels and traffic levels in the area.

I have also perused the Management Plan and am somewhat concerned and bemused by its content.

Are we expected to agree to wedding functions with live band music, a DJ and taped music from 2pm on a Friday or Saturday afternoon till 1 am in the morning? Even in the Perth metropolitan area these types of events are restricted to 11pm and 12 midnight with strict noise levels imposed.

I wonder if the Albany Council members would appreciate these types of functions next door to where they reside. There are no limits or restriction suggested as to what type of "events and function" that will occur or the frequency etc.

At present, if the submission is accepted with no restrictions, it is possible for events to take place from 9am till 1am every day of the week all year round. Unlikely I admit, but still possible. Giving a commercial concern, who after all are seeking to make money, having no limits or restriction placed on them anything is possible.

“Guests to be considerate to our neighbours”

I wonder how the “guests” behaviour will be “regulated”, its been my experience that once alcohol is involved in any large group, good behaviour is normally the first causality. Remember that the police response time to any incident that occurs there will take up to 1 hour.

The same applies to the statements that the hirer will be responsible for a multitude of conditions.

It will be impossible to guarantee that guest remain within the property, don't go into the school grounds, do not disturb the neighbours, don't throw cigarette butts in the bush etc unless they employ some security services etc.

In an ideal world guests will attend and behave appropriately but you know as I do that this will not be the case.

I am disturbed by the comments relating to the “responsible serving of alcohol.” I am led to believe these functions will be a BYO. I assume that if this application is approved then the next step we face will be an application for a liquor permit.

You should note that I originally agreed that my bottom paddock could be used as an emergency fire evacuation area, however after seeking legal advice this offer has been removed.

I understand there are a number of halls in the area that can be utilised for functions etc and whilst I sympathise with the owners of the centre having spent large amounts of money renovating the centre without having first ensured its zoning, this should not in its self be a reason why council should approve this development.

I note in the conclusion section of the Planning Report “The hall is an important venue for the Torbay community” I also note that a new sign has been placed at the Bornholm Hall indicating the hall is now called the Bornholm-Kronkup Community centre. If the hall is to be used as a function centre then I can see no reason to grant this submission as we already have a function centre set aside for this area.

The City Council has the duty to look after its residents and ratepayers and to ensure the quality of life is protected.

I did not move here to reside next to a nightclub or a function centre that has no limits placed on it.

I believe if approval is given for anything it should be for the local community to display art works etc and hold daytime events not involving alcohol.

This development, if approved, will severely impact on the current standard of living myself and my many neighbours currently enjoy and will surely impact on property values of many surrounding properties.

I implore the council to take that into consideration and deny the application.

I am happy to discuss this matter further and clarify any of the above if required.

REPORT ITEM PD088 REFERS



5th July, 2015

Chief Executive Officer
City of Albany
PO Box 484
ALBANY WA 6331

City of Albany Records
loc No: ICR15186532
file: A182155
date: 06 JUL 2015
officer: PLA;MPS

attach:
doc:
of:
doc+Vol:

Dear Sir

RE; Your ref: A182155/PA54853/P2150296 – 1 Shelley Beach Rd, Kronkup

Please consider this our submission in support of the above proposed Change of Use application.

We have lived adjacent to the above property for over twenty years, during which time the facility has hosted innumerable events and functions. Lights from the hall and sounds of music are readily seen and heard from our property. On no occasion has this ever been a problem. For the past few years, the hall has been less used, largely due to on-going renovations, and for the large part the main users have been members of the Torbay Hill community. The recently completed renovations have transformed this building into an ideal venue for any number of activities, and even more of an asset to the community.

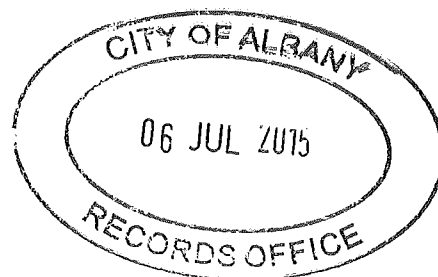
Unfortunately, recent 'tree-change' arrivals to the area – possibly moving in while renovations were under way - have failed to perceive that the hall on the corner of Shelley Beach Rd has had a history of use as a public facility, and have proceeded to object to any future use of the building without consideration for its 30+ years as a community icon.

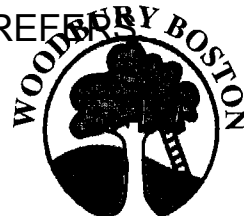
The re-invigoration of the building should be welcomed by the local community, as it has provided a hub for so many activities for so long, and it was a pity to see it falling into dis-use and disrepair.

We consider that any potential difficulties arising from the Function Centre have been more than adequately addressed in the management plan. The local manager is a very capable and experienced person, and being a local resident is able to respond to any issues in a timely manner. Moreover, the facility is unlikely to be used on a constant basis, with its distance from Albany and Denmark likely to impact on its ability to attract large numbers of weddings and parties from those towns. It is more likely that the Function Centre will continue to serve primarily as a community asset, as it has in the past, and as such should be supported.

Thank you for your consideration in this matter.

Yours faithfully





The Primary School
Where I can be me

3 July 2015

Chief Executive Officer
City of Albany
PO Box 484
ALBANY WA 6331

Dear Sir

Re: Application for planning consent for Change of Use to Private Function Centre at 1 Shelley Beach Road, Kronkup.

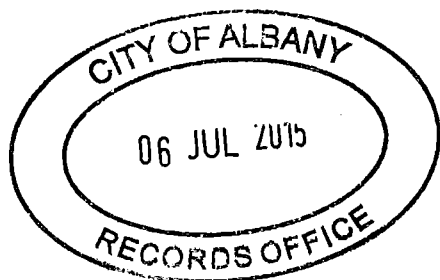
Woodbury Boston Primary School is the occupier (but not the owner) of the adjoining Lot 101.

The school fully supports the above application. In the past the building was used by the school for end-of-year family dances and other sporadic events where the school's own facilities were not suitable, and we look forward to being able to use the newly renovated centre for these community-building events in the future.

We welcome the opportunity to provide further comment, should it be required.

Yours sincerely

for



City of Albany Records
 Doc No: ICR15186533
 File: A182155
 Date: 06 JUL 2015
 Officer: PLA,MPS
 Attach:
 Cox:
 Col:
 Cox+Vol:

11 Shelley Beach Road, Torbay Hill, Kronkup, Western Australia
 PO Box 657, Albany WA 6331

Phone: (08) 9845 1185 Fax: (08) 9845 1272

Email: admin@woodburyboston.wa.edu.au

Website: www.woodburyboston.wa.edu.au

**PD080: CONSIDERATION OF SINGLE HOUSE AT LOT 75 AND
SINGLE HOUSE AT LOT 76 RANGE ROAD, YAKAMIA, 6330**

Land Description : Lot 75 and 76 Range Road, Yakamia 6330
Proponent : MGA Town Planners
Owners : Bohemia Estates Pty Ltd
Business Entity Name : Bohemia Estates Pty Ltd
Attachments : 1. Site plans
2. Elevation Plans
3. Fire Management Plan
4. Guide to Bushfire Attack Level (BAL)
5. Letter OEPA
6. Vegetation associations and units map
Supplementary Information & Councillor Workstation: : Nil
Report Prepared by : Manager Planning Services (J van der Mescht)
Responsible Officer : Executive Director Planning and Development Services (D Putland)

Responsible Officer's Signature:



STRATEGIC IMPLICATIONS

1. Council is required to exercise its quasi-judicial function in this matter.
2. When exercising its discretion in relation to planning matters, the pertinent strategic document is the *Albany Local Planning Strategy (ALPS)*.
3. The proposals are consistent with the strategic direction set in ALPS.

In Brief:

- Council is asked to consider proposals for the development of a Single House at lot 75 Range Road and a Single House at Lot 76 Range Road, Yakamia.
- The subject lots have been zoned 'Future Urban' since the 1970s.
- The Office of the Environmental Protection Agency (OEPA) provided advice that the sites have high conservation value that requires careful consideration before development approval.
- The proposed fire protection measures Building Protection Zone (BPZ) and Hazard Separation Zone (HSZ) for the two houses would result in an unacceptable impact on the ecological communities, flora and fauna habitats, and local visual amenity.
- Staff recommend that Council approve the development of the two Single Houses, subject to conditions that will provide greater protection to the vegetation on the subject lots.

RECOMMENDATION

PD080: RESOLUTION

VOTING REQUIREMENT: SIMPLE MAJORITY

MOVED: COUNCILLOR SUTTON

SECONDED: COUNCILLOR GOODE

THAT Council resolves to issue Planning Scheme Consent for the purpose of a Single House at Lot 75 Range Road, Yakamia and a Single House at Lot 76 Range Road, Yakamia and carry out development in accordance with the approved plans subject to the following Schedule of Conditions:

General

1. Prior to occupancy of use, unless varied by a condition of approval or a minor amendment to the satisfaction of the City of Albany, all development shall occur and be maintained in accordance with the stamped, approved plans dated (**insert date**).

Stormwater

2. Stormwater being managed to the satisfaction of the City of Albany.

Access

3. A new crossover to Target Road shall be constructed to the City of Albany's specifications, levels and satisfaction.

Advice:

- A 'Permit for Vehicle Crossover Construction' is required from the City of Albany prior to any work being carried out within the road reserve, which shall be in accordance with drawing nos. 97024 1/3 – 97024 3/3 (refer City of Albany Subdivision and Development Guidelines).

4. Range Road being constructed to a battleaxe lot access leg standard from the access point to Target Road to the satisfaction of the City of Albany.

Advice:

- All works to be completed in accordance with City of Albany Subdivision and Development Guidelines (specifically section 11.6).

Building Protection and Hazard Separation Zone

5. The Building Protection and Hazard Separation Zones being implemented and maintained to a standard for BAL-40, to the satisfaction of the City of Albany.
6. The dwellings being constructed to the appropriate Australian Standard (3959) Construction of Buildings in Bushfire-prone Areas for BAL-40.

Location of Single Dwellings

7. The location of the single dwellings and Building Protection Zones being modified (relocated to the west) as per the attached plan, to the satisfaction of the City of Albany.

Fire Management Plan

8. The Fire Management Plan being modified to conform with conditions of this planning scheme consent, to the satisfaction of the City.

Covenant

9. A restrictive covenant being registered on the titles for Lots 75 and 76 Range Road for the protection and management of vegetation in accordance with Fire Management Plan, to the satisfaction of the City.

General advice regarding the EPBC Act

- The owner/developer is advised to liaise with the Commonwealth Department of Environment regarding the requirements of the *Environment Protection and Biodiversity Conservation Act 1999* prior to any clearing and/or development taking place.

CARRIED 11-0

PD080: COMMITTEE RECOMMENDATION

MOVED: COUNCILLOR GOODE
SECONDED: COUNCILLOR SUTTON

THAT the Responsible Officer Recommendation be ADOPTED.

CARRIED 6-0

PD080: RESPONSIBLE OFFICER RECOMMENDATION

THAT Council resolves to issue Planning Scheme Consent for the purpose of a Single House at Lot 75 Range Road, Yakamia and a Single House at Lot 76 Range Road, Yakamia and carry out development in accordance with the approved plans subject to the following Schedule of Conditions:

General

1. Prior to occupancy of use, unless varied by a condition of approval or a minor amendment to the satisfaction of the City of Albany, all development shall occur and be maintained in accordance with the stamped, approved plans dated (**insert date**).

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Advice:

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5. The dwellings being constructed to the appropriate Australian Standard (3959) Construction of Buildings in Bushfire-prone Areas for BAL-40.

Location of Single Dwellings

6. The location of the single dwellings and Building Protection Zones being modified (relocated to the west) as per the attached plan, to the satisfaction of the City of Albany.

Fire Management Plan

7. The Fire Management Plan being modified to conform with conditions of this planning scheme consent, to the satisfaction of the City.

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8. A restrictive covenant being registered on the titles for Lots 75 and 76 Range Road for the protection and management of vegetation in accordance with Fire Management Plan, to the satisfaction of the City.

General advice regarding the EPBC Act

- The owner/developer is advised to liaise with the Commonwealth Department of Environment regarding the requirements of the *Environment Protection and Biodiversity Conservation Act 1999* prior to any clearing and/or development taking place

BACKGROUND AND DISCUSSION

What the applicant is requesting

9. An application has been received for the development of a Single House and associated Building Protection Zone (BPZ) and Hazard Separation Zone (HSZ) on Lot 75 Range Road, Yakamia and another Single House with BPZ and HSZ at Lot 76 Range Road, Yakamia. (An explanation of BPZ and HSZ is included in the "Policy Implications" section of this report)

Reason brought to council

10. The proposals are presented to Council for determination given the likely impact that the decision will have on the environmental interests identified on the subject lots and the potential implications for the draft *Yakamia/Lange Structure Plan*.

Site description

11. The subject lots are approximately 2km north-north-west of Albany town centre and have a combined area of 10.18 ha. Lot 75 has an area of 3.12 ha and Lot 76 has 7.06 ha. The land slopes upward from the south-east to north-west, rising from approximately 13m AHD to 36m AHD across Lot 75 and from 9m AHD to 49m AHD across Lot 76. In their current condition, the lots appear as a 'forested escarpment' when viewed from the south.
12. The subject lots are zoned 'Future Urban' under *Local Planning Scheme No. 1 (LPS1)*. The majority of the land surrounding the subject lots is also zoned 'Future Urban', including the lot to the west, on the opposite side of an unconstructed road reserve. The south-eastern corner of Lot 75 abuts a portion of land zoned 'Yakamia Creek', while a narrow strip of land reserved for 'Parks and Recreation' adjoins the south-eastern corner of Lot 76.
13. The subject lots are both within the draft *Yakamia/Lange Structure Plan* area.

Zoning/Land use issues

14. Clause 5.5.3 *Future Urban Zone* in LPS1 deals with development on land within the 'Future Urban' zone and sub-clause 5.5.3.1 states that the Local Government *may* approve a Single House, among other associated uses, on land within the 'Future Urban' zone.
15. Sub-clause 5.5.3.2 expands on this by stating that:

"Apart from Home Office, all land uses mentioned in clause 5.5.3.1 and any development requires the planning approval of the Local Government and no land use or development shall be permitted if, in the opinion of the Local Government, such use or development would adversely impact on the potential of the land for future urban purposes."

16. Clause 4.2.3 *Future Urban Zone* in LPS1 sets out the objectives for the 'Future Urban' zone, which include the following:

"(a) Maintain viable uses for existing lots until the land is required to be developed for the desirable ultimate long term use;

- (c) *Maintain and enhance the physical characteristics of, environmental qualities and scenic qualities in the land;*
 - (d) *Permit limited development which is in keeping with the existing character of the locality and compatible with the likely future use of the land for urban or other purposes as determined by the Local Government following the preparation of a Structure Plan."*
17. Should Council determine not to approve the development of a Single House on each of the subject lots, the landowner could contend that the lots are, in effect, reserved and should be formally identified as such. If the City formally reserved the land through the Yakamia structure plan, the landowner would have grounds to lodge a claim for compensation.

Environmental Issues

18. Clause 5.3.3 in LPS1 states that *"the Local Government may require the protection of existing vegetation on a site as a condition of planning approval"* in a variety of circumstances, including the following:
- "(a) Protect a vegetation community;*
 - (d) Maintain local visual amenity and the natural setting;*
 - (e) Protect habitat, or a threatened species;*
 - (f) Assist to provide vegetated corridors to maintain fauna and flora linkages."*
19. The vegetation the subject lots was identified in the *Albany Regional Vegetation Survey (ARVS)* as being in very good to excellent condition and potentially restricted to the ARVS area. Of particular note is a vegetation unit consisting of three principal flora species; *Banksia Coccinea, Eucalyptus Staeri* and Sheoak. This unit of vegetation is listed by Department of Parks and Wildlife (DPaW) as a Priority 1 Ecological Community (PEC) due to the susceptibility of *Banksia Coccinea* to dieback disease. The draft *Yakamia/Lange Structure Plan* area contains a total of 10.5 ha of this type of vegetation unit.
20. The Office of the Environmental Protection Authority (OEPA) has already provided strong advice that the City should prepare the draft *Yakamia/Lange Structure Plan* in a way that it protects the vegetation on the subject lots from being cleared. In accordance with this advice, the draft *Yakamia/Lange Structure Plan* identifies these lots as 'Vegetation protection' areas. It should be noted that if this advice was applied to the development applications under consideration, it would prevent both lots from being developed. However, these applications must be assessed under the provisions of LPS1 and with specific advice from the OEPA and DPaW.
21. In view of this, staff referred the development applications to the OEPA for assessment and comment. The OEPA noted that the subject lots *"hold vegetation in 'Very Good' to 'Excellent' condition which supports significant ecological communities, priority flora and habitat for threatened fauna protected under State and Commonwealth legislation."* The OEPA also noted that *"clearing for building envelopes and bushfire protection will impact 3.1205 hectares of native vegetation on Lot 75 and 7.0608 hectares on Lot 76"* and expressed a preference that any development is consistent with the draft *Yakamia/Lange Structure Plan*; that is to say that the vegetation is protected from clearing. Furthermore, the OEPA have advised that *"referral to the Commonwealth is likely to be required as the developments may have a significant impact on Matters of National Environmental Significance."*

Fire management issues

22. Clause 5.4 *Fire Protection Provisions* in LPS1 requires all planning proposals to incorporate appropriate fire protection measures, which may include *"incorporation of construction standards for buildings including those in AS 3959 – Construction of Buildings in Bushfire Prone Areas (as updated from time to time) and the Building Codes of Australia."* Fire protection measures are also expected to be consistent with the methodology contained in the Western Australian Planning Commission's *Planning for Bushfire Protection Guidelines*, or any document superseding it.
23. The methodology set out in *Planning for Bushfire Protection Guidelines* seeks to strike a balance between clearing of vegetation and fire resistant construction techniques, which may be varied dependent on the circumstances. An explanation of the methodology can be found in the **"POLICY IMPLICATIONS"** section of this report.
24. After receiving the applications, staff requested that the applicant provide a Fire Management Plan (FMP) for the lots, to satisfy the requirements of LPS1. The applicant subsequently provided an FMP that recommended BAL of 12.5, which would result in clearing of extensive amounts of vegetation. BAL 12.5 is also lower than what should be expected due to the slope of the land and the distance between the proposed developments and the type of vegetation. BAL 12.5 is the lowest BAL level provided for in the *Planning for Bushfire Protection Guidelines* and below BAL-40, as requested by the City Planning Staff.
25. The City requested that the FMP be changed to correct this anomaly and recommended that the HSZ be reduced and the BAL and associated construction standards be increased, to reduce the amount of clearing required.
26. A revised Fire Management Plan was submitted. However, it continued to recommend BAL-12.5 and the extensive amount of clearing that this level of construction would entail.
27. The *Planning for Bushfire Protection Guidelines* note that locating residential development where BAL-40 is identified is not recommended due to the level of fire risk, though it may be permitted in exceptional circumstances; for instance, where there is a significant environmental interest and the protection of vegetation is particularly important.

Options available to Council

28. In assessing these applications the matters detailed in this report have been taken into consideration. To progress these applications four options have been formulated. They are as follows:
 - a) **Option 1** – Approve the development of a Single House on each lot to the relevant construction standard for BAL-40, in order to reduce the amount of clearing required for Hazard Separation Zones.
 - b) **Option 2** – Refuse the applications on the grounds that the adverse impact on the environment and visual amenity are unacceptable. This option may lead to claims for compensation. Council may also consider purchasing these properties for the purposes of conservation.
 - c) **Option 3** – Refuse the applications on the grounds that the development would have an adverse impact on the potential of the land for future urban purposes. Should Council adopt this option, it should recommend that the draft *Yakamia/Lange Structure Plan* be modified to identify these areas as suitable for full urban development. However, this will lead to a possible EPA environmental review of the plan. This may require Council to undertake a formal environmental assessment as part of the structure plan process.

- d) **Option 4** – Approve the applications as it was submitted.

Staff reason for recommendation

29. Staff's preference is for Option 1, as it provides a balanced approach that will allow the development of a Single House on each lot, while reducing the amount of clearing necessary for development.

GOVERNMENT & PUBLIC CONSULTATION

30. The City has referred the development applications to the Office of the Environmental Protection Authority (OEPA). The OEPA elected not to formally review the applications but noted a preference for development to be consistent with the draft Yakamia/Lange Structure Plan. While the OEPA advice notes that vegetation on these lots should be preserved due to their environmental significance. (More explanation is included under "Environmental Considerations")

STATUTORY IMPLICATIONS

31. The subject lots are zoned 'Future Urban' under LPS1.
32. Clause 4.2.3 *Future Urban Zone* in LPS1 sets out the objectives for the 'Future Urban' zone.
33. Clause 5.5.3 *Future Urban Zone* in LPS1 deals with development on land within the 'Future Urban' zone. and sub-clause 5.5.3.1 states that the Local Government *may* approve a Single House, among other associated uses, on land within the 'Future Urban' zone.
34. Clause 5.3.3 in LPS1 states that "*the Local Government may require the protection of existing vegetation on a site as a condition of planning approval*" in a variety of circumstances, including the following:
- "(a) Protect a vegetation community;*
 - (d) Maintain local visual amenity and the natural setting;*
 - (c) Protect habitat, or a threatened species;*
 - (d) Assist to provide vegetated corridors to maintain fauna and flora linkages."*
35. Clause 5.4 *Fire Protection Provisions* in LPS1 requires all planning proposals to incorporate appropriate fire protection measures.
36. *Table 7: Site Requirements* in LPS1 require a minimum front setback of 20m and minimum side and rear setbacks of 10m for all development in the 'Future Urban' zone, in the absence of an adopted Structure Plan.
37. Clause 5.8.3 *Designated Building Envelope* in LPS1 states that "*the Local Government may require that all development and on-site effluent disposal systems be contained within a designated building envelope shown on an approved plan.*"

It further states that in determining the location and size of a building envelope, the Local Government shall apply various objectives including:

- "(a) Protection of remnant vegetation;*
- (d) Enhancement of visual amenity."*

38. Voting requirement **Simple Majority**

POLICY IMPLICATIONS

39. Fire protection measures should be consistent with the methodology contained in the Western Australian Planning Commission's *Planning for Bushfire Protection Guidelines*.
40. The methodology set out in *Planning for Bushfire Protection Guidelines* seeks to strike a balance between clearing of vegetation and fire resistant construction techniques, which may be varied dependent on the circumstances.
41. The starting point for this is a 20m wide cleared area around a dwelling, identified as a 'Building Protection Zone' or BPZ, which will have a fuel loading (understorey vegetation, leaf litter, etc.) of no more than two tons per hectare. Individual specimen trees are permitted within a BPZ if they stand at least two metres from a dwelling, their crowns are at least 10m apart and they are low pruned to a height of two metres.
42. Beyond this BPZ, a 'Hazard Separation Zone', or HSZ, is required. This is a parkland cleared area, where the understorey is slashed or mown, the crowns of trees are at least 10m apart and the fuel loading is maintained at between five and eight tons per hectare, although a fuel load of up to 15 tons per hectare may be permitted dependent on the type of vegetation present. As a minimum, a HSZ is expected to be 80m wide, if there are to be no implications on the construction of a dwelling. This will provide a combined 100m clearing around a dwelling.
43. The Guidelines also identify various vegetation types and 'Bushfire Attack Levels', or BALs, which relate to a level of construction under AS 3959. Dependent on the vegetation type and the degree of slope between it and the proposed development, the HSZ may be reduced from 80m (100m when combined with the BPZ), with a corresponding increase in the BAL and the level of construction required.

RISK IDENTIFICATION & MITIGATION

44. The risk identification and categorisation relies on the City's Enterprise Risk Management Framework.

Risk	Likelihood	Consequence	Risk Analysis	Mitigation
<p>Organisational Operations and Reputation If the applications are approved, the applicant may appeal to the State Administrative Tribunal (SAT) against any conditions placed on the approval. For instance, the applicant may seek to have the level of construction required under AS 3959 reduced, which would require a larger Hazard Separation Zone to be cleared. This would, in turn, may be viewed by EPA as having a detrimental impact on the vegetation on the subject lots.</p>	Likely	Moderate	High	Any decision based on proper planning grounds can be defended in SAT. If the conditions are upheld, the impact on the environment can be minimised.
<p>Community, Organisational Operations, Financial and Reputation If the applications are refused, in order to protect the vegetation, an appeal against the decision may be made to the SAT. The applicant may also seek compensation from the City.</p>	Likely	Severe	Extreme	Any decision based on proper planning grounds can be defended in SAT. The City may also enter into negotiations to purchase the land
<p>Organisational Operations, Financial If a decision is made that will result in the clearing of the vegetation and the <i>Yakamia/Lange Structure Plan</i> is modified to reflect this decision, the EPA may require the structure plan to go through a formal environmental review.</p>	Likely	Moderate	High	A decision to require the Yakamia Structure Plan to undergo a formal environmental review could be appealed, given the EPA's prior decision not to require a review following referral of the development applications for assessment and comment.

FINANCIAL IMPLICATIONS

45. There may be financial implications if a review of the decision or any conditions of approval is sought by the applicant through the SAT. However, these are unknown.

LEGAL IMPLICATIONS

46. An applicant aggrieved by a decision or a deemed refusal may apply for review to the SAT in accordance with Parts 252 and 253 of the *Planning and Development Act 2005*.

ENVIRONMENTAL CONSIDERATIONS

47. The subject lots are entirely covered in native vegetation that has been identified in the *Albany Regional Vegetation Survey (ARVS)* as being in very good to excellent condition. The vegetation also includes priority flora species and provides a habitat for threatened and endangered fauna species. The applications were therefore referred to the Office of the Environmental Protection Authority (OEPA) for their comment.

48. The OEPA provided the following response:

"Lots 75 and 76 Range Road hold vegetation in 'Very Good' to 'Excellent' condition which supports significant ecological communities, priority flora and habitat for threatened fauna protected under State and Commonwealth legislation. The vegetation within these Lots is part of a consolidated area of native vegetation which contains multiple vegetation units (catena from upland to wetland) identified as having high conservation value in the Albany Regional Vegetation Survey. It is noted that clearing for building envelopes and bushfire protection will impact 3.1205 hectares of native vegetation on Lot 75 and 7.0608 hectares on Lot 76...the OEPA's preference is that development be consistent with the draft Yakamia/Lange Structure Plan. Referral to the Commonwealth is likely to be required as the developments may have a significant impact on Matters of National Environmental Significance."

ALTERNATE OPTIONS

49. Council has the following alternate options in relation to this item, which are:

- To refuse both applications, on the grounds that they will have an adverse impact on the environment and visual amenity;
- To refuse both applications, on the grounds that the development would have an adverse impact on the potential use of the land for future urban purposes, with the option to further recommend that the draft *Yakamia/Lange Structure Plan* be modified to show these areas for full urban development; or
- Approve the applications as submitted.

SUMMARY CONCLUSION

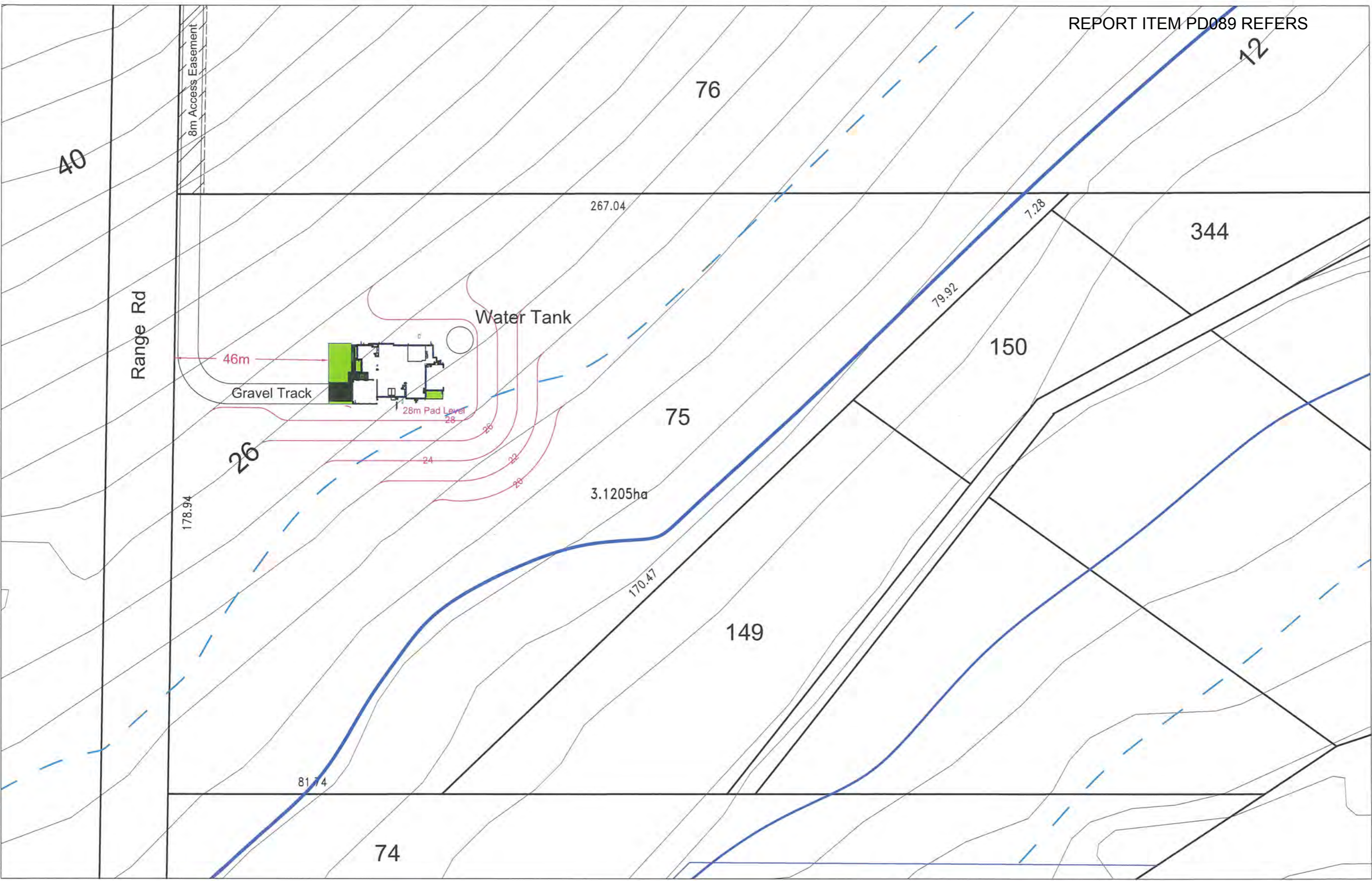
50. The proposals have been assessed against LPS1 and *Planning for Bushfire Protection Guidelines*.

51. In determining the applications it is necessary to consider the impacts on:

- Priority flora;
- Habitat for threatened and endangered fauna;
- Local visual amenity and the natural setting; and
- Vegetated corridors that maintain fauna and flora linkages.

52. It is recommended that the applications are approved, subject to conditions that will require modification of the proposals, in order to provide protection to the vegetation on the subject lots.

Consulted References	:	<ol style="list-style-type: none"> 1. Planning and Development Act 2015 2. Local Planning Scheme No. 1 3. Albany Local Planning Strategy 2010 4. Environmental Protection Act 1986 5. Environmental Defenders Office Fact Sheet No.4 6. Draft Yakamia/Lange Structure Plan
File Number (Name of Ward)	:	A86521 and A86503 (Yakamia Ward)
Previous Reference	:	PD060: Endorse advertising for the draft Yakamia/Lange Structure Plan (25/11/2014).



Range Rd

8m Access Easement

46m

Gravel Track

28m Pad Level

Water Tank

3.1205ha

178.94

81.74

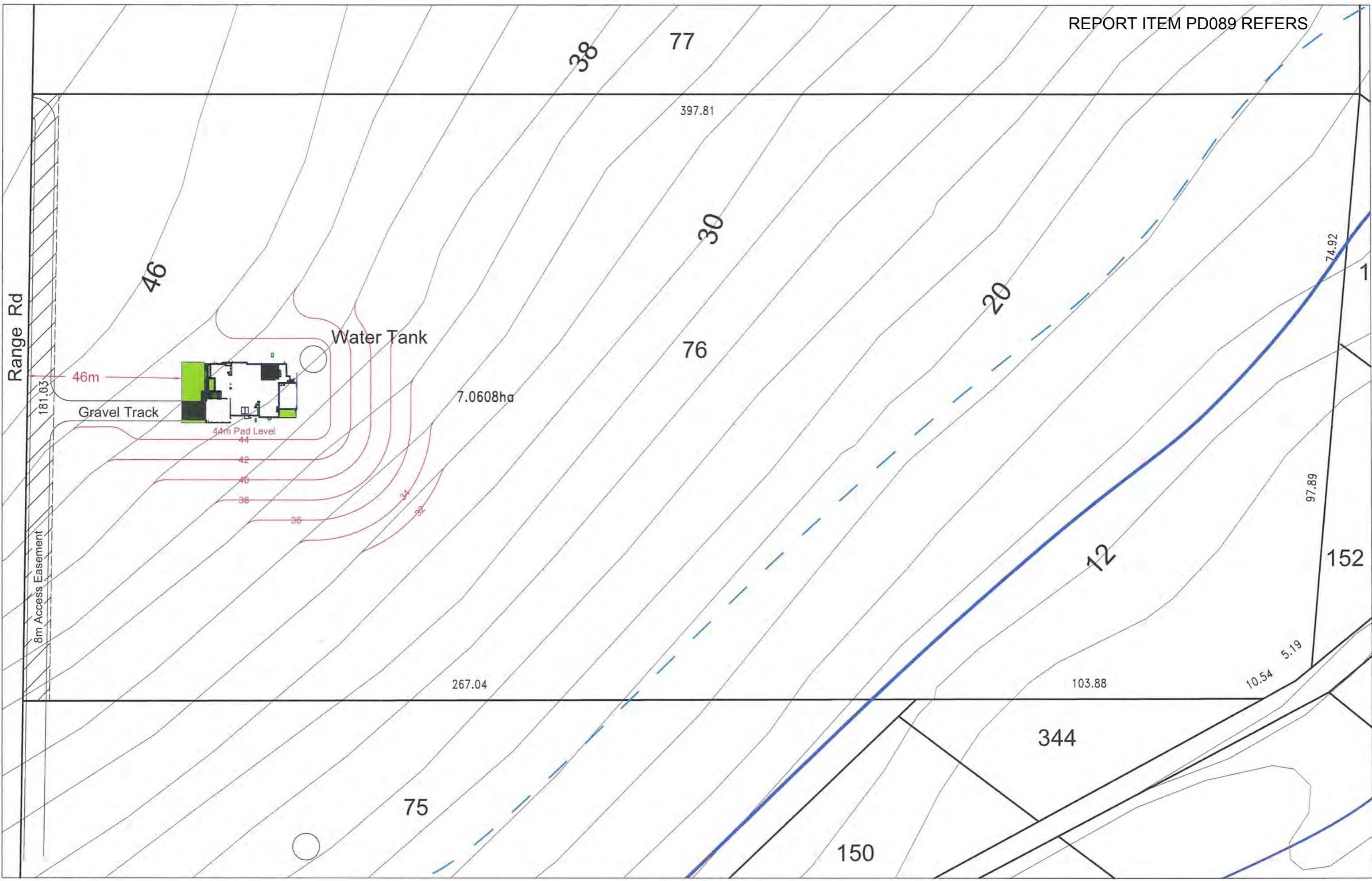
267.04

170.47

79.92

7.28

-  Wetland Conservation Area
-  50m Wetland Buffer
-  24 Building Pad Landfill



Scale 1:1000
 9 July 2015
 916/2015/House Site Plans3.dwg

-  Wetland Conservation Area
-  Building Pad Landfill
-  50m Wetland Buffer

AMENDED SITE PLAN
 Lot 76, RANGE ROAD
 YAKAMIA